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LANDSCAPING OVER SEPTIC DRAIN FIELDS

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Many homeowners in South Carolina want to know what can be grown, if anything, over their septic drain field. As an increasing number of people move into rural areas throughout the state, this issue becomes more common. A septic system represents a significant investment, so some understanding of its workings will allow a homeowner to protect and care for his investment properly. Proper care and maintenance of the septic system will save time and money while protecting the environment.

How a Septic Drain Field Functions

Understanding how a septic system functions is essential to making sound decisions about how to best landscape over the drain field. A standard septic tank will separate solids from liquids. The liquid effluent, or wastewater, will then flow from the tank into a series of drain lines that allow the effluent to slowly percolate down through the soil in the drain field. Many different soil microbes will act to filter and cleanse the liquid effluent before the harmful bacteria in it has a chance to reach ground water. These soil microbes require oxygen to function optimally, and perform less effectively in compacted

and/or saturated soils. This is why it is recommended to keep excessive traffic off the drain field to avoid over-compaction of the soils. It is also recommended to keep excessive moisture from flowing over the drain field. This can be accomplished by diverting runoff from a roof or driveway away from the drain field, and making sure that irrigation systems do not add excessive moisture. It is recommended that sprinkler heads be positioned so that no irrigation water comes within 10 feet of the drain field.

A typical septic drain field (see Figure 1), also known as a leach field, is a series of perforated pipes that are set in trenches and buried with aggregates ($\frac{1}{2}$ - to $2\frac{1}{2}$ -inch gravel or $\frac{1}{2}$ - to 4-inch rubber chips) and soil. These drain lines are at a minimum depth of 6 inches and are typically 18 to 36 inches wide. The individual drain lines will usually be $8\frac{1}{2}$ to 10 feet apart (see Figure 2). It is important to note here that each drain field system will vary from the next. It is important that the homeowner have a detailed layout of their system (giving the locations and dimensions of individual components) for their reference.

Why Bother With Landscaping the Drain Field?

There are several reasons for planting over a drain field. Perhaps the most compelling argument for planting into the drain field would be to mitigate any erosion of the soil over the drain field. Another reason would be that plants help the system to function more effectively by optimizing oxygen exchange and promoting necessary soil moisture removal through transpiration. Therefore, a cover of lawn turf would be the best plant cover to establish and maintain over the drain field. On the other hand, a homeowner's reason for wanting to

landscape the drain field may also be that it is the only sunny location on their property. This is often the case with new developments carved out of woodland areas. It may also be that the drain field is in the front yard, and the homeowner wants to plant a landscape to accentuate the front of their house. While these are certainly valid considerations, it should be noted that planting certain types of vegetation on or near a drain

field is not recommended because of the threat that their associated root systems pose to the long-term functionality of the drain field. No one wants septic effluent surfacing in their yard, not to mention the cost of repairs and the associated inconveniences. However, there are certainly recommendations for which plants should or should not be planted on or around the drain field.



Zosia Lawn.
N.C. Corporative Extension

Plant Selection for the Drain Field

According to many of the articles written on this subject, shallow-rooted herbaceous plants that are well adapted to

normal rainfall amounts for the area are best suited for use in a drain field planting. Plants that have aggressive, woody, water-loving, deep roots can potentially clog or disrupt the pipes in the system, causing serious damage that can be very expensive, very messy and threaten the environment. The key is to select plants that will satisfy landscaping needs while posing as minimal a threat to the drain field as possible.



Star-flower (*Trientalis borwalis*).

Rob Routledge, Sault College, Bugwood.org

Herbaceous Plants

Shallow-rooted herbaceous plants refer to flowering annuals and perennials (including bulbs), turfgrass, weeds and many groundcovers. As previously mentioned, these plants are unlikely to clog and damage drain lines. Many of our native grasses in South Carolina as well as non-native grasses are well suited for use in a drain field planting. Just remember that larger plants typically have larger root systems, so tall grasses like *Miscanthus* spp. or pampas grass are definitely not recommended for use in this instance. Mixes of wildflowers,

bulbs and grasses provide a suitable, attractive vegetative cover.

However, even when planting shallow-rooted plants there are some general guidelines to consider when planting on a drain field:

- Never add additional soil over the drain field unless it is a minimal amount used to restore an area that may have been eroded or pulled up by removing another plant.
- Try not to be overly zealous when tilling the soil for planting. Remember that the drain lines may be as close as 6 inches from the soil surface. Double-digging is certainly not recommended!
- Always wear gloves when working with the soil in the drain field area to minimize your exposure to the soil and any harmful organisms in it. This applies to many gardening activities such as digging, planting and weeding.
- When planting directly over a line trench, avoid using plant species that require frequent dividing.
- If a groundcover is chosen, do not use species that create a thick, dense canopy that would shade the ground beneath and collect organic debris. This situation can create an environment of cool, moist soil that does not allow enough evaporation and soil oxygen exchange from the soil surface for optimal functionality of the system.
- Choose species that are well adapted to the soils and average rainfall in the area. This may reduce the need for supplemental fertilizers and water, which can compromise the functionality of the system.

