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Small Community Wastewater Cluster Systems

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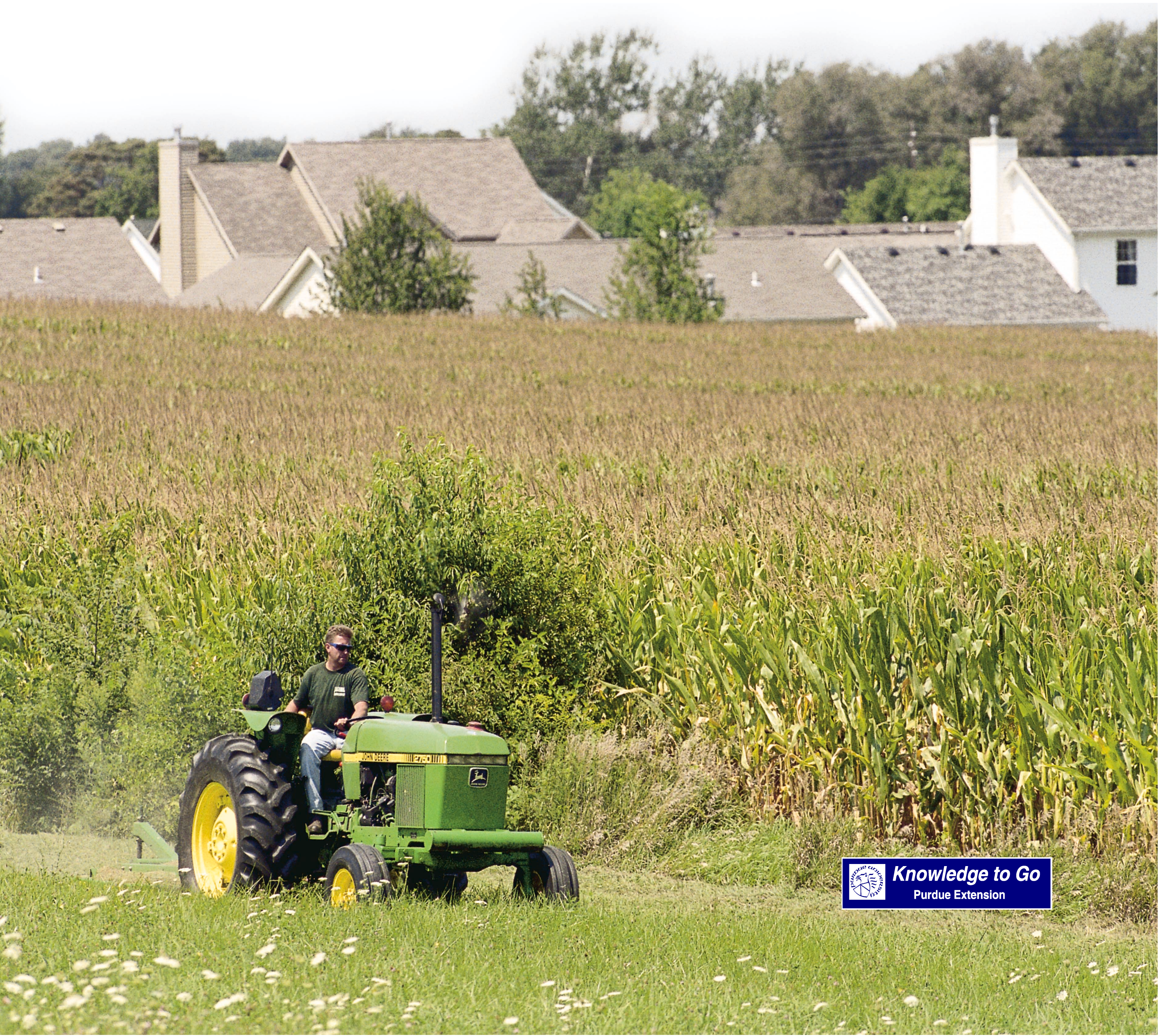

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In areas served by municipal wastewater facilities, sewage is transported away from homes in large diameter gravity sewers to a central plant where it is treated and discharged into a waterway. Outside of these areas, most individual residences must rely on a septic tank and soil absorption field, or on-site system, to dispose of their wastewater.

Cluster systems bridge the gap between these two systems in small communities where neither of the first two systems is feasible.

