Septic System Checkup: The Rhode Island Handbook for Inspection

By
M. James Riordan

Layout design and drawings by
Anne Sherman Jett

Funded by DEM using a grant from
the U.S. Environmental Protection Agency
Clean Water Act, section 319

“You can observe a lot by watching.”

Yogi Berra, 1968

TABLE OF CONTENTS

PREFACE

How should septic systems[1] be maintained? How can one determine if a given septic system is working when purchasing a home? *Septic System Checkup* answers these questions by providing state-recommended standards for evaluating and maintaining septic systems that serve residences in Rhode Island. The handbook includes complete instructions for gathering septic system records, locating components, diagnosing minor in-home plumbing problems, conducting flow trials, dye tracing, and maintenance scheduling. It describes two types of inspections: (1) a maintenance inspection to determine the need for pumping and minor repairs; and (2) a functional inspection for use during property transfer.

Septic System Checkup is for everyone with an interest in ensuring septic system function. Home inspectors should use it to determine if a system is adequate to serve the needs of a prospective buyer. Homebuyers will find it useful in learning how septic systems should be evaluated. Maintenance professionals should use *Septic System Checkup* to determine the need for routine maintenance as well as repair. Community officials will find the handbook helpful in developing septic system maintenance programs. And do-it-yourselfers can use the handbook for instruction on how to conduct their own routine inspections.

1. This handbook applies to conventional septic system components and cesspools. Those readers interested in inspection and maintenance of innovative and alternative components should refer to the specific system's permit stipulations and manufacturer instructions.

ACKNOWLEDGEMENTS

Septic System Checkup: The Rhode Island Handbook for Inspection and *Inspection Report Forms* were authored by M. James Riordan, Principal Environmental Scientist of the Office of Water Resources, Department of Environmental Management. Mr. Riordan also oversaw all aspects of their development.

During development, Mr. Riordan was supervised--and generously mentored--by Russ Chateauneuf, Division Chief of the Office of Water Resources, Sue Kiernan, Deputy Division Chief of the Office of Water Resources and Scott Millar, Supervising Environmental Scientist of the Office of Strategic Planning and Policy (who originated the concept of a septic system inspection handbook for Rhode Island).

Layout, design and graphic artwork for the handbook and report forms were all done by Anne Jett. Ms. Jett also devoted countless hours as one of the *Septic System Checkup's* primary reviewers and editors. Without her assistance, *Septic System Checkup* would have remained unmanifest.

Development of *Septic System Checkup* occurred in cooperation with Rhode Island's Septic System Maintenance Policy Forum. The policy forum is a roundtable group that comprises approximately 100 representatives from federal, state and local government, as well as private associations, businesses and general public. The policy forum operates on a consensus-based approach. The meetings are open to all interested parties. It has met seventeen times since its inception in 1995. The cooperative spirit of the policy forum and dedication of all its participants has been no less than critical to successful development of *Septic System Checkup*. A list of the attendants of the policy forum can be found in "Septic System Maintenance Policy Forum and Subcommittees" at the rear of the handbook.

Several individuals provided particularly significant time and effort towards the development of the procedures of *Septic System Checkup* as well as the science behind septic system inspections in general. They include Bob Schmidt and Peter O'Rourke of the Rhode Island Department of Environmental Management; George Loomis and David Dow of the University of Rhode Island; and Joe Frisella of Frisella Engineering, Dave Burnham of the Rhode Island Independent Contractors and Paul Brunetti of Griggs and Browne. *Septic System Checkup* would not have been possible without the benefit of their knowledge and generosity of time.

Many others have also contributed to *Septic System Checkup* by reviewing the document, discussing issues with the author and providing emotional support (here especially, Jody-Kay Riordan, the author's wife). To all of you--both named and unnamed--thank you for broadening the author's field of view.

"If I have seen farther than others, it is because I was standing on the shoulders of giants." (Albert Einstein)

CHAPTER 1
Inspecting Operating Septic Systems: An Overview

Approximately 150,000 Rhode Island households, or one third of the state's population, use some form of septic system for sewage disposal. Rhode Island's septic systems discharge some seven billion gallons of wastewater into the ground each year.

When used properly, septic systems function very well. If mismanaged, however, these systems will fail, creating conditions that may threaten human health and the environment. Untreated effluent from malfunctioning septic systems may reveal itself by sight and smell, when a system backs up, or it may quietly percolate through the soil into the groundwater and adjacent waterbodies.

Failed systems have been associated with many serious problems. Outbreaks of diseases, such as hepatitis, dysentery, and gastroenteritis, may result from unmitigated wastewater pathogens. Untreated effluent can accelerate the eutrophication process of nearby waterbodies, lowering oxygen levels and suffocating aquatic life. From an economic point of view, septic system repair bills can be staggering. Yet, many of us live with and use septic systems, giving little or no thought for their existence…until they fail.

Inspection and maintenance is the key to ensuring that septic systems function properly. Nevertheless, few systems receive routine inspection and maintenance and those that do may receive inadequate care as inspectors have historically been without standardized procedures.

This handbook is about septic system inspections. It provides guidelines for performing inspections. It also provides answers to a number of important questions regarding the operation and maintenance of septic systems. For example, what is the most convenient and least expensive maintenance method for ensuring that a septic system functions properly? How can prospective homebuyers make certain that a home purchase will include an adequate system? What is the minimum inspection regime necessary to determine if a septic system is working?

1.1 Types of Inspections

This handbook addresses the two types of inspections that are typically performed by properly trained wastewater professionals: maintenance inspections and functional inspections. The maintenance inspection is used to determine the need for pumping and to ensure proper function; the functional inspection is used primarily during property transfers and builds on the maintenance inspection.

1.1.1 Maintenance inspections

The maintenance inspection is used to determine the need for pumping and to identify minor problems before they become serious health and environmental hazards or cost prohibitive to repair. There are two maintenance inspection subtypes: a first maintenance inspection and a routine maintenance inspection. The first maintenance inspection consists of procedures that are designed to help an inspector locate the system components; the routine maintenance inspection assumes that the components have already been located. The following is an outline of first maintenance and routine inspection procedures (see also Tables 1.1 and 1.2).

First maintenance inspection

Gather Records and Data (chapter 2):

1. Interview user/homeowner (section 2.3).
2. Obtain most recent system drawings (section 2.1.3).

Locate the System Components (chapter 4):

1. Locate and gain access to the septic tank/cesspool (section 4.1).
2. Locate the soil absorption system (section 4.2).

3. Identify any potential retrofits (section 4.4).

Evaluate and Maintain the System Components (chapter 5):

1. Inspect and maintain the septic tank/cesspool (section 5.1).
2. Inspect the distribution box, if handhole is present (section 5.2).
3. Observe overall site conditions (section 5.4).

Establish an Inspection Schedule (chapter 6)

Report findings to the homeowner and, where required by municipal ordinance, a local official (*Septic System Checkup: Inspection Report Forms*)

Routine maintenance inspection

Locate the System Components (chapter 4):

1. Locate and gain access to the septic tank/cesspool (section 4.1).
2. Locate the soil absorption system (section 4.2).
3. Identify any potential retrofits (section 4.4).

Evaluate and Maintain the System Components (chapter 5):

1. Inspect and maintain the septic tank/cesspool (section 5.1).
2. Inspect the distribution box, if handhole is present (section 5.2).
3. Observe overall site conditions (section 5.4).

Establish an Inspection Schedule (chapter 6)

Report findings to the homeowner and, where required by municipal ordinance, a local official (*Septic System Checkup: Inspection Report Forms*)

In some instances, a maintenance service provider may perform an in-home plumbing evaluation, flow trial and dye tracing. However, these procedures should only be performed when a system problem is suspected and should not be done as a routine part of maintenance inspections.

1.1.2 Functional inspections

The functional inspection is used to determine whether a system is adequate to serve the wastewater disposal needs of the household. The functional inspection is especially intended for use during a property transfer as a means to protect the consumer and identify systems in need of upgrade or repair. It may involve, as appropriate, any of the procedures described in this handbook. The following is an outline of functional inspection procedures (see also Tables 1.1 and 1.2).

Gather Records and Data[2] (chapter 2):

1. Determine system conformance (section 2.1.1).
2. Determine the history of the system (section 2.1.2).
3. Acquire the most recent system drawings (section 2.1.3).
4. Acquire information about the system from community officials (as necessary) (section 2.2).
5. Interview the system user/owner (section 2.3).

Evaluate the In-Home Plumbing (chapter 3):

1. Estimate water use (section 3.2).
2. Conduct a leak diagnostics and repair evaluation (section 3.3).
3. Retrofit household fixtures with water conservation devices (section 3.4).

Locate the System Components (chapter 4):

1. Locate and access the septic tank/cesspool (section 4.1).
2. Locate the soil absorption system (section 4.2).
3. Identify any potential retrofits (section 4.4).

Evaluate and Maintain the System Components (chapter 5):

1. Inspect and maintain the septic tank/cesspool (section 5.1).
2. Inspect the distribution box, if handhole is present (section 5.2).
3. Observe overall site conditions (section 5.4).
4. Conduct a flow trial (section 5.5).
5. Conduct dye tracing (section 5.6).

2. Septic system permit records for functional inspections are typically obtained by homeowners and provided to home inspectors. Some home inspectors may provide record research services for a fee (see chapter 2).

Establish an Inspection Schedule (chapter 6)

Report findings to the homeowner, the potential homebuyer, where required by municipal ordinance, a local official, using maintenance and functional inspection reports (*Septic System Checkup: Inspection Report Forms*)

Many of the inspection procedures, described herein, require special equipment, information, and reference materials: Table 1.1, "Inspection Procedures and Necessary Information, Materials and Equipment," lists the equipment and materials necessary for each procedure. Table 1.2, "Types of Inspection and Necessary Information, Materials and Equipment," lists the items required to perform first maintenance, routine maintenance and functional inspections.

Table 1.1 Inspection Procedures and Necessary Information, Materials and Equipment

Procedure Type	Procedure	Items Required
Record and data gathering	Acquiring records from DEM and acquiring information from community officials	•Name of owner •Address of system •Plat and lot of property
	Interviewing homeowners	•System records •Interview information sheet
In-home plumbing evaluation	Estimating water use	•Recent water bills (see section 2.1) •Flashlight •Calculator (optional)
	Leak diagnosis and repair	•Calculator (optional) •Chalk, crayon or tape •Watch or stopwatch •Plumbing replacement parts and tools •Large and small metered collection cups •Clean cloth for wiping fixtures •Water conservation devices and tools as necessary •Pressure and flow meters
Accessing system components	Septic tanks and cesspools	•System drawings (see section 2.1) •Shovel or spade •Metal prod •Electrician's snake •Wrench to open building sewer •Metal detector or other pipe locator (optional)
	Distribution box	•Access to septic tank and associated tools
Evaluation and maintenance procedures	Septic tank (once accessed)	•Sludge measuring device •Scum measuring device •Latex gloves •Rag for cleaning sludge and scum off measuring devices •Bleach and water solution

Procedure Type	Procedure	Items Required
Evaluation and maintenance procedures (continued)	Septic tank (once accessed)	•Pumptruck and pumping equipment •Flashlight for viewing interior •Mirror on pole •Eye protection •Septage spoon
	Cesspool (once accessed)	•Pumpout equipment •Electrician's snake •Flashlight for viewing interior •Angled mirror on pole
	Observation of site conditions	•System drawings
	Flow trial (once the tank is located and inspected)	•Calculator •Garden hose or other water source •Flow meter or other flow measuring equipment
	Dye tracing (once tank is located and inspected)	•Dye tracing solution · dye · protective clothing · latex gloves · 1½ gallon pitcher · measuring spoons · stir stick · funnel · storage bottles · carrying cases · paper towels •Checking for bypasses · municipal permission to access basins · 6 traffic cones · manhole cover hook · rope · flashlight · broom · crow bar •Investigating bypasses · garden hose · watch
Scheduling inspections		•System records (see section 2.1) •Calculator •Most recent inspection report
Reporting findings		•Appropriate report form •Educational materials

Table 1.2 Types of Inspection and Necessary Information, Materials and Equipment

Routine Maintenance	First Maintenance	Functional Inspection
	All items from "Routine Maintenance" and...	*All items from "Routine Maintenance" and "First Maintenance" and...*
•Most recent inspection report	•Name of owner	•Interview information sheet
•Shovel or spade	•Address of system	•Recent water bill (see section 2.1 "Acquiring Records from DEM")
•Metal probe	•System drawings (see section 2.1 "Acquiring records from DEM")	•Food coloring for identifying toilet leaks
•Electrician's snake	•Calculator (optional)	•Chalk, crayon or tape
•Wrench to open building sewer		•Watch or stopwatch
•Metal detector or other pipe locator (optional)		•Plumbing replacement parts and tools
•Sludge and scum measuring device		•Clean, dry cloth for wiping fixtures
•Pumping equipment		•Large and small metered collection cups
•Flashlight		•Water conservation devices and tools as necessary
•Mirror on pole		•Pressure and flow meters
•Appropriate report form		•Garden hose or other water source
•Educational materials		•Dye tracing solution
•Latex gloves		•Municipal permission to access basins
•Rag for cleaning sludge and scum measuring device		•Rope
•Bleach and water solution		•6 traffic cones
		•Broom
		•Manhole cover hook
		•Crow bar
		•Metered (measuring) cup

1.2 Types of Septic Systems and Their Workings

Septic systems come in many forms and state-of-the-art technology is constantly evolving. The vast majority of systems in Rhode Island, however, fall into one of two basic categories: cesspools and conventional systems.

1.2.1 Cesspools

What exactly is a cesspool? Typically, a cesspool is a rock-walled, covered hole that receives wastewater from a home and allows it to drain into the surrounding soil. More sophisticated designs incorporate open-bottom concrete vaults with grated sidewalls and may discharge to a seepage pit or drainfield (refer to Figure 1.1). DEM's *Rules and Regulations Establishing Minimum Standards Relating to Location, Design, Construction and Maintenance of Individual Sewage Disposal Systems* (hereafter referred to as the ISDS Regulations) define "cesspool" as follows:

> The term "cesspool" shall be held to mean any buried chamber, including but not limited to, any metal tank, perforated concrete vault or covered hollow or excavation, which receives discharges of sanitary sewage from building sewer for the purpose of collecting solids and discharging liquids to the surrounding soil. Cesspools are not an approved method of sewage disposal under these Regulations and all existing cesspools are considered to be substandard. (SD 1.00)

Approximately 70,000 Rhode Island homes use cesspools for wastewater disposal. Irrespective of their wide distribution, cesspools provide inadequate wastewater disposal service for many users. Because of this inadequacy, households that rely on cesspools and employ modern appliances, such as garbage grinders, dishwashers and washing machines, tend to have system overflows or backups.

Cesspools also compromise public health and environmental quality. Cesspools allow wastewater to flow to ground- and surface-water resources without providing adequate treatment. This means that disease-causing bacteria and viruses, which are commonly found in raw wastewater, go unchecked. When wastewater pathogens pass freely into the natural environment, they threaten fishing grounds, bathing beaches and drinking water supplies.

DEM strongly encourages owners of cesspools to upgrade their systems; however, the department also recognizes that not every owner has the immediate financial means to replace a septic system. Therefore, this handbook recommends procedures for cesspool maintenance that should be used when cesspools are not obviously failing or causing nuisance. Inspectors and owners should be aware, however, that even cesspools maintained according to handbook procedures provide, at best, marginal treatment and should be considered for upgrade as soon as practicable. Additionally, a failed cesspool is not considered repairable and should be replaced with a conventional septic system in accordance with regulatory standards.

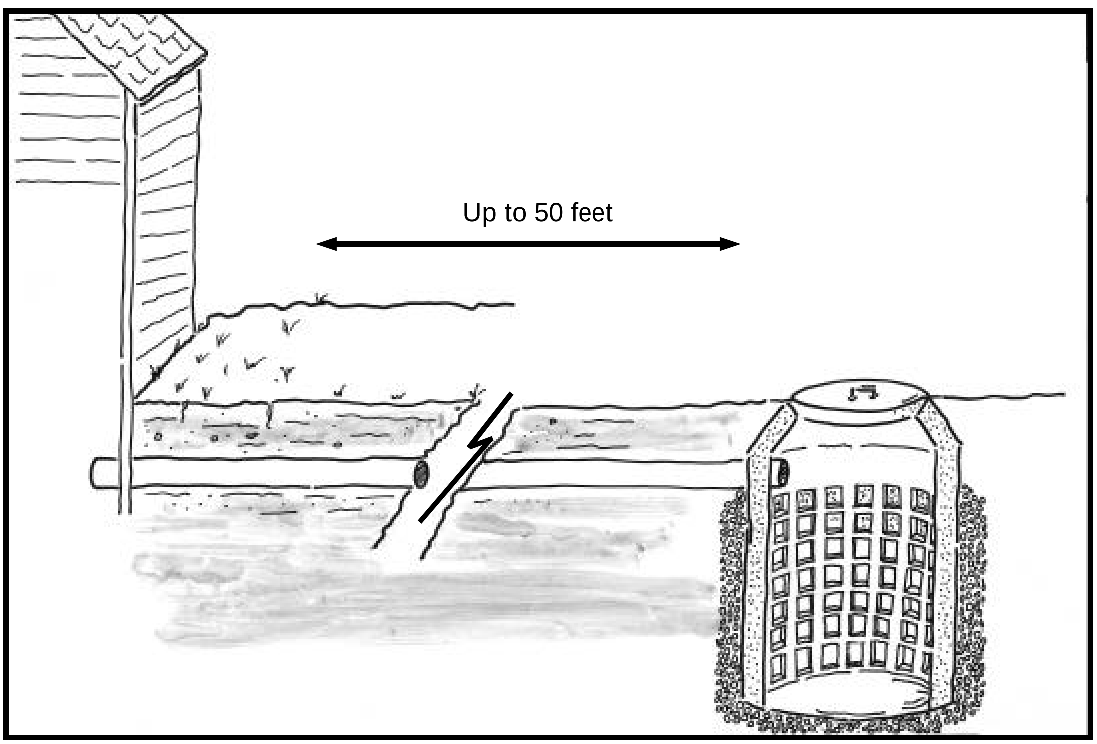

Figure 1.1 Cut away of a typical cesspool with a concrete vault. Wastewater flows by gravity from the building sewer to the cesspool, which may be located up to 50 feet from the foundation.

1.2.2 Conventional septic systems

A well-designed and maintained septic system provides an excellent means for sewage disposal. Once considered only a short-term option, experts now recognize that the conventional septic system can be long-lived and cost effective. In fact, in many suburban and rural areas, conventional septic systems are preferred over sewers.

In Rhode Island, a conventional septic system includes three basic components: building sewer, septic tank, and soil absorption system. The following sections describe the general workings of each.

Building sewer

Houses with conventional plumbing discharge all wastewater through a single pipe, called the building sewer or soil pipe, which delivers wastewater by gravity to some part of a sewage disposal system, typically the septic tank.

Septic tank

Modern septic tanks are generally rectangular boxes that are constructed of either concrete or fiberglass (refer to Figure 1.3a). Older tanks may be round (i.e., cylindrical) and built of substandard material, such as steel, which may corrode over time. Modern tank sizes typically range from 1000 - 1500 gallons, depending on the number of bedrooms served. Some older tanks may be as small as 500 gallons.

A septic tank is used to hold wastewater while the wastewater's solid and liquid constituents separate. The heavier material in the wastewater, called sludge, sinks to the bottom of the tank where it slowly decomposes. The floatable material (e.g., grease and oil), which is refered to as scum, rises to the surface and becomes trapped between devices at the tank's inlet and outlet, either baffles or sanitary tees. When wastewater enters the tank, it pushes relatively clean septage out of the tank from the "clear zone," which is the settling area between the scum and sludge layers, out of the tank .

Typically, solids accumulate in septic tanks faster than they decompose. This accumulation of solids reduces the clear zone of the tank. If the clear zone becomes too small, the incoming wastewater will displace the wastewater before solids and liquids have properly separated. Wastewater with unsettled solids will clog a soil absorption system. Thus, tanks need to be pumped to maintain an appropriate clear zone. Failure to pump in a timely manner will cause the soil absorption system to fail.

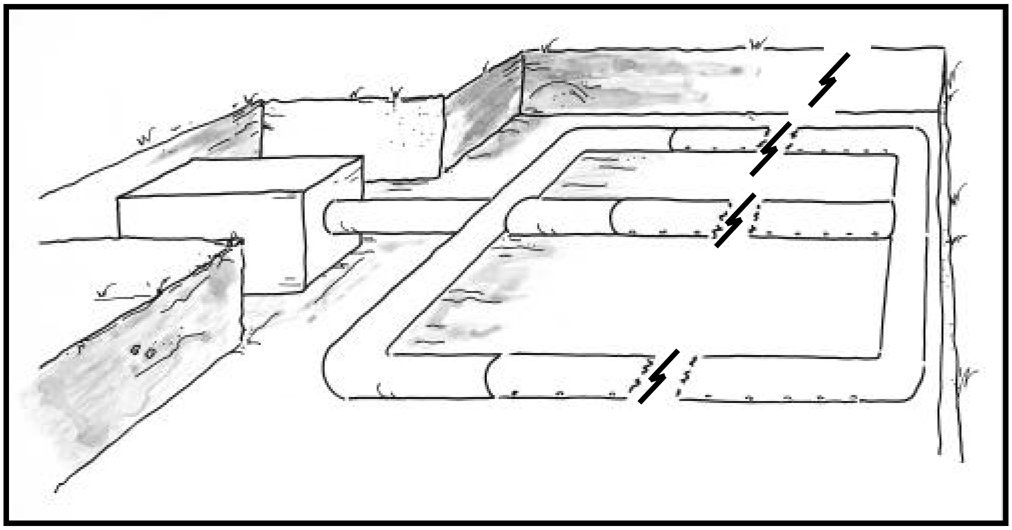

Figure 1.2a Soil absorption bed system

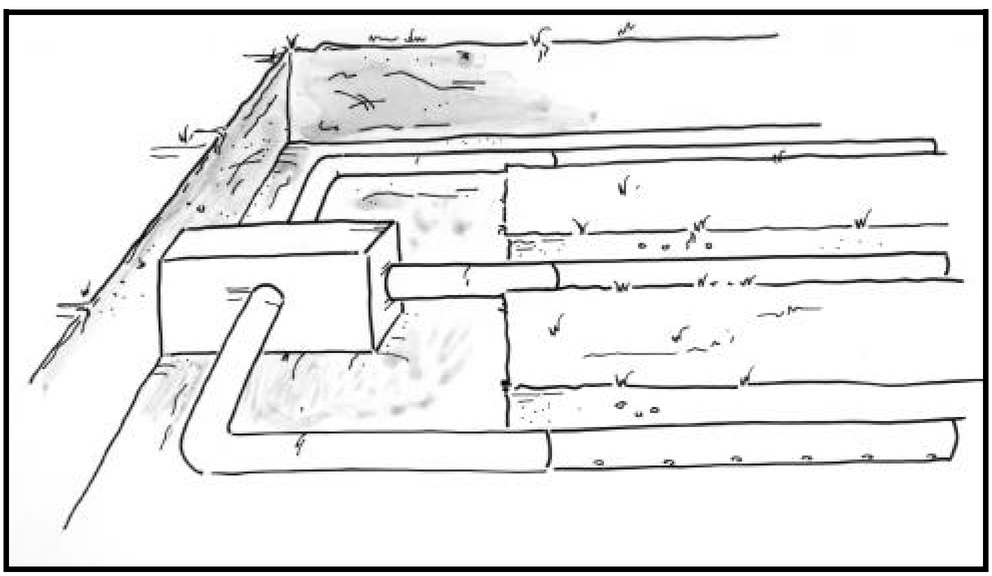

Figure 1.2b Soil absorption trench system

Soil absorption system

When effluent leaves the septic tank, it flows to the soil absorption system. If the septic tank of a conventional system is maintained in accordance with the procedures of this handbook, the soil absorption system should function properly for many, many years, perhaps in perpetuity. Three basic types of soil absorption systems are commonly used in Rhode Island: seepage pits, disposal beds and disposal trenches.