- Minimize traffic over the drain field. Select low maintenance species and try to plan for a minimum of foot traffic and activity over the area.
- Keep the mulch layer to a minimum so as to not restrict evaporation of soil moisture.

Selected Listing of Plants for Use on Septic Drain Fields

Herbaceous plants, such as annuals, perennials, bulbs and ornamental grasses are generally the

best choices for use on a septic drain field. Ornamental grasses also offer the advantages of having a fibrous root system that holds soil in place, and providing year-round cover. The following listing of suggested plants is not meant to be all-inclusive, but rather a small sampling of suggested plants for use. Suggested plants should be further investigated to ensure that individual site conditions and location are conducive to that plant's cultural requirements, especially soil moisture and sunlight duration.



Switchgrass (*Panicum virgatum*).
James H. Miller, USDA Forest Service,
Bugwood.org

Ornamental

Grasses:

For Sun (plants marked with an * will tolerate light shade):

- *Andropogon gerardii* – Big Bluestem
- *Andropogon gyrans* – Elliot Bluestem
- *Bouteloua curtipendula* – Sideoats Grama
- *Carex appalachica* – Appalachian Sedge
- *Carex elata* – Golden Sedge *
- *Carex pennsylvanica* – Pennsylvania Sedge *
- *Chasmanthium latifolium* – River Oats *
- *Danthonia* spp. – Oatgrass
- *Eragrostis curvula* – Weeping Love Grass
- *Festuca ovina* – Blue Fescue

Bulbs:

- *Agapanthus* spp. – Lily-of-the-Nile
- *Allium* spp. – Ornamental Onions
- *Anemone* spp. – Anemone/Windflowers
- *Colchicum* spp. – Autumn Crocus
- *Crocasmia* spp. – Montbretia
- *Crocus* spp. – Crocus
- *Dahlia* spp. – Dahlias
- *Endymion hispanica* – Spanish Bluebell
- *Galtonia candicans* – Summer Hyacinths
- *Gladiolus* spp. – Gladioli
- *Hyacinthus orientalis* – Common Hyacinth
- *Ipheion uniflorum* – Star Flower
- *Iris* spp. – Iris
- *Leucojum aestivum* – Summer Snowflake

- *Melica mutica* – Two-flowered Melic Grass
- *Muhlenbergia capillaries* – Pink Muhly Grass
- *Oplismenus setarius* – Crinkly Leaf *
- *Panicum virgatum* – Switchgrass
- *Piptochaetium avenaceum* – Green Needle Grass
- *Schizachyrium scoparium* – Little Bluestem
- *Sorghastrum nutans* – Indiangrass
- *Spartina bakerii* – Baker’s Cordgrass
- *Sporobolus heterolepis* – Prairie Dropseed *
- *Stipa gigantean* – Giant Needle Grass
- *Stipa tenuissima* – Texas Needle Grass
- *Tridens flavus* – Purpletop *
- *Lilium* spp. – Lilies
- *Muscari* spp. – Grape Hyacinths
- *Narcissus* spp. and hybrids – Daffodils
- *Tulipa* spp. and hybrids – Tulips

Perennials:

For Shade (plants marked with a * will tolerate the most shade):

- *Acanthus mollis* – Bear’s Breech
- *Alchemilla mollis* – Lady’s Mantle
- *Amsonia tabernaemontana* – Blue Star
- *Aquilegia* spp. – Columbine
- *Arum italicum* – Painted Arum *
- *Asarum* spp. – Wild Gingers *
- *Aspidistra elatior* – Cast Iron Plant *
- *Astilbe x arendsii* – Astilbe
- *Begonia grandis* – Hardy Begonia
- *Bergenia cordifolia* – Heartleaf Bergenia

For Sunny, Dry Conditions:

- *Achillea* spp. – Yarrow
- *Agave parryi* – Hardy Century Plant
- *Andropogon* spp. – Bluestem Grass
- *Anthemis tinctoria* – Golden Marguerite
- *Artemisia* spp. – Wormwood
- *Asclepias tuberosa* – Butterfly Weed
- *Aster novae-angliae* – New England Aster
- *Baptisia* spp. – False Indigo
- *Belamcanda chinensis* – Blackberry Lily
- *Coreopsis* spp. – Coreopsis
- *Delosperma cooperi* – Hardy Ice Plant
- *Eupatorium purpureum* – Joe-Pye Weed

