



Septic System Status and Issues Working Paper

Metropolitan North Georgia Water Planning District

DRAFT

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Introduction

The number of septic systems in the 16 county Metropolitan North Georgia Water Planning District (Water District) is estimated to be more than half a million with over 12,000 septic systems being added per year. At one time septic systems were thought of as a temporary wastewater treatment solution until sewer lines could be extended, however that is no longer the case. Now it appears that some portions of the Water District will never be sewerred. Because septic systems will be the permanent wastewater treatment solution for many households, the long term management of septic systems requires more consideration.

The Long-term Wastewater Management Plan that was adopted by the Metropolitan North Georgia Water Planning District in 2003 began a district-wide discussion on septic systems and their management. To better understand the practice and status of septic system management in the Water District this report has been prepared. The following septic system topics are included: background on system function and types, management of septic systems in Georgia and results from a septic system survey.

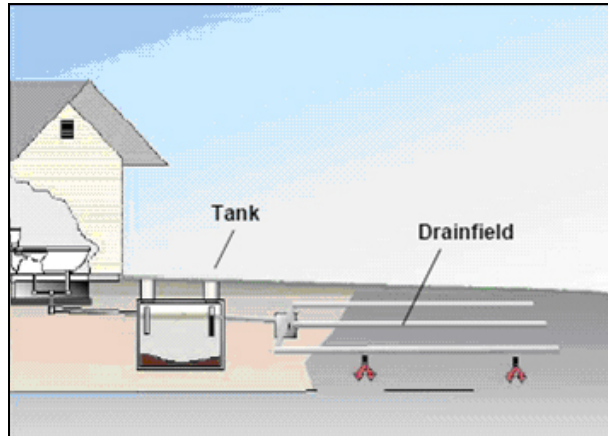
In the summer of 2005 Water District staff interviewed County Environmental Health Officers responsible for on-site sewage management in each of the 16 counties in the Water District. A copy of the survey form used is included as Appendix A. The survey gathered data to summarize the current usage of septic systems, practices, problems, and suggestions for improvement. Appendix B lists the survey participants. The knowledge gained during the septic system survey could not have been possible without the generous contributions of time and expertise provided by the various County Environmental Health Department representatives who were interviewed.

Portions of this report are taken from materials developed by the Georgia Department of Human Resources (DHR), the National Environmental Services Center and the National Small Flows Clearinghouse. Special thanks to Scott Uhlich, Program Director for the Land Use Unit of the Environmental Health Section, Division of Public Health and his staff. Portions of this report were based on Mr. Uhlich's technical writing, presentations, and conversations. Also, portions of this report are based on information provided by the National Environmental Services Center and the National Small Flows Clearinghouse. The reference section of this report includes a list of materials used from these sources.

Description of Septic Systems

Septic systems have many names which include: septic tanks, septic tank systems, individual sewage management systems and on-site sewage management systems. For simplicity reasons this report will use the term septic systems. Whichever name is used there are two common elements to all septic systems; a tank to break down solids and an absorption field (also known as a drainfield or leachfield) to distribute the wastewater into the soil.

Figure 1. Conventional septic system



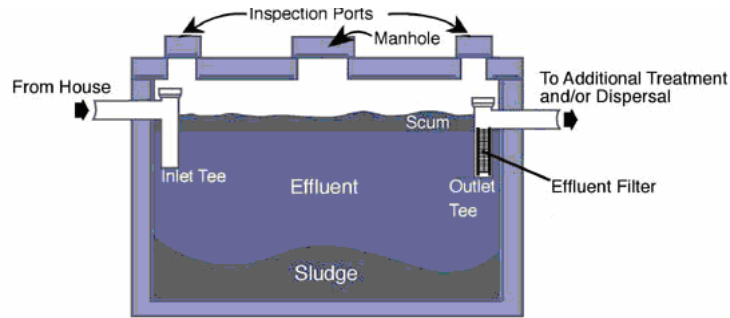
Source: http://www.ndwrmdp.org/userfiles/WUHT0030_post.pdf

Septic Tank

A septic tank is a water tight box made of concrete, fiberglass or plastic. The primary purpose of the septic tank is to separate solids from liquids and promote partial breakdown of the solids by microorganisms naturally present in the wastewater. Wastewater from the home enters the tank through an inlet. Septic tanks provide a minimum of 24 hours retention time for the wastewater. In the tank, solids settle to the bottom forming a layer of sludge, where some digestion by the bacteria in wastewater occurs. Wastes lighter than water such as grease and fats float to the top forming a layer of scum. The sludge and scum remain in the tank and should be pumped out periodically. A middle layer of partially clarified wastewater develops between the sludge and scum layers. The clarified wastewater effluent passes out of the tank to the absorption field through an outlet device. Inlet and outlet devices can be either baffles or tees (or a combination), with the outlet device approximately three to five inches lower than the inlet.

The minimum size septic tank is a 1000 gallon tank but may be larger depending on the number of bedrooms and the use of a garbage disposal. Homes with garbage disposals are required to increase the size of the septic tank by 50%. Septic tanks installed prior to February 20, 2000 consist of a single compartment. Septic tanks installed after February 20, 2000 are required to have two compartments and an effluent filter for further solids removal. This helps ensure that solids do not reach the drainfield where they can cause clogging. As solids accumulate in the septic tank, the effluent filter may become clogged. This is an indication that it is time to have the solids pumped out of the tank and the filter cleaned.

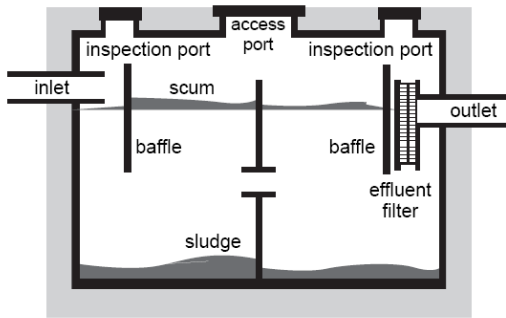
Figure 2. Single compartment septic tank



Single Compartment Septic Tank

Source: www.nesc.wvu.edu/nsfc/frd-10/septicTank.htm

Figure 3. Multi-compartment septic tank



Source: www.nsf.wvu.edu

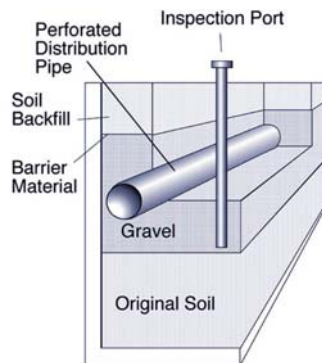


Source: On-Site Sewage Management System Presentation by Scott Uhlich, GA Dept. of Public Health

Absorption Field

The absorption field (also known as drainfield or leachfield) is the next treatment step in an on-site wastewater management system. It is designed to receive clarified sewage from the septic tank and discharge it underground into the soil. A conventional absorption field is typically a gravel filled trench with a perforated pipe running through its length.

Figure 4. Gravel filled trench



Source: <http://www.nesc.wvu.edu/nsfc/frd-10/trenchsystem.htm>

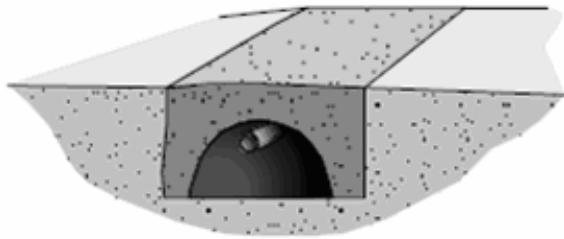


Source: On-Site Sewage Management System Presentation by Scott Uhlich, GA Dept. of Public Health

The effluent is distributed through the perforated pipes, exits through the holes in the pipes, and trickles through the rock or gravel where it is stored until absorbed by the soil. The absorption field, which is located in the unsaturated zone of the soil, treats the wastewater through physical, chemical, and biological processes. The soil also acts as a natural buffer to filter out many of the harmful bacteria, viruses, and excessive nutrients, effectively treating the wastewater as it passes through the unsaturated zone before it reaches the groundwater.

The absorption field may be constructed of gravel or other approved aggregate, chamber systems, gravelless pipe, drip irrigation or other approved alternative product. The type of absorption field is usually determined by the soil conditions present on the site. For single family residences, the number of bedrooms and the soil percolation rate determines the size of the absorption field.

