

Septic Systems in the Smokerise Development, Swansea, MA

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Executive Summary

From this study we determined that septic systems in the Smokerise housing development have a high probability of failure. Most systems have not been inspected since installation in the early 1970's, and for those that have, almost all required repair. Impermeable soils and the high water table make this area of Swansea unsuitable for septic systems to function properly. Despite this clear danger to water quality, there are many factors preventing corrective action: 1) inspections are only mandatory at time of sale or visible failure, 2) the Town of Swansea continues to vote down a sewer feasibility study, and 3) failures in Smokerise constitute non-point sources of pollution that the government has limited ability to control. We recommend a comprehensive study of septic system status and alternative options for sewage disposal in Smokerise.

Background

In 1960, the Town of Swansea voted against the option to sewer the town. The Smokerise housing development was zoned as affordable housing and built during the early 1970's and septic systems were installed on every lot. Title V standards that regulate on-site sewage disposal did not go into effect until 1975. In addition, prior to 1978, rules pertaining to the design, construction and monitoring of septic systems were significantly less stringent than current ones, and enforcement by the State Department of Public Health was ineffective.¹ The 1980 Facilities Plan Summary and 2000 update for Swansea found that town-wide Title 5 septic system failure rates have increased from 22% in 1980 to a range of 46-57% from 1995 to 2000.²

When septic systems fail, sewage can seep into the groundwater and enter water bodies. People depend on good water quality for drinking, food sources, and recreation. Failing systems in Smokerise are of particular concern because the Kickemuit River runs directly through the housing development.

Procedure

Our research consisted primarily of entering data into an Access database called BOH2000 and conducting semi-structured interviews with stakeholders, including officials from MA DEP, RIDEM, EPA, Save the Bay, the town of Swansea and the Kickemuit River Council. We reviewed files in the Swansea Board of Health office, and entered data for 223 of the approximately 400 residential lots within the Smokerise and Mt. Fair Circle area. Because our primary focus was the Kickemuit River, over 200 of the lots we chose to enter are located within 300 ft. of the river. The information entered concerned location, nature of repairs (if any), system design, and soils data.

¹ Wastewater Facilities Plan Update, Swansea, MA. 1980 and 2000.

² See Wastewater Facilities Plan Update, Swansea MA, section 1.B for calculation methods.

Condition of Septic Systems

Of the 223 systems we reviewed:

- 60% were “original constructions,” meaning that the only records on file were for the original construction (usually in the early 1970s).
- 37% of systems had been repaired, meaning that at least one element of the tank, piping, or leach field had been repaired or replaced.
- 3% of the systems were inspected, meaning that there was an inspection done but no record of repair on file.

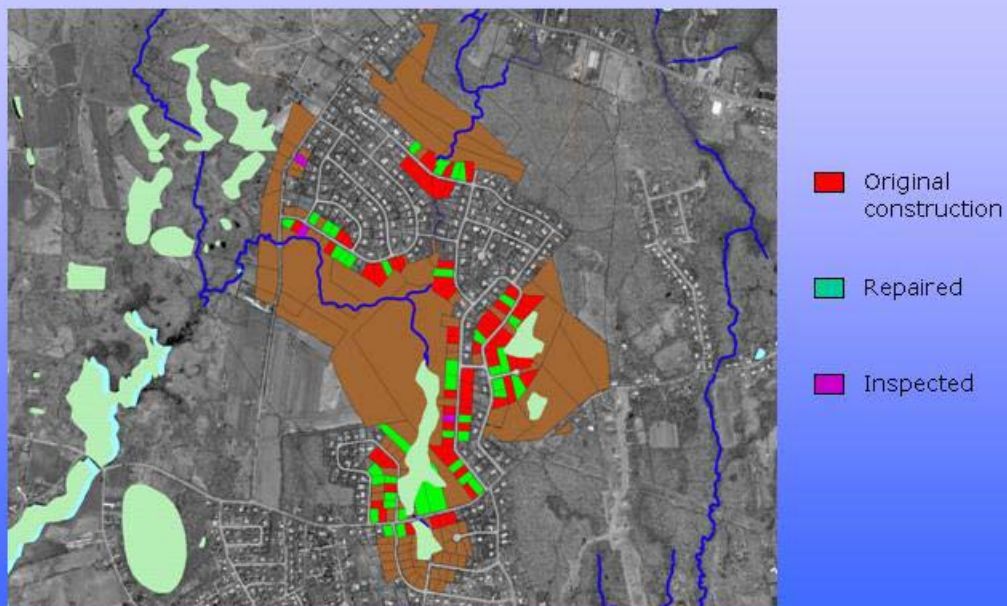
Examples of perceived failure (quoted directly from BOH files):