- *Brunnera macrophylla* – Siberian Bugloss
- *Ceratostigma plumbaginoides* – Plumbago
- *Chelone oblique* – Turtlehead
- *Chrysogonum virginianum* – Green and Gold
- *Cimicifuga* spp. – Bugbane/Cohosh
- *Convallaria majalis* – Lily-of-the-Valley *
- *Cyclamen* spp. – Hardy Cyclamen
- *Dicentra* spp. – Bleeding Heart
- *Digitalis* spp. – Foxglove
- *Epimedium* spp. – Barrenwort *
- Ferns * (most)
- *Galium odoratum* – Sweet Woodruff *
- *Geranium maculatum* – Cranesbill Geranium
- *Euphorbia* spp. – Spurge
- *Gaillardia* spp. – Blanket Flower
- *Gaura lindheimeri* – Gaura
- *Helianthus* spp. – Perennial Sunflower
- *Hemerocallis* spp. and hybrids – Daylily
- *Hesperaloe parviflora* – False Red Yucca
- *Kniphofia uvaria* – Red Hot Poker
- *Lantana* spp. – Lantana
- *Lavandula x intermedia* – Provence Lavender
- *Liatris* spp. – Gayfeather
- *Limonium latifolium* – Sea Lavender
- *Nepeta* spp. – Catmint
- *Oenothera* spp. – Evening Primrose, Sundrops
- *Opuntia humifusa* – Prickly Pear Cactus

- *Gillenia trifoliata* – Bowman's Root
- *Helleborus foetidus* – Bearfoot Hellebore
- *Helleborus orientalis* – Lenten Rose
- *Heuchera* spp. – Coral Bells
- *Hosta* spp. – Plantain Lily
- *Lamium maculatum* – Spotted Dead Nettle *
- *Lobelia cardinalis* – Cardinal Flower *
- *Lobelia siphilitica* – Great Blue Lobelia *
- *Mertensia virginica* – Virginia Bluebells *
- *Myosotis sylvatica* – Forget-me-not
- *Phlox divaricata* – Wild Sweet William
- *Phlox stolonifera* – Creeping Woodland Phlox
- *Perovskia atriplicifolia* – Russian Sage
- *Phlomis* spp. – Jerusalem Sage
- *Plumbago auriculata* – Plumbago
- *Rudbeckia* spp. – Black-eyed Susan
- *Ruellia brittoniana* – Mexican Petunia
- *Salvia greggi* – Texas Sage
- *Santolina* spp. – Lavender Cotton
- *Sedum* spp. – Stonecrop
- *Sempervivum tectorum* – Hens & Chickens
- *Setcreasea pallida* – Purple Heart
- *Solidago odora* – Sweet Goldenrod
- *Stachys byzantine* – Lamb's Ear
- *Verbena* spp. – Verbena

- *Polygonatum* spp. –
Solomon's Seal *
- *Primula* spp. – Primrose
- *Pulmonaria* spp. –
Lungwort *
- *Salvia koyame* –
Japanese Yellow Sage
- *Saxifraga stolonifera* –
Strawberry Begonia
- *Shortia galacifolia* –
Oconee Bells *
- *Smilacina racemosa* –
False Solomon's Seal
- *Spigelia marilandica* –
Indian Pink
- *Thalictrum* spp. –
Meadow Rue
- *Tiarella* spp. – Foam
Flower *
- *Tradescantia virginiana*
– Spiderwort *
- *Tricyrtis* spp. – Toad Lily
*
- *Trillium* spp. – Wake
Robin *



Hardy Begonia (*Begonia*
spp.).
Howard F. Schwartz, Colorado
State University, Bugwood.org

- *Viola* spp. – Violet *
-

Woody Plants

Woody plants are mostly larger shrubs and trees that have woody stems and other woody plant parts that do not die back to the ground in winter. These plants are much more likely to cause serious damage to drain fields with their root systems. Trees with very aggressive root systems that should be avoided include willows, red and silver maples, beeches, birches, elms and poplars. Some trees with less aggressive root systems include cherries, crabapples, dogwoods, hemlock and oaks. To reduce the associated financial risk and emotional stress of a failed system, plant trees at least as far away as their estimated root spread at maturity. There are two methods used to estimate tree root spread. One rule of thumb is that roots extend out from the tree two to four times the diameter of the canopy. Another is that tree roots spread out one to three times the height of the tree. These estimates should be considered a bare minimum, and to reduce the risk, the trees should be planted even further away from the drain field.

Shrubs with less aggressive root systems should never be planted any closer than 10 feet and small less aggressive trees no closer than 20 feet from the drain field. Planting these less-aggressive species, such as boxwoods, hollies or arborvitae towards the drier ends of the drain lines may also reduce the risk for problems down the road.