Figure 5. Chamber systems are sturdy plastic molded into a dome shape and the sides are slotted to allow for seepage into the soil.



Source: http://www.nesc.wvu.edu/nsfc/nsfc_pipeline.htm

Source: On-Site Sewage Management System Presentation by Scott Uhlich, GA Dept. of Public Health

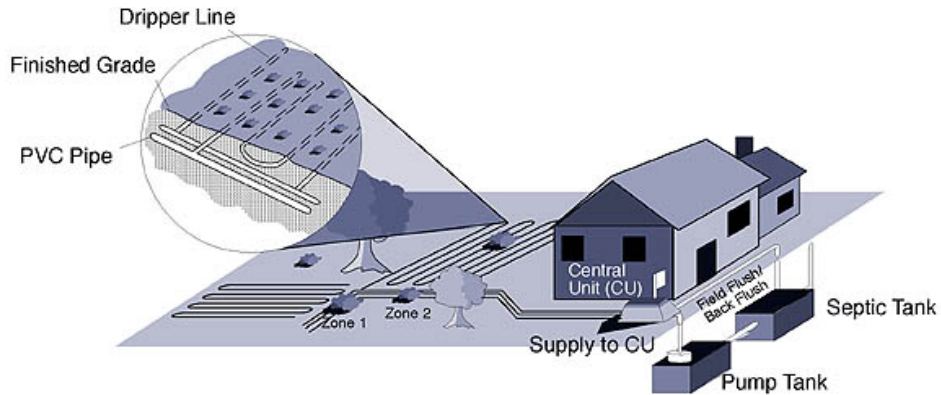
Figure 6. Absorption trenches containing bundles of polystyrene aggregate in place of gravel.



Source: On-Site Sewage Management System Presentation by Scott Uhlich, GA Dept. of Public Health

Drip irrigation systems apply treated wastewater to soil slowly and uniformly from a network of narrow plastic, polyethylene, or polyvinylchloride (pvc) tubing placed at shallow depths of usually six to 12 inches in the plant root zone. The wastewater is pumped through the drip lines under pressure but drips slowly from a series of evenly spaced openings called "emitters."

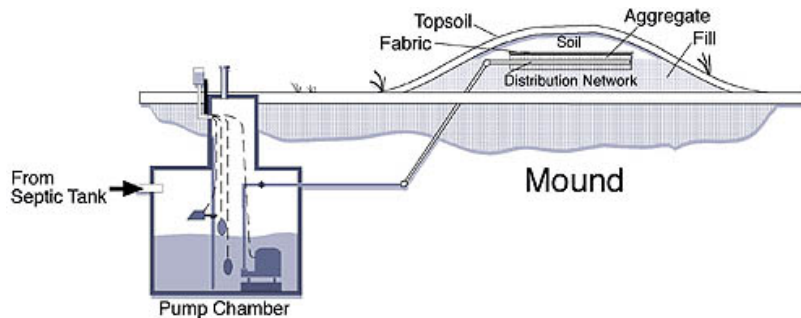
Figure 7. Drip irrigation system



Source: <http://www.nesc.wvu.edu/nsfc/frd-10/dripirrigation.htm>

A mound system is a soil absorption system that is elevated above the natural soil surface using a suitable fill material. Wastewater is first pretreated then fed by gravity to a pump chamber where the effluent is dosed to the mound system. The purpose of the design is to overcome site restrictions, such as slowly permeable soils, shallow permeable soils over creviced or porous bedrock, and permeable soils with high water tables.

Figure 8. Mound system



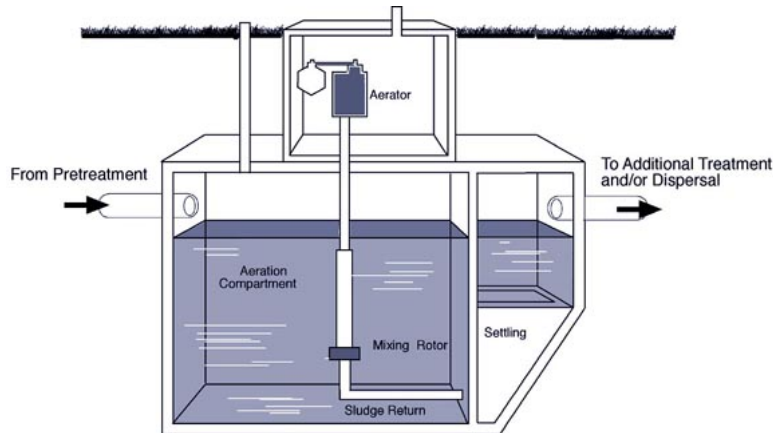
Source: <http://www.nesc.wvu.edu/nsfc/frd-10/moundsystem.htm>

Advanced Sewage Treatment

Not all property in the State of Georgia is suitable for a typical septic tank system. In areas where the soil is not capable of treating domestic wastewater, an advanced sewage treatment system may be utilized as part of an on site sewage management system. Advanced treatment systems facilitate treatment of the wastewater before application to the soil absorption field.

Aerobic treatment units are stand alone advanced sewage treatment systems, providing wastewater treatment prior to disposal in the subsurface absorption field. Aerobic treatment units (ATUs) provide aerobic biodegradation or decomposition of wastewater constituents by bringing the wastewater into contact with air mechanically.

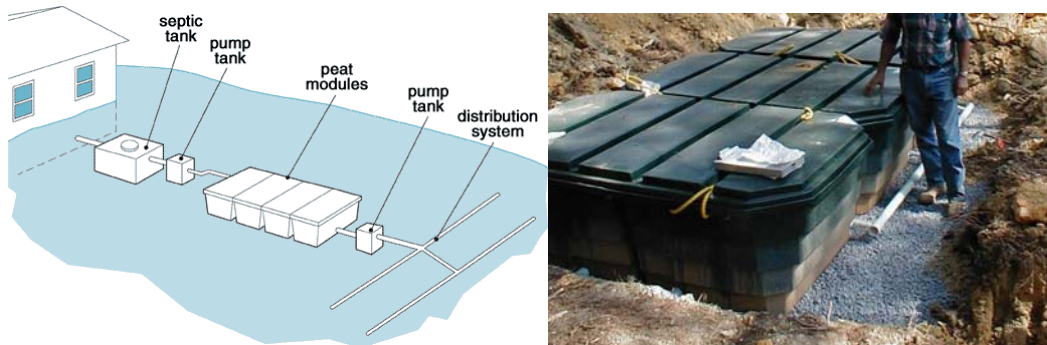
Figure 9. Aerobic treatment unit



Source: www.nesc.wvu.edu/nsfc/frd-10/aerobictreatment.htm

The typical bio-peat system consists of a septic tank, a dosing tank with effluent pump, pretreatment modules containing specialized biofibrous peat, and a soil absorption field. The septic tank wastewater effluent is pumped to and equally distributed through the biofilter modules. As the wastewater effluent passes through the peat a combination of physical, chemical and biological treatment occurs. The wastewater effluent exits the bottom of the modules into the absorption field.

Figure 10. Peat filters



Source: <http://www.extension.umn.edu>

Source: On-Site Sewage Management System Presentation by Scott Uhlich, GA Dept. of Public Health

Septic System Management in Georgia

In Georgia, County Boards of Health and the state Department of Human Resources(DHR) regulate septic systems up to 10,000 gallon tank capacity. Chapter 290-5-26 of the Rules of the Department of Human Resources, “On-Site Sewage Management Systems,” establishes statewide regulations for septic systems. The DHR rules establish a permitting and inspection system for system installations and repairs and certification requirements for contractors, inspectors, soil classifiers and pumpers. DHR has written a manual (DHR Manual) that details the design criteria, site suitability parameters, as well as the installation and operational requirements for on-site sewage management systems. These regulations establish the minimum requirements that are enforced by County Boards of Health.

The On-Site Sewage Rules can be found at
<http://health.state.ga.us/programs/envservices/onsiterules.asp>.

Information on how to obtain a copy of the DHR On-Site Manual can be found at
<http://health.state.ga.us/programs/envservices/documents.asp>.

The Rules and Regulations for On-Site Sewage Management Systems, Chapter 290-5-26, defines the design limits for conventional or chamber septic systems as no smaller than 1000 gallons or no larger than 10,000 gallon tank capacity. Septic systems that fall into this range are regulated and permitted by GA DHR and in turn the county boards of health. Any septic systems larger than 10,000 gallons are permitted by GA EPD.

