An Evaluation of On-Site Technology in Indiana

Purdue has finished its report to the Indiana State Department of Health entitled An Evaluation of On-Site Technology in Indiana. This report outlines most of our findings from the last nine months of research pertaining to the status of on-site systems in Indiana. It discusses concerns that we have about specific practices and outlines our recommendations for reform. It also provides an overview of sand filters, constructed wetlands, and aerobic treatment units. This report is available from our website or you can contact us and we’ll send you a copy.

Confused about constructed wetland design?

There are still unknowns in constructed wetland design and optimization. Large quantities of data have been generated from many sources, but it is often difficult to sort and distill. Inconsistent results can be found due to the magnitude of data (literally thousands of articles and reports have been written) and rapidly changing design theory. In light of this, the EPA has constructed a “North American Wetland Treatment System Database” to keep track of engineering data on constructed wetlands. The database includes parameters such as location, wastewater type, wetland type, number of cells, flow, area, plant species, depth, costs, and effluent quality from published and unpublished sources. Most databases will accept data from database IV. The DOS-based database can be obtained from the USEPA. It requires 4 MB free disk space and can be sent by email or on a 3.5 inch floppy disk. Further information can be obtained from the EPA’s Wetlands Information Hotline at 1-800-832-7828.

Sand Filter Installation Video

Sand filters are used in many states for septic tank effluent pretreatment. Pretreatment is beneficial because it lowers effluent strength, decreasing the burden of treatment placed on soil absorption fields. In some states, pretreatment is used to allow renovation of failing on-site systems, downsized absorption fields, and on-site systems on sites where conventional systems would not be permitted. Like all on-site systems, sand filter success is based on a combination of proper siting, installation, and maintenance. Wood County, Wisconsin has made a video (Sand Filter Installation) with the cooperation of the University of Wisconsin demonstrating single pass sand filter installation. Purdue has three copies of this video available. If you would like to check out this video for 10 days, let us know (765-496-3454).

Also available for loan are several copies of Septic Systems Revealed. This video describes the theory and maintenance of septic systems and is geared toward homeowners. It would be useful for health departments as a component of the permitting process, and for contractors, as a demonstration video. If you would like to purchase a copy, contact the Minnesota Extension Service at 1-800-876-8636.

On-Site is a cooperative project between county health departments, Purdue University and the Indiana State Department of Health
Another Plea for Help...

The following letter was received by the Purdue on-site staff. We are publishing a somewhat edited version of it because we feel it depicts the problems we are facing clearer than statistics ever could. This is just one of many letters and phone calls we receive regularly of this nature. To respect the privacy of the parties involved, names, and other details have been changed.

Many of the questions we don’t have answers for, or not good ones. The problems are very complex. Please understand that answers to the selected questions, located under the question, are very brief and simplified and should be viewed accordingly.

Hello,

My name is John Doe. I am a Realtor who does a lot of business with rural and small towns, several of which are having waste disposal ‘woes’ in our part of the state.

In the past five years there have been three small communities in the county informed that they have failing systems. This month 22 homeowners in the Community 1 fringe area will begin court proceedings after being sued by the County to stop using their systems. Community 2, a community of approximately 60 homes will be in the same situation by next year. Community 3, slightly larger than Community 2 will be next in line. There are several other small communities in the county that will encounter this problem within the next 5 years.

The town that I live and work in (approximately 200 homes) was fortunate enough to have the City Council act before the problem went to court. The other communities did not have that luxury, nor do the residents have the funds or even the land available to do much about it. Communities 1 and 2 are close enough to a nearby town to hook up to their Sanitary, but haven’t. For what reason I am not quite sure.

The county government has not been able to help much. They say that all they can do is investigate reports of raw sewage and inform homeowners of what must be done. This may be true for the health department but I had hoped the county administrator would get more involved. The homeowners have been left to drown. They have received very little support, guidance, or information. I’ll get off my soap box now and get to the point.

I have a few questions. I will try to be brief. [NOTE: John Doe’s questions (and our answers) follow.]

Thanks for your time,
John Doe

1. Are there any state funds available to these people?

Indiana doesn’t have any state funding specifically for on-site system repair. There is some federal funding which a community can apply for if they qualify. It is easier to obtain funding for communities than for individual residences. Small Flows Clearinghouse has several resources on how to acquire funding for on-site systems. Titles include Federal Funding Sources for Rural Areas, Road to Financing: Assessing and Improving Your Communities Creditworthiness, and It’s Your Choice: A Guidebook for Local Officials on Small Community Wastewater Management Options. Small Flows can be reached at 800-624-8301. Another resource is the USEPA’s funding resource web site. They have a Guidebook of Financial Tools online at: http://www.epa.gov/efinpage/guidebk/guindex.html

2) What specific research results do you have for our County?