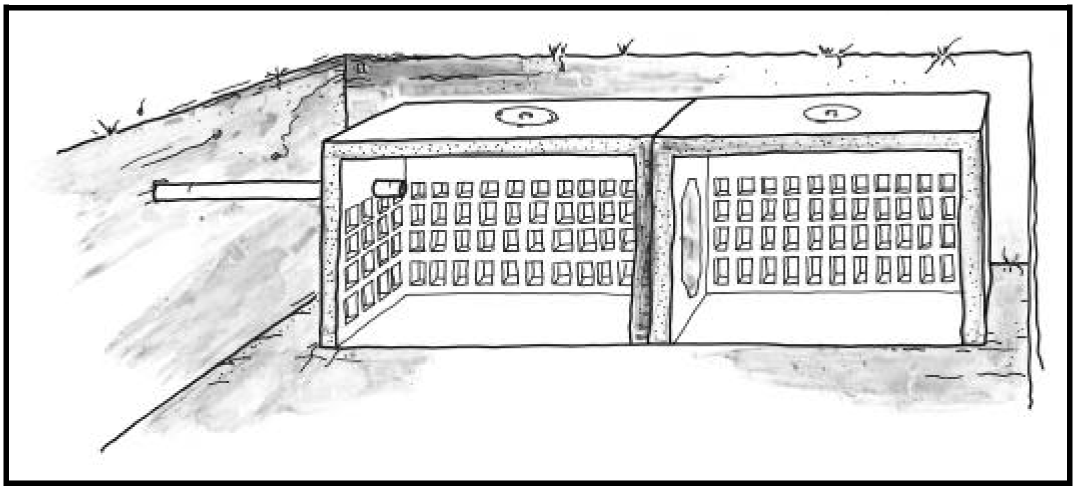

Figure 1.2c Cut-away view of soil absorption two galley-style seepage pits in series

Seepage pits (see Figure 1.2c)—sometimes referred to as flow diffusers or galleys—employ bottomless concrete structures with grated sides. The design of a seepage pit is similar to that of a cesspool; however, a seepage pit, by regulatory definition, is always downline from a septic tank.[3]

Disposal beds and disposal trenches are generically referred to as drainfields, but are in fact different. A disposal bed system is a shallow rectangular excavation that is partially backfilled with stone, lined with a network of perforated distribution pipe, and then filled to grade with earth. A disposal trench system consists of two or more parallel ditches that are partially filled with stone, each lined with singular perforated pipe, covered with a porous liner and then filled to grade with earth. Both system types typically utilize a distribution box (i.e., D-box, see Figure 1.3b). The D-box follows the septic tank, splitting the flow into approximately equal amounts, which it channels to the drainfield lines.

3. When a cesspool system has two chambers, the second is usually referred to as a seepage pit.

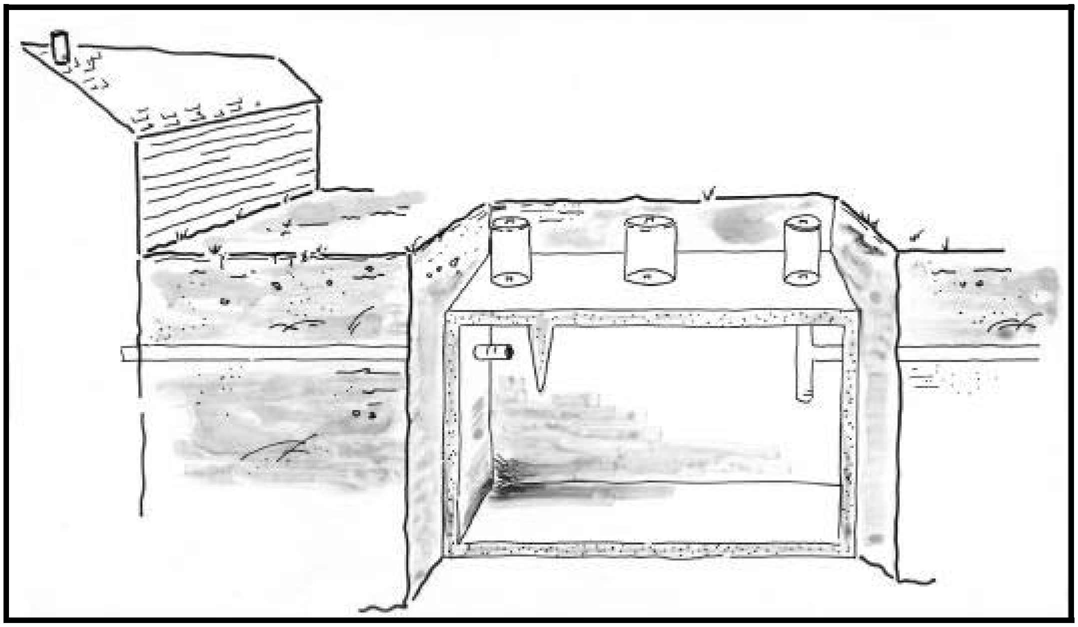

Figure 1.3a Cut-away view of a conventional 1000-gallon septic tank. Wastewater flows by gravity from the building sewer to the septic tank, followed by the distribution box and then to the soil absorption system.

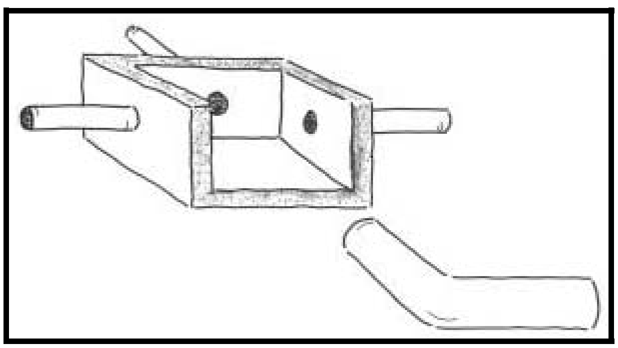

Figure 1.3b Exploded diagram of a conventional distribution box.

CHAPTER 2
Gathering Records and Data for Inspections

Determining the adequacy of a septic system requires knowledge about its design, use and maintenance. Such information may be obtained by reviewing its application, use and maintenance records and by talking with the system's users.

Inspectors should make certain to have written records available at the time of inspection. Table 2.1, "Obtaining Septic System Application, Use and Maintenance Records," lists types of records and where they can be obtained. These records are necessary to ensure system conformance. The records will also provide valuable time savings when attempting to locate buried components . Usually, records are gathered by the homeowner and provided to an inspector; however, this does not preclude inspectors from gathering records as a service to homeowners.

Table 2.1 Obtaining Septic System Application, Use and Maintenance Records

Type of information	Name of record	Availability
Application[a]	Applications for new system, alteration & repair Certification of conformance Certification of construction	DEM Homeowner Building official System designer
Use[a]	Septage pumping records Water bill	Homeowner or tenant Inspector/pumper (pumping records only)
Maintenance	Maintenance inspection report	Homeowner Wastewater management official

Note: a. Some information regarding application and use may have been recorded in functional inspection and first maintenance inspection reports. However, such information should be checked against the original source, whenever possible, to avoid repeating any data-gathering errors.

The following sections describe how inspectors and homeowners may obtain information from DEM and community officials. It also discusses how inspectors should interview homeowners and other system users, such as renters.

2.1 Acquiring Records from DEM

Application records demonstrate that a system is properly permitted. Most systems installed after April 6, 1968 will have application records. Homeowners and inspectors may obtain copies of these records from DEM, which generally has the most comprehensive and up-to-date records.

Whenever possible, an inspector should review records with the homeowner to make sure they are complete. If a homeowner notes any discrepancy, the inspector should request documentation. Homeowners should follow up with local officials and DEM regarding any discrepancies that are found.

DEM keeps records at 235 Promenade Street, Providence in the Office of Water Resources. DEM's Office of Technical and Customer Assistance is available to help the general public in obtaining permits. DEM's telephone number is in the Blue Pages of the telephone directory. To obtain optimum assistance, customers may wish to call DEM before visiting the office in person. With respect to DEM records, a functional inspection should include a review of the following:

1. System conformance and construction certificates, and optionally, a functional inspection may include records of system history such as violations or applications for repair or alteration.
2. Most recent as-built plans.

2.1.1 System conformance and construction

A functional inspection should include a determination of whether a system is conformed and constructed in accordance with regulations. All conformed systems are recorded in a reference set, entitled *Conformed ISDS Applications*. Conformance records show that a system was constructed and installed in accordance with the regulations that were in force at the time of the application approval. *Conformed ISDS Applications* lists eight fields of information for each system:

1. Year of application.[4]
2. City/Town of system location.
3. Application number.
4. Microfilm number.
5. Street of system location.
6. Plat number.
7. Lot number.
8. Applicant name.

The reference indexes septic systems by town of location, and either street of location or application number.

In January 1992, DEM computerized its septic system records. Reference numbers since then have two parts that are separated by a hyphen. The first four digits include a two digit number for the year (e.g., "92" for applications in 1992) and two digits representing town number in an alphabetized listing (e.g. "30" for Scituate). The second part is a number of 1-4 digits representing order of receipt (e.g., "99" for the ninety-ninth ISDS application received by DEM in a given year). Thus, the application number for the system just described would be: 9230-99. Applications prior to 1992 were assigned reference numbers using other systems.

2.1.2 Determining system history (optional)

Though determining system history is not necessary for either functional or maintenance inspections, homeowners and potential homebuyers may wish to find out whether a system has a good history of regulatory compliance. The records of new construction, alteration or repair are bound in logbooks cataloged by year, town and application number. These records are available through DEM's Office of Technical and Customer Assistance.

4. An application, with proper renewals and transfers, may be valid for years after it has been approved. Thus a system may be built in one year, but have an application for another year.

DEM also keeps records of violations in a log entitled *EE. RIDEM ISDS Status Report*. The report is indexed by year, town, and street address. It dates back to 1982. Records of violations are available by request at the DEM Office of Technical and Customer Assistance, 235 Promenade Street, Providence.

2.1.3 Acquiring the most recent system drawings

To access system components, inspectors will need to know where system components are located. System drawings generally give reliable information. Using the techniques described in "Determining system history" (section 2.1.2), find the most recent permit application number for the system. Find the microfilm number in *Conformed ISDS Applications*. To obtain a hard copy of the application, contact DEM's Office of Technical and Customer Assistance.

2.2 Acquiring Information from Community Officials

Local officials may keep permit or maintenance records. Generally, building officials or wastewater officials provide appropriate points of contact.

Building officials keep records of all building permits. Before a town issues a certificate of occupancy, state law requires the town to confirm the existence of an up-to-date certificate of conformance for the septic system.

Towns with wastewater management programs may keep records of inspection and maintenance. To acquire such information, call the appropriate official as listed in the Blue Pages of the telephone directory. For questions about who to contact, call the town hall. DEM's Office of Water Resources is currently developing a reference text that also provides this information.

2.3 Interviewing System Owners

The functioning of a septic system is dynamic and complex. Sometimes observations during an inspection have more than one possible interpretation. Interviewing a system's owner and users may help to interpret inspection results. Figure 2.1 lists important information an inspector may wish to obtain from the homeowner or system users.

HOMEOWNER/OCCUPANT RECORDS & DATA, as available

Information collected pursuant to this section is to be provided voluntarily and at the discretion of the property owner. The property owner is solely responsible for record and data accuracy and completeness. The inspector assumes no responsibility for the accuracy of information provided by the property.

Indicate whether the following information was made available during the inspection. Attach copies of available records. If the property owner states that any of the following services were not provided—or in the case of application records that the system was installed prior to regulations (April 1968) — indicate not applicable (N/A). If the property owner states that partial records were provided, indicate "partial."

Source of Records & Data

Records and data were given to the inspector by:

_______ Property owner _______ Realtor ________ Other _____________________________

Application Records

Yes	No	N/A	
☐	☐	☐	Applications for septic system (inclusive of new systems, alteration, repairs). Indicate the number of each: ______ New system ______ Alteration ______ Repairs
☐	☐	☐	Certificate of Construction
☐	☐	☐	Certificate of Conformance

Use Records

Yes	No	N/A	Partial	
☐	☐	☐	☐	Last two septage pumping bills
☐	☐	☐	☐	Water bills for the last 12-24 months

Maintenance Records

Yes	No	N/A	Partial	
☐	☐	☐	☐	Maintenance inspection reports

Resident Data

During the last 12 months, the inspected residence housed _____ year-round occupants

Plat Number ______ Lot Number ______

Figure 2.1 Important homeowner records and information as required for the functional inspection, see *Septic System Checkup: Inspection Report Form.*

Begin the interview by carefully reviewing all pertinent written information. Some written records may be out of date or contain inaccuracies. An interview may help to verify data on written reports.

Interviews are best done in person. When interviewing be sure to maintain a courteous and professional demeanor. Make the person being interviewed feel comfortable. This will help to optimize the quality of the interview. Interviews also provide an excellent opportunity to educate the user about how to care for their septic system. Inspectors may wish to leave educational materials with system users. Educational materials are available from DEM, the University of Rhode Island's Onsite Wastewater Training Center, and from some municipalities.

CHAPTER 3
In-Home Plumbing Evaluation

Faulty or outdated plumbing may add significantly to the wastewater load on a septic system. Overloaded systems tend to fail and as a result may generate expensive repair bills. Also, faulty plumbing adds to overall water use and may result in expensive water bills.

Inspectors performing functional inspections should carefully check all plumbing, water fixtures and water-using devices for malfunctions.[5] Maintenance inspections, however, will not usually include in-home plumbing evaluation.

3.1 Wastewater Routing

For the purposes of this handbook, wastewater routing refers to the manner in which gray and black water outlets exit from a building. Unless otherwise allowed by a DEM-approved permit, all wastewater should route through the building sewer to the septic system. Inspectors should visually check to make certain that *only one* wastewater pipe exits the basement and, in particular, that the washing machine outflow goes to the septic tank. Homeowners may illegally route these out a window or to a storm drain.

If a gray water discharge to a dry well is approved by the department and it has not been altered since its permit approval, then it is usually an acceptable discharge.[6] Nevertheless, having a permit approval does not ensure that a dry well functions properly. Homeowners should keep in mind that most inspectors *do not* assume responsibility for dry wells and therefore do not include them as part of a functional

5. While checking for faulty plumbing, an inspector may also wish to take the opportunity to locate the building sewer to help find the septic tank.
6. Black water discharges to dry wells are prohibited by regulation.

inspection. Currently, there is no procedure to ensure the proper functioning of a dry well.

Sump pumps and foundation drains should not be routed to the septic system. Water volumes generated by these devices will quickly overload a system and cause backups or other hydraulic failures. Instead, these devices should outlet to the ground surface or a dry well.

3.2 Estimating Water Use

Inspectors should analyze water use as part of the functional inspection. High water use contributes to septic system failure in two major ways: (a) high water flows tend to stress the absorptive capacity of soils; and (b) overly large flows are likely to carry over solids from the septic tank and thereby clog the soil absorption system. Inspectors should use the following method to diagnose water-use problems when a water meter is present.

3.2.1 Estimating water use with a water meter

1. Obtain water bills from the last 12-24 months including records of previous meter readings. Inspectors should obtain water bills from the homeowner (refer to section 2.3).
2. Locate the water meter by following any water line back to the main water supply line inlet. The meter may be in the basement or outside the house. Water meters generally have protective flap covers that lift open.
3. Read the meter. Water meters come in three types as shown in Figure 3.1. Use the Equation 3.1 to approximate water use per capita per day. Inspectors should also ask residents about their outdoor water-use habits (refer to section 2.3 for information on conducting interviews). Typical outdoor water use (e.g., lawn and garden) adds approximately 25 percent to water consumption. Inspectors should subtract outdoor water use from total water use before making the calculation in Step 3. Table 3.1 shows some general ranges for

Equation 3.1 Water Use Per Capita Per Day

$$W = (R_2 - R_1)/D \cdot O$$

Where:

- W = water use per capita per day
- R_2 = most recent water meter reading
- R_1 = oldest water meter reading
- D = number of days elapsed between the water meter readings
- O = average occupancy of the residence between readings (R_1, R_2)

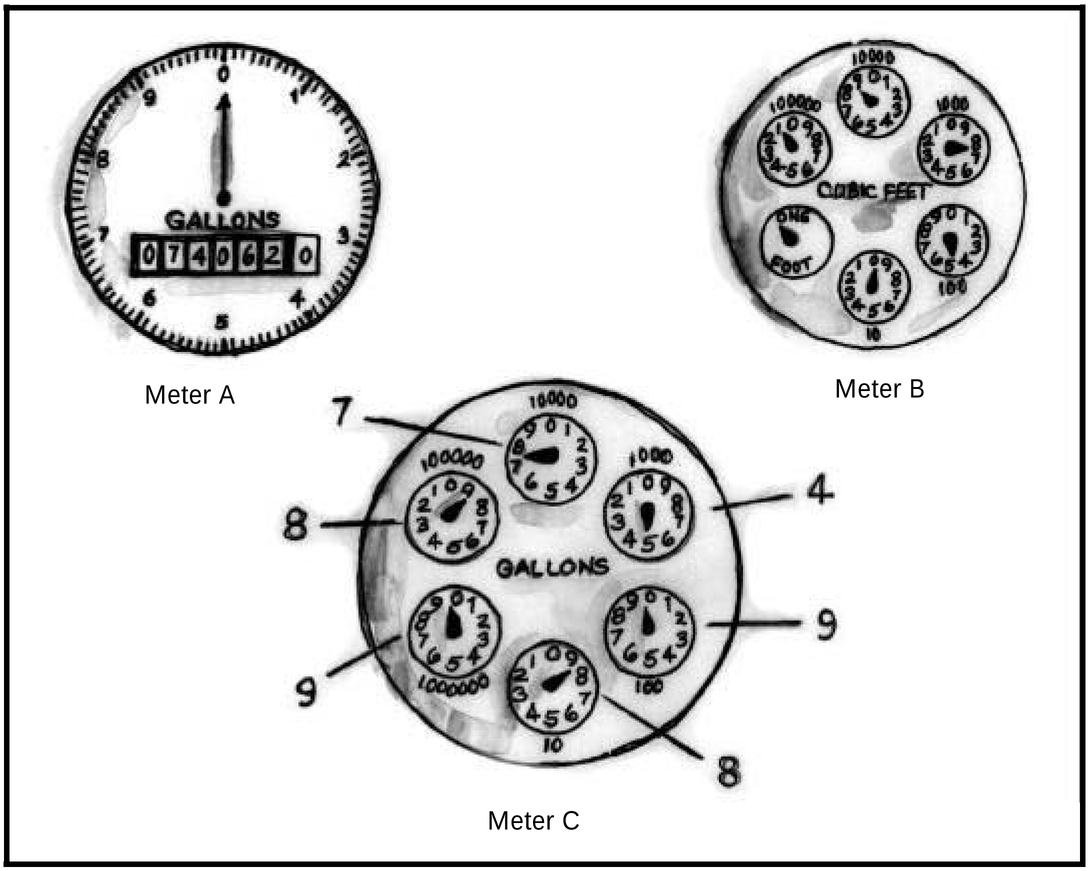

Figure 3.1 Water meters — Meter A reads 74,062.0 gallons, Meter B reads 187,499 cubic feet and Meter C reads 9,875,890 gallons.

Table 3.1 Typical Residential Outdoor Water Use

Type of use	Percentage of outdoor water use	Percentage of total water use
Lawn and garden	75-100	25-30
Swimming pool	0-12.5	0-5
Car washing	0-12.5	0-5

Note: Adapted from *Evaluating Urban Water Conservation Programs* (Planning and Management Consultants, 1993).

outdoor water use as a percentage of total usage.

4. Check the meter for units of measure.[7] It should read in either gallons or cubic feet--sometimes hundreds of gallons or cubic feet. Usage, as calculated in Step 3 for a home that is occupied throughout the day, should not exceed 75 gallons or 10 cubic feet per person per day. Water use in homes where occupants are absent for long periods during the day should be less--no more than 50 gallons per person per day.

Water consumption above these levels suggests leakage and may compromise system function. If excessive water use is found, inspectors should follow up with leak diagnosis as described in section 3.3.

3.2.2 Estimating water use in unmetered homes

Many homes on private wells do not have water meters. When a water meter is unavailable, water use cannot be measured directly. Inspectors may rely on home occupancy to identify potential overloads. Septic system permits are granted for use by up to two year-round occupants per bedroom. Occupancy in excess of two occupants per bedroom may damage the system. To calculate occupancy per bedroom, refer to Equation 3.2. Inspectors should note excess occupancy.

7. Cubic foot = 7.48 gallons

Equation 3.2 Household Occupancy Per Bedroom

$$O_B = O_T/B$$

Where:

O_B = Occupancy per bedroom

O_T = Year-round occupancy, averaged over 12 months

B = Number of rooms in a house, which are of at least 100 square feet in floor area and which have at least one window and closeable passageway (i.e., doorway (see also Rule SD 1.00 of the ISDS Regulations)

Because excess water use may be generated by faulty plumbing, all fixtures and appliances in an unmetered home should be inspected carefully. Refer to section 3.3, "Leak Diagnosis and Repair."

In homes where there are water-use problems and no water meters, owners may wish to consider installing sewer-water meters. These meters apprise both the homeowner and septic system inspector of exactly how much water flows to the septic system over a period of time. Meters can help to find out if plumbing leaks or improperly routed water-using devices are adding to the hydraulic load in the septic system, and whether the home occupants are using more water than the system can handle.

3.2.3 Reducing excessive water use

In most cases where water use is above the acceptable range (approximately 50 to 75 gallons per person per day--see section 3.2., "Estimating Water Use"), it is because of leaky or out-of-date (i.e., high volume) water fixtures. Water-use problems can often be fixed by retrofitting a fixture with a water conservation device or by troubleshooting and repairing leaks. Sometimes, however, water-use problems may be best fixed by replacing a faulty fixture. Table 3.2, entitled "Intervention for Excess Water Use," lists typical remedies for residential water-use problems.

Table 3.2 Intervention for Excess Water Use

Fixture	Intervention	Repair person	Comment
Toilet	Retrofit	Homeowner Plumber	Retrofit devices are inexpensive, but work well only if carefully selected, installed and adjusted. Refer to section 3.4, "Retrofitting Household Fixtures with Water Conservation Devices."
	Leak repair	Homeowner Plumber	A leaky toilet can waste well over 100 gallons of water per day (see section 3.3.2, "Toilets").
	Replacement	Plumber	Toilets with a 1.6 gallon flush are required for replacement by code.
Faucets	Retrofit	Homeowner Plumber	Not recommended for faucets with intentionally high flows. Refer to section 3.4, "Retrofitting Household Fixtures with Water Conservation Devices."
	Leak repair	Homeowner Plumber	Due to the many types of fixtures, leak repair may require a plumber's service.
Showerheads	Retrofit	Homeowner Plumber	Retrofit devices are inexpensive, but work well only if properly selected, installed and adjusted. Refer to section 3.4, "Retrofitting Household Fixtures with Water Conservation Devices."
	Leak repair	Homeowner Plumber	Depending on the location of the leak, this may require the services of a plumber.
Water treatment appliance	Leak repair	Homeowner Plumber	A leaky water treatment appliance can waste hundreds of gallons of water per day. Refer to section 3.3.4, "Water treatment Appliances."

3.3 Leak Diagnosis and Repair

The following sections discuss step-by-step procedures for identifying and repairing leaky plumbing fixtures.

3.3.1 Measuring flow rate

Flow rates may be determined by measuring volume of flow over a period of time and substituting the measurements for variables in the flow rate equation. Inspectors should use Equation 3.3 when calculating the rate of flow from leaks.