Regulatory Authority

Prior to the adoption of state legislation in 1997, the rules concerning the regulation of septic systems were handled by each county board of health. In 1997 the law was changed to grant the Georgia Department of Human Resources the authority to adopt state-wide regulations relating to septic systems (O.C.G.A. § 31-2-7) as well as to outline certain duties that local county boards of health would have concerning septic systems (O.C.G.A. § 31-3-5). The county boards of health, under O.C.G.A. § 31-3-5 established six areas where county boards of health regulate the installation of septic systems:

1. Specifying the locations within the incorporated and unincorporated area of the county where on-site sewage management systems may be installed;
2. Specifying the minimum lot size or land area which may be served by an on-site sewage management system based on scientific data regarding on-site sewage management systems;
3. Specifying the types of residences, buildings, or facilities which may be served by on-site sewage management systems;
4. Issuing permits for the installation of on-site sewage management systems prior to such installation;
5. Inspecting on-site sewage management system installations prior to the completion of the installation; and
6. Providing for ongoing maintenance of such systems *except for non-mechanical residential sewage management systems*

In 2000 O.C.G.A. § 31-3-5 was amended to include the above italicized words “except for non-mechanical residential sewage management systems”. This language in effect removed the ability of the county boards of health from requiring maintenance on non-mechanical septic systems, those which do not require electricity or pumps to function. These non-mechanical septic systems are what most people think of when they picture a traditional septic system.

Organization

At the state level the Land Use Unit of the Environmental Health Section under the Division of Public Health in DHR manages the state’s responsibilities regarding the regulation of septic system installations and repairs as well as providing training and technical guidance on septic systems. <http://health.state.ga.us/programs/envservices/landuse.asp>

Several committees have also been established to assist the department.

[Technical Review Committee \(TRC\)](#)

Makes recommendations to the department regarding the approval of new systems, assists the Department with the development of standards and guidelines for new technology, assists with the adoption of periodic updates to the Manual for On-Site Sewage Management Systems. The most up to date list of approved septic system products can be found at

<http://health.state.ga.us/programs/envservices/product.asp>.

[Certification Review Committee \(CRC\)](#)

The CRC is responsible for the certification of persons who install, inspect, pump, maintain or repair on-site sewage management systems.

[Soil Classifiers Certification Advisory Committee \(SCCAC\)](#)

The SCCAC is responsible for certification, oversight, performance assessment and recertification of persons who classify soils for on-site sewage management systems.

At the county level the issuing of septic system installation and repair permits is handled by county environmental health departments which are governed by the county boards of health. These county boards of health are governed by a health district responsible for numerous counties. In Georgia the 159 county health departments are governed by 18 health districts. These health districts in turn are governed by the Georgia Division of Public Health (GDPH) which is part of the Georgia Department of Human Resources (DHR).

Local county governments also play an important role in the implementation of public health services. County officials are directed by statute to appoint certain representatives to the county boards of health. In addition, the county is responsible for providing facilities and equipment to the county board of health that “are sufficient for its operations” (O.C.G.A. § 31-3-9). Further information about organization and functions of county boards of health is included in the “Board of Health Handbook for Members of County Boards of Health in Georgia” which can be downloaded from <http://health.state.ga.us/publications/manuals.asp>

Funding

In addition to funding from county governments, county boards of health receive income from appropriations from the Georgia Legislature and fee income from services provided.

Each county board of health receives an annual allotment of state dollars through a Grant-In-Aid process spelled out in a document called the Master Agreement. Prior to the beginning of the state fiscal year, county boards of health are advised by DHR how much state funding they will receive and how much “match” must be contributed by their county. The county board of health prepares a budget and forwards it to the county commission for review. The county commission has the responsibility to levy taxes sufficient to raise the needed funds for the county board of health budget. County boards of health also submit their proposed budgets to their district office for review and approval.

Maintenance

Chapter 290-5-26-.18 states that the property owner shall be responsible for properly operating and maintaining the septic system to increase life expectancy and prevent failures.

County boards of health are prohibited from requiring maintenance on non-mechanical septic systems. The District, Georgia DHR and county boards of health are promoting the need to educate homeowners on proper maintenance. This is being done through distribution of educational pamphlets and a DVD. The DHR Manual contains a chart that estimates pumping frequencies based on the size and number of people the septic system serves.

Minimum Lot Size

In 1997, O.C.G.A. § 31-3-5 was amended to allow county boards of health to establish minimum lot sizes that may be served by septic. The DHR Manual (Section M) provides guidance on establishing minimum lot sizes for septic systems. Section M of the Manual suggest a ½ acre minimum lot size for a home on public water and a 1 acre minimum lot size for a home served by well water. This recommendation is based on a typical sized 3 or 4 bedroom home being 2400 square feet. The Manual suggest that larger minimum lot sizes be used on larger homes or when swimming pools, circular drives, or landscaping interfere with useable soil area. The lot size should also be large enough to accommodate a full size drain field replacement area if the initial drain field fails. A county board of health and/or county zoning authority may require larger minimum lot sizes and then that larger lot size would take precedence.

One factor that has influenced this minimum lot size guidance is the state legislation that allows chamber system drain fields a 50 percent reduced drain field length. This 50 percent reduction allows for larger homes to be built on smaller lots. There is anecdotal evidence that septic systems using a reduced drain field length are three times more likely to fail than conventional septic systems. Since 80% of new septic systems installed are using the reduced drain field length there is concern that the future rate of failures will increase.

Septic System Application Process

Prior to breaking ground for a home that will be served by septic a construction / installation permit must be obtained from the county board of health. The home builder must provide the health department information about the home including: property location, septic system plans and designs, number of bedrooms, location of water features and utilities, and soil characteristics of the site. A certified soil classifier must be used by the home builder to obtain the soil characteristic information for the site. This information is then field varied by health department staff. Once the installation permit is issued then the home may be built and the septic system may be installed. The septic system can not be covered up or used until the health department staff conducts a final inspection.

Chapter 290-5-26 outlines three ways to become a certified soil classifier; earn a Bachelors of Science in Soil Science or a related field and have 4 years of full time experience as a soils scientist, be a certified Geologist, or be a certified Engineer. Geologists and Engineers also have to take an eight hour course before they can become certified soils scientists.

Information on soil classifiers can be found at
<http://health.state.ga.us/programs/envservices/sccac.asp>.

Septage Hauling & Disposal

Septic System pumpers and haulers are certified by the GA DHR. Recertification is required every two years and shall be based on meeting continued education requirements. Each year the septage hauling trucks are required to be inspected by the county board of health to ensure the trucks are not leaking and properly marked. Each truck must also present a sewage treatment letter of acceptance from the wastewater treatment plant or a land application service giving the pumpers permission to dispose of septage at that location. The three approved methods of disposing of septage are as follows:

- Discharge to public or community sewage treatment system for treatment in a wastewater treatment plant.
- Treatment at separate septage handling facility
- Direct land application

Chapter 290-5-26-.11 outlines the requirements for the removal and disposal of septic system waste (septage) and section N of the DHR Manual outlines the requirements for becoming a certified septic system pumper.

Garbage Disposals

Chapter 290-5-26-.05 requires that the septic tank capacity be increased by 50% if a garbage disposal is installed in a home. The reason for the 50% increase in tank capacity is to account for the additional solids (vegetable parts) from the disposal. This additional load is not accounted for unless the tank is designed with this in mind. The requirement is hard to enforce because a garbage disposal is something that a homeowner can add to their home after it has been constructed. This is also something that is hard to catch by the septic system inspector unless the home has been wired for electricity by the time the final inspection is done and this is usually not the case.

Septic System Survey Results

Quantities

The estimated number of septic systems in 2005 located in the 16 county Water District was 525,970. This number should be used with caution. Counties estimated the number of septic systems within their respective counties since complete records were generally not available for before 1998. After 1998, in most but not all counties, some kind of computer based system was used. In addition counties do not keep records of when septic systems are taken out of service or connected to sewer and this has an effect on the count of systems within the Water District. Currently, several counties are upgrading their record collection systems to computer data collection systems. The use of these systems will create more accurate records in future years. The most accurate estimates came from DeKalb and Gwinnett counties. In those two cases, the county water and sewer departments provided the health department with information on water customers that were not billed for sewer as a cross check.