The Case for Improved Small Community Wastewater Service

There are an estimated 800,000 residences and small businesses in Indiana which are not connected to a centralized sewage treatment facility. The Indiana State Department of Health has stated that as many as 200,000 of these have an inadequate means of sewage disposal. This is a significant public health concern, especially for the 700 or so small unsewered communities in the state. Many of these are older communities that never really planned for sewage disposal; in fact, several have direct discharges or connections to town drains due to a lack of such planning. They often cannot solve the problem using individual on-site systems due to small lots that are poorly suited for on-site systems. Such problems will continue until cost efficient technologies are made available to these communities. Communities expanding into rural areas also need these new technologies so that additional sewage disposal problems are not created.

A centralized wastewater system is an excellent solution in larger densely populated areas, since the cost of a municipal sewage system is lower if it can be distributed over a larger number of users. However, centralized treatment systems operated by small communities often perform poorly because the expertise and funding is not be available to update and maintain the facilities. In fact, sewered small communities which treat and discharge wastewater account for most non-compliance violations, according to the U.S. Environmental Protection Agency. It would seem, therefore, that non-discharging decentralized wastewater treatment systems, or "cluster systems," should be carefully considered for this type of community. In an April 1997 report to Congress on the Use of Decentralized Wastewater Treatment Systems, the U.S. EPA stated that, "Adequately managed decentralized wastewater systems are a cost-effective and long-term option for meeting public health and water quality goals, particularly in less densely populated areas." This support of alternative on-site systems for small communities is a major shift from previous national policies.

Over the past 25 years the nation has made significant strides in addressing the wastewater treatment needs of communities across the country. But enormous wastewater treatment needs remain — especially in small communities. EPA's 1996 Clean Water Needs Survey estimated that small communities need an additional $13.8 billion to comply with the Clean Water Act by the year 2016. Nearly $8 billion in government funding has already been provided to small communities for wastewater treatment projects since 1992.

Cluster systems transport wastewater via alternative sewers to either a conventional treatment plant or to a pretreatment facility followed by soil absorption of the effluent. Cluster systems can be environmentally sound, financially responsible solutions for small community wastewater problems, where conventional central treatment systems are not practical or affordable and where individual on-site systems are inappropriate because of site or soil limitations.

This publication will focus on alternatives to conventional large-diameter gravity sewers and on pretreatment and soil absorption, rather than treatment/discharge systems. It will discuss the various components of a cluster system, their advantages and disadvantages, and management needs to ensure their proper operation. The community and financial procedures necessary to plan, build, and maintain a cluster system will also be covered.

Components of a Cluster System

Cluster systems, as discussed in this publication, collect wastewater from a small number of homes, usually 2 to 10, and transport it via an alternative sewer to a pretreatment and land absorption area with no surface discharge of effluent. Within this description, the options can be divided into the following categories: collection, pretreatment, final soil absorption, and management of the system.