Equation 3.3 Flow Rate

$$R = V/T$$

Where:

R = Flow rate
V = Volume of water accumulated
T = Time elapsed during accumulation of flow

3.3.2 Toilets

A leaky toilet may easily contribute a hundred gallons of water per day to the wastewater flow (see Table 3.3, "Flows from a Leaky Toilet"). Leaky toilets have also been found to cause septic system failure.

The following procedures may be used to determine if a toilet is leaking:

1. Sometimes leaks can be heard. Flush the toilet, wait for it to complete its refill cycle and then listen for flowing water. If no sound is detected, use either Procedure 2 or 3 to identify silent leaks.
2. Add a small amount of food coloring (as it will not stain) to the toilet cistern (i.e., tank or reservoir). Wait fifteen minutes. If the toilet is leaking, dye will appear in the toilet bowl.
3. Shut off the in-flow to the cistern and mark the level of water in it with crayon, chalk or tape. Wait a period of time--thirty minutes or so--and recheck the water level. If it has dropped, then the toilet is leaking. For a seeping (i.e., slight) leak, water level in a 3-5 gallon cistern may drop about an inch in 30

Table 3.3 Flows from a Leaky Toilet[a]

Leak type	Approximate water loss (gallons per day)
Seeping	30+
Open (stuck valve)[b]	6000

Notes: a. Adapted from *How Much is Enough* (Judd, 1993).
b. Assumes 4 GPM flow (i.e., as from an open valve).

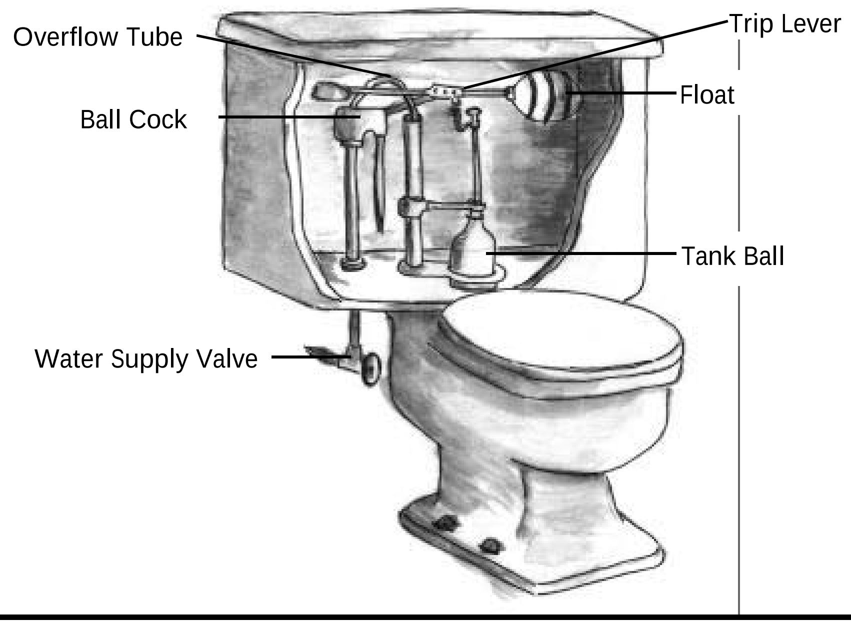

Figure 3.2 Diagram of a toilet

minutes. This represents a loss of approximately a half gallon or 24 gallons per day (see Table 3.3).

Toilet leaks are generally easy to fix. The following steps for fixing toilet leaks have been adapted from the text *Onsite Wastewater Disposal* (Perkins, 1989).

1. Check the water level in the cistern to make sure that water is not continuously running down the overflow tube. If it is, turn the adjustment screw to lower the float. If there is no adjustment screw, carefully bend the float arm.
2. If water flows in the cistern when the float is fully elevated, replace the shut off valve.
3. Inspect the overflow pipe below the water level. Replace it if there are any pitholes.
4. Check the plunger (tank ball) at the bottom of the cistern to see if it seals

properly. Remove any debris and replace any worn parts.

5. If the plunger does not drop exactly into the opening in the cistern bottom, adjust the vertical rod and/or the loops through which it passes to allow it to drop freely.
6. Make sure that the chain on the plunger rod is not twisted or caught.

3.3.3 Faucets

A water faucet that drips just a couple drops per second may add many gallons to the daily wastewater load (see Table 3.4). Often a leak can be fixed by changing a washer. If a faucet is leaking, the washer should be changed.

Sometimes leaks are not apparent. To check a fixture that is suspected of leaking, use the following procedure:

1. Open the fixture and allow water to flow for approximately 2-3 seconds.
2. Firmly close the fixture, but do not over tighten. The fixture should be closed as it would be after normal use.
3. Dry the fixture completely with a clean cloth, especially around the spout, control valves, and any plumbing joints. Watch carefully for 10 seconds to see if droplets form in the dried areas. If droplets form, recheck to be sure the control valves are firmly closed and dry the fixture again. Watch for another 10 seconds. If droplets continue to form on any part of the faucet or spout, this indicates a leak. Inspectors can use Procedures 4 and 5 to measure the rate of leakage; however, these are optional.

Table 3.4 Comparison of Leaks and Flows from a Typical Faucet [a]

Flow	Water loss (gallons per day)
Slow drip (approximately 1 drop per second)	36
Heavy leak	180
Fully open valve [b]	3600

Notes: a. Adapted from *How Much is Enough* (Judd, 1993).
b. Water loss rates assume a flow of 2.5 gallons per minute when a faucet is fully open.

Figure 3.3 A slow steady leak (i.e., one drop per second) from a faucet may create a water loss of 36 gallons per day. A heavy leak may lose 180 gallons per day. A fully open faucet flowing at 2.5 gallons per minute will pour out 3600 gallons per day.

4. Place a dry metered cup or other collection device under the tap. Note the time and allow it to collect for at least fifteen minutes.

5. After fifteen minutes or so, recheck the collection cup. The flow rate of the leak can be calculated using the equation described in section 3.3.1, "Measuring flow rate."

3.3.4 Water treatment appliances

Water treatment appliances include softeners and purification systems. Water softeners remove minerals from domestic water. Water purifiers use filters to remove pathogens and low-level toxins from domestic water.

Most water treatment appliances backflush routinely. The backflush leaves the system via a small-diameter hose. The hose typically directs flow to one of three outlets: (a) the septic system via the washing machine outlet; (b) a sump pump outlet; or (c) an auxiliary soil absorption system (i.e., dry well) that is separate from the septic system.

Water treatment appliances backflush at a very high flow rate. Sometimes the backflush valve of a softener or purifier may stick open or leak. Such a leak may waste several hundred gallons of water per day. If a leaky softener or purifier is routed to the septic system, the system may become overloaded and back up. When softeners and purifiers are present, the following procedures should be used to locate the backflush outlet and check for leakage.

Finding water treatment backflush outlets:

1. Ask the residents. If the residents are unable to assist, proceed to Steps 2-4.
2. Some water treatment appliances are installed under the kitchen sink. Check there first.
3. Often, softeners and purifiers are designed to treat all the water coming into the house and thus intercept the main water supply line. If not found under the sink, locate a softener or purifier by following any water supply line (e.g., a cold water line from a sink) back to the incoming main.
4. Softeners and purifiers usually have four lines: (a) an incoming line--the main supply line coming into the house; (b) an outgoing line--the continuation of the supply main that delivers water to the house after it is treated by the appliance; (c) a bypass line--a line with a valve that will allow water to bypass the treatment appliance; and (d) a backflush line--usually a small, clear or black rubber hose that is approximately 10 feet long, though sometimes more, which directs backflush out of the appliance.
5. Follow the backflush line to its outlet. If the backflush line terminates in the building sewer or in another line that feeds to the septic system, it should be checked carefully for leaks. See the next procedure, "Identifying water treatment appliance leaks."

Identifying water treatment appliance leaks:

1. Locate the backflush line. See the previous procedure, "Finding water treatment backflush outlets." A backflush line will generally make a loose, unfastened connection to its outlet. Open the outlet and--being careful to avoid spillage--move the line from the outlet to a metered container (approximately 1 gallon). Observe the water treatment appliance and confirm that it is not performing a routine backflush. Generally, water treatment appliances use a timer to control backflushes. Backflushes typically occur late at night, so as not to conflict with normal water usage.
2. Backflush from a stuck valve usually flows out of a water treatment appliance under pressure and may squirt from the line. If water flows lightly and does not clearly indicate a leak, place the line in the container for 5 minutes and observe whether water flows continually. A very small amount of water may

be residual from a previous flush cycle.

3. In some cases, inspectors may desire to calculate the flow rate. Refer to section 3.3.1, "Measuring flow rate."

3.4 Retrofitting Household Fixtures with Water Conservation Devices

Excessive household water use may result from old, high-flow fixtures. Installing conservation devices is typically quick, inexpensive, and will reduce the wastewater load on a septic system. Retrofitting should, however, be undertaken thoughtfully, to avoid inappropriate remedies. Anyone who installs a conservation device should make sure of the following:

1. The new device fits the use of the fixture. Most homeowners will remove devices that are too restrictive and may damage the associated fixture in the process.
2. Water savings justify the cost of the device.
3. The new device complies with code (refer to Rhode Island State Building Code, Plumbing Code Regulation SBC-3, Article 15, Water Supply and Distribution, as amended).
4. The homeowner and/or potential homeowner are happy with the look and operation of the new device.
5. The simplest installation possible is used. Inspectors should be mindful of their skill limitations. Some installations may require a licensed plumber.
6. The retrofits are recommended after measuring flows and water pressure. Water pressure below 60 pounds per square inch requires specially designed devices. Use an in-line pressure meter to determine pressure.

   Installing conservation devices in a toilet may seem simple, but can be tricky. Inspectors should be certain to use only properly designed and manufactured devices. Makeshift retrofits can damage toilets. Never use a brick or piece of concrete as a water displacement device. Both of these materials disintegrate and may gum up plumbing mechanisms over time.

CHAPTER 4
Techniques for Accessing Septic System Components

When a system receives its first maintenance or functional inspection, the location of system components may be unknown. The following techniques are simple methods to help an inspector find the exact location of the septic tank or cesspool and to approximate the location of the distribution box and soil absorption system. Refer to chapter 5, "Evaluation and Maintenance Procedures for Septic System Components," for information on how to inspect and maintain these components.

4.1 Locating Septic Tanks and Cesspools

Several procedures may be used to locate a septic tank or cesspool. They are presented here with the least invasive procedures listed first. In general, a septic tank will be located 5-15 feet from the foundation of the house and a cesspool will be located up to 50 feet from the foundation. Keep in mind, locating a septic tank or cesspool is as much an art as it is a science. Refer to section 4.3 for instructions on how to open septic system components.

1. Check for a past maintenance inspection or functional inspection report. The homeowner and the inspector who wrote the report should have a copy. Municipalities with septic system maintenance programs may also keep reports.
2. If no written records exist, ask the homeowner. The homeowner may know approximately or even exactly where the septic tank or cesspool is located.
3. Look for inspection ports at ground level. Tanks installed after 1990 should

have ports to grade. Also, many cesspools have manholes to grade. Tanks installed prior to 1990 should have accesses that are no more than 1 foot below grade.

4. Acquire a copy of the as-built design plans. The plans should accurately show the location of all system components. DEM keeps plans and other septic system permit information for most systems built after April 1968 (refer to section 2.1.3, "Acquiring the most recent system drawings"). Homeowners or local building inspectors may also have copies.

5. Look for indirect evidence of the building sewer pipe location. The sewer pipe usually exits the basement directly below the sewer vent pipe. Also, most building sewer lines will exit the basement from the area beneath the bathroom. If no access to the house is permitted, look for a bathroom window, which is typically a small window, to help determine the approximate vicinity of the pipe.

   After determining the general location of the sewer line, precisely locate the tank using a steel probe. Most tanks are made of steel-reinforced concrete, so a metal detector may also be used. Attempt to locate buried cesspools in the same manner; however, as many cesspools have no metal parts, probing with a rod may be necessary. Be careful; probes may puncture orangeberg pipes.

6. If other procedures do not work, and if the inspector is given access to the basement, the building sewer can be used to help locate the tank.

   Open the building sewer cleanout closest to where it exits the basement and insert a snake. (An electrician's snake works best.) The inlet baffle, tee or the furthest wall of the tank or cesspool should stop the snake as it is inserted. The length of snake inserted approximates the distance to the tank or cesspool from the building sewer access. A building sewer typically runs in a straight line to the cesspool or septic tank. Inspectors should note, however, that some building sewers bend or corner, offsetting the location of the tank or cesspool from the outlet in the basement.

   Alternatively, a float with a remote sensing device may be used to locate a septic tank. Refer to the manufacturer's instructions for proper use.

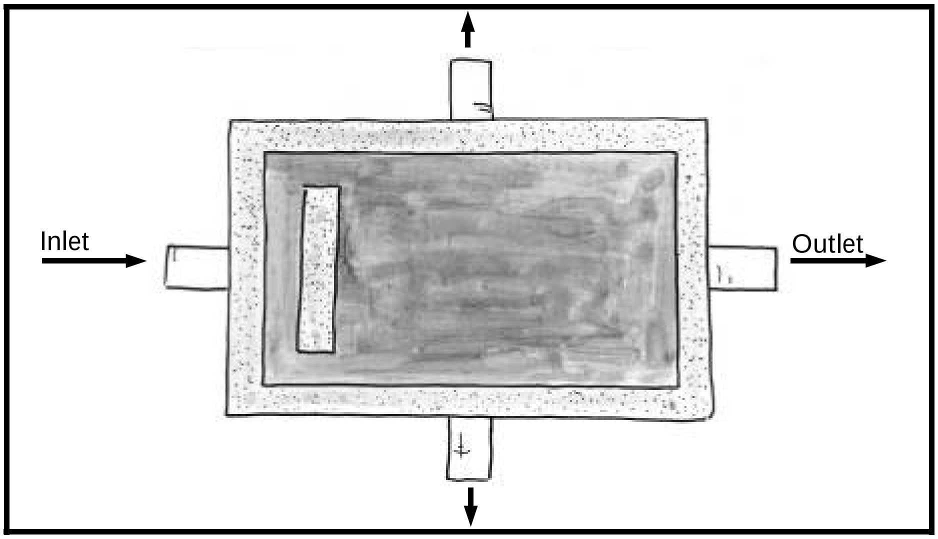

Figure 4.1 Top view of a distribution box

4.2 Locating Distribution Boxes and Soil Absorption Systems

The following techniques may be used to approximate locations for both the distribution box and soil absorption system.

1. Refer to past inspection reports. Ask the homeowner for copies. If there is a wastewater management program in town, inspection reports may also be available through the program. Refer to section 2.2 for procedures on acquiring information from community officials.

2. System components of conventional systems are constructed in accordance with as-built plans. Obtain the plans prior to the site visit and use the plans as a tool for locating components. See section 2.1.3, "Acquiring the most recent system drawings."

3. If system drawings and past inspection reports are unavailable, observe the direction of the outlet pipe of the septic tank to determine the general location of the distribution box and soil absorption system. Occasionally, the distribution box will have an inspection port (i.e., handhole) at the ground

level, providing direct access and evidence of location. Refer to section 4.3 for instructions on how to open septic system components.

4.3 Opening and Closing Component Accesses

In some cases, a component will have an access at grade. In others, the access is buried. A system component, once located, still needs to be opened. After the inspection is completed, it will also need to be closed. It is important to complete these procedures carefully and with minimal disturbance to any landscaping.

4.3.1 Accesses at grade

Sometimes, a septic system component is accessible via a riser. See Figure 4.2a, "Top view of septic tank risers at grade level." Risers are vertical tubes with tight-fitting fiberglass or concrete covers at, slightly above, or just below the ground surface. Open a fiberglass cover by unfastening the lid and lifting it off. If the lid is locked, ask the homeowner to open it. Concrete covers do not usually lock or latch.

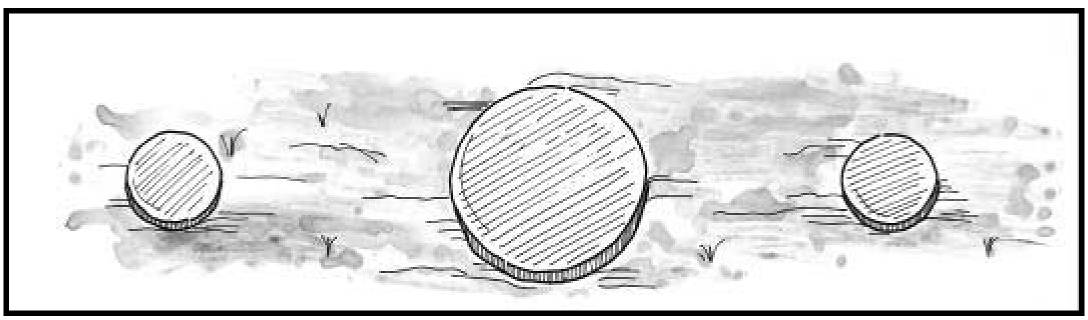

Figure 4.2a Top view of septic tank risers at grade level.

Close the access in the reverse manner to which it was opened. Be certain to replace any locks.

4.3.2 Buried accesses

Use the following procedures to open a buried access:

1. Locate the system component (refer to sections 4.1 and 4.2).
2. Approximate the location of the inspection ports or central manhole based on the anticipated component size. See Figure 4.1, "Top view of a distribution box" and Figure 4.2b, "Top view of a typical unearthed septic tank."
3. Use a spade to carefully cut and remove sections of sod. After removing the ground cover, dig as necessary to uncover the tank inspection ports. Pre-1990 code did not require that septic tanks have an access at grade. Post-1990 code requires accesses at grade.

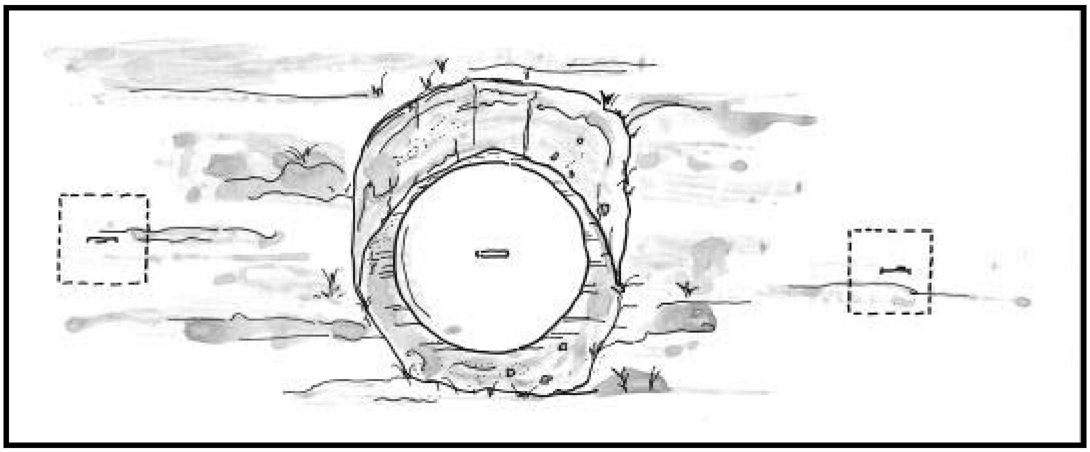

Figure 4.2b Top view of a typical unearthed septic tank main access (manhole). (Current regulations require a manhole and two inspection ports. DEM is revising the regulations to require two 20-inch manholes at the influent and effluent ends of the tank and no center manhole.)

Use the following procedures to close a buried access:

1. Be sure all port and manhole locations are correctly indicated on the current inspection report and the reports for first maintenance inspection, functional inspection and certificate of construction, as available. All component accesses should be located using swing-tie measurements. The term swing-tie

refers to two or more measurements made from the corners of a building foundation that intersect only at the point to be located. The length of each swing-tie from the intersection to the foundation corner is recorded to make finding the septic system easy.

2. Be sure port and manhole gaskets and seals are properly in place and intact before closing.
3. Rebury the access. Carefully replace the sod and tamp it down to ground level.

4.4 Suggested Retrofits for Conventional Septic Systems

The following retrofits are recommended to make inspections easier and to improve the longevity of the system. Inspectors should recommend these retrofits to system owners at the time of inspection.

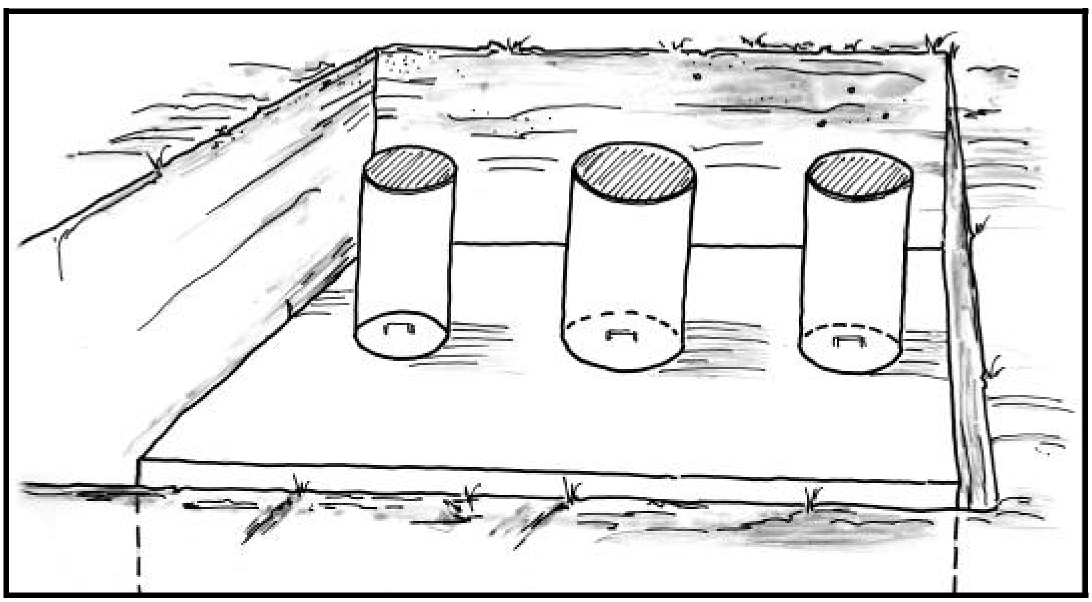

Figure 4.3a Proper installation of fiberglass risers.

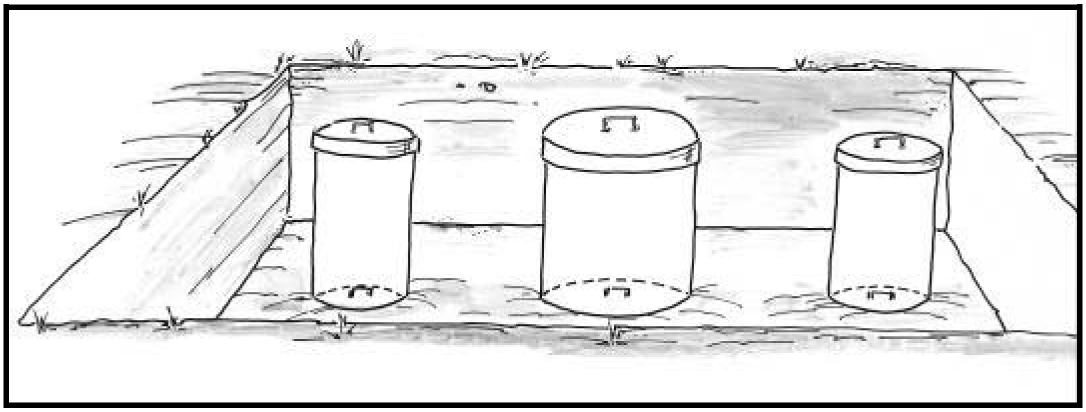

Figure 4.3b Proper installation of concrete well ring risers on the main access (manhole). Main access (manhole) cover remains on the tank; well rings are capped with a concrete cover that overlaps the outside of the rings to prevent leakage.