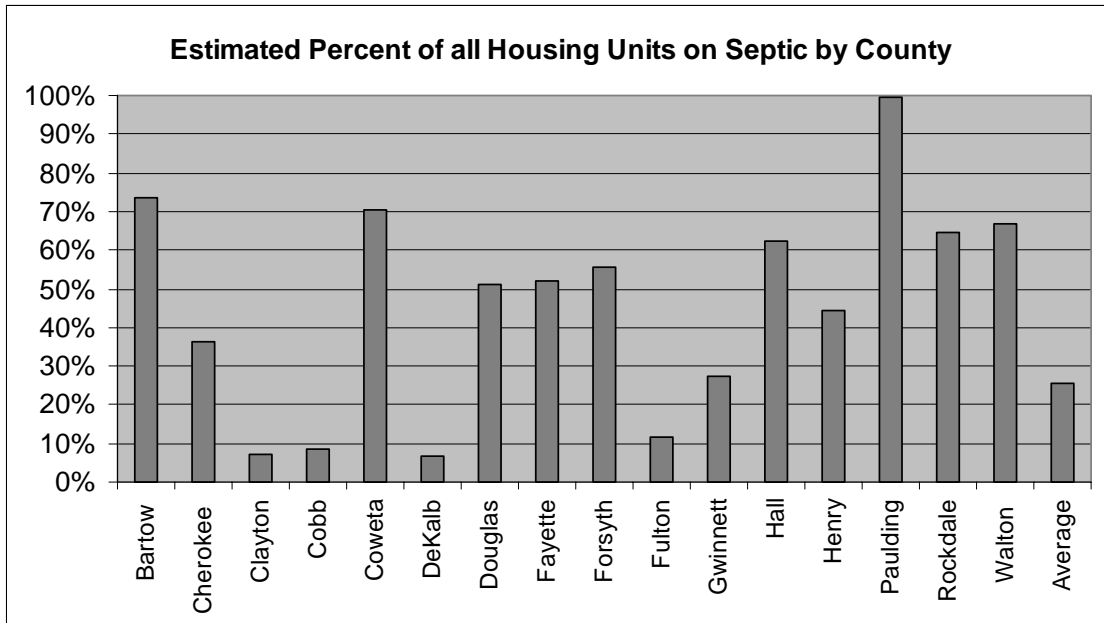
Most septic systems in use are residential. Water District-wide, residential systems are estimated at 90% while commercial and other systems are estimated at 10% of the total number of septic systems.

Table 1. Estimated number of septic systems

County	Estimated Number of Systems	Percent Residential	Percent Commercial & Other
Bartow	26,000	99%	1%
Cherokee	26,000	99%	1%
Clayton	9,000	80%	20%
Cobb	25,000	90%	10%
Coweta	35,000	85%	15%
DeKalb	23,370	86%	14%
Douglas	25,500	90%	10%
Fayette	22,000	90%	10%
Forsyth	30,000	95%	5%
Fulton	50,000	92%	8%
Gwinnett	88,600	80%	20%
Hall	50,000	75%	25%
Henry	30,000	95%	5%
Paulding	45,500	95%	5%
Rockdale	20,000	94%	6%
Walton	20,000	98%	2%
Total:	525,970	90%	10%

An estimate of the percent of total housing units served by septic systems was made using the estimate above and data from the U.S. Census Bureau. Based on this analysis, it is estimated that 26 percent of the total housing units in the District are served by septic systems. The percent of total housing units on septic by county is illustrated in the following chart.

Figure 11.



Source: Total Housing Units from U.S. Census Bureau

The average number of septic systems installed in the Water District per year is estimated at about 13,000 systems. Currently the largest number of installations is in Paulding County with 1,700 systems per year. Hall and Henry counties have averaged 1,500 and 1,600 systems per year, respectively.

Table 2. Single-family (SF) septic system annual installations compared to SF building permits

County Name	FY 2003 Residential Installations	SF Building Permits	FY 2003 % on Septic	FY 2004 Residential Installations	SF Building Permits	FY 2004 % on Septic	FY 2005 Residential Installations	SF Building Permits	FY 2005 % on Septic
Bartow	574	970	59.18%	584	905	64.53%	623	1,020	61.08%
Cherokee	607	3,282	18.49%	1,065	3,794	28.07%	1,032	3,722	27.73%
Clayton	366	2,332	15.69%	299	2,227	13.43%	217	1,713	12.67%
Cobb	387	4,575	8.46%	413	5,303	7.79%	309	5,074	6.09%
Coweta	1,026	1,585	64.73%	1,069	1,979	54.02%	1,075	1,928	55.76%
DeKalb	342	4,132	8.28%	65	3,590	1.81%	81	3,446	2.35%
Douglas	583	1,960	29.74%	529	2,062	25.65%	585	1,712	34.17%
Fayette	659	803	82.07%	576	1,054	54.65%	422	927	45.52%
Forsyth	1,177	2,535	46.43%	1,131	3,279	34.49%	1,110	3,614	30.71%
Fulton	508	3,899	13.03%	511	7,275	7.02%	247	8,101	3.05%
Gwinnett	589	8,589	6.86%	425	9,379	4.53%	451	9,468	4.76%
Hall	1,683	1,354	124.30%	1,479	1,507	98.14%	1,352	1,498	90.25%
Henry	1,966	3,819	51.48%	1,414	3,826	36.96%	1,484	3,552	41.78%
Paulding	1,670	2,610	63.98%	1,777	3,097	57.38%	1,737	2,975	58.39%
Rockdale	279	1,018	27.41%	305	602	50.66%	253	766	33.03%
Walton	730	1,238	58.97%	1,110	1,417	78.33%	1,117	1,527	73.15%
Total	13,146	44,701	29.41%	12,752	51,296	24.86%	12,095	51,043	23.70%

¹ Data Source: GA DHR Residential Septic System Installation Inspections. FY = Fiscal Year (July - June). GA DHR's explanation of data: The # of installation inspections represents new residential systems installed and inspected (multiple/follow-up inspections are not included in this total).

² Data Source: US Census Bureau. Only Single-Family Residential Building Permits were used and do not include Duplexes or Apartment Homes.

General Location of Septic Systems

The survey responses indicate that in general sewer is available in and near most cities and the main concentration of septic systems are located outside these areas. However, septic systems are located throughout the counties even in the sewered areas. Local wastewater utilities can provide maps of areas served by sewer in each county but only DeKalb and Gwinnett have maps of the septic system locations throughout their counties.