3) Would you be willing to do a more in depth study of our county?

4) Are there any new or current systems that could fit in on a 10,000 sq. ft. lot that could be approved in a timely manner? If so are they cost effective?

There aren’t any systems currently permitted which are designed for lots that small. Pretreatment systems, such as sand filters or aerobic treatment units, have been used in other states to renovate failed absorption fields. Pretreatment acts to “clean up the effluent” so that the existing filter field works better. If the existing field is in total failure, however, a replacement is usually needed. Pretreatment requires regular professional maintenance. As other states have discovered, permitting these systems without providing for long-term maintenance often creates problems as bad as the original ones. A plan to guarantee competent maintenance is necessary. This is difficult to accomplish, but other states have done it. It requires significant reform and legislative backing for ongoing education and training of service and installation individuals.

Perhaps a better solution would be to build a community on-site system. Some type of small diameter, variable grade sewer and cluster treatment or disposal system works for many small communities. This requires land located adjacent to or at least near the community in order to collect the septic tank effluent from the homes and transport it to a central treatment and disposal site. Also, a legal arrangement, such as a sewer district would need to be set up with the ability to “tax” the homeowners who benefit from the sewer to provide for installation, operation and maintenance expenses.

The treatment configuration at the central site could be a lagoon and irrigation or even a large septic system, depending on soil type at that site. A community sand filter might also be appropriate prior to dispersal to an absorption field. There are several alternatives for small communities which have a mechanism to provide maintenance, however, most are experimental in Indiana. There are engineers at the Indiana State Department of Health...
which can help small communities select an on-site system which will meet their needs.

One of the major complications here is that oversite of small community systems is split between two state government agencies. Lagoons with surface discharge or spray irrigation come under the control of the Indiana Department of Environmental Management while pretreatment with discharge to an absorption area comes under the control of ISDH.

5) Are you aware of any other communities that have conquered or are currently involved in a similar situation?

Many counties in the state are dealing with this same problem. If we were to honestly look at Indiana’s small communities on wells and septs, most counties would have at least one community in almost complete failure. The practice of continued expansion of residential subdivisions on one or two acre lots will exerbate this problem. For example, a fifty-acre site divided into one acre lots places fifty septic systems in close proximity to fifty wells all connected to groundwater supplies. Enlarging lot sizes only creates “sprawl”, often spreading rural homeowners into valuable farmland and natural resource areas. Cluster development with community on-site systems accompanied by guaranteed, organized maintenance is a safer, and often a more economical solution.

6) In your opinion, what role should the county be playing in this, or what can the affected homeowners do to help get the county more involved?

The health department is doing its job. Failing septic systems and raw sewage are health hazards. Indiana cannot allow its water to be contaminated with infectious diseases. What diseases are linked to sewage? Typhoid, tuberculosis, dysentery, gastroenteritis, giardiasis, cholera, infectious hepatitis, and leptospirosis to name just a few. Headaches, expense, and stress preventing these diseases are trivial compared to what would result from outbreaks and an unsafe water supply.

What your county should be doing is a tougher question, as each county works a little differently. Developing a sewer district and applying for federal funding requires the cooperation of the county. The communities may or may not need the county’s help to simply build a community system and set up a legal homeowners maintenance agreement. The health department should cooperate with reasonable attempts to improve the situation, but the homeowners have to want to fix the problem and become organized to make it happen.

7) Is there any other information about private disposal systems that would be beneficial to them that you could send me?

The Purdue On-Site Project report may provide some insight specific to Indiana. Small Flows, an organization which specializes in on-site systems technology, operation and maintenance, regulations, management, finance, and education may be your best overall resource.

We would like watertight tanks, please.

Watertight septic tanks are essential for maintaining environmental quality and permitting innovative technologies. Leaky tanks may release large concentrations of relatively untreated wastewater to a very small area. The tank may be located in a soil type inappropriate for treatment, below the seasonal high water table, or too deep to allow proper treatment of wastewater. Even in an ideal soil and location, the hydraulic loading rate may be too high to allow proper soil treatment. If the tank is located below the groundwater surface, water may infiltrate into the tank, overloading the absorption field and causing premature failure.

One of the limiting factors to many alternative technologies is the availability of water tight tanks. Researchers tracking systems sensitive to effluent dosing have often found that the actual amount of wastewater dosed is far higher than actual household water use. The magnitude of this problem in Indiana is unknown because septic tank integrity is seldom checked. Also, most of our system permits do not require close monitoring of septic tank influent and effluent quantities. Testing or proof of structurally sound, watertight tanks before installation would greatly help.