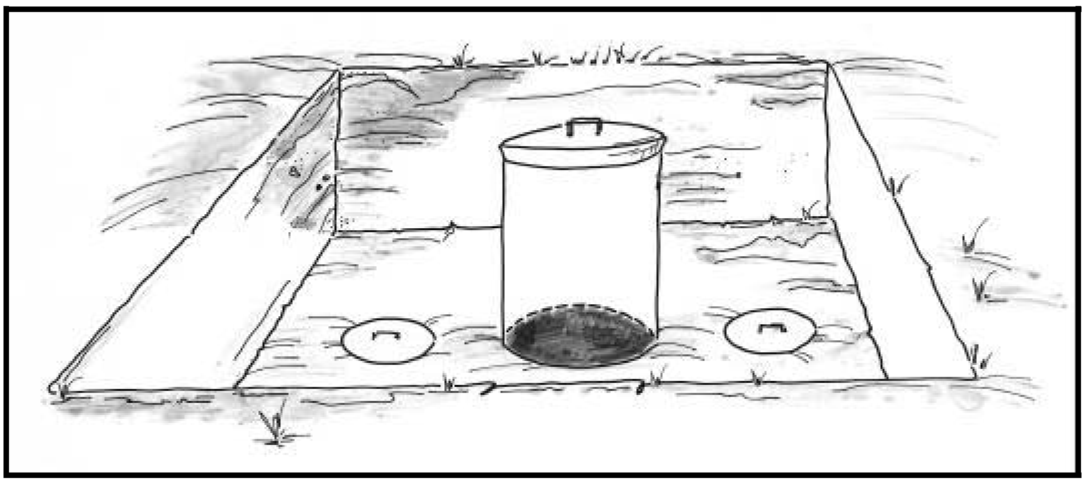

Figure 4.3c Improper installation of well ring risers with the septic tank main access (manhole) cover moved to the top of the well ring. This provides a poor fit, which may result in leakage as well as chipping of the concrete.

4.4.1 Risers to grade

Septic tank risers allow easy access to the septic tank, inspection port and manhole. Without risers, a tank must be unearthed during every inspection and pumpout. With risers, little or no digging is necessary.

System owners may also wish to install distribution box (D-box) risers. D-box risers allow inspectors to see if any solids are being carried over into the D-box. Solids carryover contributes to leachfield failure. D-box risers also allow easy access to the laterals of the soil absorption system, which may clog occasionally and require cleaning.

Risers come in two varieties: fiberglass risers and concrete well rings. Installers should make certain to use a riser with an interior dimension that is larger than access hole or manhole cover. Never use a tank's access cover as the lid for a riser. See Figures 4.3a, 4.3b and 4.3c. A tank cover will not seal a riser properly. Over time, an improper cover will damage a riser and allow stormwater to leak into the septic tank.

4.4.2 Effluent filters and gas baffles

Effluent filters attach at the outlet of a septic tank. Filters provide an easy and inexpensive means of capturing particulates to prevent them from carrying over to and clogging the soil absorption system. Properly sized filters only need cleaning at routine maintenance intervals (i.e., every 5 years or so). Refer to section 5.1.7, "Procedures for cleaning effluent filters," for more information. Gas baffles (refer to Figure 4.4) attach to the effluent sanitary tee of the septic tank and deflect gas bubbles, which may otherwise carry solids through the effluent outlet. Effluent filters and gas baffles are simple and inexpensive ways to protect and extend the life of soil absorption systems.

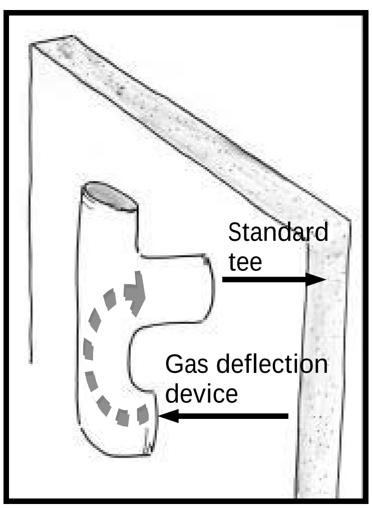

Figure 4.4 A gas baffle typically employs a standard sanitary tee fitted with a gas deflection device.

CHAPTER 5
Evaluation and Maintenance Procedures for Septic System Components

5.1 Inspecting and Maintaining Septic Tanks

This part of the inspection requires, at a minimum, access to one inspection port of the septic tank, preferably the effluent port (i.e., port at the outflowing side of the septic tank). If a pumpout is needed, the septic tank manhole must also be accessible. Locate and access the septic tank as described in sections 4.1 and 4.3. Inspectors should be aware that some septic tanks are built with two large access ports, instead of two small inspection ports with a large manhole or center hole. Two-port tanks should be inspected from the effluent port and may be pumped from either port.

5.1.1 Examining the external condition of septic tanks

Look for cracks or other signs of leakage on top of the tank and especially around the manhole and inspection ports. Leaks in the septic tank prevent proper wastewater treatment. Septic tank failures may contribute to soil absorption system failures. Any damage to the manhole or port should be repaired, but usually does not require a permit.

5.1.2 Determining when conventional tanks need pumping

Septic tanks must be pumped regularly to ensure proper functioning. If the septic system is not pumped in a timely manner, solids will bypass the effluent tee or baffle and clog the soil absorption system. Unabated, this will eventually result in hydraulic failure (e.g., plumbing backup and wastewater breakout).

Septic tanks are usually sized to allow a little more than half their volume for accumulation of solids. The remaining volume of a tank , which is called the “clear zone,” provides a quiescent area for holding wastewater while the solids settle out from liquids. Standard septic tanks have a flow depth of 48 inches. A standard septic tank, which is inspected routinely, in accordance with chapter 6 of this handbook, can store 16 inches of solids (i.e., scum and sludge combined) before pumping should be considered. Pumping should also be considered when sludge depth in a tank exceeds 13 inches or the scum depth exceeds 5 inches.

A combined solids accumulation of 16-34 inches, during a routine maintenance inspection, indicates a need to pump the tank. If accumulation is over 26 inches, evaluate the inspection schedule. Combined solids accumulation greater than 34 inches indicates a high potential for solids carryover and the need for more in-depth analysis by a licensed designer. Such an analysis should include a flow trial and recommendations to improve system operation. Refer to Table 5.1a for more information.

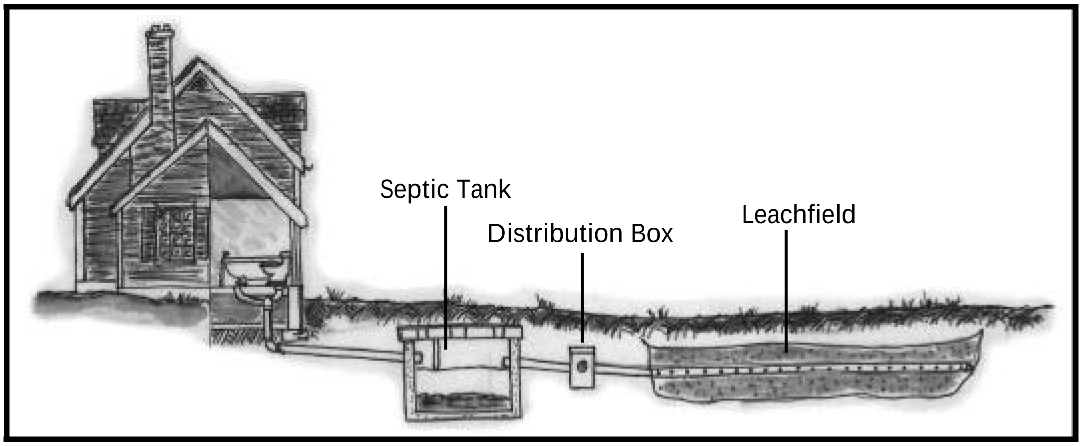

Figure 5.1 Diagram of a conventional septic system

Generally speaking, sludge accumulates at 3-4 times the rate of scum. However, relative accumulation rates may vary over a wide range, depending on such factors as the presence of a garbage disposal (see section 6.1.3 for more information on the

Table 5.1a Pumpout Guidelines for Conventional Septic Systems Serving Residential Properties

Solids Depth Criteria: 48 inch depth tank	Solids Depth Criteria: Nonstandard depth tank	Recommended Action
Combined solids < 16 inches	Combined solids < 1/3 flow depth	Pump at owner's discretion. Consider setting a new Maintenance Inspection Schedule (see section 6.5 "Evaluation of Inspection Schedules."
Combined solids = 16 - 34 inches[b]	Combined solids = 1/3 - 3/4 flow depth[b]	Pump the tank and re-inspect as per section 6.5 "Evaluation of Inspection Schedules."
Either: Combined solids > 34 inches, Sludge > 26 inches, or Scum > 11 inches	Either: Combined solids > 3/4 flow depth, Sludge > 1/2 flow depth, or Scum 1/5 flow depth	Pump the tank and consider a system analysis by a licensed designer. A new inspection schedule, which accounts for system capacity and use, should be set by the licensed designer.

<u>Note:</u> a. Based on T. Bounds (1987) anticipated accumulation rates.
b. Refer to Table 5.1b to determine if relative accumulation rates of scum and sludge are within acceptable ranges. Accumulation of more than 26 inches (1/2 flow depth) of combined solids indicates a need for more frequent maintenance.

Table 5.1b Combined Solids Depths and Range of Sludge Depths at Pumpout for Maximum Septic Tank Efficiency

Combined Solids (inches)	Acceptable Range of Sludge Depth (inches)[a]	Combined Solids (inches)	Acceptable Range of Sludge Depth (inches)[a]
16	11-13	26	18-20
17	11-13	27	18-21
18	12-14	28	19-22
19	13-15	29	20-24
20	14-16	30	20-24
21	14-16	31	21-24
22	14-17	32	22-25
23	16-18	33	22-26
24	16-19	34	23-26
25	16-20		

<u>Note:</u> a. Acceptable sludge-depth range equals approximately 66-80% of combined solids. Ranges have been rounded conservatively to whole inch numbers (i.e., top-end ranges are rounded down; bottom-end ranges are rounded up).

impact of garbage grinders), cooking habits and clothes-washing habits. For a septic tank of any flow depth to operate efficiently, scum depth should make up about 20-33% of solids depth, while sludge depth should make up 66-80% of solids depth. Table 5.1b, “Combined Solids Depths and Range of Sludge Depths at Pumpout for Maximum Septic Tank Efficiency,” lists relative depths of sludge for combined solids measurements to ensure proper and efficient operation of conventional septic systems.

The following procedures should be used to measure solids depths and determine if a tank needs to be pumped:

1. Locate and open the septic tank inspection port. If two ports are accessible, open the port on the effluent side. Refer to sections 4.1 and 4.3 for more information.
2. Put on latex gloves and measure the depth of the scum and sludge layers with appropriate scum and sludge measuring device(s) and record the results. There are several devices that may be used to make scum and sludge layer measurements. Refer to manufacturer instructions for information on proper use. URI’s On-Site Wastewater Training Center can be contacted for information on manufacturers and vendors of such equipment.
3. Consider Tables 5.1a and 5.1b to determine the need for pumping and other appropriate actions.

5.1.3 Cleaning sludge and scum measuring devices

The following procedures should be used for cleaning sludge and scum measuring devices:

With a garden hose

If a garden hose is available, hose down each measuring device into the septic tank and wipe each device clean with a rag that has been thoroughly wetted with a bleach and water solution. (Use 1 tablespoon of bleach to a gallon of water. Because chlorine is volatile, a batch of bleach solution is good for approximately two days.) Let the sun dry the devices as the weather allows and store for transport in a sheath, case or other container.

Without a garden hose

If no garden hose is available, wipe each measuring device down with the rag and bleach solution as directed for cleaning "With a garden hose." Let the sun dry the devices and store for transport as above.

5.1.4 Pumping need for metal tanks

Some older septic systems may use metal septic tanks. Metal septic tanks tend to rust, causing a loss of structural integrity. Occasionally, this may result in a collapse or cave-in. Internal rusting may cause baffles and sanitary tees to break apart or drop off. Because they are prone to failure, metal septic tanks should be pumped out as part of every inspection and then inspected carefully for structural problems. Metal tanks should be replaced with tanks that are up to code as soon as possible

5.1.5 Pumping septic systems automatically as part of the first maintenance inspection

In many cases, the first maintenance inspection will mark the first time that a system receives thorough and proper maintenance. For this reason, it is a good idea to have tanks pumped initially, regardless of solids levels, in order to fully inspect the tank.

5.1.6 Procedures for multicompartment tanks or septic tanks in series

Some septic systems may have multicompartment tanks (Figure 5.2) or two septic tanks in series. Septic tanks in series are not always visually apparent. To determine if more than one tank is in use, refer to the application information (see Table 2.1), which should include a drawing of the complete system. Multicompartment tanks may also be identified by referring to the application information, but are usually evident at inspection.

Maintenance for multicompartment tanks and tanks in series is similar to that for single-compartment and single-tank systems. Simply replicate the inspection procedures on all tanks and compartments and pump out as needed per Table 5.1a.

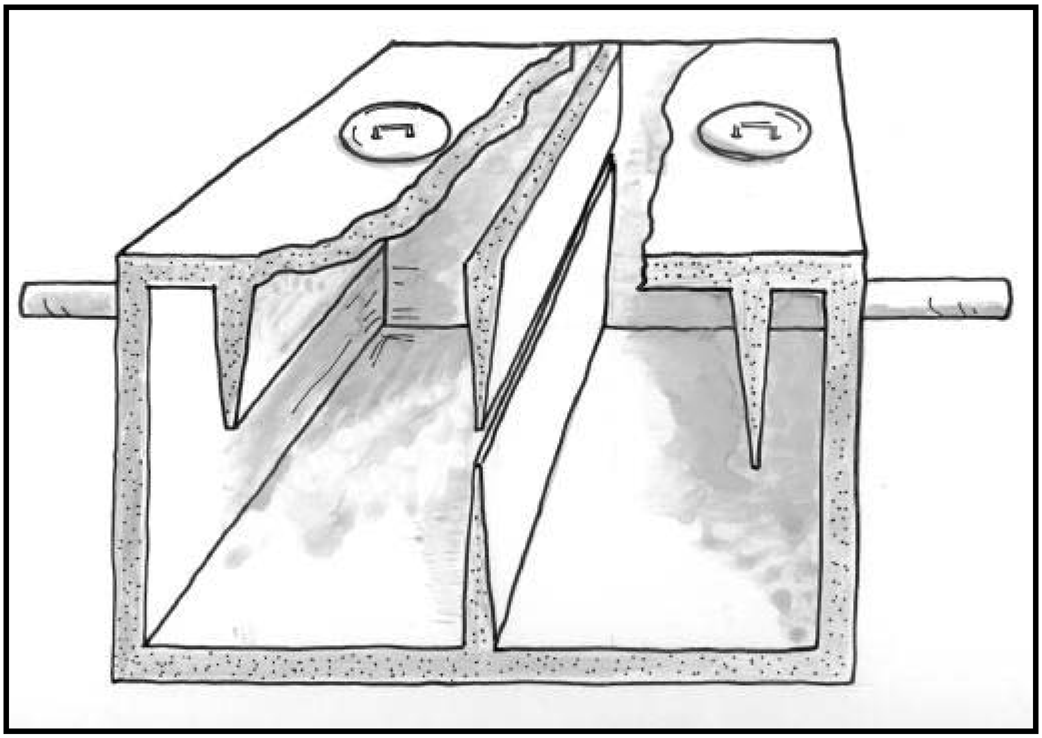

Figure 5.2 Cut-away view of a multicompartment septic tank

5.1.7 Procedures for cleaning effluent filters

Effluent filters protect soil absorption systems from clogging by removing particulates from the waste stream. Properly designed effluent filters will self-clean between routine maintenance inspections. Particles in the waste stream get caught in the filter during high-flow conditions. Most then drop to the bottom of the tank as flows subside. Septic tank bacteria eat away and dislodge the remaining particles, keeping the filter clear enough to pass wastewater.

Effluent filters should be inspected and cleaned as part of each maintenance inspection (i.e., at 3-5 year intervals). To clean a filter, put on latex gloves and remove the filter cartridge from its housing. Tap the filter against the inside of the inspection port or hose it off into the tank. The filter does not need to be cleaned spotlessly. In fact, the bio-mass that accumulates naturally on the filter helps to prevent solids carryover. After cleaning, replace the filter and continue with the inspection.

5.1.8 Pumping procedures for septic tanks

Septic tanks need pumping only when the solids buildup in the tank begins to exceed storage capacity or when a complete internal inspection is to be done. To determine if maintenance pumping is needed, refer to section 5.1.2, "Determining when conventional tanks need pumping." If the tank requires pumping, do so using the following procedures:

1. Before pumping, note the liquid level of the tank in relation to the tank's outlet pipes. Consider Table 5.2 for troubleshooting flow-level problems in the septic tank and record the tank's condition on the inspection report.
2. If not already accessed, open the appropriate access port--usually the large central access on the septic tank--using the procedure described in section 4.3, "Opening and Closing Component Accesses." Only pump out the tank from the manhole. Pumping from inspection ports may damage tees and baffles. Also, the inspection ports do not allow pumping access to all areas of the tank.[8]
3. As the tank is pumped, watch for backflow from the tank outlet. Backflow indicates a soil absorption system backup. Notify the owner and record the occurrence on the inspection report.
4. Pump the tank completely. Use a septage spoon to loosen the sludge in the corners of the tank. There is no need to seed the tank by leaving septage in it. Conversely, there is no need to scrub or powerwash the tank's walls.
5. Once the tank is pumped, look at it to visually check the integrity of the

8. Some tanks are designed with large (20 inch) access ports and no center hole (e.g., Connecticut-style tanks). These tanks can accommodate pumpout from either port.

Table 5.2 Troubleshooting for Flow Problems Based on Liquid Level in a Septic Tank

Observation	Condition and Cause
Liquid level is approximately 2 inches below the inlet and even with the outlet bottom. There is no apparent wastewater flow in the tank.	Tank is installed properly and at rest with no indication of backup based on liquid level.
Liquid level is below the inlet and elevated less than 2 inches above the bottom of the outlet. Free flow of wastewater from inlet to outlet is apparent.	Tank is installed properly and is currently in use with no indication of backup based on liquid level.
Regardless of observed wastewater flowage in septic tank, liquid level is at or above inlet bottom or elevated by 2 inches or more above the outlet bottom.	Tank is probably installed properly, but elevated wastewater levels indicate probable backup in the system down-flow of the the tank. The inspector should perform a flow trial.
Regardless of observed wastewater flowage in the septic tank, the liquid level is at or below the outlet and the inlet is submerged.	Tank is installed up gradient or installed backwards (i.e., with the inlet in the outlet's position). Up-gradient tanks may appear to slope up towards the outlet end. Tanks installed backwards may have tees and baffles in reverse positions. Either condition should be corrected by a licensed installer.
Regardless of observed flowage in tank, liquid level is more than 2 inches below the inlet and the outlet appears and no more than 2 inches above the outlet bottom.	Tank is sloped down gradient. Depending on the severity of the slope, the tank may actually appear to slope downward toward the outlet. If the slope is minimal, no repair is necessary. Consider evaluation by a licensed installer.
Regardless of observed flowage in tank, liquid level is below inlet and outlet.	Tank may be leaking and may have structural problems. Pump the system and have a licensed installer make repairs as necessary.

sanitary tees, baffles and overall structure. Under current regulations, tanks should have an inlet tee or baffle and an outlet tee. Use a mirror on a pole and flashlight, as necessary, to look around corners and see in darkened areas. Inspection of baffles and tees can visually be done without a mirror from the inspection ports. Look for groundwater seepage through cracks or holes in the tank. Listen for trickling sounds that may indicate either backflow from the soil absorption system or groundwater seepage through a crack in the tank. Most tank in Rhode Island have a lateral midseam that may be susceptible to leakage. Tanks manufactured using a monolithic poring have a seam around the top and are susceptible to leakage there. Leakage may also occur at inlets and outlets. If there appears to be any damage, notify the owner and record the observation on the inspection report. Carefully inspect the influent side of the inlet baffle. Sometimes, baffles may trap a plug of scum or floatables that could create a plumbing backup.

5.1.9 Determining septic tank volume (optional)

Occasionally, inspectors may wish to determine the volume of a septic tank. The following procedures may be used to approximately measure volumes of rectangular and round (i.e., cylindrical) tanks.

1. Use a tape measure to determine the outer top-side dimensions of the septic tank in inches. Measure the diameter, if the tank is round. Measure the length and width if the tank is rectangular.

2. Use a sludge-measuring device to determine the flow depth of the tank in inches (i.e., the distance from the internal bottom or floor of the tank to the bottom of the tank's outlet pipe).

3. The following tables may be used to determine the volume of most tanks.

Table 5.3a **Typical Rectangular Tank Volumes, Styles and Approximate Dimensions**

Volume	Style	Dimensions outside length × outside width × flow depth in inches
1,000	Single compartment	102 × 58 × 48
1,000	Lowboy	126 × 68 × 40
1,250	Single compartment	126 × 60 × 48
1,500	Single compartment	126 × 68 × 48

Table 5.3b **Approximate Flow Depths and Diameters for Typical Round-Tank Volumes**

Diameter (inches)	Volume (gallons) and Flow Depth (inches)			
	500	600	750	900
60	41	49	61	74
72		34	43	51
84			31	38

If the tank's dimensions are atypical and the volume cannot be determined with the previous tables, use Equation 5.1 or 5.2 to approximate volumes.

Equation 5.1 Volume of Rectangular Tanks

$$V = D \times L \times W \times 0.00439 \text{ gallons/cubic inch}$$

Where:
- V = Volume
- D = Flow Depth
- L = Length
- W = Width
- 0.00439 gallons/cubic inch = Conversion factor (cubic inches to gallons)

Equation 5.2 Volume of Round Tanks

$$V = D \times Pi \times r^2 \times 0.00439 \text{ gallons/cubic inch}$$

Where:
- V = Volume
- D = Flow Depth
- r = Radius (r = d/2)
- d = Diameter
- Pi = 3.14
- 0.00439 gallons/cubic inch = Conversion factor (cubic inches to gallons)

5.1.10 Septic system additives

A number of companies market products (e.g., enzymes and baking soda) under the claim that routine addition to the toilet or septic tank will improve septic system function and restore flow to "slow plumbing." Most experts consider these product claims to be unsubstantiated. Consumers should be aware that wastewater flow problems, which originate in a septic system, are symptomatic of major system failure. Without the proper attention of a wastewater professional, such problems will usually get worse and more expensive to repair. Relying on additives to fix septic system problems is ill-advised at best.

Some septic system service companies offer acid and organic chemical treatments as a remedy for septic system backups or even as preventative maintenance. Use of such solvents is extremely dangerous. They are caustic, typically poisonous and may contaminate nearby water supplies (e.g., private wells). Use of such solvents is also a violation of Rhode Island's ISDS Regulations. The only exception is hydrogen peroxide, which may sometimes be used in conjunction with a system enlargement to rehabilitate a failing system.

Septic system owners should note that backups are often the result of wastewater overload. Beyond danger and regulatory infraction, a solvent cannot increase the long-term capacity of a septic system. Septic systems that are undersized will need to be enlarged in order to function properly.

5.2 Procedures for Maintaining Distribution Boxes if an Inspection Port is Present

Occasionally, a distribution box may have a handhole at grade. If present, open the port and check the distribution box. There should be no solid material or standing water above the outlets in the box. If standing water is present, it may indicate a backup in the soil absorption system. If solids are present, it indicates solids carryover and the likelihood of an impending failure. If either condition is present, notify the owner and record it on the inspection report.

5.3 Maintenance Inspection for Cesspools

It is estimated that 20-30 percent of existing cesspools in Rhode Island are hydraulically failed (i.e., backing up into the building sewer or onto the surface of the ground). Cesspools need more frequent maintenance than conventional septic systems as they are typically of smaller design capacity, more prone to failure and therefore, less protective of public health and the environment. At first sign of failure, cesspools, like other substandard systems, should be upgraded.