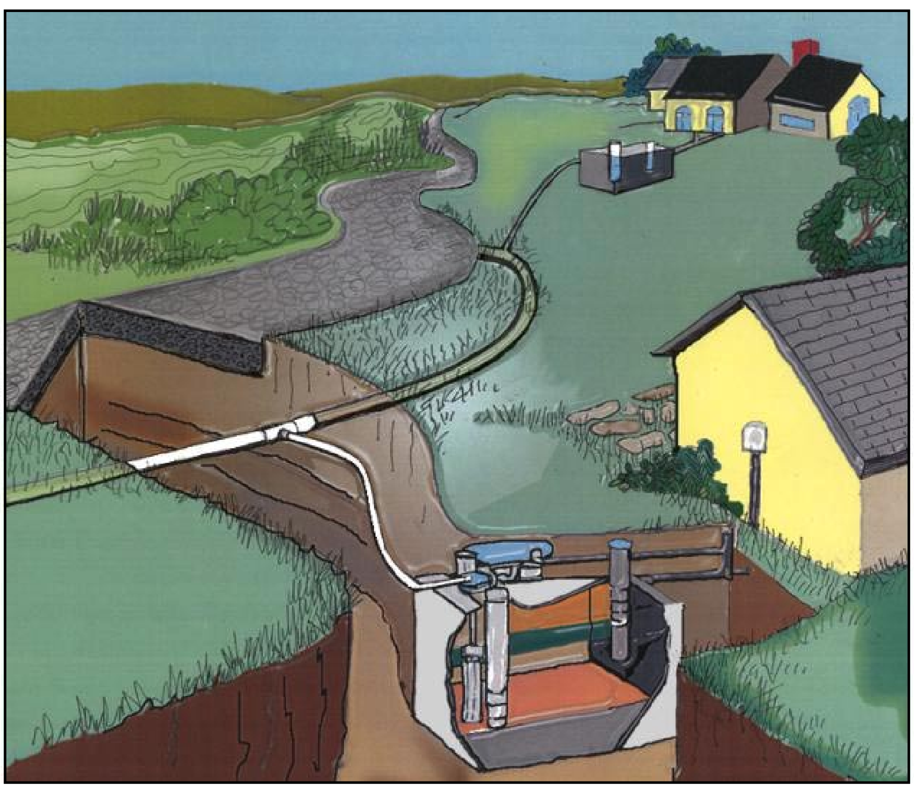
Collection Options

Alternative sewer systems use plastic pipes that are typically smaller in diameter than conventional sewer pipes because the wastewater is first treated (in a septic tank or grinder pump, for example) so that large, solid materials are separated out or ground into smaller pieces. An advantage of alternative sewers is that the small plastic pipes used in their construction makes it less likely that water will infiltrate into the sewer, a common problem with large-diameter sewers. Infiltrated water adds to the load on the treatment facility or the final absorption of the treated effluent, which can reduce the degree of treatment, the life of the system, and lead to environmental contamination. Small-diameter flexible plastic pipes can also be easily routed around trees and other obstacles, which can simplify construction, minimize disruption to the area, and save money.

Several types of alternative sewer systems — pressure, small-diameter gravity (SDG), and vacuum sewers — can be used to collect and transport wastewater. Pressure sewers are the most popular alternative collection systems, and either pump septic tank effluent or utilize a grinder pump by replacing the septic tank with a smaller sump and pump. SDG systems use septic (interceptor) tanks at the home to remove the settleable and floatable solids prior to their entry into the sewer. This minimizes sewer clogging and minimizes the need for higher flow velocities to keep solids in suspension, allowing the use of small-diameter sewers to transport the effluent. Vacuum sewers (VS) utilize a central vacuum source that draws wastewater and air through collection pipes to the central collection point. Vacuum systems have historically been the least used of the three alternatives in the U.S., but their use has increased substantially in the past few years as the technology has improved.

Pressure Sewers and Pumps

Pressurized alternative sewer designs are appropriate for hilly or extremely flat terrain, shallow bedrock, high water table, or anywhere the costs and environmental impact of excavating for traditional gravity sewers would be prohibitively expensive. Pressure sewer systems have different operation and maintenance requirements than



STEP systems use septic tanks to remove larger solids and small pumps to transport the sewage effluent.

conventional sewer systems because they use pumps with controls and rely on electricity. The pumps are relatively small and run only a few minutes a day, so little energy is used.

Pressure sewers are subdivided into grinder-pump (GP) systems, which shred sewage solids before pumping, and septic tank effluent pumping (STEP) systems, which use septic tanks located at the residence to remove grit, grease, and settleable solids prior to pumping. Pressure is created in the line by the wastewater pumped into the pipes at the home connections. Since wastewater flow is not dependent on gravity, the pipe can follow the contour of the land and be placed in shallow trenches just below the frost line. Grinder pumps are more expensive to operate than STEP systems, but may cost less to install. Both types of pressure systems use less costly cleanouts instead of manholes as access points for cleaning and monitoring the lines. Both GP and STEP systems have been widely used in North America and in many European and Asian countries.

A grinder pump system receives sewage from the home rather than a septic tank. A grinder pump in the chamber works similarly to a garbage disposal, in that solid materials in the wastewater are cut into very small pieces. Wastewater is then pumped through a pressurized line. Grinder pumps are usually larger than the effluent pumps used in STEP systems and turn on and off according to the liquid levels in the pumping chamber.

A STEP system consists of a septic tank to remove solids from the wastewater and a small pump to push the tank effluent through the system to final disposal. The effluent pump is located in a pumping chamber either located inside the septic tank or next to the tank outlet. As effluent from the tank enters the pumping chamber, it triggers a high-water sensor, which starts the effluent pump. The effluent is then pumped into the effluent sewer line until the water level in the chamber drops and another sensor shuts the pump off. Sensors also trigger an alarm if effluent levels get too high in the pumping chamber.

Because the effluent is relatively free from larger solids, sewers can be as small as 1.5 inches in diameter for the pipes leading from the service connection, and two or three inches for the mains. This is in comparison to large-diameter conventional sewers, which are often eight inches or more in diameter.