"This design does not conform to Title V. Since soil conditions are extremely poor on this site no subsurface disposal system can be expected to function for any period of time. This system design is intended as no more than a temporary relief from the present condition."

"The owner of the property was supposedly repairing his own system. His neighbors and the police complained. Upon inspection, he failed Title 5. His property is immediately next to wetlands. The west side of his dwelling was overflowing to the surface of the ground."

Inspection as of Jan 14 1998 failed. "Backup of sewage into system component due to an overloaded or clogged SAS or cesspool."

GIS Overlay of Septics Status in Smokerise



Stakeholders Meeting, May 9th, 2002

A meeting of stakeholders was convened at Brown University on May 9th, 2002. Those present included officials from the Kickemuit River Council, EPA, RIDEM, MADEP, the Eastern RI Conservation District, the Towns of Swansea, MA and Warren, RI, Brown University and the Somerset *Spectator*. Issues discussed included:

- Kickemuit water quality
- Barriers to action concerning septic systems (regulatory, political and financial)
- Option to sewer Swansea
- Future action

From the meeting it became apparent that there is interest in finding a solution to the problem of potentially failing systems in Smokerise. However, there are many barriers to action. The Town of Swansea has voted down both sewerage of Swansea and a sewer feasibility study, most likely because of the associated high costs. In addition, septic systems constitute non-point sources of pollution, making the problem of failing systems difficult to target as the source of water quality problems. There was uncertainty in terms of whether phosphorous and nitrate levels for the Kickemuit would warrant official investigation, but it does not appear that fecal coliform levels would.

A joint meeting between the Swansea Board of Selectmen and Board of Health was suggested. Our hope is that this study will be incentive for further action and coordination between stakeholders in the future.

Discussion

According to documents available in the BOH files, 60% of the systems currently exist in their original state as installed in the early 1970s. They have not been inspected, repaired, upgraded, or replaced. This is significant because there is no alternative regulatory mechanism to BOH inspections in place. And, in effect, there is no official information available concerning how these systems are functioning. This becomes more notable considering that, according to the Wastewater Facilities Plan Update for Swansea (2000), “Systems built before 1978 have a very high likelihood of failure due to lack of design and construction controls placed on these systems prior to this date.”³

That almost all of the systems with records other than original construction on file needed some degree (most often substantial) of repair is also notable. This data further suggests high rates of probable septic system failure in Smokerise.

Inspection and Regulation:

In 1995 Title V regulations were amended. The state attempted to require mandatory inspection of all septic systems that were installed before 1978. Due to public disapproval, however, inspection became mandatory only at time of sale or if there were

³ Wastewater Facilities Plan Update, Swansea MA, section 1.B.

visible problems. Almost all of the repairs and inspections we recorded were initiated at time of sale, usually in the late 1980s to late 90s.⁴

We were not able to review pump-out records for Smokerise. This information will be important for future study because lack of regular pump-outs can lead to a decrease in septic system life.

While fecal coliform counts increase substantially through the Smokerise development (see “Water Quality” section below), the levels do not violate regulations and therefore do not warrant immediate government intervention. In addition, septic system failures constitute non-point sources of pollution. It is difficult to target individual failing systems as impairing a water body. Therefore, while federal and state agencies may be aware of the problem, they are limited in their ability to induce change.

The Town of Swansea is currently facing acute financial problems. Due to severe budgetary restraints, it is unlikely that enforcement of inspections will increase in the near future. In addition, the Board of Health staff has recently been reduced, making enforcement even more difficult.