If a cesspool has not failed and is not being immediately upgraded, then it should be maintained using the procedures that follow. Nevertheless, system owners should be reminded of the potential pitfalls of these substandard systems.

5.3.1 Inspection prior to pumping

1. As with a septic tank, inspect the cesspool for cracked covers. Cracked covers should be replaced as soon as possible.
2. Inspect for backup into or above the inlet pipe. If septage is found above the inlet, the system has reached the end of its useful life and should be upgraded to regulatory standard as soon as possible.

5.3.2 Pump the cesspool regardless of solids depth

1. As with a septic tank, pump a cesspool completely. No additional maintenance is necessary.
2. After the system is pumped, observe the inside. If water is rising from the bottom or seeping through the sidewalls, so as to create standing water, the cesspool is likely to be installed in the groundwater and should be upgraded. If the system has apparent structural problems, the system is failed and should be upgraded as soon as possible.

5.3.3 Cesspools with overflow pipes and other outlets

Some cesspools may have one or more overflow pipes or other outlets.[9] Outlets may outfall into a secondary soil absorption system (e.g., seepage pits, leaching trenches, etc.), waterbody, catch basin, or onto the surface of the ground.

Because an outlet may direct wastewater to the ground surface, an inspector should attempt to locate the outlet's terminus using the procedures of section 5.6.1, "Identifying suspected treatment bypasses." If a suspected treatment bypass is

9. Cesspool overflows and outlets are generally illegal unless they direct flow to a secondary soil absorption system.

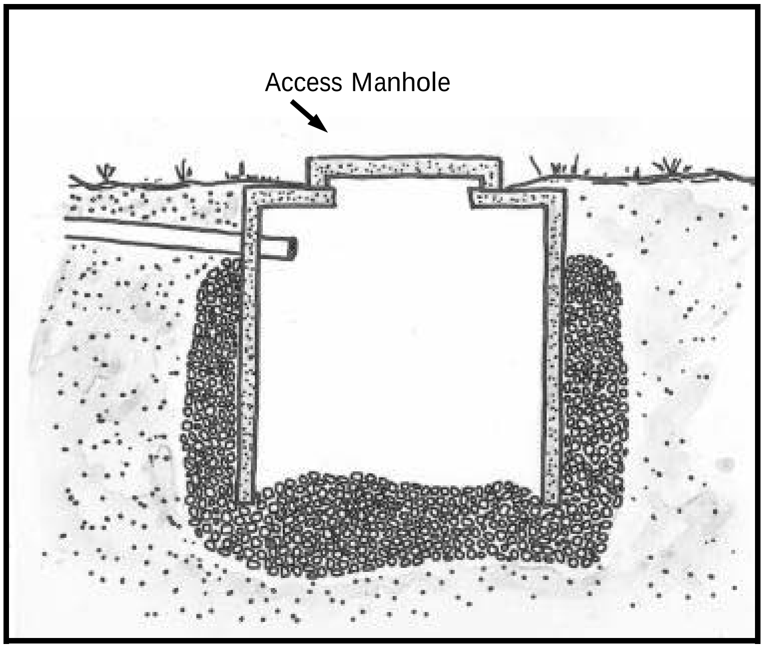

Figure 5.3 Diagram of a cesspool

identified, the inspector should notify the system owner and indicate the bypass on the inspection report.

If no bypass is observed, the inspector should assume that the overflow pipe leads to a secondary soil absorption system. Attempt to locate the absorption system, applying the principles used for locating the cesspool (see section 4.1).

If a secondary soil absorption system, which could need maintenance, is found, access, inspect and clean it as per sections 5.3.1-2.

5.4 Observation of Site Conditions

This portion of the inspection requires general knowledge of the location of certain components. These are the cesspool or septic tank and soil absorption system. Location of components can be determined by referring to the results of a first maintenance inspection, functional inspection or conformed system drawings.

Location may also be determined at the site by the inspector (refer to chapter 4, "Techniques for Accessing Septic System Components"). Once components are located, inspectors should do the following:

1. Look for any trees, large shrubs or other plants with extensive root systems growing over or within 10 feet of any system components. If any such plants are present, the owner may wish to have them removed. Owners may wish to leave ornamental and other such plants in place. However, inspectors should inform owners that large roots may crack, offset or otherwise intrude and damage components (Figure 5.4).

2. Look for any indication (e.g., tire tracks and other imprints) that heavy machinery or heavy objects (e.g., cars, above-ground pools, etc.) are or have been over any system components. If any heavy objects or indication of heavy objects are present, the owner should remove objects and discontinue the placement of such objects over the system components. Heavy objects may crush or offset system components.

3. Look for any indication that stormwater (e.g., roof runoff or outflow from foundation drains such as sump pumps) is flowing into or over any septic system components. If this condition is present, the owner should take steps to redirect the flows. Runoff that is diverted to the area of the soil absorption system may flood it and interfere with proper wastewater treatment or cause backup. Runoff diverted over other system components adds to wear and tear. Runoff may also infiltrate components,

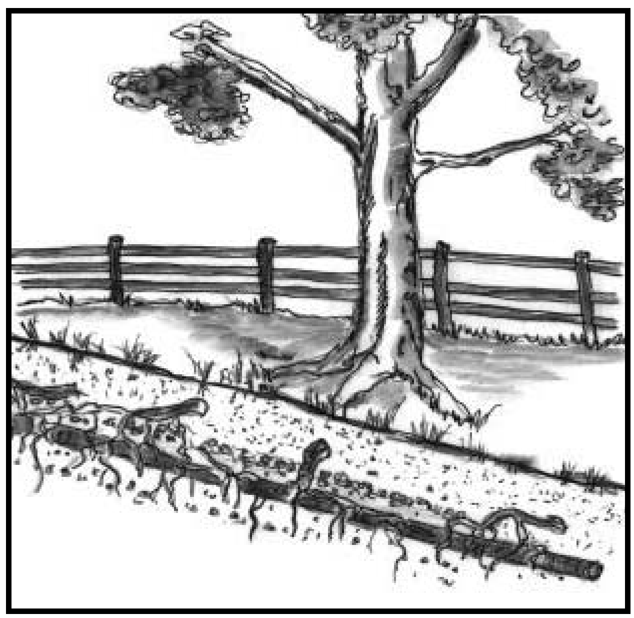

Figure 5.4 Root systems of large plants may intrude into a septic system when proper setbacks (i.e., 10 feet) are not observed.

eventually flooding the soil absorption system.

4. Look for physical evidence of system malfunction, such as cave-in or exposed components. If present, the owner should be instructed to have the malfunction fixed by a repair professional.
5. Look for impermeable surfaces, such as driveways or patios, within 10 feet of components. Impermeable surfaces block the natural movement of air and moisture in soil, inhibiting biological activity and hindering wastewater treatment. The owner should have any such surfaces removed.
6. Look for any observable signs of system malfunctioning, such as septic odors, ponding, or other signs of wastewater outbreak, patches of lush green grass (in conjunction with other signs of failure and giving consideration to seasonal growth patterns), burnt-out grass or ground staining. Symptoms, such as the aforementioned, indicate a major system failure and should receive the immediate attention of a repair professional.

5.5 Flow Trial for Identifying Gross Loss of Hydraulic Capacity

Hydraulic capacity--the potential for a soil absorption system to accept wastewater--varies as a result of changes in effective absorption area, wastewater flow, waste strength and biological activity in the soil. When overly stressed by excessive flows or waste strengths, a system may lose hydraulic capacity. In the most severe cases, this may result in a complete failure (i.e., a wastewater backup into the house or onto the ground surface). The functioning of a soil absorption system may also be impaired as a result of cave-ins, crushed pipes or objects stuck in lines. The flow trial is a means for identifying blockages or significant reduction of hydraulic capacity.

5.5.1 Limitations of the flow trial

The flow trial is one of a suite of techniques that may be used to assess a septic system during a functional inspection. It is not a be-all-and-end-all test, nor is it accurate under all conditions. The results of a flow trial should always be interpreted within the context of the entire inspection. If a system is showing signs of failure, certain flow-trial procedures may actually aggravate the problem (see "Situations when a flow trial performed at the septic tank outlet is recommended …," which follows). Under such circumstances, if a flow trial cannot be done at the outlet, do not perform a flow trial. If there is an obvious cave-in over the soil absorption system, the system clearly needs a major repair and no flow trial is necessary.

Situations when a flow trial may give unreliable results

1. During the last 12 months, the home was unoccupied for a continuous period of one month or more.
2. The system has had a recent hydrogen peroxide treatment (usually evidenced by chemical scouring or a bleached-out appearance on concrete components). Inspectors should be mindful that use of hydrogen peroxide generally indicates an attempt to fix a major system failure, which will be likely to recur.

Situations when a flow trial performed <u>at the septic tank outlet</u> is recommended as other methods may contribute to a failure (refer to section 5.5.3, "Flow trial procedures," for more information on various methods to load a system with the flow trial volume)

1. Overaccumulation of solids: (a) depth of combined solids is greater than 34 inches; (b) depth of scum is greater than 11 inches; or (c) depth of sludge is greater than 26 inches.
2. Evidence of structural damage to the system: (a) broken tee or baffle; (b) cracked tank; (c) evidence of a heavy object placed over the soil absorption system; or (d) one component or more has been exposed as a result of soil erosion.
3. Inspector has not measured the depth of solids and the system has not been pumped in over 3 years. An adequately sized, conventional system, which has been pumped in the last 3 years, is unlikely to have an overaccumulation of solids; however, inspectors may wish to measure solids for added certainty.

5.5.2 Calculating the flow trial volume

Normal wastewater flows vary over the course of a day, peaking during the morning and evening hours when people are most likely to use the kitchen, bathroom and laundry facilities. The greatest flow that may enter a system during an hour of time is called the peak one-hour flow. As it is typically the most stressful condition experienced by a system, the peak one-hour flow is also the condition that the flow trial is designed to approximate (i.e., peak one-hour flow = flow trial volume).

An examination of the literature indicates that peak one-hour flow can be estimated as 12 times the average hourly flow or half the daily flow. Systems in Rhode Island are designed based on the daily flow (i.e., design flow = daily flow), which can be calculated as 150 gallons per bedroom per day.[10] Therefore, flow trial volumes can be calculated as half the design flow or as the number of bedrooms times 75 gallons. Table 5.4 indicates flow trial volumes for homes relative to number of bedrooms and design-flow volumes.

Table 5.4 Minimum Flow Trial Volumes Relative to Number of Bedrooms and Design Flow

Number of Bedrooms	Design Flow (Gallons/Day)	Flow Trial Volume (Gallons)
2	300	150
3	450	225
4	600	300
5	750	375
6	900	450

5.5.3 Flow trial procedures

The following are procedures for a flow trial. Inspectors should keep in mind that a flow trial requires a large volume of water, which creates a good condition for dye tracing. If both a dye tracing and flow trial are to be done, an inspector should perform them together to avoid waste (to determine if dye tracing is necessary refer to section 5.6, "Dye Tracing for Confirming Treatment Bypasses").

10. The design flow should also be indicated on the certificate of construction.

1. Ask occupants to refrain from using any plumbing fixtures (e.g., sinks, toilets, spigots, etc.) during the flow trial.

2. Consider the condition of the septic tank (refer to section 5.1.1, "Examining the external condition of septic tanks" and to section 5.5.1, "Limitations of the flow trial"). If there is evidence of backflow from the soil absorption system, evidence of solids carryover or other situations of concern, do not flow trial the system at the inlet or by using in-home water fixtures. Instead, consider doing a flow trial by running water through a garden hose that has been inserted into the tank outlet. If the inspector opts not to do the flow trial at the outlet, then the tank should be pumped and the inspector should refer the system owner to a repair professional.

   In general, if a system has been pumped in the last three years, then it can be assumed that there will be no solids carryover during a flow trial. If no pumpout record is available, the inspector should measure the depth of both the scum and sludge layers. (Refer also to Item 1 of "Situations when a flow trial performed at the septic tank outlet is recommended..."). If the system appears to be in working order, the flow trial volume may be added via either the inlet or the outlet of the septic tank.

3. The flow trial volume (refer to section 5.5.2, "Calculating the flow trial volume") may be added at a rate of between 5 and 10 gallons per minute. This may be done by placing a garden hose at the inlet inspection port of the tank or by opening water taps in the house.

   If the house has a water meter, then the meter may be used to measure flow (refer to section 3.2, "Estimating Water Use"). (Be sure to note the volume unit of flow on the meter--a cubic foot is approximately 7.48 gallons.) If a household water meter is not present, an in-line flow meter may be used on a garden hose to measure flow rate. If no metering device is available, flow rate from a garden hose may be estimated by opening the tap fully and timing the fill up of a 5 gallon bucket (refer to section 3.3.1, "Measuring flow rate," for more details).

   If dye tracing is being performed on the system, dye should be added to the outlet of the septic tank during this step (refer to section 5.6, "Dye Tracing for Confirming Treatment Bypasses").

4. Measure and record the time it takes to add the flow-trial volume as determined in Step 2. If water begins to back up (i.e., rises more than two inches above the outlet bottom), record the time it took for this to occur. Inspectors should note that when first adding flow to the soil absorption system, a small rise in water level (1 or 2 inches) will occur in the septic tank. This is not a backup.
5. Calculate the volume of flow accepted by the soil absorption system (refer to section 3.3.1, "Measuring flow rate," for more details). Record the results on the inspection report form. If the system did not accept the full flow-trial volume, refer the owner to a repair professional.

5.6 Dye Tracing for Confirming Treatment Bypasses[11]

Soil absorption systems use the soil to treat wastewater and remove pathogens, (i.e., disease-causing organisms and viruses) from wastewater. When wastewater bypasses soil treatment, wastes and pathogens are not adequately removed and remain in unhealthful concentrations. For example, treatment may be bypassed by an overflow pipe that routes flow out of a septic system component, preventing it from reaching the soil absorption system. Bypasses are illegal under Rhode Island law and should be eliminated when they are confirmed.

Bypasses may take complex and broken paths, making them difficult to trace visually or even by use of a snake. Dye tracing overcomes this problem, as dye will resurface and flow wherever wastewater does (i.e., up to the ground surface, into a waterbody or stormwater system). Inspectors should use the following procedures when dye tracing.

5.6.1 Identifying suspected treatment bypasses

Most bypasses are installed to drain undersized or failed cesspools or drain gray-water appliances (e.g., washing machines). Bypasses in conventional septic systems

11. Procedures are based on *Identification of Sewage Contamination Sources: A Field Handbook* (RIDEM, in draft).

are rare, but not entirely unheard of. Therefore, check all systems thoroughly.

The following procedures may be used to find potential bypasses, but require a large volume of water to be effective. Therefore, the dye tracing and flow trials should be performed together. If a flow trial is not being performed because of solids-carryover concerns, do not perform dye tracing either (refer to section 5.5).

1. Ask the residents if they know of any wastewater bypasses or overflow pipes.
2. Walk the property boundary and note any catch basins within view, pipes emerging from the ground or retaining walls as well as waterbodies that border the property. Also, walk throughout the whole property and note any waterbodies and groundwater upwellings. Inspectors should note both visible outlets and wet areas where outlets are likely to discharge.

   Check the interiors of cesspools and septic tanks using a mirror and flashlight if necessary. A bypass is most likely installed at or just above the flow line, therefore, pumping the tank is not required for inspection purposes.
3. If any potential bypasses are observed, note their locations and any signs of flowage (i.e., actual flow or evidence of flow, such as laundry lint, algal growth, or erosion patterns on the ground). If any catch basins are found, they should be checked for bypass lines (refer to section 5.6.2, "Checking catch basins for bypasses").
4. If no potential bypasses are visible and the residents report no bypasses, dye tracing is not necessary. Proceed with the remainder of the inspection. If a suspected bypass is identified, proceed to section 5.6.3, "Investigating suspected bypasses."

5.6.2 Checking catch basins for bypasses

Safety precautions for observing and opening catch basins

1. Opening and working near catch basins must be undertaken carefully in order to avoid risk to both the inspector and unwary onlookers. Removal of a catch basin grate or manhole cover is heavy work and somewhat dangerous.

Removing a catch basin cover should only be done by a trained drainlayer or municipal employee.

2. Never enter a catch basin without following appropriate Occupational Safety and Health Administration precautions (refer to OSHA 1910.146 Permit Required Confined Space Rule). Never leave an open catch basin unattended (i.e. out of view) as water in the basin may present a drowning hazard.
3. Catch basins are usually owned by a municipality. Notify and obtain permission from local officials--both at the police and public works departments--prior to accessing a catch basin.

   Ask for assistance in following safety procedures as these may change from one municipality to another.
4. Oncoming traffic can be dangerous. Do not attempt to open or look inside catch basins where posted speeds exceed 25 miles per hour.
5. Do not attempt to open or look inside covers, located more than five feet laterally from the curb edge to the furthest point on the cover.

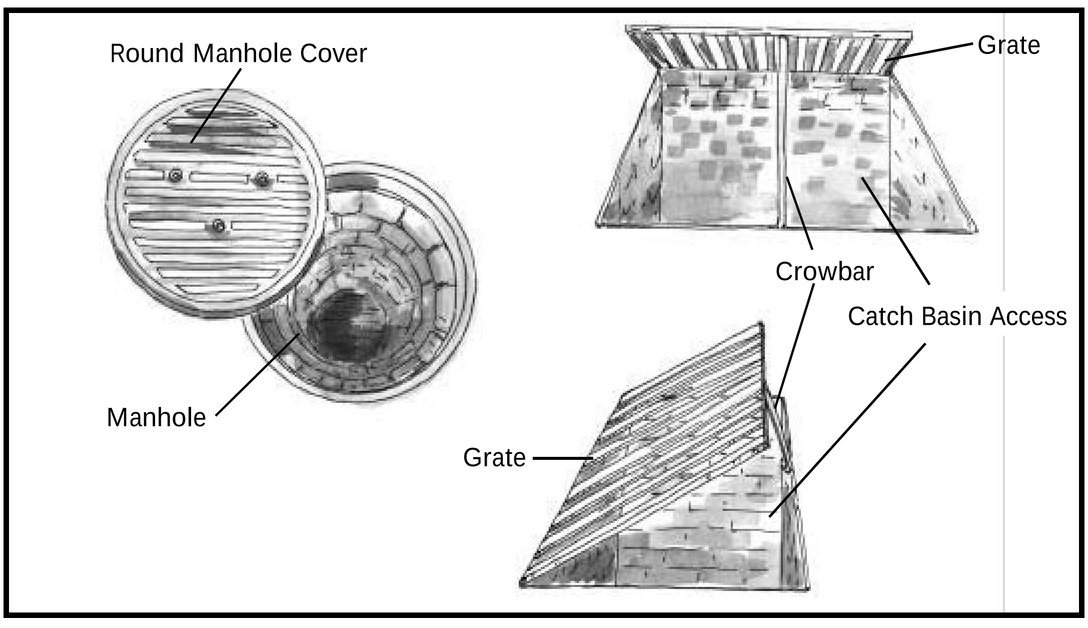

Figure 5.5 Opened storm drain grates.

6. Catch basins should not be opened or observed during inclement weather or when driving conditions are otherwise poor.

7. To limit traffic hazards, park a vehicle, with the hazard lights flashing, approximately 10 feet up-traffic of the catch basin being accessed. Place three traffic cones up-traffic of the parked vehicle. Place three additional cones at five-foot intervals around the cover in a triangular formation.

Determining the need to open catch basins (refer to "Safety precautions for observing and opening catch basins," listed above)

If the cover is a grate, dye may be observable without opening the grate. Attempt to look inside the access hole using a flashlight. If a suspected bypass, bottom of the basin or water in the basin can be viewed clearly, then the tracing dye will also be visible and opening the basin is not necessary.

Opening and closing catch basins (refer to "Safety precautions for observing and opening catch basins," listed above)

1. Sweep debris and sand from the general area of the catch basin to prevent it from falling into the cover seating when the basin is opened. This makes resetting the cover easier.

2. If pivoted diagonally, a rectangular grate may fall into its access hole. Before attempting to open a rectangular grate, secure a rope to it and then to something that can support its weight if it falls (e.g., your vehicle bumper, if it is sturdy enough). Circular covers cannot fall into their access holes and do not need to be secured.

3. Wedge a crowbar into any notch around the edge of the cover and pry the cover with the crowbar until it is raised an inch or so above its seating. Insert a manhole cover hook and use it to grab the cover. Circular covers may be swung along side the catch basin access hole. Rectangular covers should propped up on one side of their seating using the crowbar as a prop (see Figure 5.5).

4. Check the inside of the catch basin for bypass lines. A bypass line is typically a 2-inch diameter pipe. However, the minimum standard pipe size for a

stormwater drain is 12 inches; therefore, an inspector should be suspicious of any pipes less than 12 inches in diameter. If no suspected bypass is found, close the catch basin (refer to Step 6) and proceed with the inspection as appropriate.

5. If a suspected bypass is identified, proceed with dye tracing (refer to section 5.6.3, "Investigating suspected bypasses"). Be certain to replace any removed catch basin covers at the end of the dye-tracing procedure.

6. Before closing a catch basin, sweep its cover seating to remove sand or other obstructions. Replace the cover, being certain that the cover resets tightly.

5.6.3 Investigating suspected bypasses

Use the following procedures to determine if a suspected bypass is actually diverting flows and interrupting septic system treatment. Only use this procedure after suspected bypasses have been identified (refer to section 5.6.1, "Identifying suspected treatment bypasses").

1. After following the steps of "Identifying suspected treatment bypasses," add one quart of dye solution (refer to section 5.6.4, "Preparation of dye-tracing solution").

2. Dye testing is typically done in conjunction with a flow trial. Proceed with a flow trial (refer to section 5.5, "Flow Trial for Identifying Gross Loss of Hydraulic Capacity"). Look through the outlet inspection port to make certain that dye is moving into the outlet pipe. If the dye appears to be pooling or if the flow trial is being done at the septic tank outlet, use a garden hose to wash it through.

3. Once the flow trial is in process and water is being added to the septic system, begin observation of the suspected bypasses by checking them every 10 minutes for dyed water. If no dye is apparent by the end of the flow test, a bypass is not present. If dye is present, it indicates a bypass. Record the occurrence in the inspector’s report, noting the location and general description of the bypass and recommend that the owner seeks the advice of a repair professional.

5.6.4 Preparation of dye-tracing solution

Fluorescein dye, which is used for the dye-tracing procedures, may be purchased in powder or liquid concentrates. Liquid concentrates are generally easier to work with than powder. The dye powder can be messy to handle. It may permanently stain clothing, carpets and other textiles. Dye powder may be blown about by very light air movement.

If powder is being used, an inspector should prepare dye solution before visiting the inspection site. The following is a procedure for making a dye tracing solution from powdered dye, which was adapted from *Identification of Sewage Contamination Sources: A Field Handbook* (RIDEM, in draft).

Equipment

1. Utility sink with a nearby counter or other clear work surface.
2. Lab smock or other covering to protect clothing from dye stains.
3. Latex gloves to prevent staining of hands.
4. A 1½ gallon pitcher for mixing and pouring the solution.
5. Measuring spoons: teaspoon and tablespoon.
6. Stir stick or long-handled mixing spoon.
7. Funnel.
8. 4 clearly labeled,[12] quart-sized, plastic bottles with screw-on tops (to prevent poisoning do not use drink containers) for storing and dispensing the dye solution.
9. Waterproof carrying case (such as a smaller cooler) to transport the bottles of dye solution.
10. Paper towels for cleanup.

12. Inspectors should clearly label bottles as follows: **"Caution - flourescien dye solution, not for human consumption"** to ensure that it is not confused with a beverage.

Materials per 1 gallon batch

1. 2 teaspoons of fluorescein yellow dye powder. Yellow dye is recommended as it is easy to see in the field.

2. 1 gallon and 1 tablespoon of water (tap water is acceptable).