Age

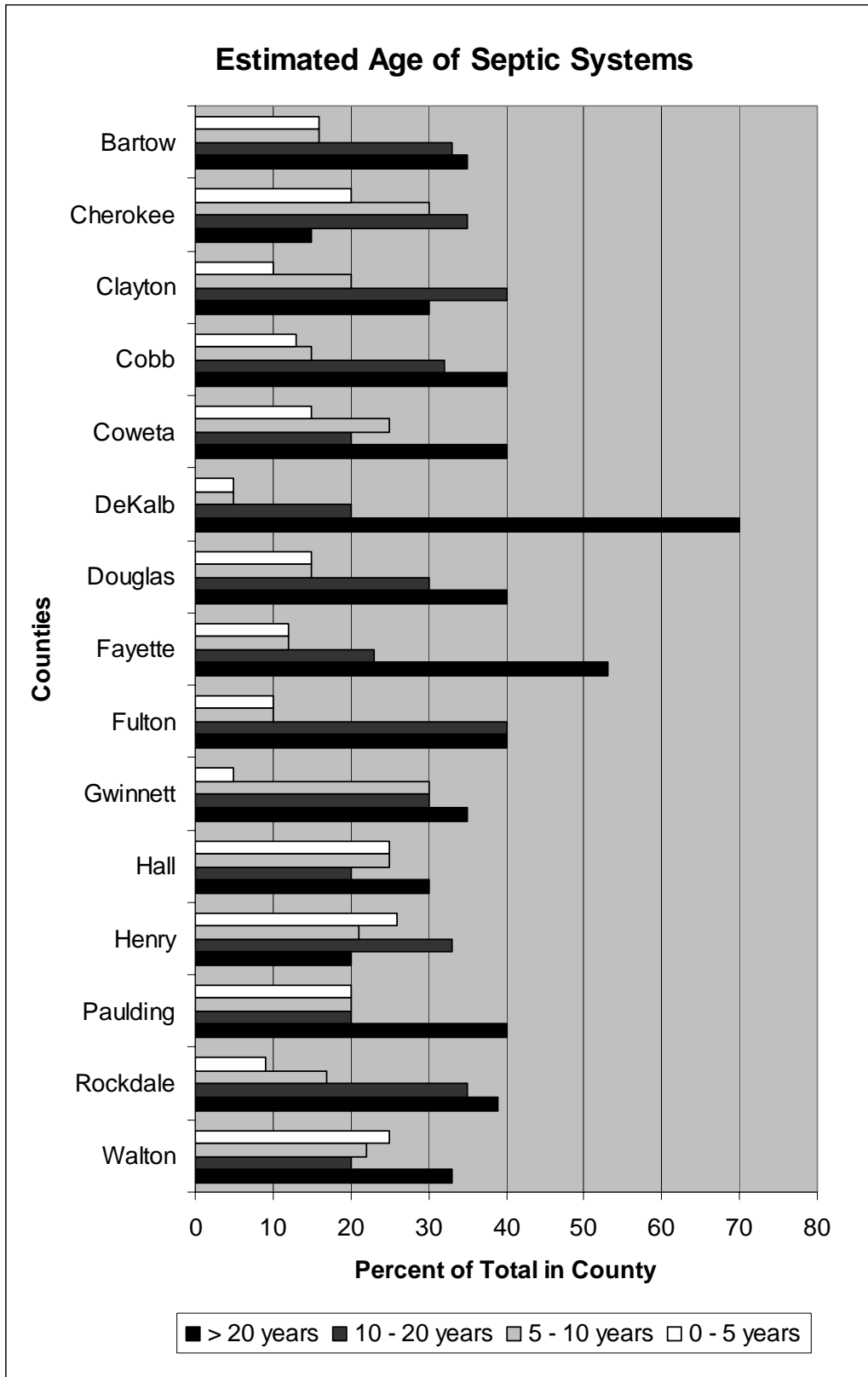
The septic systems within the Water District are aging. The survey results indicate that almost 40% of septic systems are estimated at more than 20 years old. Figure 12 shows the relative ages of septic systems by county in the Water District. Most of the older systems were designed and installed using a previous method of approval. These older systems in the Water District were installed under less rigorous requirements than the current soils classification method. Those systems that were installed in areas of unsuitable soils and on small lots will experience more problems as they age.

Another issue is the level of usage that the older systems were initially designed for. Some of the older septic systems were designed and installed for single families or seasonal use are now being used by multiple families and year round usage.

Also, age is an issue for the use of septic systems because there is a natural aging process that will eventually cause the soil absorption field (drainfield) to fail. As the effluent is discharged into the drainfield, bacterial growth develops beneath the distribution lines. A black, jelly like layer forms along the bottom and sidewalls of the drainfield trench call a bio-mat. The bio-mat is less permeable than soil. As the biomat develops, the soil infiltration rate will decrease and eventually the drainfield will fail. Wastewater will pond on the soil surface or backup into the home. Biomat formation cannot, and should not, be prevented, but septic tank filters, proper organic loading and proper maintenance of the septic tank can slow the rate at which it forms.

There are many factors that influence how long a septic system will last they include: site conditions (soils ability to handle hydraulic loads), precipitation, installation quality, system size, development rate of the biomat, system maintenance, and the amount of people in the home (volume and pattern of use). When a septic system is properly sited, designed, and maintained it can have a minimum life expectancy of 20 – 30 years, but over time it will fail.

Figure 12.



*Data from Forsyth County is unavailable.

Minimum Lot Size

The size of the lot should be sufficient to allow enough suitable soils and other appropriate conditions for a drainfield and a future drainfield for replacement. The DHR manual sets a minimum lot size for the state of Georgia. The minimum lot size is ½ acre (21,780 sq. ft) with public water supply and 1 acre (43,560 sq. ft) with well water. However, if larger lots are needed to meet the requirements set forth in the DHR manual, then local County Boards of Health and / or County Zoning Authorities may require larger minimum lot sizes. These local minimums will take precedence over the DHR minimums.

Because of the varied soil properties found in the Water District and the trend of increasing new home size, most of the Water District counties have increased minimum lot sizes to obtain enough suitable soils. Minimum lot size in the Water District varies from 69,696 sq ft to 20,000 sq ft. Given local experience with suitable soils, slopes, water tables and typical house sizes in their counties, all but two survey respondents think that their minimum lot size should be increased more than their current minimum lot size. This increase would help to provide enough area of suitable soils for the primary and secondary drainfields.

One issue regarding the state minimum lot size guidance is that state legislation allows chamber system drain fields a 50 percent reduced drainfield length. This 50 percent reduction allows for larger homes to be built on smaller lots. There is anecdotal evidence that septic systems using a reduced drain field length are three times more likely to fail than conventional septic systems. Since 80% of new septic systems installed are using the reduced drain field length there is concern that the future rate of failures will increase.

Table 3. Minimum lot size

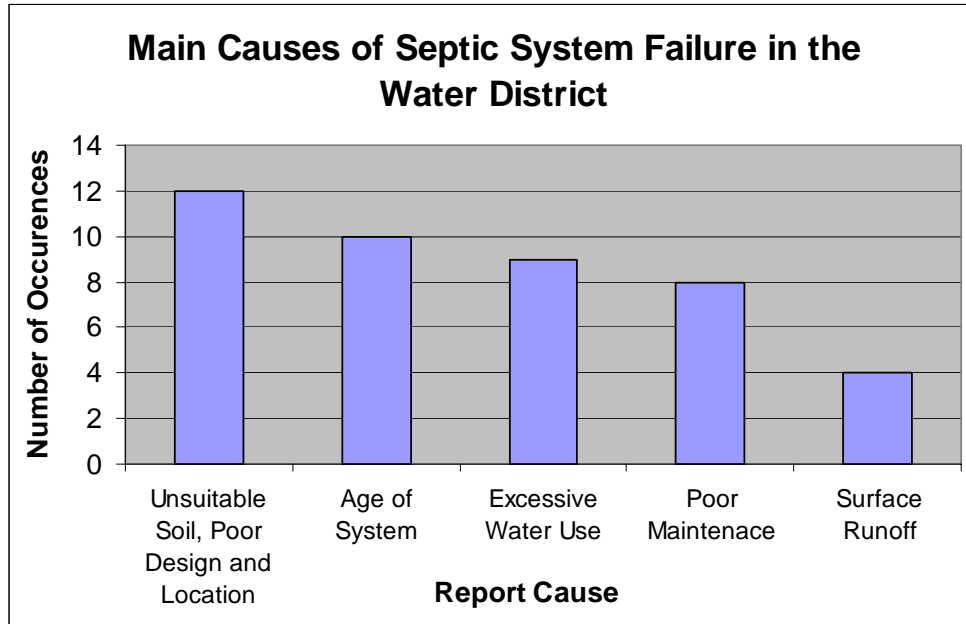
County	Current Minimum Lot Size	<i>Given suitable soils, slopes, water tables and typical house sizes in your county, what do you think the minimum lot size should be in your county?</i>
Bartow	26,500 ft ² (0.61 Acres)	26,500 ft ² (0.61 Acres)
Cherokee	27,000 ft ² (0.62 Acres)	35,000 ft ² (0.8 Acres)
Clayton	22,000 ft ² (0.51 Acres)	0.6 to 1 Acre
Cobb	21,780 ft ² (0.5 Acres)*	21,780 ft ² (0.5 Acres)
Coweta	69,696 ft ² (1.6 Acres)	69,696 ft ² (1.6 Acres)
DeKalb	25,500 ft ² (0.59 Acres)	25,500 ft ² (0.59 Acres)
Douglas	21,780 ft ² (0.5 Acres), Dog River Basin is 3 Acre Min.	32,670 ft ² (0.75 Acres)
Fayette	43,560 ft ² (1 Acre)	43,560 ft ² (1 Acre)
Forsyth	25,500 ft ² (0.59 Acres)	25,500 ft ² (0.59 Acres)
Fulton	43,560 ft ² (1 Acre)	43,560 ft ² (1 Acre)
Gwinnett	25,500 ft ² (0.59 Acres)*	43,560 ft ² (1 Acre)
Hall	34,848 ft ² (0.8 Acres)*	34,848 ft ² (0.8 Acres)
Henry	30,000 ft ² (0.69 Acres)	43,560 ft ² (1 Acre)
Paulding	20,000 ft ² (0.46 Acres)	32,670 ft ² (0.75 Acres)
Rockdale	25,500 ft ² (0.59 Acres)*	30,000 ft ² (0.69 Acres)
Walton	25,500 ft ² (0.59 Acres)*	

*Of suitable soil

Septic System Failure

Approximately one percent of the septic systems in the District fail per year. This is about 4,000 systems per year. The first figure below summarizes the main causes of failure in the District. The figure on the following page shows the main causes of septic system failure by county.