Small-Diameter Gravity Sewer Systems

Small-diameter gravity sewer (SDGS) systems are another alternative sewer option for small communities. SDGS systems are also known as effluent or variable-grade sewers. SDGSs are a good low-cost alternative to conventional gravity sewers.

Like conventional sewers, SDGS systems use gravity, rather than pumps or pressure, to collect and transport wastewater to a facility for final treatment or to empty into a conventional sewer main. Like STEP systems, SDGS use septic tanks to remove most of the solids from the wastewater so the sewers transport relatively solids-free effluent. SDGS sewers can be smaller in diameter than conventional sewers but need to be somewhat larger (usually three or four inches in diameter) than those used for pressure sewers. SDGS can be laid at variable grades like pressure systems as long they are placed below frost line and the elevation of the source is the highest point in the pipe.

Vacuum Sewers

Vacuum sewers rely on suction, created at a central pumping station and maintained in the small diameter mains, to draw and transport wastewater through the system to final treatment. But because they have limited capabilities for transporting wastewater uphill (a maximum of about 20 feet), they are better suited for areas with flat or gently rolling terrain.

Since the vacuum in the sewer is drawn by vacuum pumps at a central pumping station, the components needed at the individual connections are relatively simple. Most vacuum systems do not require vacuum toilets or any special plumbing inside the house. When the wastewater in a small holding tank at the home reaches a certain level, a sensor opens a pneumatic valve and the tank contents are sucked into the line by the vacuum in the sewer main. The valve stays open a few seconds to also allow some air to be sucked in after the wastewater. The alternate plugs of wastewater and air from many connections can follow the contour of the land, traveling through the main to the central pumping station.

The initial force of the vacuum removing the wastewater from the valve pit is usually enough to break up solids in the wastewater, so relatively small-diameter (three- to four-inch) plastic pipe can be used for the service connection with four- to 10-inch mains.

Pretreatment Options

The pretreatment facility in a cluster system is often a larger version of ones found in some individual on-site systems, such as aeration, constructed wetlands, or media filters, followed by dispersal of the treated effluent into a soil absorption system. Because of the soil absorption field, cluster systems require more land area than municipal treatment systems that discharge.

There are a variety of alternative on-site pretreatment technologies being tested and installed nationwide. Recirculating media filters, where wastewater is circulated through the filter to aerate the wastewater with the effluent returned to the pump chamber to mix with incoming low-oxygen wastewater from the septic tank, are widely used to enhance nitrogen removal and pathogen reduction and to lower absorption area requirements.

Advances also are being made by engineered absorption components. The sand or gravel used in filters is being replaced with lightweight artificial media that can be fabricated at a factory and quickly installed at the site. These technologies will reduce installation labor and speed installation.

Final Disposal Options

Some alternative sewer systems empty into a conventional sewer main that leads to a centralized municipal treatment facility. This may be the most cost-effective plan for communities that have this option. However, many small communities do not have a wastewater treatment plant nearby or it may be too small to handle the extra wastewater flow. There are several other treatment alternatives for these communities to consider. If a proper site and soil area can be located nearby, it may be practical to disperse the effluent from septic tank effluent pump systems and small diameter gravity sewers in a large community subsurface soil absorption field similar to the smaller ones used for individual homes with septic systems. Usually this effluent is first treated in a pretreatment unit as discussed above to improve the performance of the soil system. Wastewater from vacuum and grinder pump collection systems must first be settled in a large septic tank, and often passed through a pretreatment system as well before going to a soil absorption field.

There are a number of alternatives to conventional trench and mound soil absorption systems. Alternatives to aggregate for the absorption field trenches, such as chambers and gravel-less trenches, while slightly more expensive, are attractive to both homeowners and installers because of the ease of transport, quick installation and elimination of the need for large amounts of aggregate. In several states, drip irrigation systems are being used because of their ability to place small amounts of wastewater effluent a few inches below the ground surface where nutrients can be taken up by plants in the lawn rather than leaching into groundwater.

Advantages and Disadvantages of Cluster Systems

Advantages

Cluster systems have a number of advantages:

- Cost
- Flexibility in land use
- Maintenance
- Environmental protection

Cost

Conventional sewer and treatment systems in Indiana can cost $20,000 or more per household (2000 prices), and can result in monthly sewage bills of over $100. The design and construction of the sewage collection system is often responsible for two-thirds or more of the cost. Much of this is due to the large-diameter gravity sewers, which must be laid on grade and can require very deep excavations or a number of lift stations.