Cost of Repairs:

The cost of septic system repairs has increased substantially in recent years. Beginning with amended Title 5 regulations in 1995, every septic project was required to be designed by an engineer and approved by the local authority and sometimes DEM/DEP as well, which increased costs. For example, before 1995, new systems could cost \$7,000 to \$9,000. After 1995, the cost increased to as much as \$35,000.⁵ Because Smokerise remains a low-income neighborhood, these costs can be prohibitively high.

There is a revolving loan program for septic repairs in place, with interest based on income (zero interest for lowest income bracket). However, the program has not been utilized by many homeowners because of lack of funding and lack of awareness of its existence.⁶ The program is on its first revolution, and is in the process of being paid back. It could be a viable source of money in the future.

Soils and Water Table:

While there were soil data available for almost all of the lots recorded, we do not believe these data are reliable for two reasons. First, they were not certified by the BOH agent, and are therefore not official information.⁷ Second, percolation tests before the original construction in the early 1970s were not taken on each lot. Instead, only a few sites were tested and the results copied into multiple other files.⁸ There were very few updated percolation tests in the files we reviewed. This indicates that basic data required for proper sewage disposal are incomplete. We know from other sources that 80% of soils in Swansea are known to be impermeable because of glacial till, rock, and wetlands.⁹ This suggests that the area is unsuitable for septic systems to function properly.

⁴ David Steele, Swansea BOH agent.

⁵ Cynthia Farias, Former Chairman of BOH, Swansea.

⁶ David Steele.

⁷ David Steele.

⁸ Cynthia Farias.

⁹ Roger Pelletier (Chairman of the Sewer Feasibility Study, Swansea).

In addition, depth to groundwater (available for less than half of the lots recorded) was also not certified by the health agent.¹⁰ According to Title V, the bottom of the leach field must be at least 48” above groundwater (without a variance). We have learned from multiple sources that the water table in Smokerise is too high to be suitable for septic systems,¹¹ which according to one source was as high as 36” depth to groundwater.¹² Therefore, in order to meet Title V standards (or a BOH variance), most leach fields have to be mounded (elevated). This is not an effective long-term solution, however. Soils remain unsuitable, potentially allowing sewage to enter surface or groundwater without properly filtering.

Water Quality:

According to the Data Assessment Report for the Kickemuit Reservoir TMDL Study (2001) by RIDEM, fecal coliform levels are substantially lower above Smokerise on the Kickemuit than below it.¹³ While these levels do not violate regulations and do not directly target Smokerise as the source, they do warrant attention.

Fecal coliform levels in the lower Kickemuit do not appear to originate from Smokerise. The highest levels occur during storm water runoff, suggesting animal feces as the primary cause there. We recognize the importance of phosphorous and nitrate data to conclusions about Kickemuit River water quality and suggest further investigation of these levels.

Recommendations

Our research on septic systems in Smokerise and our subsequent meeting of stakeholders held on May 9th, 2002 have led us to make several recommendations. What is most needed is a comprehensive study of the current septic conditions and best options for wastewater management in Swansea. Unfortunately, a sewer feasibility study has already been voted down three times by the town. It is clear that various councils, organizations and homeowners in Swansea need to coordinate their efforts to decide the best course of action.

The Kickemuit River Council has been a dynamic force in addressing water quality problems in the lower, saltwater portion of the Kickemuit River. Due to their clear capacity for organization and mobilization, we believe they have the potential to affect change upstream in Massachusetts, where there is currently no Council membership. Their presence would be a positive influence and could greatly assist in the education and mobilization of the Smokerise community.

The success of a watershed approach requires the involvement and coordination of stakeholders throughout the watershed. The Kickemuit River watershed is located in both Massachusetts and Rhode Island. Therefore, agencies from both states need to coordinate their efforts in order to better address wastewater management needs in the Smokerise housing development and the Town of Swansea.

¹⁰ David Steele.

¹¹ Cynthia Farias, David Steele, and Greg Barnes (Town Administrator, Swansea).

¹² David Steele.

¹³ RIDEM, USEPA and Numeric Environmental Services. “Data Assessment Report for the Kickemuit Reservoir TMDL Study.” 2001.