An important point to remember is that the drain field needs sun to perform optimally, so do not shade the area heavily with trees and shrubs. If the homeowner decides that it is worth the risk to plant less aggressive, fibrous-rooted shrubs or small trees in the drain field, at least plant them between the drain

lines. In South Carolina these trenches are typically 8½ to 10 feet apart. However, not all systems are created equal. Refer to your layout chart or diagram that should provide the locations and dimensions of your system's components. Please be aware that planting trees and shrubs near the drain field is inherently risky, but if you are willing to take the risk of potentially damaging the drain lines in order to enjoy the landscape, then keep these guidelines in mind when planning.

Strategies to Reduce the Threat of Root System Damage

Proper soil preparation can discourage roots from damaging drain lines. The idea is to provide an area for root growth away from the drain lines to prevent roots from seeking out water and nutrients in the drain field. It is recommended to dig as wide a planting hole as possible for the tree or shrub (at least 2 – 3 times the width of the canopy), digging out further on the side of the hole opposite the drain field. The reasoning behind this is to offer the roots a “path of least resistance” in the soil away from the drain field.

There are also several root barriers to consider using. These can range from rudimentary materials to more expensive geotextiles that are impregnated with herbicides to restrict root growth. In order for the barrier to be effective, it needs to be buried up to a depth of at least 2 feet. Ideally the barrier should run the length of the drain field to prevent tree roots from flanking the barrier and disturbing the drain lines. Keep the root barrier at least 5 feet or more from the drain line, and then at least another 5 feet from the planting hole. Just remember to never create a circle around the root ball of the tree with the barrier, which would create problems for the tree as it grows.

Will the Effluent Affect my Growing Conditions?

The effluent in the septic drain field does affect growing conditions. Whatever goes down the drain in a particular household influences the composition of the effluent. The vast majority of household chemicals are alkaline (pH above 7) and thus raise the pH of the effluent. However, a properly functioning septic system has anaerobic digestion by bacteria in the tank that tends to keep the effluent pH closer to neutral. Bearing this in mind, it is advisable to test the soil pH and to plant species that are largely pH adaptable. Another factor to consider is that salinity levels have the potential to be high, so selecting species with a known tolerance for salt is advisable if a soil test reveals high levels of sodium.

Growing Vegetables Over a Septic Drain Field

Although the drain field may seem to be the ideal place to have a vegetable garden, it is not recommended. Even though different soil types differ in their ability to filter contaminants out of the effluent, there is no way to be absolutely sure that everything is being filtered out. Therefore it is not recommended to plant vegetables in a septic drain field because of the health risks associated with bacterial contamination. Also, vegetable gardening requires frequent cultivation of the soil, supplemental watering and fertilization. None of these practices are recommended for a drain field. Using a raised bed is also not recommended. The additional soil over the drain field reduces the effectiveness of the system to filter the effluent because it interferes with evaporation of soil moisture.

Conclusion

A layer of vegetation over the drain field, such as a lawn, is recommended to hold soil in place and increase the efficiency of the system. However, certain guidelines should be followed to avoid costly and unpleasant experiences. Perhaps the best advice would be to keep the landscaping over this area free of trees and shrubs. The optimal performance of your septic system should be the foremost consideration, but a cost/benefit analysis of using certain plants will have to be considered by each homeowner on an individual basis.

This fact sheet was largely adapted, with permission, from Virginia Cooperative Extension Publication 426-617: *“Planting on Your Septic Drain Field”* available at: <http://pubs.ext.vt.edu/426/426-617/426-617.html>.

Figures 1 and 2 used with permission from SC DHEC: http://www.scdhec.gov/health/envhlth/onsite_wastewater/docs/septic_tank_system.pdf

Figure 1. Construction details for an absorption trench

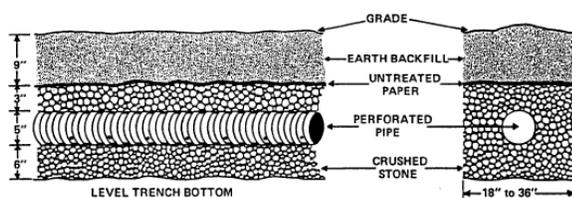
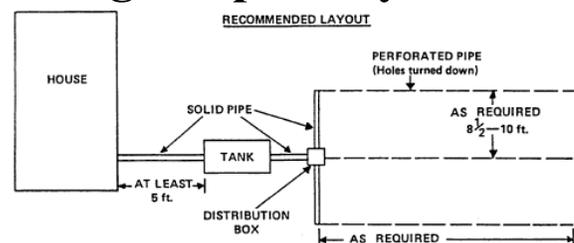


Figure 2. Construction details for an individual sewage disposal system



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