Small-diameter plastic pipes used in alternative systems are less expensive and easier to install than conventional sewer pipes. Pressurized sewers don't rely on gravity to operate, so they can be buried at shallow depths, just below the frost line, and follow the natural contours of the land, saving on excavation costs.

Flexibility in Land Use

County planning agencies sometimes cite the soil and site limitations of traditional on-site systems as the justification for halting development in unsewered areas and to defend land-use plans. Alternative on-site technologies have the potential to allow land-use decisions to be determined more by issues such as roads, schools, hospitals, and other important criteria. Cluster wastewater systems may permit smaller lot sizes and provide planners with a tool to better preserve the green areas and rural character of small communities. These features are frequently lost when large, gravity sewers are installed and high-density development follows, or if large lot sizes are required for individual on-site sewage disposal systems.

Maintenance

Complex sewage treatment processes require expertise often not found in rural locations. When workers acquire this expertise through training and experience, they often have an opportunity for higher salaries in nearby cities. Therefore, treatment systems that require larger land areas, but less complex operation and maintenance (O&M) are often attractive for small communities. Such systems minimize the need for process understanding and rely more on the mechanical aptitude of an O&M staff, which is more often available in rural settings.

Environmental Protection

Many small communities with centralized sewage treatment systems are having difficulties in meeting required discharge limits. According to the EPA, sewered small communities with discharge of treated wastewater represented over 90 percent of non-compliance violations in 1999. Since many of these small community systems discharge to high quality, low flow streams, local environmental impacts can be disproportionately high. Non-discharging, decentralized wastewater treatment systems can provide an environmentally sound alternative for these communities.

Disadvantages

The primary disadvantage of cluster systems has to do with the amount of operation and maintenance needed. While usually not complicated, alternative sewers have components that conventional sewers do not have, such as septic tanks that need to be inspected and pumped and mechanical parts and controls that use electricity. These require more frequent and regular maintenance than conventional sewers. They also are located on site, requiring workers to travel to individual homes or businesses. This may, however, be more than offset by higher operational costs at more complex central treatment facilities.

Clusters require a somewhat complex organizational structure in order to make community decisions such as fee collection and continuing education of homeowners about wastewater issues. Homeowner cooperation is much more important than with municipal systems since smaller systems are less resilient and less tolerant of periodic large flows or larger than normal loadings of household chemicals than in large systems, where these peaks are averaged out over a very large user base.

Other disadvantages with alternative sewers include disruptions in service due to mechanical breakdowns and power outages. Also, systems may be poorly designed, installed, or overpriced if engineers or contractors have little experience with alternative technology. Poor design and installation of alternative sewers can result in higher than expected O&M costs.

Managing Cluster Systems

With traditional on-site systems, maintenance is left up to the homeowner who typically pays little attention to the system until it begins to fail.

Innovative systems require more homeowner awareness as well as regular maintenance procedures.

Preventative maintenance is important with this technology because an overloaded septic tank or broken pump at one connection can potentially affect other parts of the system. Depending on the size of the system, communities may need a full-time maintenance employee or staff to ensure that the system is being properly operated and maintained and to handle emergencies. There are several models for providing maintenance for cluster systems. All systems require that workers have access to the user's property to inspect septic tanks and effluent baffles or filters on a routine basis and to pump tanks as needed. Regular maintenance is also necessary to ensure proper performance of the pretreatment and final disposal.

Remote monitoring may have a place in managing decentralized on-site systems, and small community systems that are too small to have on-site operators present at all times. Advanced on-site monitoring systems typically use "control boxes" that turn electric pumps on and off, monitor septic tank levels, and sound an alarm when an unusual condition occurs. The alarm connects to a panel in the house. The homeowner must then contact a repairman. Remote sensing could also be used to send a signal from the home directly to a central monitoring office. In more complex systems, the communication can even be interactive so that pump dosing frequencies could be changed, along with other system controls, from a remote base.

Creating a Management Structure

The physical maintenance of decentralized on-site systems is not as difficult to establish as are the legal and financial arrangements needed to ensure that maintenance is accomplished and that homeowners pay their fair share of the costs in doing so. The policies and procedures that must be put in place with cluster systems can be more complex than with municipal sewer systems. The establishment of a management entity for decentralized projects is necessary in order to apply for federal, state, or other funding, minimize liability, establish service boundaries, and to manage the administrative, financial, and operational activities for the services provided. Acceptable management entities include counties, incorporated cities and towns, special governmental units (county-wide or area-wide regional sewer districts, conservancy districts, etc.), public or private utilities, private corporations, and nonprofit organizations. Each management entity has certain advantages and disadvantages and comes with its own set of guidelines for formation and oversight by regulatory authorities. Community leaders that are evaluating the use of decentralized cluster systems must decide which management entity would be most beneficial for their project.