Preparation steps

1. Put on the smock and gloves and arrange all materials and equipment at the utility sink. In the sink, place the mixing pitcher and 4 storage bottles. On the nearby work surface, spread out 1 or 2 paper towels with the opened dye powder container and measuring spoon on top. Place the carrying case, funnel, and stir stick nearby so it will be ready for use.

2. Holding the dye powder container over the sink, measure 2 teaspoons of dye powder carefully into the mixing pitcher. Put the dye powder back on the paper towel and re-cover it.

3. Add 1 tablespoon of water--in a few driblets--to the dye in the mixing pitcher. Mix the powder and water with the stir stick so that the powder becomes wetted and pasty. If the powder is not completely wetted, it will not mix in when the larger volume of water is added, but instead will float like unsweetened cocoa powder in cold milk. Add the gallon of water and mix thoroughly.

4. Place the funnel into the neck of a storage container. With one hand, grasp the neck of the bottle and funnel together, giving them support. Use the other hand to pour off dye solution from the pitcher and fill the storage bottle. Fill each of the remaining bottles in the same manner.

5. Cap the storage bottles tightly and wipe off any dye residue with paper towels. Discard the used towels and place the bottles in the carrying case. Carefully fold up and discard the paper towels on the counter. Use additional paper towels to wipe up any spilled dye from the sink and counter area.

CHAPTER 6

Scheduling Maintenance Inspections

6.1 Conventional Systems Serving Single-Family Homes

All septic systems require regular maintenance, which should include inspection and pumping if necessary. Because pumpouts are the most regularly required type of maintenance for conventional systems, maintenance schedules may generally be based on the anticipated need for pumping. In some cases, however, systems may go for long periods without needing pumpout. Such systems should still be inspected at least once every 5 years to ensure that other types of maintenance and repair are not needed.

6.1.1 Conventional systems serving 1-2 persons per bedroom

When scheduling inspection based on the anticipated need for pumping, inspectors should consider two factors: tank volume and household occupancy. Table 6.1, "Longest Recommended Inspection Frequency in Years for Single-Family Residences on Conventional Systems," may be used to determine the maximum recommended interval between maintenance inspections. Table 6.1 also accounts for the 5-year inspection limit. As mentioned above, systems should be inspected at least once every 5 years to ensure proper function. To calculate number of persons per bedroom refer to Equation 3.2 in section 3.2.2.

Table 6.1 Longest Recommended Inspection Frequency in Years for Single-Family Residences on Conventional Systems

<table>
<tr><th rowspan="2">Tank Size
(gallons)</th><th colspan="4">Household Occupancy
(number of people)</th></tr>
<tr><th>1-4</th><th>4-6</th><th>6-8</th><th>10 or more</th></tr>
<tr><td>1000</td><td>5</td><td>3</td><td colspan="2">Undersized Tanks</td></tr>
<tr><td>1250</td><td>5</td><td>4</td><td>3</td><td></td></tr>
<tr><td>1500</td><td>5</td><td>5</td><td>4</td><td>3</td></tr>
</table>

Notes:
a. Inspections frequencies are based on worst-case scenarios for solids accumulation as determined by the US Public Health Service study (1954) and T. Bounds study (1987); as well as the 5-year anticipated need for preventative maintenance.
b. Inspection frequencies are based on a household wastewater disposal rate of 150 gallons per bedroom per day.
c. "Undersized Tanks" means that based on ISDS Regulations, the tank size is substandard for the number of people indicated.

6.1.2 Conventional systems serving 1 person per bedroom or less

The inspection frequencies listed in Table 6.1 allow for fairly high household occupancy. Households that can document stable occupancy of 1 person per bedroom or less can extend their inspection frequencies to the maximum of 5 years. To calculate number of persons per bedroom refer to Equation 3.2 in section 3.2.2.

6.1.3 Effect of garbage grinders on maintenance

Garbage grinders can be compatible with well-designed conventional septic systems; however, they are known to increase scum layer accumulation rates by approximately 20 percent (Bounds, 1987). Certain food wastes tend to biodegrade slowly. For example, egg shells and coffee grounds break down at a very slow rate. Disposal of such wastes via a septic system will necessitate more frequent maintenance.

For a septic system with a garbage grinder, an owner should consider that maintenance pumpouts will probably be needed 1-2 years earlier than for the same system without a garbage grinder. Effluent filters are recommended for any system with a garbage grinder to prevent solids from carrying over to the soil absorption system (refer to section 4.4.2, "Effluent filters and gas baffles.") Garbage grinders are not recommended for use with substandard systems.

6.2 Nonconventional Systems Serving Single-Family Homes

6.2.1 Cesspools and other substandard systems

All substandard systems, including cesspools, systems with metal tanks and systems with undersized tanks, should be inspected[13] on a 1-3 year basis. Because cesspools are set deep into the ground, they are susceptible to groundwater infiltration. Cesspools should be inspected during the rainy season (i.e., early spring) if possible. The scheduling frequency should be based on the sensitivity and proximity of local natural resources as well as local conditions that predispose systems to failure. In particular, communities may wish to consider proximity to water resources (e.g., coastal resources, surface water supplies and wellheads), local soil type, local depth to groundwater, depth to restrictive layers (e.g., bedrock), lot size and household occupancy.

6.2.2 Alternative systems

A wide variety of alternative technologies are available for wastewater treatment. Rhode Island has formed a technical review committee to determine what forms of alternative treatment technology will be allowable in the state. These various alternative treatment technologies and their specific maintenance requirements are not described in this document. However, the companies that manufacture these systems are required by the state to make operation and maintenance information

13. Inspections for cesspools and substandard systems should always include pumping the system (see section 5.3, "Maintenance Inspection for Cesspools").

available to homeowners. Owners and inspectors should also refer to requirements for maintenance included as part of their permits.

6.3 Special Consideration for Systems Serving Rental Properties

Though not always the case, some renters tend to be less attentive to septic systems than are owners. In addition, rental properties are frequently occupied by more people per bedroom than single-family houses. Septic systems serving rental units with year-round occupancy should be inspected on a 1-3 year schedule. Septic systems serving summer rental units or other temporary rental units should be inspected every year.

Different tenants are likely to have different water-use habitats. For this reason, property owners should consider having their systems inspected within 6 months to a year after a change in tenancy.

Owners should consider doing regular water-use surveys to monitor for system leaks and level of water usage. Chapter 3 of this handbook describes how to detect leaks in various household water-using devices. For more information, readers may contact the American Water Works Association. *How Much is Enough? Controlling Water Demand in Apartment Buildings* (Judd, 1993) is one publication that describes leak diagnosis for household plumbing.

6.4 Suggested Policy for Scheduling Inspections in Community Programs

Communities adopting wastewater management programs may wish to simplify the inspection scheduling process. The following six statements could be used to frame such a policy. Table 6.2, "Policy for Inspection Frequency Based on Household Type and System Type," summarizes these policies.

14. A standard tank is one that meets current DEM ISDS regulatory standards by size and construction.

Table 6.2 Policy for Inspection Frequency Based on Household Type and System Type

Household Type	System Type	Inspection Frequency
Water use of 75 gals./bedroom or less (i.e., 1 occupant per bedroom or less)	Conventional (standard tank)[a]	5 years
Single family	Conventional	5 years
Single family 3 or more bedrooms	Conventional (large tank)[b]	4 years
	Conventional (standard tank)	3 years
Rental or seasonal property	Any system	1-3 years (determined on a case-by-case basis)
Any household	Substandard (i.e., cesspool, metal tank, undersized tank, excessive occupancy, etc.)	1-3 years (determined on a case-by-case basis)
	Innovative or alternative	Based on type of technology

Notes:
a. A standard tank is a tank that meets current RIDEM ISDS regulatory standards for size and construction.
b. A large tank is a septic tank that is larger than required by ISDS Regulations.

(a) All conventional systems with standard tanks,[14] serving a residence with low occupancy (1 person per bedroom or less), should be inspected on a 5-year schedule. Refer to Equation 3.2 in section 3.2.2 to calculate occupancy per bedroom.

(b) All conventional systems with at least 1000 gallon tanks, serving 1-2 bedroom homes, should be inspected on a 5-year schedule.

(c) All conventional systems with tanks that are larger than required by regulation and serving a residence with up to 2 persons per bedroom should be inspected on a 4-5 year schedule.[15] Refer to Equation 3.2 in section 3.2.2 to calculate occupancy per bedroom.

(d) All conventional systems with standard tanks, serving 3-bedroom or larger homes with up to 2 persons per bedroom, should be inspected on a 3-year schedule. Refer to Equation 3.2 in section 3.2.2 to calculate occupancy per bedroom.

15. Large tanks are fairly rare and communities may wish to drop this provision.
16. Undersized tanks are tanks that do not meet DEM’s current volumetric standards.

(e) All substandard systems, including cesspools, systems with metal tanks and systems with undersized tanks,[16] and systems serving households with occupancy of more than 2 persons per bedroom, should be inspected on a 1-3 year schedule to be determined by the community on a case-by-case basis. Refer to Equation 3.2 in section 3.2.2 to calculate occupancy per bedroom.

(f) All systems serving rental properties should be inspected on a 1-3 year schedule as determined by the community.

(g) All systems using alternative wastewater disposal mechanisms should be scheduled for inspection based on the type of technology and DEM permit requirements.

Table 6.3 Adjusted Inspection Intervals for Conventional Systems Serving Single Family Residences Based on Combined Solids Accumulation Since the Last Pumpout [a, b]

Combined Solids Accumulation		System Pumped 3 Years Ago	System Pumped 4 Years Ago	System Pumped 5 Years Ago
48-inch tank	**nonstandard depth tank**			
30-34 inches	3/5-3/4 of depth flow	System Analysis Required [c]		3 years
26-30 inches	1/2-3/5 of flow depth		3 years	4 years
20-26 inches	2/5-1/2 of depth flow	3 years	4 years	5 years
16-20 inches	1/3-2/5 of depth flow	4 years	5 years	5 years
< 16 inches	< 1/3 of depth flow	5 years	5 years	5 years

Notes:
a. Recommended inspection intervals are based on worst-case scenario for rate of solids accumulation, (Bounds, 1987).
b. Inspection intervals are valid for systems where scum makes up 20-33% of combined solids and sludge makes up 66-80% of combined solids (see also Table 5.1b). Other systems should be assessed by a design professional and are likely to need more frequent inspections.
c. "System Analysis Required" means that combined solids accumulation will necessitate maintenance every 2 years or less. Such systems may need upgrades (e.g., larger tank).

6.5 Evaluation of Inspection Schedules

Occasionally a system's inspection schedule may need adjustment. Whenever a home changes ownership or occupancy, changes to an inspection schedule should be considered in accordance with Table 6.3. Other conditions that necessitate an inspection schedule evaluation include evidence of system failure and greater or lesser than anticipated accumulation of solids in the septic tank.

If a system has no more than 26 inches of scum and sludge combined and the system requires only routine maintenance (i.e., pumpout), then the time between inspections may be increased as per Table 6.3. However, inspection intervals should never exceed 5 years and an inspector should only recommend lengthening an inspection interval if the system is also being pumped.

From time to time, an inspector may observe a system that has an overaccumulation of solids. If a system has an overaccumulation of solids (greater than 26 inches of combined solids), but no signs of failure, then use Table 6.3 to recommend a more appropriate inspection frequency.

Setting inspection frequencies after a system has failed is beyond the scope of this handbook. If a system has failed, it should be referred to a repair professional.

GLOSSARY OF TERMS

Alternative (Innovative) System: See “Septic System.”

Angled Mirror on a Pole: A pole of approximately 6 feet in length with a mirror attached to one end at a 45 degree angle. The device is used to see the interior parts of a septic tank, which are not otherwise visible from the manhole or inspection ports.

Application: See “System Records.”

As-Built Plans: See “System Drawing.”

Baffle: A downward extension from the ceiling of the septic tank that spans the sides, but leaves area underneath itself for wastewater flow. Baffles are typically designed to trap scum in the top portion of the septic tank.

Bedroom: Any room in a residential structure that is more than 100 square feet in floor area and has at least one window and a closeable passageway (i.e, doorway). Refer also to SD 1.00 of the ISDS Regulations for more detail.

Black water: Refers to sanitary sewage that is, in some substantial part, made up of human or animal excrement.

Building Sewer: A pipe beginning outside a building wall and extending to a septic system component (e.g., septic tank or cesspool).

Bypass: A pipe or other conveyance that allows sewage to short-circuit normal treatment. In a cesspool a bypass may also be referred to as an overflow pipe.

Bypasses are typically installed to prevent septage from backing up into the building sewer.

Certificate of Conformance: See "System Records."

Cesspool: A buried chamber that receives sanitary sewage from a building sewer for the purpose of collecting solids and discharging liquids to the surrounding soil. An overflow cesspool refers to a secondary cesspool intended to collect overflow from a primary cesspool. Cesspools in a series refers to two or more cesspools linked together, consecutively.

Clear Zone: The relatively clear liquid layer between scum layer and sludge layer in a septic tank. In a properly functioning tank, effluent is taken from the clear zone as it is relatively free of solids.

Combined Solids: The combined thickness of the scum layer and sludge layer. In a typical septic tank, which has 48-inch liquid depth, combined solids accumulation should not exceed 26 inches as measured at the effluent inspection port.

Conventional Septic System: See "Septic System."

Design Plans: See "System Drawings."

Distribution Box (D-box): A watertight compartment that receives septic tank effluent and distributes it in approximately equal amounts to two or more pipe lines of a soil absorption system.

Effluent Filter: A filter installed on the outlet side of a septic tank that traps solids to prevent them from carrying over to the distribution box and soil absorption system.

Gray Water: Wastewater that is discharged from a structure, but does not contain human or animal excrement or discharges from water closets. For example, gray water sources include sink water and washing machine discharge.

Handhole: A small access or inspection port (approximately 6-inch diameter) that allows access to a septic system component.

Inspection Report: See “System Records.”

ISDS Regulations: The most recently adopted *Rules and Regulations Establishing Minimum Standards Relating to Location, Design, Construction and Maintenance of Individual Sewage Disposal Systems*.

Riser: A cylinder, typically made of concrete or fiberglass, which allows easy access to the manhole or inspection ports of a septic system component.

Scum Layer: Scum is the wastewater constituent that is lighter than water and therefore tends to float. The scum layer is that portion of wastewater that accumulates in the top portion of a septic tank.

Scum Layer Measuring Device: A device for measuring the thickness of scum that accumulates in the upper part of a septic tank.

Septage Pumping Records: See “System Records.”

Septic System: A device that receives wastewater from a building sewer and typically discharges it to the soil on site.

> Alternative System: A septic system with components that are intended to deal with special site conditions (e.g., nitrogen-reduction systems, shallow trench soil absorption systems, sand filters).
>
> Conventional System: A septic system that includes a building sewer, septic tank and soil absorption system. Conventional systems may have substandard components.
>
> Substandard System: A septic system that does not meet the current minimum standards of the ISDS Regulations. Substandard systems include, but are not limited, to cesspools, systems with an undersized tanks and systems with metal tanks.

Septic System Inspections: For the purposes of this handbook, septic system inspections refer to inspections done for maintenance or for property transfers.

First Maintenance Inspection: The first inspection for maintenance purposes that is done on a septic system. First maintenance inspections involve some record and data gathering and locating of components that is usually not necessary for routine maintenance inspections.

Functional inspection: Inspection of a septic system that typically includes investigation of permit records, in-home plumbing evaluation, and evaluation of septic system components including flow trial and dye tracing, as appropriate. Functional inspections are primarily done at property transfers.

Routine Maintenance Inspection: An inspection of the septic tank or cesspool and the system site to determine the need for pumping and repairs. Routine maintenance inspections are typically done every 1-5 years.

Septic Tank: A receptacle that receives wastewater from a building sewer, segregates scum and sludge via settling, and discharges clarified effluent to a distribution box or soil absorption system.

48-Inch Tank: A septic tank with a liquid depth of 48 inches. 48 inch tanks are the industry standard.

Large Tank: A septic tank that has more liquid volume than required by the ISDS Regulations. Large tanks require less frequent maintenance than standard and undersized tanks.

Metal Tank: A septic tank that is constructed of metal, typically steel. Metal tanks are substandard and tend to rust out over the course of years.

Multicompartment Tank: A septic tank with two or more consecutively linked chambers. Multicompartment tanks generally improve the settling process and produce cleaner effluent than noncompartmentalized tanks.

Nonstandard-Depth Tank (e.g., lowboy or ledge tank): A septic tank that does not have a liquid depth of 48 inches.

Septic Tanks in Series: Two or more septic tanks linked together consecutively. Septic tanks in series, like multicompartmental tanks, generally produce a cleaner effluent than singular tanks.

Sludge Layer: Sludge is wastewater material that is heavier than water and therefore sinks. The sludge layer is that portion of wastewater that accumulates at the bottom of a septic tank.

Sludge Layer Measuring Device: A device for determining the depth of sludge that has accumulated in the bottom of a septic tank.

Soil Absorption System: A component of a septic system that allows wastewater to leach into the soil for the purpose of treatment. Soil absorption systems include, but are not limited to, seepage pits (i.e., galleys), disposal beds, disposal trenches and cesspools.

Substandard System: See "Septic System."

System Drawings: A schematic for a septic system that includes components and their locations.

As-Built Drawings: System drawings that precisely and accurately indicate the installation of a completed septic system.

Design Plans: System drawings that indicate specifications for the proposed installation of a septic system.

System Records: Written forms that indicate the design, use and maintenance of a septic system.

Applications: Plans and specifications for installing, constructing, altering or repairing a septic system. There are three types of septic system application: Application for a New System, Application for Alteration, and Application for Repair. (See ISDS Regulations for more information.)

Certificate of Conformance: A form issued by DEM, which indicates that an installed system conforms with the ISDS Regulations. A municipality may not issue a certificate of occupancy without a certificate of conformance. Buildings may not be occupied or sold until a certificate of occupancy is issued. (See ISDS Regulations for more information.)

Certificate of Construction: A form filled out by an installer and approved by DEM, which indicates that a septic system was installed in accordance with permit plans as approved by DEM. Installers who encounter unanticipated conditions during construction, which prevent installation as per the permit plans, must file a revised application for DEM approval. Installers should leave a copy of the certificate in the home near the building sewer. (See the ISDS Regulations for more information.)

Inspection Reports: One of four reports prepared pursuant to this handbook: Functional Inspection Report, First Maintenance Inspection Report, Routine Maintenance Report, and Maintenance Report Supplement.

Septage Pumping Records: A bill or official record (e.g., an inspection report) that indicates that a septic system was pumped on a particular date.

Tees (Sanitary): A T-shaped pipe that is installed in a septic tank, typically on the effluent end, so as to prevent scum from flowing out of the tank.

Undersized Tanks: See "Septic System, Substandard System."

Wastewater: For the purposes of this handbook, wastewater refers to gray or black water discharge from toilets, laundry tubs, washing machines, sinks, and dishwashers, as well as the contents of septic systems.

Wastewater Management Program: A program that either encourages or compels proper septic system maintenance within the boundaries of a municipality or other geographic region (i.e., wastewater management district). A wastewater management program may either work through a voluntary or an enforceable approach. Wastewater management programs may be involved in public education, technical assistance, financial assistance, maintenance record tracking as well as other activities associated with areawide management of septic systems.

Wastewater Management Official: A person who is charged with some aspect of operating a wastewater management program.

Water Treatment Appliance: A device that filters or softens the water supply to a building. Water treatment appliances, as referred to in this handbook, have backflush cycles.

BIBLIOGRAPHY

Adamowicz, S. (1995). Home owners' septic system fact sheet. Providence: Rhode Island Department of Environmental Management Narragansett Bay Project.

Alexander, D.J., Jones, C., Sandman, P. (1992). The systematic evaluation and repair of failing drainfields in the coastal zone area of Virginia. Richmond, VA: Commonwealth of Virginia Department of Health.

Aley, T. (1991). The water tracer's cookbook and related groundwater tracing information. Protem, MO: Ozark Underground Laboratory.

Amended/revised plans for subsurface sewage disposal systems. (1997). [Fact Sheet No. WD-SSB-3]. Concord, NH: New Hampshire Department of Environmental Services.

"Approval for Operation" requirements for subsurface disposal systems. (1997). [Fact Sheet No. WD-SSB-8]. Concord, NH: New Hampshire Department of Environmental Services.

Atlantic States Rural Water & Wastewater Association. (1997). The source: A technical bulletin of Atlantic States Rural Water & Wastewater Association, Volume 1. Norwich, CT: Authors.

Barnstable County. (1997). Alternative septic system update, Issue Number 10. Barnstable, MA: Barnstable County Department of Health and the Environment.

Bounds, T.R. Septic tank septage pumping intervals. Sutherlin, OR: Orenco Systems.

Bounds, T.R. (1988). Glide audit 1986-1987, summary of sludge and scum accumulation rates. Roseburg, OR: Douglas County Department of Public Works.

Bounds, T.R. (September 22, 1997). Personal communication and accompanying Orenco Systems corporate literature. Sutherlin, OR: Orenco Systems.

Bounds, T.R. (1997). Design and performance of septic tanks. In M.S. Bedinger, J.S. Fleming, and A.I. Johnson, (Eds.) Site Characterization and Design of On-Site Septic Systems ASTM STP 1324. (pp. 217-234). American Society for Testing and Materials.

Bureau of Water Quality Management. Consumers guide to on-lot sewage system permits. (Publication Number DER#516-3/90). Pennsylvania Department of Environmental Resources.

Burks, B.D., Minnis, M.M. (1994). Onsite Wastewater Treatment Systems. Madison, WI: Hogarth House.

Buying a home or business? Questions you should ask on sewage disposal. (1991). [Fact Sheet No. WD-SSB-6]. Concord, NH: New Hampshire Department of Environmental Services.

Buzzards Bay "SepTrack" Initiative. [Publication No. EPA842-F-97-002G]. Washington, D.C.: EPA.

Cameon, P.J. (Ed.). (1997). Small Flows. 11 (2).

Cameon, P.J. (Ed.). (1997). Small Flows. 11 (4).

Canody,J. (Ed.). (1998). Small Flows. 12 (1).

Canody,J. (Ed.). (1998). Small Flows. 12 (3).

Care and maintenance of your septic system. (1991). [Fact Sheet No. WD-SSB-2]. Concord, NH: New Hampshire Department of Environmental Services.

Clark, J.W., Viessman, W., Jr., Hammer, M.J. (1971). Water Supply and Pollution Control. Scranton: International Textbook Company.

Coastlines. (1997, Winter).

Commonwealth of Massachusetts Department of Environmental Protection. (1995). Training manual for system inspectors; State Environmental Code Title 5. Boston: Commonwealth of Massachusetts Department of Environmental Protection Executive Office of Environmental Affairs.

Commonwealth of Massachusetts Department of Environmental Protection. (1997). Guidance for the inspection of subsurface sewage disposal systems. Boston: Commonwealth of Massachusetts Department of Environmental Protection Executive Office of Environmental Affairs.

Cromwell, N.M. (1990). Septic systems: a homeowner's manual. Providence: Save The Bay.

Department of Environmental Management, Division of Groundwater and ISDS. (1992). Rules and regulations establishing minimum standards relating to location, design, construction and maintenance of individual sewage disposal systems. Providence: State of Rhode Island and Providence Plantations.

Department of Environmental Management, Office of Water Resources. (1997). Amendments to rules and regulations establishing minimum standards relating to location, design, construction and maintenance of individual sewage disposal systems. [Regulation No. 12-120-002] Providence: State of Rhode Island and Providence Plantations.

DiLibero, W.A. (1988). Septic systems: a homeowner's guide to their operation and maintenance. University of Massachusetts, Massachusetts Cooperative Extension.

Dziegielewski, B., Opitz, E.M., Keifer, J.C., Baumann, D.D. (1993). Evaluating urban water conservation programs: a procedures manual. Carbondale, IL: Planning and Management Consultants, Ltd.

Falvey, C. (Ed.). (1995). Pipeline: Small Community Wastewater Issues Explained to the Public. 6 (3).