Figure 13.



Failures that result in a repair inspection are reported to the state. The following table illustrates several recent years of such data from DHR.

Table 4. Septic system repair inspections

County Name	FY 2002 Repair Inspections*	FY 2003 Repair Inspections	FY 2004 Repair Inspections	FY 2005 Repair Inspections
Bartow	156	208	259	206
Cherokee	164	108	188	174
Clayton	87	170	124	144
Cobb	344	386	254	426
Coweta	209	216	215	213
DeKalb	248	443	200	467
Douglas	351	359	250	251
Fayette	163	210	224	215
Forsyth	251	270	275	296
Fulton	95	76	154	177
Gwinnett	702	708	624	699
Hall	390	539	564	553
Henry	103	128	154	165
Paulding	311	314	315	308
Rockdale	48	73	95	80
Walton	42	97	96	115
Totals	3,664	4,305	3,991	4,489

*Source: GA DHR Residential Septic System Repair Inspections. FY = Fiscal Year (July – June)

Table 5. Causes of septic system failure

County	<i>What are the three main causes of septic system failure in your county?</i>
Bartow	Age of the system and drainfield. The condition of the soils and lot size. Overuse, lack of maintenance and surface runoff into the drainfield (downspouts over drainfield).
Cherokee	Poor maintenance High water usage
Clayton	Age – biomat formation Poor soil conditions Improper maintenance program
Cobb	Seasonal high water tables Excessive water usage Age of system (Biomat formation, root blockage, broken tank outlet)
Coweta	Age of the system. Many are 30 years old. Surface water runoff entering the system. Over optimistic soils reports and engineered system designs, especially for alternative type systems.
DeKalb	Age of the system. The soils get clogged and a biomat forms. Excessive water usage or a water leak in the household. Lack of maintenance.
Douglas	Attrition due to advance age Systems installed in soils not appropriate for the type of system utilized. Water overuse; water consumption exceeds usage that the system was designed for.
Fayette	Systems installed in poor soil conditions, high water tables, rock or restrictive layers. Poor maintenance of systems. Leaking plumbing, especially commodes with small leaks.
Forsyth	Reduced drainfield length Serial drainfield design Lack of maintenance Poor soil information Developer cuts lot incorrectly
Fulton	Age (biomat formation) Lack of maintenance (no pump out) System misuse (high water usage, pouring grease into system, expansion of structure, deck or pool, and irrigation systems over drainfield).
Gwinnett	High water use by the occupants Marginal soil conditions from older systems installed using percolation tests. Surface water run off entering the drainfield Homeowner activities such as room additions and pool installations over the system or replacement area, an increase in residence occupancy, and the addition of a garbage disposal.
Hall	Lack of system maintenance by the occupant. Excessive water use due to leaks in plumbing, too many occupants, and modification of use/structure. The use of restrictive soils back when perc tests were used.
Henry	Poor soil conditions Site alterations – builders cutting lots before home is built. Improper landscaping – drain swells cut over drainfield, downspouts over drainfield.
Paulding	Age Soil Conditions High Water Usage
Rockdale	Age of the systems. Biomat formation. High and perched water tables, subsurface water entering the system.
Walton	Age of the system (biomat) Lot location (excessive water entering the drainfield by runoff and improper landscaping) Undersized drainfield (50% reduction is too much)

Areas of Failure

Most of the environmental health department staff interviewed could identify sections of their county that were experiencing higher failure rates than other areas. In general these areas were characterized by unsuitable soils, old systems sited and designed under older inadequate rules, small lots, areas around lakes and areas with high water tables. The follow table outlines areas mentioned in the survey.

Table 6. Areas of failing septic systems

County	<i>Are there any sections of the county that experience higher system failure than other sections?</i>
Bartow	There aren't any sections of the county that experience higher system failure than the other sections. Failure appears to be determined by the age of the system. Most failures are in older areas.
Cherokee	The Kellogg Creek, off of Kellogg Road, area has high system failures due to poor soils. The systems were installed using poor soil information, because development at this time did not require good soil classification.
Clayton	Riverdale and the south side of the County due to the age of the systems. In these areas the County is seeing 15 -20 year old systems failing.
Cobb	Some localized subdivisions that were approved for septic prior to the level 3 soil study requirement.
Coweta	No there are no hot spots.
DeKalb	Norris Lake experiences a high failure rate due to old small lot sizes. Saddlewood's high failure rate is due to rock, thin soils and a high water table.
Douglas	The Lithia Springs area experiences a greater number of failures due to the high water table. Also, the Kings Highway area has systems that were installed based on old methods. More recent soil tests show these systems should be installed deeper for the soil conditions in that area. This has caused this area to experience greater failures.
Fayette	Most of the failures are occurring on the systems installed on the smaller lot sizes.
Forsyth	Mostly small lots on the lake side of GA400. The systems were constructed for seasonal use but now they are used as primary residences.
Fulton	Along creeks like Nancy Creek, flood prone areas, areas where the high water mark has changed. Around lakes – Mountain Park and Rico Lake. Chastain area – originally summer cottages now year round houses.
Gwinnett	Yes, the southern and western parts of the county experience a higher system failure rate than the rest of the county. The contributing factors are the older age of the systems and a higher system stress because of more people using the system then what the system was originally built for.
Hall	The perimeters of the city have a higher failure rate than the rest of the county. This can attributed to the high percentage of older systems on very small lots that were built expecting sewer, and older rentals with too many occupants.
Henry	Some areas have poor soils and those areas are more prone to failure. The Keysferry Road area, North Ola Road and the Tussahaw watershed are two of these areas.
Paulding	No.
Rockdale	The High Shores area has poor soils. The Francis Hollow and Briarwood Subdivisions both have high water tables. The Milstead area has old systems.
Walton	Most of the higher system failures appear to occur on individual lots with old systems.

Mandatory Pump-Out or Inspection

The District's septic survey revealed that there is very little support or justification for an across-the-board mandatory pump-out or inspection program. Seventy five percent of the county health departments interviewed did not support such a program. Even those interviewed that supported the idea, acknowledged implementation problems such as lack of resources, enforcement and lack of capacity to dispose of septage. Instead local health department staff said that limited resources would be better spent by educating homeowners on septic system maintenance.

There was support for mandatory programs in special areas such as around lakes, in small water supply watersheds, in areas with a high concentration of older systems or high failure rates and areas with limited soil conditions.

Permitting and Installation Inspection of New Septic Systems

The County Boards of Health require a septic tank permit prior to obtaining a building permit. All septic systems in the Water District are inspected by County Boards of Health before they are put into operation. The purpose of the inspection is to verify that the system is installed in accordance with the permit and the site specifications required by local and State regulations.

For an effective inspection County Health Inspectors follow established procedures developed in the DHR manual as well as proven county procedures. Experience is key and the ability to address potential problems before they occur is crucial.

An important part of the inspection process is determining the suitability of soils. This is important so the septic system can be planned, designed, and sited for longevity and effectiveness. The DHR manual lists over 480 unique soil series that are found throughout the state of Georgia. The DHR manual places the Water District firmly in the Land Resource Area of the Southern Piedmont. Within the Southern Piedmont Area there are 83 soil series. Out of those soils only 22 (27% of all soils classified within the Water District) are defined as suitable soils for septic systems. Suitability is defined as the ability of a soil to function as a drainfield with proper design, installation and maintenance. Suitability as defined constitutes 7 soil, land, and hydrological properties: Land Resource Area; % Slope; Depth to Bedrock; Bedrock Hardness; Depth to Seasonal High Water Table; Hydraulic Conductivity; Recommended Trench Depth.

Careful predevelopment planning of subdivisions is needed to install septic systems. All factors including soil suitability, house footprint, circular drives, pools, and landscaping need to be considered. (DHR Manual)

Overall the current system of pre and post installation inspection is working in the Water District. Good planning, inspections and upfront work lead to a good system installation, fewer problems, and longevity. However all the upfront work may be for not, if the builders make changes to approved plans without going through an approval process. Some of these changes are the addition of housing structures, pools, drainage, lot cuts, and the driving over the drainfield during the construction process may cause future septic system problems.