Rural electric cooperatives have extensive management expertise, and in some areas (parts of Alabama and Minnesota) have become involved in managing on-site wastewater systems in their service area. Control systems, standard for electric utilities, are just emerging in the wastewater field. This type of management can ensure that the wastewater system is serviced promptly and properly. Regular inspection and interaction of service personnel with the homeowners can foster a common concern for protecting the systems from harsh chemicals or other practices that could disrupt the system, increase O&M costs, and affect water quality.

The design, construction, and management of sewage collection and treatment works, including decentralized cluster systems, for counties, incorporated cities and towns, sewer districts, and conservancy districts, are under the regulatory authority of the Indiana Department of Environmental Management (IDEM). If your community is not an incorporated city or town, and your county does not have a program for extending sewers to your area, you may want to investigate the advantages of forming a regional sewer district or conservancy district. To obtain information on the formation and management of a regional sewer district or conservancy district, contact the IDEM Regional Water Sewer District Coordinator, at 317-233-0476 or 1-800-451-6027.

The formation and management of public and private utilities in Indiana are under the regulatory authority of the Indiana Utility Regulatory Commission (IURC). For questions on the formation process of a public or private utility, you may contact the Utility Analyst for the IURC at 317-232-2778. The design and construction of a decentralized cluster system that will ultimately be managed by a public or private utility is under the regulatory review and approval authority of the Indiana State Department of Health (ISDH), and may, in many cases, also require review and approval from IDEM. For questions about plan design, review, and approval of decentralized cluster systems that will be managed by public or private utilities, contact ISDH, at 317-233-7186, and IDEM, at 317-232-8660.

Which Alternative is Right for My Community?

Collection Systems

If your community has decided that an alternative sewer system may be a good option, there are a variety of factors that can help determine which technology could work best. The most important factors to be considered are site-related. Certain site conditions make some alternative sewer technologies more appropriate and cost effective than others. For example, if the homes or businesses to be served by the sewer are located at a higher elevation than the final treatment facility, then small-diameter gravity sewers might be the most cost-effective technology. If homes are located in a relatively flat area where it would be too expensive to excavate to install gravity sewers, vacuum sewers or grinder pumps may be a better choice.

Operation and maintenance requirements and community planning issues need to be considered when choosing an alternative sewer system since the community may have to hire additional maintenance staff.

Alternative sewer technologies can sometimes be combined with other technologies. For example, many communities have houses located at both high and low elevations. A system could make use of small diameter gravity sewers for some homes and pressure sewers for others.

The costs of both conventional sewers plus centralized municipal treatment plants and of cluster systems are highly variable depending on housing density and terrain, but cluster systems are often half as much as the cost of conventional systems, and require less complicated maintenance.

Pretreatment and Disposal Options for Decentralized Cluster Systems

The availability and cost of land plays a significant role in the pretreatment and disposal options selected. This includes the land required for pretreatment and disposal of the treated effluent but does not address the additional requirement of obtaining easements from property owners that will be affected by any sewer project. Obtaining such easements, however, is a necessary step in any proposed infrastructure project.

It is rare that a community will already own the land required to disperse the effluent from a cluster system. Some communities may be fortunate enough to have suitable land donated or sold at a discount by the county or concerned citizens in favor of the project. Communities may be able to purchase the land at less than market rates, or obtain a long-term lease on the land required. Other communities may obtain financial assistance from a local community foundation toward the purchase of land. Other creative options may be available to help communities address land acquisition requirements so community leaders should look at all possible options for land acquisition.

Potential Impact of Indiana's Emerging Groundwater Standards

The Indiana Water Pollution Control Board is considering a new groundwater standard for Indiana. It is anticipated that the standards may take effect sometime in the year 2001. Community leaders considering decentralized cluster system pretreatment and disposal options should be aware that these groundwater standards would establish concentration limits for contaminants in ambient groundwater. Pretreated effluent from decentralized cluster systems may be required to meet discharge limits for certain contaminants (particularly nitrates) before disposal into the soil. The groundwater standards could play a significant role in a community's selection of design, pretreatment, and disposal options for a decentralized cluster system. As mentioned previously, alternative pretreatment technologies coupled with drip irrigation disposal, represent a potential method of meeting such requirements. For more information on the adoption of Indiana's groundwater standards, contact IDEM Groundwater Section, 317-308-3388.