Falvey, C. (Ed.). (1996). Pipeline: Small Community Wastewater Issues Explained to the Public. 7 (1).

Falvey, C. (Ed.). (1996). Pipeline: Small Community Wastewater Issues Explained to the Public. 7 (2).

Falvey, C. (Ed.). (1998). Pipeline: Small Community Wastewater Issues Explained to the Public. 9 (2).

Falvey, C. (Ed.). (1998). Pipeline: Small Community Wastewater Issues Explained to the Public. 9 (4).

Frekot, L.L.C., Elvebak, M.L. (1997). Inspection manual for existing septic systems. In M.S. Bedinger, J.S. Fleming, and A.I. Johnson, (Eds.) Site Characterization and Design of On-Site Septic Systems ASTM STP 1324. (pp. 3-11). American Society for Testing and Materials.

Frey, E. (Ed.). (1992). Criteria for regulation of on-site sewage treatment and disposal systems. Boston: New England Interstate Water Pollution Control Commission.

Friedman, D. (1997). The home buyer's guide to septic systems. [WWW document]. URL http://www.insepct-ny.com/septic/buyguide.htm.

Friedman, D. (1998). Where does it go when I flush? And… will we meet again? [WWW document]. URL http://www.inspect-ny.com/septic/septtext.htm.

Fundamentals of on-site wastewater treatment & disposal. (1994, May 17, Westford, MA). [Conference Proceedings]. Wilmington, MA: New England Interstate Water Pollution Control Commission's On-Site Wastewater Task Force.

Funding onsite/decentralized wastewater systems using the Clean Water State Revolving Fund (Draft). (1999). (Publication No. EPA 832-F-99-001). Washington, D.C.: United States Environmental Protection Agency Office of Water.

Glocester Wastewater Management Commission. Glocester wastewater management study; public workshop summary. (1996, November 20, Glocester, RI). [Public Workshop]. Glocester, RI: Authors.

Gover, N. (Ed.). (1996). Small Flows. 10 (1).

Gover, N. (Ed.). (1996). Small Flows. 10 (2).

Gover, N. (Ed.). (1996). Small Flows. 10 (3).

Gustafson, D. (1998, February 19). Inspection workshop. [Workshop handbook]. Shakopee, MN: University of Minnesota Extension Service.

Heufelder, G. (1997, January 14). [Transcript of presentation at the Runnins River Steering Committee meeting at Seekonk Town Hall]. Barnstable, MA: Barnstable County Health & Environmental Department.

Hoover, M.T. Site evaluation, design, and engineering of on-site technologies within a management context. Cary, NC: The On-Site Corporation.

I/A on-site wastewater technologies. (1998). Technovation: Current News and Events on Innovative Environmental Technologies, Fall/Winter.

Investigation of failed individual sewage disposal systems and innovative solutions. (1996, March 29, Warwick, RI). [Conference Proceedings]. Wakefield, RI: Frisella Civil and Environmental Engineering.

Joint Task Force on Existing Sewer Evaluation and Rehabilitation. (1983). Existing sewer evaluation & rehabilitation. NY: American Society of Civil Engineers.

Judd, P.H. (1993). How much is enough? Denver: American Water Works Association.

Knott, J.L, Jr. (1995). New frontiers in wastewater treatment. Environmental Protection, May. pp 19-23.

Laak, R. (1980). Wastewater engineering design for unsewered areas. Ann Arbor: Ann Arbor Science Publishers.

Laird, C. (1991). Water-efficient technologies: a catalog for the residential/light commercial sector (2nd edit.). Snowmass, CO: Water Program – Rocky Mountain Institute.

Lazaro, T.R. (1979). Urban hydrology: a multidisciplinary perspective. Ann Arbor: Ann Arbor Science Publishers.

Loomis, G., Calhoun, Y. (1988). Maintaining your septic system. [Fact Sheet No. 88-2]. Kingston, RI: Rhode Island On-site Wastewater Training Program, The University of Rhode Island.

Loomis, G., Gullerton, G. (1996). Maintaining your septic system. [Fact Sheet No. 96-1]. Kingston, RI: Rhode Island On-site Wastewater Training Program, The University of Rhode Island.

Lukin, J. (1992). Understanding septic systems. Winchendon, MA: Rural Housing Improvement.

Maddaus, W.O. (1987). Water conservation. Denver: American Water Works Association.

Managing small-scale, alternative & on-site wastewater systems: opportunities, problems and responsibilities. (1995, December). [Conference Summary]. Worcester, MA: *ad hoc* Task Force for Decentralized Wastewater Management.

McCann, A., Husband, T.P. (1991). Water conservation in and around the home. [Fact Sheet No. 91-2]. Kingston, RI: Rhode Island On-site Wastewater Training Program, The University of Rhode Island.

McComas, S. (1993). Lakesmarts: the first lake maintenance handbook. Washington, DC: Terrene Institute.

Millar, S. (1987). Wastewater management districts...a starting point. Providence: The State of Rhode Island and Providence Plantations Department of Administration, Division of Planning.

Minnesota Pollution Control Agency. (1998). Minnesota Pollution Control Agency manual for individual sewage treatment system inspections. St. Paul: Authors.

National Onsite Wastewater Recycling Association. Homeowner's septic tank system guide and record keeping folder. Hartland, WI: Authors.

National Small Flows Clearinghouse. (1999). Products guide. Morgantown, WV: National Small Flows Clearinghouse, West Virginia University.

Nurse, J. (Ed). (1999). The Zabel Zone: An Onsite Wastewater Magazine , Spring.

Onsite sewage disposal systems, water supplies and solid waste management. (1992). Chapter 420-2-1. Rules of the State Board of Health Bureau of Environmental and Health Service Standards, Division of Community Environmental Protection, The Alabama Department of Public Health.

On-site sewage treatment systems. (1996, November). [Conference Proceedings]. Sturbridge, MA: Society of Soil Scientists of Southern New England.

Otis, R.J. Design module number 18: septic tanks. Morgantown, WV: National Small Flows Clearinghouse, West Virginia University.

Permitting of installers and designers of subsurface sewage disposal systems. (1991). [Fact Sheet No. WD-SSB-4]. Concord, NH: New Hampshire Department of Environmental Services.

Protecting your community's water resources: a workshop for local officials on on-site wastewater management. (1999, June). [Conference Proceedings]. Lowell, MA: New England Interstate Water Pollution Control Commission.

Recording of approvals for operation for subsurface sewage disposal systems. (1997). [Fact Sheet No. WD-SSB-5]. Concord, NH: New Hampshire Department of Environmental Services.

Repair/replacement of an existing septic system. (1997). [Fact Sheet No. WD-SSB-9]. Concord, NH: New Hampshire Department of Environmental Services.

Replacement of a failed subsurface disposal system. (1997). [Fact Sheet No. WD-SSB-1]. Concord, NH: New Hampshire Department of Environmental Services.

Rhode Island Department of Environmental Management. (1995). Reducing the pollution potential in the Greenwich Bay and Green Hill Pond through septic system compliance activity. Providence: Authors.

Robillard, P.D., Martin, K.S. Use of dyes and tracers to confirm septic system failures. [Fact Sheet. Publication Number SW-167]. University Park, PA: Penn State College of Agricultural Sciences, Cooperative Extension.

Ross, J.A. (Ed.). (1994). The Small Flows Journal. 1, (1).

Ross, J.A. (Ed.). (1997). Small Flows. 11 (1)

Selling developed waterfront property: site assessment study required. (1993). [Fact Sheet No. WD-SSB-10]. Concord, NH: New Hampshire Department of Environmental Services.

Septic systems and ground-water protection: a program manager's guide and reference book. (1986). (Publication No. EPA 440/6-86-006). Washington, D.C.: United States Environmental Protection Agency Office of Water Ground-Water Protection.

Septic tank function. (1993). [Fact Sheet No. WD-SSB-11]. Concord, NH: New Hampshire Department of Environmental Services.

Shephard, F.C. (1995). Managing wastewater: prospects in Massachusetts for a decentralized approach: a discussion of options and requirements. Woods Hole, MA: Author.

Small wastewater systems: alternative systems for small communities and rural areas. (1980). (Publication No. FRD-10). Washington, D.C.: United States Environmental Protection Agency Office of Water.

Small wastewater systems: alternative systems for small communities and rural areas. (1992). (Publication No. 830-F-92/001). Washington, D.C.: United States Environmental Protection Agency Office of Water.

So...now you own a septic tank. [Brochure]. Morgantown, WV: National Small Flows Clearinghouse, West Virginia University.

Staff. (1997). ASTM's guides for septic systems. Environmental Protection, September. pp 12-13.

Suhrer, T. (Ed.). (1998). Small Flows. 12 (2).

Test pits and percolation tests for subsurface disposal systems. (1993). [Fact Sheet No. WD-SSB-7]. Concord, NH: New Hampshire Department of Environmental Services.

The care and feeding of your septic tank system. [Brochure]. Morgantown, WV: National Small Flows Clearinghouse, West Virginia, University.

The magic box: your septic tank. (1988). [Pamphlet]. Lakeland, FL: Florida Septic Tank Association.

The Water Quality Program Committee, Virginia Tech. (1995) Maintenance of mound septic systems. [Publication 448-401]. Blacksburg, VA: Virginia Cooperative Extension, Virginia Polytechnic Institute and State University.

The Water Quality Program Committee, Virginia Tech. (1995) Maintenance of low pressure distribution septic systems. [Publication 448-402]. Blacksburg, VA: Virginia Cooperative Extension, Virginia Polytechnic Institute and State University.

The Water Quality Program Committee, Virginia Tech. (1995) Septic system maintenance. [Publication 448-400]. Blacksburg, VA: Virginia Cooperative Extension, Virginia Polytechnic Institute and State University.

Thompson, J. (Ed.). (1997). The source of Tennessee nonpoint news. Tennessee Nonpoint Source Newsletter. 2(1)

U.S. Department of Labor, Occupational Safety and Health Administration. 29 CFR §1910 (1993).

Understanding septic systems. (1996). [Fact Sheet, Publication No. 3640-FS-DEP1414 Rev. 4/96]. Commonwealth of Pennsylvania Department of Environmental Protection.

Wastewater management alternatives for southern New England communities. (1995, May 11). [Conference Proceedings]. Kingston, RI: Rhode Island On-site Wastewater Training Program, The University of Rhode Island.

Waterfront property site assessment study. (1999). Part Env-Ws 1025 New Hampshire Department of Environmental Services Administrative Rules. [WWW document] URL http://www.state.nh.us/gencourt/ols/rules/env-ws1000.html. pp. 121-125.

Weiskel, P.K., Howes, B.L., Heufelder, G.R. (1996). Coliform contamination of a coastal embayment: sources and transport pathways. Environmental Science &Technology, 30(6), 1872-1881.

Wesley, E.F., Jr. (1987). Easy ways to save water, money & energy at home. Potomac Rivers & Trails Council.

Whalen, T. (March 6, 1996). Personal communication.

Your septic system: a reference guide for homeowners. (1990). Annandale, VA: Northern Virginia Planning District Commission.

SEPTIC SYSTEM MAINTENANCE POLICY FORUM AND SUBCOMMITTEES

Septic System Maintenance Policy Forum

Sue Adamowicz; Rhode Island Department of Environmental Management
Rob Adler; US Environmental Protection Agency
Andy Alcusky; Beta Engineering
Linda Allen; Pete Fenner, Inc.
Martin Anderson; Fuss & O'Neill
Bob Ballou; Rhode Island Department of Environmental Management
Bill Bivona; Narragansett Conservation Commission
Jim Boyd; Coastal Resources Management Commission
Jeff Brownell; Save the Bay
Paul Brunetti; Griggs and Browne
Dave Burnham; Rhode Island Independent Contractors
Russ Chateauneuf; Rhode Island Department of Environmental Management
Clarkson Collins; Narragansett Community Development Department
Nicole Cromwell; Save the Bay
Kevin Cute; Coastal Resources Management Commission
Betsy Dake; Rhode Island Department of Environmental Management
Chris Deacutis; Rhode Island Department of Environmental Management
Steve DeNoyelle; Rhode Island Department of Mental Health, Retardation and Hospitals Facilities and Maintenance
Tom DePatie; Charlestown Wastewater Management Commission
Brenda Dillmann; Planning Consultant
Oscar L. Doucett; Fidelity Inspection Service
David Dow; University of Rhode Island
Laura Ernst; Coastal Resources Management Commission

William Freeman; Superior Home Inspection
Joe Frisella; Frisella Engineering
Wenly Ferguson; Save the Bay
John Gagnon; Second Opinion Home Inspection
Darlene Gardner; Superior Septic Service
Dan Geagan; Warwick Planning Department
Bob Gilstein; Portsmouth Planning Department
Alicia Good; Rhode Island Department of Environmental Management
Tom Groves; New England Interstate Water Pollution Control Commission
Christopher Hamblett; Save the Bay
Tom Hansen; Fuss & O'Neill
Robin Hedges; Rhode Island Clean Water Finance Agency
Nancy Hess; Charlestown Planning Department
Eric Izzi; New England Interstate Water Pollution Control Commission
Philip Johnson; New Shoreham Sewer Commission
Lorraine Joubert; University of Rhode Island
Janet Keller; Rhode Island Department of Environmental Management
Sue Kiernan; Rhode Island Department of Environmental Management
Kevin Klein; Brown University
Jennifer Langheld; Rhode Island Department of Environmental Management
Elizabeth Leach; Rhode Island Clean Water Finance Agency
Kathleen Leddy; Rhode Island Department of Administration
Susan Licardi; North Kingstown Water Department
George Loomis; University of Rhode Island
Don Lucas; Town of Old Saybrook, Connecticut
Jay Manning; Rhode Island Department of Environmental Management
Eugenia Marks; Audubon Society of Rhode Island
David McCurdy; Atlantic States Rural Water and Wastewater Association
Galen McGovern; Rhode Island Department of Environmental Management
Bob Mendoza; US Environmental Protection Agency
Ted Mercier; Home Check
Joe Migliore; Rhode Island Department of Environmental Management
Laura Miguel; Coastal Resources Management Commission
Scott Millar; Rhode Island Department of Environmental Management
Chris Miller; University of Rhode Island
Dave Monk; Salt Ponds Coalition

Brian Moore; Rhode Island Department of Environmental Management
Tom Mulhern; Rhode Island Realtors Association
Mickie Musselman; Rhode Island Department of Environmental Management
Carlene Newman; Rhode Island Department of Environmental Management
Ray Nickerson; South Kingstown Planning Department
Craig Onorato; Warwick Sewer Authority
Peter O'Rourke; Rhode Island Department of Environmental Management
Ernie Panciera; Rhode Island Department of Environmental Management
Meg Parulis; Town of Old Saybrook, CT
Dick Pastore; RP Engineering
Roger Pease; Charlestown Wastewater Management Commission
Tony Perri; John Perri and Sons
Jesse Perry; Ocean State Home Inspection
Margret Pilaro; Warwick Planning Department
Margherita Pryor; US Environmental Protection Agency
Richard Ribb; Rhode Island Department of Environmental Management
Steve Richtarik; Beta Engineering
M. James Riordan; Rhode Island Department of Environmental Management
Deb Robson; Rhode Island Department of Environmental Management
Bob Schmidt; Rhode Island Department of Environmental Management
Robert Scott; Atlantic States Rural Water and Wastewater Association
Frank Sheppard; University of Massachusetts
Anthony Simeone; Rhode Island Clean Water Finance Agency
John Slivey; Rhode Island Cesspool Cleaners
Gregory Snow; Beta Engineering
Sally Spadaro; Governor's Policy Office
Jonathan Stevens; Warwick Planning Department
JoAnne Sulak; US Environmental Protection Agency
Beth Tetreault; Glocester Wastewater Management Commission
Warren Towne; Rhode Island Department of Environmental Management
Suzanne Vetromile; Narrow River Preservation Association
Dennis Vinaheirto; Warwick Sewer Authority
Alison Walsh; US Environmental Protection Agency
Jeff Willis; Coastal Resources Management Commission
Mike Young; Burrillville Cesspool

Issues related to septic system maintenance and inspection can be complex and occasionally controversial. The policy forum created subcommittees as issues arose that required special consideration. Subcommittee meetings were open to all interested parties and were attended as follows:

Flow Testing Subcommittee

David Dow; University of Rhode Island
Joe Frisella; Frisella Engineering
Scott Millar; Rhode Island Department of Environmental Management
Brian Moore; Rhode Island Department of Environmental Management
Peter O'Rourke; Rhode Island Department of Environmental Management
M. James Riordan; Rhode Island Department of Environmental Management
Dennis Vinaheirto; Warwick Sewer Authority

Inspection Subcommittee

Dave Burnham; Rhode Island Independent Contractors
Nicole Cromwell; Save the Bay
Tom DePatie; Charlestown Wastewater Management Commission
David Dow; University of Rhode Island
Joe Frisella; Frisella Engineering
Dan Geagan; Warwick Planning Department
Phil Johnson; Town of New Shoreham
George Loomis; University of Rhode Island
Eugenia Marks; Audubon Society of Rhode Island
Scott Millar; Rhode Island Department of Environmental Management
Brian Moore; Rhode Island Department of Environmental Management
Craig Onorato; Warwick Sewer Authority
Margaret Pilaro; Warwick Department of Planning
M. James Riordan; Rhode Island Department of Environmental Management
Bob Schmidt; Rhode Island Department of Environmental Management
Gregory Snow; Beta Engineering
Alison Walsh; Save the Bay

Field-Testing Subcommittee

Paul Brunetti; Griggs & Browne
David Burnham; Rhode Island Independent Contractors
David Dow; University of Rhode Island
Joe Frisella; Frisella Engineering
Gary Fullerton; University of Rhode Island
Darlene Gardner; Superior Septic System Service
Rick Gardner, Jr.; Superior Septic System Service
George Loomis; University of Rhode Island
Sue Licardi; North Kingstown Water Department
M. James Riordan; Rhode Island Department of Environmental Management
Adam Sykes; University of Rhode Island

Home Inspector and Pumper Workgroup

Paul Brunetti; Griggs & Browne
Russ Chateauneuf; Rhode Island Department of Environmental Management
William Freeman; Superior Home Inspection
John Gagnon; Second Opinion Home Inspections
Darlene Gardner; Superior Septic Service
Rick Gardner; Superior Septic Service
Ted Mercier; House Check
Tony Perri; John Perri & Sons
Jesse Perry; Ocean State Home Inspections
M. James Riordan; Rhode Island Department of Environmental Management
John Slivey; Rhode Island Cesspool Cleaners
Mike Young; Burrillville Cesspool

Rhode Island Recommended

SEPTIC SYSTEM FUNCTIONAL INSPECTION REPORT[1]

as described in *Septic System Checkup: The Rhode Island Handbook for Inspection*

Inspection Date:____________________

CLIENT INFORMATION

Client's Name ____ Phone # ______________

Inspection Street Address & Town ____

____

INSPECTOR INFORMATION

Inspector's Name ____

Company ____ Phone # ______________

Street Address & Town ____

____

IMPORTANT NOTICE

This inspection report indicates the present condition of the system based on state-recommended inspection procedures, *but is in no way* a guarantee or warranty of future performance. The inspection report excludes and does not intend to cover components that are concealed or are otherwise not observable. Dry wells are not included in this inspection.

HOMEOWNER/OCCUPANT RECORDS & DATA, As Available (chapter 2)[2]

Information collected pursuant to this section is to be provided voluntarily and at the discretion of the property owner. The property owner is solely responsible for record and data accuracy and completeness. The inspector assumes no responsibility for the accuracy of information provided by the property owner.

Indicate whether the following information was made available during the inspection. Attach copies of available records. If the property owner states that any of the following services were not provided—or in the case of application records that the system was installed prior to regulations (1968) — indicate not applicable (N/A). If the property owner states that partial records were provided, indicate "partial."

Source of Records & Data

Records and data were given to the inspector by:

_______ Property owner _______ Realtor ________ Other __________________________

Application Records

Yes	No	N/A	
☐	☐	☐	Applications for septic system (inclusive of new systems, alteration, repairs). Indicate the number of each: ______ New system ______ Alteration ______ Repairs
☐	☐	☐	Certificate of construction
☐	☐	☐	Certificate of conformance

Use Records

Yes	No	N/A	Partial	
☐	☐	☐	☐	Last two septage pumping bills
☐	☐	☐	☐	Water bills for the last 12-24 months

Maintenance Records

Yes	No	N/A	Partial	
☐	☐	☐	☐	Maintenance inspection reports

Resident Data

During the last 12 months, the inspected residence housed _____ year-round occupants

Plat Number ______ Lot Number ______

1. The Functional Inspection Report is primarily intended for inspection as part of a property transfer or sale.
2. Chapter and section numbers refer to *Septic System Checkup: The Rhode Island Handbook for Inspection.*

IN-HOME PLUMBING EVALUATION (chapter 3)

Information reported in this section may in part be based on homeowner records and data. The inspector assumes no responsibility for inaccurate records or data.

Wastewater Routing (section 3.1)

Yes	No	Inconclusive	
☐	☐	☐	All grey and black water plumbing is routed to the ISDS. Comments: ____ ____

Occupancy/Water Use (section 3.2)

Yes	No	Inconclusive	
☐	☐	☐	Water records and owner data show water use is over 75 gallons per person per day (GPD), indicating high usage or potential plumbing problems. ____ gallons were used by ____ occupants during ____ months.
☐	☐	☐	Current occupancy is estimated to be over 2 occupants per bedroom, which may be stressful to the system. Owner data indicates there were ____ live-in occupants during previous ____ months. Based on in-home observations, there are ____ bedrooms.
☐	☐	☐	A garbage disposal is routed to the septic system and may place an added burden on it (section 6.1.3).

Leak Diagnosis (section 3.3)

The following fixtures were found and inspected (indicate #):___ toilets ___ bathtub faucets ___ basin faucets ___ showerheads

Yes	No	Inconclusive	
☐	☐	☐	A water treatment appliance backflushes to the septic system.
☐	☐	☐	There is evidence of plumbing leakage from: toilet, basin faucet, bathtub faucet, showerhead or water treatment appliance. (Circle one or more of the aforementioned.) Indicate floor and room: ___________

SYSTEM COMPONENT EVALUATION (chapters 1 and 5)

Type of septic system (section 1.2): ☐ Single Cesspool ☐ Conventional septic tank system ☐ Other _________________________

Type of tank, if present (section 1.2.2): ☐ Concrete ☐ Metal ☐ Other _________________________

Indicate if any of the following components or accessories are present:
___ ISDS effluent pump ___ D-box handhole ___ Effluent filter ___ In-door lift pump ___ Other _________________________

Access to the system (diagram below or attach existing drawings): ☐ At grade ☐ Below grade

a. Outline approximate shape of the house, indicate front (F) and back (B).
b. Use swing-tie measurements to indicate the manhole (main access) of the septic tank, if buried.
c. Sketch in septic tank and other components as well as important surface features that may help to locate parts of the system.

Cesspools, *before pumpout and dye tracing* (section 5.3)

Yes	No	Not Observable	
☐	☐	☐	There is evidence of structural damage (section 5.3.1 and 5.3.2).
☐	☐	☐	There may be an overflow, second cesspool, soil absorption system, or other outlet from the cesspool. Dye tracing is recommended (section 5.3.3).
☐	☐	☐	There is standing water in the cesspool above the invert (section 5.3.1).

Septic Tank, *before pumpout, flow trial and dye tracing* (section 5.1)

Yes	No	Not Observable	
☐	☐	☐	There is evidence of structural damage to the baffles, tees or superstructure of the tank (circle one or more)(section 5.1.8).
☐	☐		Based on visual observations, sewage or septage may bypass the soil absorption system via a pipe or other conveyance. If a flow trial is being done, dye tracing should also be done (section 5.6.1).
☐	☐		Flowage was seen or heard coming from the inlet even though all known water-use appliances/fixtures in the home are off. This condition may indicate in-home plumbing leakage (section 5.1.8). See also "In-Home Plumbing Evaluation" (chapter 3).
☐	☐		Scum and sludge layer thickness measurements were taken. Scum is ___ ins. and sludge is ___ ins. Indicate the appropriate "Recommended Action" in the Pumpout Guidelines table which follows (section 5.1.2).