Performance Evaluation of Existing Septic Systems

The DHR Manual contains guidance on conducting a “performance evaluation of existing on-site sewage management systems”. These evaluations are most commonly requested by a mortgage company / home buyer at the time of home sale. The evaluation usually consists of a property walk and observation of the drainfield area for standing water, septage, or landscaping that could divert additional water onto the drainfield. County environmental health personnel do not check any plumbing fixtures inside the house and because these evaluations are done at time of home sale they very rarely encounter the current owner.

Performance evaluations are performed by certified county environmental health inspectors and by private septic system contractors. In eleven counties both private and health department personnel perform the evaluations, in two of the counties (Fulton & Walton) mostly private companies perform the evaluations, and in the other three counties (DeKalb, Henry, & Paulding Counties) only health department personnel perform the evaluations. Only three (Bartow, Fayette, & Hall Counties) of the sixteen District counties require that the tank be uncovered during the performance evaluation and then only when there are no records available for the system. The cost of evaluations when conducted by county environmental health personnel ranges from \$55 - \$200.

The county environmental health personnel interviewed made the following comments regarding the performance evaluation process:

- The performance evaluation is only a visual inspection. There is no way to tell if the system has backed up into the house or if there are water leaks in the house. Even with a pump-out, the system can appear normal for a few months and then back up again.
- The current evaluation just weeds out gross problems.
- It is only a visual inspection. When the evaluation is performed the system has not been in use for sometime because the house is for sale and thus no water is being used. To make the evaluation effective the tank should be opened, tee’s checked and the filter inspected.
- There are cases when the home is not occupied and that is not a good evaluation of the system and that is noted on the form.
- There is always a chance a problem will be missed even if the tank is uncovered. It is hard to determine the functionality of a system if the house is vacant. Also the system may work great for a family of 2, but fail for a bigger family.
- The performance evaluation only proves the system is working on the day of the inspection.

Septage Handling and Disposal

Wastewater Treatment plants are designed to accept and treat the wastewater found in sewer lines (sewage). The typical waste that flows through sewer lines is much more diluted than that found in septage. This more concentrated septage is harder and more expensive to treat than typical sewage. At least one wastewater treatment facility in each of the 16 counties accepts septage for a fee. The typical fee in the District is \$200 to \$500 per load depending on the size of the pumping truck. In many cases the utilities do not feel this dumping fee adequately covers the higher cost of treating the septage. Most wastewater treatment facilities have to limit either the hours they accept septage or the amount of septage they can accept per day to ensure the treatment capacity of the plant is not exceeded. Several county environmental health officers that were interviewed reported that the capacity load at their public wastewater treatment plants changes several times a week. This requires that the pumpers call ahead to each wastewater treatment plant to make sure they can dispose of their septage at that facility.

There is separate septage handling facilities in Georgia where pumpers/haulers can dispose of septage. There are a couple of ways these facilities can operate. One way is to dry out the septage and send any liquid to a sewer line and send the dried out solids to a landfill. Another method could be the use of engineered wetlands to treat the septage. These facilities are required to have a permit from GA EPD to operate. Two other counties, Cobb and Fayette, have private separate septage handling facilities located in the county.

Currently in Georgia there are only a couple of land disposal sites that can accept septage from numerous pumping/hauling businesses. The other option for land disposal is if a pumper/hauler obtains a permit from the county board of health to land apply the septage to their own land. The stipulation for this is that only the pumping trucks he owns can be applied onto his own land. Septage can be used as a soil condition and its nutrients can be used as fertilizer for crops. There are guidelines in the DHR Manual on the waiting times needed between septage application and crop planting/human contact. Two counties, Coweta and Forsyth, have private direct land application sites located in the county.

Suggestions for Improvement

Oversight

- More aggressive action is needed by the State to decertify unscrupulous contractors and poor soil classifiers.
- Soil classifiers need to do a more complete job. They often give the Environmental Health Department inadequate information to make decisions, knowing that certain conditions will require more tests, checking for rock etc. Environmental Health then has to go back to the property owner who has to go back to the soil classifier for more work.
- There needs to be a program that requires oversight of engineers who perform poor soil classifications. There needs to be a way to enforce or punish consistent mistakes made by installers, pumpers, and soil classifiers. A good idea is to have a State Soil Classifier whose full time job is to settle soil classification disputes throughout the state. One State level person could do it but it would require lots of travel.
- The minimum lot size should be based on the amount of suitable soils and other site specific conditions. A 27,000 ft² lot is too small to achieve this.
- Reduce downsizing of absorption / drain fields.
- Reevaluate the 50% reduction and lengthen the drain lines.
- Require larger lot sizes and drain fields.
- Eliminate the use of serial drain field systems.
- Encourage landscaping that will divert runoff away from the drain field.
- Require builders and contractors to follow plans closer.
- More staff is needed to address unapproved changes that builders make to approved plans without going through the approval process.
- Prohibit wet weather installations, especially the drain fields which may cause damage to the soil structure.
- The number of bedrooms is a major issue. Rooms that are not labeled as bedrooms are often used as bedrooms. There needs to be a clear definition / guidance on extra rooms and how they should be included in the design, planning, and permitting process.
- Require that County Environmental Health Department personnel bore one hole per lot to verify the soil classifications.
- Increase the minimum design criteria for septic systems. Especially for alternative systems (Drip Emitters, ATU systems, and peat systems).
- The minimum standards (soils, depth to restrictive layer, lot size, etc.) appear to be too minimum. The high water table, poor soils, and rock problems all need to be addressed when considering the minimum standards.
- Improve / increase staff training.
- Better pay will draw qualified people for the job.
- More inspectors are needed.
- Require that inspection risers be installed

Planning & Coordination

- Local county boards of health and local city and county governments should work together to evaluate the soil conditions in their county as part of their landuse planning to determine which areas are conducive to septic systems.
- There should be more testing on the lots that need alternative systems (Aerobic Treatment Units, Drip Emitters, Peat Bio-Filter and Mound Systems).
- Require pre-planning with the county zoning department and upfront review of lot designs.
- County Board of Health should work with the Water and Sewer Department to plan for extending sewer lines to areas of the county experiencing high septic system failure rates.
- Improve the communications between Planning and Zoning and the Health Department.
- Have the County Zoning office change the zoning to account for septic minimum lot size.
- Increase public sewer in the region.
- Request that Planning and Zoning and Utilities invite / involve Health Department representative to planning meetings.
- The most important thing is good preliminary work to be sure that the land and soils data can support what is being proposed. All this should be looked at, at the beginning of the development process. Lots should be turned down for septic if the facts require it. If the data and the design does not support septic, counties need to be firm and deny permits.
- The Health Department should develop a working relationship with the utility that addresses pump out disposal locations and water usage information sharing.
- Environmental Health staff needs to be involved in the development process from the beginning. When plats are submitted to Engineering a copy should be sent to all departments for comment and then a meeting should be held.
- Require that plans be submitted to all agencies for approval before any roads are cut, then require a soils study and have septic approved before the lots are approved and a building permit issued.
- Install more sewers.

Education

- Educate owners about septic system operation and maintenance.
- Conduct education and consultation by the environmentalist during the repair process.
- Conduct maintenance presentations at the subdivision or community level in areas with a high amount of septic problems and failures.
- There needs to be better communication and understanding of the builders when it comes to the sensitivity of the drain field soils. The builders often destroy the soil structure during construction.
- A good way to start the homeowner education process is a packet about their septic system at the time of closing. In this packet will be contact information and also information about planning for a replacement system.

- Water saving fixtures and appliances and regular plumbing maintenance will help with excessive water in the septic tank.
- Improve data access so homeowners could access information about their systems online.

Maintenance

- Require ongoing maintenance contracts for all alternative and mechanical septic systems for the life of the system.
- The septic system users need to decrease their water usage, and perform timely maintenance on the system.

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Appendix A. Survey Form

Metropolitan North Georgia Water Planning District Septic System Study Questionnaire

The purpose of this questionnaire is to gather data that will illustrate a snapshot of current septic system practices. The questionnaire is in 7 sections: Contact Information, Septic System Quantities, Age, Type, and General Locations, Septic System Failure, Installation Inspections, Evaluation of Existing Septic Systems, Septage Removal and Disposal, and Other Information.