How to Develop Support for a Community Wastewater Project

Community leaders considering an infrastructure project need to lay some preliminary groundwork in order to educate and gain public support for the project. The following steps are critical and should be taken prior to soliciting professional services from consulting engineers or other professionals. Many of these steps can be pursued simultaneously in order to insure that projects move forward in a timely manner.

Community Assessment

A critical step in the process to obtain community support for a wastewater project is the documentation of the public health and environmental problems associated with the improper treatment and disposal of domestic wastewater in the project area. Numerous complaints to and investigations by the local health department, limiting site/soil factors and documentation of widespread septic failures coupled with few repair options show the need for a community-based solution to the problem. Your local health department may already have sufficient documentation on file that suggests a public health problem exists in your community due to failing septic systems. The Indiana State Department of Health in conjunction with the Indiana Rural Community Assistance Program (RCAP) currently maintains a database of over 400 unsewered communities in Indiana with failing septic systems and other improper disposal practices of domestic wastewater. Contact RCAP at (800) 382-9895 for more information.

Public Education

After sufficient documentation is obtained, public education is the next important step. The community needs to know about any health concerns such as waterborne diseases caused by pathogens, nitrate contamination, etc. Public education may include distributing literature to the community about contaminants found in untreated wastewater. Much of this information is available through pamphlets that can be obtained from State or local health departments or your county Extension office. Information is also available from the USEPA Web site <www.epa.gov> or the National Small Flows Clearing House website <www.estd.wvu.edu/nsfc/>. Other websites such as the Centers for Disease Control <www.cdc.gov> publish fact sheets on outbreaks caused by contaminated water. A series of educational articles published in local newsletters and newspapers may also help to educate the general public.

Public Meetings

To gain public acceptance of the monthly bill that will result from a new project, regular public meetings to discuss the community's problems are of critical importance throughout the project. Although it is rare to obtain 100% support for a public project, public buy-in and ownership are essential if the project is to be successful. Such meetings are needed to:

- Provide education about the public health and environmental problems
- Foster trust
- Gain support
- Provide a forum for communicating progress reports on the project
- Allow for public comment

Public meetings must be well publicized with reasonable advance notice to optimize public participation. A minimum of four to six public meetings is usually needed to allow for sufficient public involvement and comment. Some public funding programs require a minimum public announcement period prior to public meeting dates and also require a minimum number of public meetings to be held. Community leaders and the volunteer committee should become familiar with public meeting requirements of the various public funding programs by contacting the relevant agencies directly.

Establishing a Volunteer Advisory Committee

Sometime during the community education phase, or during the first one or two public meetings, a volunteer advisory committee should be established to serve as a collective body to move the project forward. The committee needs to be composed of residents who live in the community and who are not perceived to have a hidden agenda. It is advisable to include volunteers who are in high regard in the community on this committee. The committee should consist of 5-9 volunteers. An odd number is preferred to avoid a tie when voting on issues.

Finding and Hiring the Most Qualified Consultants

The design and installation considerations of cluster system technologies require the expertise of an engineer and one or more contractors that have experience with a particular system. Only after the community has completed the preliminary steps of documenting the problem and educating the public to the need for the project should serious consideration be given to searching for professional services to complete a PER (Preliminary Engineering Report). The PER is a prerequisite for most funding programs and usually must be prepared by a licensed professional engineer.

The QBS Process

Community leaders considering any infrastructure project should choose professionals based on qualification rather than bidding price alone. The preferred system for the selection of professional services such as a consulting engineer, grant administrator or other professional(s) for both the PER (Preliminary Engineering Review) phase and the Design & Construction phase of a project is the Qualification Based Selection (QBS) process. Public infrastructure projects that are financed in part by federal funds are required by federal law to use the QBS process. Indiana law also allows public agencies to select professionals based on qualifications. Price becomes a factor to negotiate only after the most qualified professional has been selected and the community and the professional have jointly identified the scope of services required in the project.