Pumpout Guidelines for Conventional Systems (Table 5.1a)

Depth Criteria: Solids 48 inch depth tank	Depth Criteria: Nonstandard depth tank	Recommended Action
Combined solids < 16 inches	Combined solids < 1/3 flow depth	Pump at owners discretion. Consider setting a new Maintenance Inspection Schedule (see section 6.5 "Evaluation of Inspection Schedules."
Combined solids = 16 - 34 inches	Combined solids = 1/3 - 3/4 flow depth	Pump the tank and re-inspect as per section 6.5 "Evaluation of Inspection Schedules."
Either: Combined solids > 34 inches, Sludge > 26 inches, or Scum > 11 inches	Either: Combined solids > 3/4 flow depth, Sludge > 1/2 flow depth, or Scum 1/5 flow depth	Pump the tank and consider a system analysis by a licensed designer. A new inspection schedule, which accounts for system capacity and use, should be set by the licensed designer.

SITE OBSERVATIONS (section 5.4)

Yes	No	Inconclusive	
☐	☐	☐	Impermeable surface such as concrete, asphalt, or brick is located approximately over the soil absorption system.
☐	☐	☐	There are one or more of the following signs of system malfunction present: ___ Septic odors ___ Ponding or wastewater breakout ___ Burnt out grass or ground staining over the soil absorption system (only indicate if one or more other signs are present). ___ Patches of lush green grass over the soil absorption system (only indicate if one or other signs are present).
☐	☐	☐	Trees, large shrubs or other plants with extensive root systems were observed in the vicinity (10 feet as per Rule 11.06(2) of the ISDS Regulations) of the soil absorption system.
☐	☐	☐	Heavy objects (e.g. cars or pools); or evidence from such objects (e.g. tracks and impressions) are in the vicinity (i.e. directly over) of the soil absorption system.
☐	☐	☐	Stormwater, sump pumps, foundation drains or roof runoff is diverted to flow into the septic system.
☐	☐	☐	An apparent cave-in or exposed component was identified. A flow trial is not recommended.

FLOW TRIAL AND DYE TRACING (section 5.5 and 5.6)

Flow trial (75 gals/bdrm. @ 5 - 10 gpm with less than 2 inch rise in septic tank fluid level (section 5.5))
Indicate one of the following:

___ Preliminary evaluation indicates that a flow trial should be performed at the septic tank outlet for any of the following reasons (indicate one or more; section 5.5.1):
 ___ Excessive depth of septic tank solids ___ Structural damage ___ No solids depths measured and no pumpout in over three years

___ Flow trial shows the system accepted ___ gals. over ___ mins. (flow trial volumes are approximates), which is:
 ___ At least 75 gals/bdrm. ___ Is less than 75 gals/bdrm.

___ Flow trial results were inconclusive for the following reasons (section 5.6.1): ____
____

Dye tracing, when indicated (section 5.6)
Indicate one of the following:

___ Dye tracing was not done, as no potential system bypasses were identified (sections 5.6.1 and 5.6.2).

___ Potential bypass(es) was/were identified but no dye tracing was performed for the following reasons (sections 5.6.1 and 5.5.1): ____________
____

___ Dye tracing was performed as ___ potential system bypasses had been identified. Dye tracing results were as follows:
 ___ No bypasses were confirmed.
 ___ ___ bypasses were confirmed originating from inside the home and ___ bypasses were confirmed that originate outside the home.

 Describe where bypasses originate and terminate: ____
____

RESULTS & RECOMMENDATIONS

Results:
Inspection revealed (indicate one or more of the following):

___ System functions properly.
___ System is substandard or has substandard components. (Note reason(s) for indicating this on comment line below. Substandard systems may include, but are not limited to, cesspools, metal tanks, round tanks, undersized systems, and improper setbacks.)
___ Structural damage to the system (such as cracks in the septic tank or a soil absorption system cave-in).
___ Excessive wastewater backup in the soil absorption system.
___ Plumbing leaks or wastewater routing problems in the home.
___ Need for system maintenance.
___ Due to the condition of the system or lack of information, the inspection results are inconclusive.

Comments: ____
____
____

The system was last inspected or pumped on _______ (indicate date or N/A if there is no knowledge of previous maintenance) based on:
___ Pumping bill ___ Inspection report ___ Other ___________________________

Recommendations:
Indicate one or more of the following:
___ Further evaluation by a repair professional is recommended.
___ System upgrade should be considered.
___ Evaluation by a plumber is recommended.
___ Pumping and completion of the inspection is recommended.

Indicate one of the following (chapter 6)
___ Based on this inspection, the recommended maintenance interval is ___ (years) and should occur on ________________________ (date).
___ The system should receive further evaluation before a next inspection is scheduled.

Standard Inspection Schedules for Single-Family Residences on Conventional Systems (section 6.1.1)

Tank Size (gallons)	Household Occupancy			
	1-4	4-6	6-8	10 →
1000	5	3	**Undersized Tanks**	
1250	5	4	3	
1500	5	5	4	3

Please note: Substandard systems such as cesspools and systems with metal or undersized tanks should be on 1-3 year schedules, as should rental and seasonal properties. Innovative and alternative system should be scheduled based on DEM requirements.

Adjusted Inspection Schedules for Conventional Systems (section 6.5)

Combined Solids Accumulation **48 inch tank**	**nonstandard depth tank**	**System Pumped 3 Years Ago**	**System Pumped 4 Years Ago**	**System Pumped 5 Years Ago**
30"- 34"	3/5- 3/4 of flow depth	**System Analysis Required**		3 years
26"- 30"	1/2- 3/5 of flow depth		3 years	4 years
21"- 26"	2/5- 1/2 of flow depth	3 years	4 years	5 years
16"- 21"	1/3- 2/5 of flow depth	4 years	5 years	5 years
< 16"	< 1/3 of flow depth	5 years	5 years	5 years

INSPECTOR SIGNATURE

____
Inspector's Name (printed or typed)

____
Inspector's Signature

Rhode Island Recommended

SEPTIC SYSTEM
FIRST MAINTENANCE INSPECTION REPORT[1]

as described in
Septic System Checkup: The Rhode Island Handbook for Inspection

Inspection Date:______________________

CLIENT INFORMATION

Client's Name ____ Phone # ________________

Inspection Street Address & Town ____

____

INSPECTOR INFORMATION

Inspector's Name ____

Company ____ Phone # ________________

Street Address & Town ____

____

IMPORTANT NOTICE

This inspection report indicates the present condition of the system based on state-recommended inspection procedures, *but is in no way* a guarantee or warranty of future performance. The inspection report excludes and does not intend to cover components that are concealed or are otherwise not observable. Dry wells are not included in this inspection.

HOMEOWNER/OCCUPANT RECORDS & DATA, As Available (see chapter 2)[2]

Information collected pursuant to this section is to be provided voluntarily and at the discretion of the property owner. The property owner is solely responsible for record and data accuracy and completeness. The inspector assumes no responsibility for the accuracy of information provided by the property owner.

Indicate whether the following information was made available during the inspection. Attach copies of available records. If the property owner states that any of the following services were not provided—or in the case of application records that the system was installed prior to regulations (1968) — indicate not applicable (N/A). If the property owner states that partial records were provided, indicate "partial."

Application Records

Yes	No	N/A	
☐	☐	☐	Applications for septic system (inclusive of new systems, alteration, repairs). Indicate the number of each: ______ New system ______ Alteration ______ Repair
☐	☐	☐	Certificate of construction
☐	☐	☐	Certificate of conformance

Maintenance and Inspection Records

Yes	No	N/A	Partial	
☐	☐	☐	☐	Last septage pumping bill
☐	☐	☐	☐	Last maintenance or home inspection report

1. The Home Inspection Report is primarily intended for inspection as part of a property transfer or sale. For information on reports for use during other inspection circumstances, refer to *Septic System Checkup: The Rhode Island Handbook for Inspection.*
2. Chapter and Section numbers refer to *Septic System Checkup*.

SYSTEM COMPONENT EVALUATION (chapters 1 and 5)

Type of septic system (section 1.2): ☐ Single Cesspool ☐ Conventional septic tank system ☐ Other ________________________

Type of tank, if present (section 1.2.2): ☐ Concrete ☐ Metal ☐ Other __________________________

Indicate if any of the following components or accessories are present:
___ ISDS effluent pump ___ D-box handhole ___ Effluent filter ___ In-door lift pump ___ Other __________________________

Access to the system (diagram below or attach existing drawings): ☐ At grade ☐ Below grade

a. Outline approximate shape of the house, indicate front (F) and back (B).
b. Use swing-tie measurements to indicate the manhole (main access) of the septic tank, if buried.
c. Sketch in septic tank and other components as well as important surface features that may help to locate parts of the system.

Cesspools, *before pumpout* (section 5.3)

Yes	No	Not Observable	
☐	☐	☐	There is evidence of structural damage (section 5.3.1 and 5.3.2).
☐	☐	☐	There may be an overflow, second cesspool, soil absorption system, or other outlet from the cesspool. Dye tracing is recommended (section 5.3.3).
☐	☐	☐	There is standing water in the cesspool above the invert (section 5.3.1).

Septic Tank, *before pumpout* (section 5.1)

Yes	No	Not Observable	
☐	☐	☐	There is evidence of structural damage to the baffles, tees or superstructure of the tank (circle one or more) (section 5.1.8).
☐	☐	☐	Based on visual observations, sewage or septage may bypass the soil absorption system via a pipe or other conveyance. If a flow trial is being done, dye tracing should also be done (section 5.6.1).
☐	☐	☐	Flowage was seen or heard coming from the inlet even though all known water-use appliances/fixtures in the home are off. This condition may indicate in-home plumbing leakage (section 5.1.8). Performing an in-home evaluation should be considered (chapter 3).
☐	☐	☐	Scum and sludge layer thickness measurements were taken. Scum is ___ ins. and sludge is ___ ins. Indicate the appropriate "Recommended Action" in the Pumpout Guidelines table which follows (section 5.1.2).

Pumpout Guidelines for Conventional Systems (Table 5.1a)

Depth Criteria — Solids 48 inch depth tank	Nonstandard depth tank	Recommended Action
Combined solids < 16 inches	Combined solids < 1/3 flow depth	Pump at owners discretion. Consider setting a new Maintenance Inspection Schedule (see section 6.5 "Evaluation of Inspection Schedules."
Combined solids = 16 - 34 inches	Combined solids = 1/3 - 3/4 flow depth	Pump the tank and re-inspect as per section 6.5 "Evaluation of Inspection Schedules."
Either: Combined solids > 34 inches, Sludge > 26 inches, or Scum > 11 inches	Either: Combined solids > 3/4 flow depth, Sludge > 1/2 flow depth, or Scum 1/5 flow depth	Pump the tank and consider a system analysis by a licensed designer. A new inspection schedule, which accounts for system capacity and use, should be set by the licensed designer.

SITE OBSERVATIONS (section 5.4)

Yes No Inconclusive

☐ ☐ ☐ Impermeable surface such as concrete, asphalt, or brick is located approximately over the soil absorption system.

☐ ☐ ☐ There are one or more of the following signs of system malfunction present:
- ___ Septic odors
- ___ Ponding or wastewater breakout
- ___ Burnt out grass or ground staining over the soil absorption system (only indicate if one or more other signs are present).
- ___ Patches of lush green grass over the soil absorption system (only indicate if one or other signs are present).

☐ ☐ ☐ Trees, large shrubs or other plants with extensive root systems were observed in the vicinity (10 feet as per Rule 11.06(2) of the ISDS Regulations) of the soil absorption system.

☐ ☐ ☐ Heavy objects (e.g. cars or pools); or evidence from such objects (e.g. tracks and impressions) are in the vicinity (i.e. directly over) of the soil absorption system.

☐ ☐ ☐ Stormwater, sump pumps, foundation drains or roof runoff is diverted to flow into the septic system.

☐ ☐ ☐ An apparent cave-in or exposed component was identified. A flow trial is not recommended.

RESULTS & RECOMMENDATIONS

Results:

Inspection revealed (indicate one or more of the following):

___ System fuctions properly.

___ System is ubstandard or has substandard components. (Note reason(s) for indicating this on comment line below. Substandard systems may include, but are not limited to, cesspools, metal tanks, round tanks, undersized systems, and improper setbacks.)

___ Structuraldamage to the system (such as cracks in the septic tank or a soil absorption system cave-in).

___ Excesive wastewater backup in the soil absorption system.

___ Need for system maintenance.

___ Due to th condition of the system or lack of information, the inspection results are inconclusive.

Comments: ____

____

____

The system was last inspected or pumped on _______ (indicate date or N/A if there is no knowledge of previous maintenance) based on:

___ Pumping bill ___ Inspection report ___ Other __________________________

Recommendations:

Indicate one or more of the following:

___ Further evaluation by a repair professional is recommended.

___ System upgrade should be considered.

___ Evaluation by a plumber is recommended.

___ Pumping and completion of the inspection is recommended.

Indicate one of the following:

___ Based on this inspection, the recommended maintenance interval is ___ (years) and should occur on ________ (date) (sections 6.1. and 6.5).

___ The system should receive further evaluation before a next inspection is scheduled.

Standard Inspection Schedules for Single-FamilyResidences on Conventional Systems (section 6.1.1)

Tank Size	Household Occupancy			
	1-4	4-6	6-8	10 →
1000	5	3	**Undersized Tanks**	
1250	5	4	3	
1500	5	5	4	3

Please note: Substandard systems, such as cesspools and systems with metal or undersized tanks, should be on 1-3 year schedules, as should rental and seasonal properties. Innovative and alternative system should be scheduled based on DEM requirements.

Adjusted Inspection Schedules for Conventional Systems (section 6.5)

Combined Solids Accumulation **48 inch tank**	**nonstandard depth tank**	**System Pumped 3 Years Ago**	**System Pumped 4 Years Ago**	**System Pumped 5 Years Ago**
30”- 34”	3/5- 3/4 of flow depth	**System Analysis Required**		3 years
26”- 30”	1/2- 3/5 of flow depth		3 years	4 years
21”- 26”	2/5- 1/2 of flow depth	3 years	4 years	5 years
16”- 21”	1/3- 2/5 of flow depth	4 years	5 years	5 years
<16”	< 1/3 of flow depth	5 years	5 years	5 years

INSPECTOR SIGNATURE

____

Inspector’s Name (printed or typed)

____

Inspector’s Signature

Rhode Island Recommended

SEPTIC SYSTEM
ROUTINE MAINTENANCE INSPECTION REPORT[1]

as described in
Septic System Checkup:
The Rhode Island Handbook for Inspection

Inspection Date:____________________

CLIENT INFORMATION

Client's Name ____ Phone # ______________

Inspection Street Address & Town ____

____

INSPECTOR INFORMATION

Inspector's Name ____

Company ____ Phone # ______________

Street Address & Town ____

____

IMPORTANT NOTICE

This inspection report indicates the present condition of the system based on state-recommended inspection procedures, *but is in no way* a guarantee or warranty of future performance. The inspection report excludes and does not intend to cover components that are concealed or are otherwise not observable. Dry wells are not included in this inspection.

HOMEOWNER/OCCUPANT RECORDS & DATA, As Available (see chapter 2)[2]

Information collected pursuant to this section is to be provided voluntarily and at the discretion of the property owner. The property owner is solely responsible for record and data accuracy and completeness. The inspector assumes no responsibility for the accuracy of information provided by the property owner.

Indicate whether the following information was made available during the inspection. Attach copies of available records. If the property owner states that any of the following services were not provided—or in the case of application records that the system was installed prior to regulations (1968) — indicate not applicable (N/A). If the property owner states that partial records were provided, indicate "partial."

Maintenance and Inspection Records

Yes	No	N/A	Partial	
☐	☐	☐	☐	Last septage pumping bills
☐	☐	☐	☐	Last maintenance or home inspection report

SYSTEM COMPONENT EVALUATION

Cesspools, *before pumpout*:

Yes	No	Not Observable	
☐	☐	☐	There is evidence of structural damage (section 5.3.1 and 5.3.2).
☐	☐		There may be an overflow, second cesspool, soil absorption system, or other outlet from the cesspool. Dye tracing is recommended (section 5.3.3).
☐	☐		There is standing water in the cesspool above the invert (section 5.3.1).

1. The Routine Maintenance Inspection Report is intended for use during a routine maintenance inspection. For information on reports for use during other inspection circumstances, refer to *Septic System Checkup: The Rhode Island Handbook for Inspection.*
2. Chapter and Section numbers refer to *Septic System Checkup*.

Septic Tank, *before pumpout*

Yes	No	Not Observable	
☐	☐	☐	There is evidence of structural damage to the baffles, tees or superstructure of the tank (circle one or more). A flow trial is not recommended (section 5.1.1 and 5.1.8).
☐	☐		Based on visual observations, sewage or septage may bypass the soil absorption system via a pipe or other conveyance. If a flow trial is being done, dye tracing should also be done (section 5.6.1).
☐	☐		Flowage was seen or heard coming from the inlet even though all known water-use appliances/fixtures in the home are off. This condition may indicate in-home plumbing leakage (section 5.1.8).
☐	☐		Scum and sludge layer thickness measurements were taken. Scum is ___ ins . and sludge is ___ ins. Indicate the appropriate "Recommended Action" in the Pumpout Guidelines table which follows (section 5.1.2).

Pumpout Guidelines for Conventional Systems (Table 5.1a)

Solids 48 inch depth tank Depth Criteria	Nonstandard depth tank	Recommended Action
Combined solids < 16 inches	Combined solids < 1/3 flow depth	Pump at owners discretion. Consider setting a new Maintenance Inspection Schedule (see section 6.5 "Evaluation of Inspection Schedules."
Combined solids = 16 - 34 inches	Combined solids = 1/3 - 3/4 flow depth	Pump the tank and re-inspect as per section 6.5 "Evaluation of Inspection Schedules."
Either: Combined solids > 34 inches, Sludge > 26 inches, or Scum > 11 inches	Either: Combined solids > 3/4 flow depth, Sludge > 1/2 flow depth, or Scum 1/5 flow depth	Pump the tank and consider a system analysis by a licensed designer. A new inspection schedule, which accounts for system capacity and use, should be set by the licensed designer.

SITE OBSERVATIONS (section 5.4)

Yes	No	Not Observable	
☐	☐	☐	Impermeable surface such as concrete, asphalt or brick is located approximately over the soil absorption system.
☐	☐	☐	There are one or more of the following signs of system malfunction present: ___ Septic odors ___ Ponding or wastewater breakout ___ Burnt out grass or ground staining over the soil absorption system (only indicate if one or more other signs are present). ___ Patches of lush green grass over the soil absorption system (only indicate if one or other signs are present).
☐	☐	☐	Trees, large shrubs or other plants with extensive root systems were observed in the vicinity (10 feet as per Rule 11.06(2) of the ISDS Regulations) of the soil absorption system.
☐	☐	☐	Heavy objects (e.g. cars or pools); or evidence from such objects (e.g. tracks and impressions) are in the vicinity (i.e. directly over) of the soil absorption system.
☐	☐	☐	Stormwater, sump pumps, foundation drains or roof runoff is diverted to flow into the septic system.
☐	☐	☐	An apparent cave-in or exposed component was identified. A flow trial is not recommended.

RESULTS & RECOMMENDATIONS

Results:

Inspection revealed (indicate one or more of the following):

___ System functions properly.
___ Structural damage to the system (such as cracks in the septic tank or a soil absorption system cave-in).
___ Excessive wastewater backup in the soil absorption system is indicated.
___ Need for system maintenance.
___ Due to the condition of the system or lack of information the inspection results are inconclusive.

Comments: ____

____

____

The system was last inspected or pumped on _______ (indicate date or N/A if there is no knowledge of previous maintenance) based on:
___ Pumping bill ___ Inspection report ___ Other __________________________

Recommendations
Indicate one or more of the following:
___ Further evaluation by a licensed designer is recommended.
___ System upgrade should be considered.
___ Evaluation by a plumber is recommended.
___ Pumping and completion of the inspection is recommended.

Indicate one of the following
___ Based on this inspection, the recommended maintenance interval is ___ (years) and should occur on _____________ (date).
___ The system should receive further evaluation before a next inspection is scheduled.

Standard Inspection Schedules for Single-Family Residences on Conventional Systems (section 6.1)

Tank Size (gallons)	**Household Occupancy**			
	1-4	4-6	6-8	10 →
1000	5	3	**Undersized Tanks**	
1250	5	4	3	
1500	5	5	4	3

Please note: Substandard systems such as cesspools and systems with metal or undersized tanks should be on 1-3 year schedules, as should rental and seasonal properties. Innovative and alternative system should be scheduled based on DEM requirements. To change schedules for systems with nonstandard-depth tank consult handbook.

Adjusted Inspection Schedules for Conventional Systems (section 6.5)

Combined Solids Accumulation **48 inch tank**	**nonstandard depth tank**	**System Pumped 3 Years Ago**	**System Pumped 4 Years Ago**	**System Pumped 5 Years Ago**
30”- 34”	3/5-3/4 of flow depth	**System Analysis Required**		3 years
26”- 30”	1/2-3/5 of flow depth		3 years	4 years
2”- 26”	2/5-1/2 of flow depth	3 years	4 years	5 years
16”- 21”	1/3-2/5 of flow depth	4 years	5 years	5 years
< 16”	< 1/3 of flow depth	5 years	5 years	5 years

INSPECTOR SIGNATURE

____
Inspector’s Name (printed or typed)

____
Inspector’s Signature

Rhode Island Recommended

SEPTIC SYSTEM MAINTENANCE INSPECTION REPORT SUPPLEMENTS[1]

as described in

Septic System Checkup: The Rhode Island Handbook for Inspection

Inspection Date:____________________

CLIENT INFORMATION

Client's Name ____ Phone # ______________

Inspection Street Address & Town ____

____

INSPECTOR INFORMATION

Inspector's Name ____

Company ____ Phone # ______________

Street Address & Town ____

____

FLOW TRIAL AND DYE TRACING (sections 5.5 and 5.6)

Flow trial: 75 gals/bdrm. @ 5 - 10 gpm with less than 2 inch rise in septic tank fluid level (section 5.5)[2]

Indicate one of the following:

___ Preliminary evaluation indicates that a flow trial should be performed at the septic tank outlet for any of the following reasons (indicate one or more; section 5.5.1):

___ Excessive depth of septic tank solids ___ Structural damage ___ No solids depths measured & no pumpout in over three years

___ Flow trial shows the system accepted ___ gals. over ____ mins. (flow trial volumes are approximates), which is:

___ At least 75 gals/bdrm. ___ Is less than 75 gals/bdrm.

___ Flow trial results were inconclusive for the following reasons (section 5.5.1): ________________________________

____

Dye tracing , when indicated (section 5.6)

Indicate one of the following

___ Dye tracing was not done, as no potential system bypasses were identified (sections 5.6.1 and 5.6.2).

___ Potential bypass(es) was/were identified but no dye tracing was performed for the following reasons (sections 5.6.1. and 5.5.1):

___ Dye tracing was performed as ___ potential system bypasses had been identified. Dye tracing results were as follows:

___ No bypasses were confirmed.

___ Bypasses were confirmed.

___ bypasses were confirmed originating from inside the home and

___ bypasses were confirmed that originate outside the home.

Describe where bypasses originate and terminate: ________________________________

____

INSPECTOR SIGNATURE

____
Inspector's Name (printed or typed)

____
Inspector's Signature

1. The Home Inspection Report is primarily intended for inspection as part of a property transfer or sale. For information on reports for use during other inspection circumstances, refer to *Septic System Checkup: The Rhode Island Handbook for Inspection.*
2. Chapter and Section numbers refer to *Septic System Checkup*.