Section 1 – Contact Information

Name	Agency / Title	Contact Information

Section 2 – Septic System Quantities, Age, Type, and General Locations

1. How many septic systems are located in the County?

2. What is the relative percentage of septic systems by type? As an example; Commercial, Residential, Church, School etc?

3. What is the average number of septic systems installed per year in the county?

4. Do you have annual data on installations for the past five years that we could obtain?

5. What is the data source of these totals and how did you arrive at the totals?

6. What is the age breakdown and system type of the above total number?(Please estimate as best you can.)

0-5 years old _____

5-10 years old _____

10-20 years old _____

More than 20 years old _____

Two Compartment with Filter _____

One Compartment with Filter _____

One Compartment with out Filter _____

Are there plans for a Filter retrofit?

Yes___ No ___

7. Are there any records of when septic systems are taken out of service? Yes___ No ___

8. Has anyone mapped the areas of the county served by septic systems vs. sewer? If so who and when?

9. Where are the major concentrations of septic systems located in the County? Indicate generally on a county map.

10. What is the county's minimum lot size for septic?

11. What is the county's minimum lot size for septic with well water?

12. Given your experience with suitable soils, slopes, water tables and typical house sizes in your county, what do you think the minimum lot size should be in your county in order to insure most lots have enough area of suitable soils?

13. What do you think is the average or typical lot size used for current and recent growth on septic in the county?

14. In areas of the county where growth is still occurring on septic, are most homes being developed in subdivisions or is most of the development on septic using larger lots?

15. Are any innovative / alternative septic systems in use? Please Name. Do you see more of these systems being installed in your county? If so, why do you believe this is so?

16. Do you think these systems are effective? Have you had more problems with these systems than a traditional septic system? Do you think a maintenance agreement should be required and if so how would it be enforced?

Section 3 – Septic System Failure

1. How many systems fail per year? _____
2. Are forms used to record septic system failure? Yes ___ No ___ Obtain copy of form used _____
3. If YES how are the failure forms filed?

By Address ___ By Date ___ By other indicator ___

Paper or digitally filed? _____ If digitally filed by what program?

4. What do you think are the three main causes of septic system failure in your county?

Please give a rating for how much each of these factors influenced failure of septic systems in your county.

Rating Scale

1 – very little affect to 5 – main reason for failure

- a) failed pump
① ① ② ③ ④ ⑤
- b) water level above outlet
① ① ② ③ ④ ⑤
- c) filter condition
① ① ② ③ ④ ⑤
- d) broken outlet pipe
① ① ② ③ ④ ⑤
- e) inlet and outlet levels (backwards tank or not level)
① ① ② ③ ④ ⑤
- f) outlet fall from tank
① ① ② ③ ④ ⑤
- g) float or timer problem
① ① ② ③ ④ ⑤
- h) D-Box or lines out off level
① ① ② ③ ④ ⑤
- i) peak or surge sewage flows
① ① ② ③ ④ ⑤
- j) surface water entering system
① ① ② ③ ④ ⑤
- k) excessive water use
① ① ② ③ ④ ⑤
- l) subsurface water flow entering system
① ① ② ③ ④ ⑤
- m) short circuiting between laterals
① ① ② ③ ④ ⑤

- n) elevation of stepdown
① ① ② ③ ④ ⑤
- o) damage to stepdown
① ① ② ③ ④ ⑤
- p) blockage
① ① ② ③ ④ ⑤
- q) Biomat (Age)
① ① ② ③ ④ ⑤
- r) undersized drainfield for soil conditions
① ① ② ③ ④ ⑤
- s) undersized drainfield for structure
① ① ② ③ ④ ⑤
- t) shallow restrictive layer
① ① ② ③ ④ ⑤

5. How are complaint records filed?

By Address ____ By Date ____ By other indicator ____

Paper or digitally filed? _____ If digitally filed by what program?

6. Are there any sections of the county that experience higher system failure than other sections? Name of locations and indicate on provided county map:

7. Describe the process of finding a problem and correcting the problem?

8. Do you have any suggestions to prevent future failures?

9. If sewer is available are properties with failing septic systems required to connect to sewer?

10. What do you think about a mandatory pump-out or mandatory inspection program, what justification is there, and how could it be enforced?

Section 4 –Installation Inspection of New Septic Systems

1. What form or forms are used in the pre installation inspection (DHR 3882 or other)?

Obtain copy of form _____

2. How are the forms filed?

By Address _____ By Date _____ By other indicator _____

Paper or digitally filed? _____ If digitally filed by what program? _____

3. What form or forms are used in the installation inspection (DHR 3884 or other)?

Obtain copy of form _____

4. How are the forms filed?

By Address _____ By Date _____ By other indicator _____

Paper or digitally filed? _____ If digitally filed by what program? _____

5. Do you find the current system of pre installation and installation effective?

6. What changes would you like to see in the way the installations, inspections are handled and information is collected?

Section 5 – Performance Evaluation of Existing Septic Systems

1. When mortgage companies/home buyers request a septic system performance evaluation, do county employees or a private company perform the evaluation?

2. What qualifications or certifications are required to perform the performance evaluation inspections?

3. Is the tank uncovered during the performance evaluation?

4. Are pumping frequencies addressed in the performance evaluation? Yes ____ No ____
5. If yes, is education provided regarding pumping frequency if there is evidence of modifications to the dwelling served; such as room additions, expanded population, garbage disposal additions, etc. that were not present during the initial installation of the system?

6. What does the performance evaluation cost?

7. What form is used for the performance evaluations? _____
Obtain copy of form used _____
8. How are the performance evaluation forms filed?
By Address ____ By Date ____ By other indicator ____
Paper or digitally filed? _____ If digitally filed by what program? _____
9. What is the average number of performance evaluations per year? _____
10. In the past year how many evaluations have lead to a system repair action? _____
11. Based on your experience working in the county, how often should an average septic system be pumped out?

12. Do you think the performance evaluation of existing septic systems adequately determines if the septic system is functioning properly? If no, what changes to the process do you suggest?

Section 6 - Septage Removal and Disposal

1. How is the pumped out septage disposed in the county?
Public wastewater treatment plants _____ Separate septage handling facilities _____
Direct land application _____ Other _____

2. How are pumping companies regulated in your county?

3. How are the septage removal permits filed? (Pumper / Hauler Permit)

By Address ____ By Date ____ By other indicator ____

Paper or digitally filed? _____ If digitally filed by what program? _____

Section 7 – Other Information

1. Do you have any ideas to improve the overall management of septic systems in the region?

2. What are the health department's ideas about how to more closely coordinate with local land use and wastewater management decision making?

3. Do you work with sewer and local planning and development agencies to periodically develop and update wastewater management plans to identify areas for long-term septic system use, areas where public sewer service will eventually be available, and transition areas from septic to sewer?

4. If sewer is available are septic systems allowed to be installed?

Appendix B. List of Government Officials Surveyed

<u>County</u>	<u>Name</u>	<u>Title</u>
Bartow	Pamela Robinson	Env. Health County Manager
Cherokee	G. Curtis Barnhart, JR.	Env. Health County Manager
Clayton	Walter Howard	District Environmental Health Director
	Samual McCullough	Environmental Health Specialist
Cobb	Tom Campbell	Assistant Director, Center for Environmental Health
Coweta	Duane L. Fields	Env. Health County Manager
DeKalb	Rob Blake	Director of Env. Health DeKalb County
	David Pike	Assistant Director, Technical Residential and Land Use
	Alan Gaines	Env. Health County Manager
	Mohamed Koita	GIS DeKalb County
Douglas	Robert F. Gore	Douglas County Board of Health Environmental Health Section
Fayette	Richard Fehr	Env. Health County Manager
Forsyth	Ed Carter	Env. Health County Manager
	Gary D. Helmuth	Env. Health County Manager
Fulton	Rita Alexander	Environmental Health Supervisor
	Pearl J. Gordon	Senior Environmental Specialist
Gwinnett	Ferrell Curlee	Env. Health County Manager
Hall	Patricia Lacey	Env. Health County Manager
	Tim Callahan	Hall County Env. Health
Henry	Glinda Scott	Env. Health County Manager
Paulding	John Ackerson	Paulding County Environmental Health
Rockdale	Joe Farmer	Env. Health County Manager
Walton	Chris Kumnick	Env. Health Specialist III