The following outlines the basic steps in the QBS process:

1. **Establish a technical review committee** - A technical review committee is formed from 5 to 9 community volunteers. An odd number of participants is always encouraged to avoid a tie in voting or scoring.
2. **Establish a scope of services -** The committee establishes a list of services they expect the engineer to perform, such as the public health concern, need, goals, etc.
3. **Establish evaluation criteria** - The committee establishes the criteria by which professional firms will be evaluated.
4. **Assign numerical weights to evaluation criteria** - The committee prioritizes and assigns a numerical weight to each criterion. For example, experience in designing and constructing decentralized cluster systems may have an assigned weight of 10, whereas location and proximity of assigned personnel to the project may have an assigned weight of 2.
5. **Establish scoring ranges for evaluation criteria –** The committee establishes the scoring range that will be utilized with the weights. For example, the scoring can range from 1to 5, with 5 being the highest possible score. Each committee member will score professionals on each criterion. For example, one committee member may score a firm a 2 for experience with design and constructing decentralized cluster systems. With an assigned weight of 10, this would mean the firm scored 20 (2x10) in this criterion.
6. **Send out a Request for Proposal/Statement of Qualifications solicitation (RFP/SOQ) to professional firms –** A list of professional

firms that specialize in infrastructure projects can be obtained from Consulting Engineers of Indiana (CEI), 317-776-1290, fax 317-776-1260 or the Indiana Society of Professional Engineers (ISPE), 317-255-2267. Send out a letter requesting statements of qualifications (SOQ) that includes the scope of services for the project.

7. **Develop a list of 3-5 firms to interview.**
8. **Establish a list of interview questions evaluation criteria and other factors and schedule the firms for an interview.**
9. **Interview firms and select the firm that scores the highest.**
10. **Negotiate fees with the selected firm and confirm the scope of services.**

A complete QBS user's guide is available to Indiana community leaders by contacting:

QBS
One Virginia Avenue, Suite 250
Indianapolis, Indiana 46204-3616
317-637-3316, Fax: 317-637-9968
E-mail: qbs@ai.org
Web site: <www.ai.org/qbs>

Funding Small Community Cluster Systems
(Finding the Resources)

There are several sources of state and federal financial assistance for community projects like these. Hardship grants have not been funded in Indiana since the original appropriation, so they are effectively not a source of money at present.

Environmental Infrastructure Working Group

The Environmental Infrastructure Working Group (EIWG) is an important resource for communities trying to navigate the available funding sources. EIWG membership is made up of representatives of most, but not all, Indiana government agencies that fund water/wastewater projects (USDA Rural Development, Public Works & Economic Adjustment Grant, Community Focus Funds, and the State Revolving Fund). EIWG does not itself provide funding for water/wastewater projects. The purpose of EIWG is to allow its members to evaluate individual projects. Communities are able to obtain feedback on the validity of a project and identify agencies and programs that are most likely to fund their project without having to go to each agency individually. EIWG should be one of the first places a community turns when looking for ways to finance a water/wastewater project; however, not all possible sources of public funding for water/wastewater projects are represented here.

EIWG normally meets monthly in Indianapolis, although a community may request an on-site or conference call meeting. The community needs to complete a two-page "In-take" form, available from RCAP, that includes specific information about the community, the problems they are experiencing, and past efforts to fix the problem. The community should then schedule a presentation at an EIWG meeting.

State Revolving Fund Loans

The Clean Water State Revolving Fund (SRF) programs in each state operate like banks. Federal and state contributions are used to set up the programs. These assets, in turn, are used to make low interest loans for important water quality projects. Funds are then repaid to the SRF over terms as long as 20 years. Repaid funds are recycled to fund other water quality projects. These SRF resources can help supplement the limited financial resources currently available for decentralized treatment systems. Projects that may be eligible for SRF funding include:

- New system installation to correct an existing pollution problem
- Replacement, upgrade, or modification of inadequate or failing systems
- Costs associated with the establishment of a centralized management entity (legal fees, etc.)
- Capital associated with centralized management programs (e.g., trucks, storage buildings, spare parts, etc.)

Who May Qualify

The Clean Water Act (CWA) of 1987 authorized the CWSRF to fund point source (§212), non-point source (§319), and estuary (§320) projects. Decentralized system projects that are solutions to non-point source problems may also be eligible as a §319 project. Included in a long list of eligible CWSRF loan recipients are political subdivisions, nonprofit organizations, and conservation districts (even individuals in some states.) Project funding and eligible applicants vary according to the priorities, policies, and laws within each state.

The first step for a community seeking a CWSRF loan is to contact their state CWSRF representative. The list of CWSRF state representatives can be found at the EPA Web site <www.epa.gov/owm>. You should ask your state representative:

- Does the state CWSRF fund decentralized systems?
- If so, is an individual or private entity eligible to receive a CWSRF loan for a decentralized system?
- If not, can I receive a state CWSRF loan through my county government? Your CWSRF state representative will be able to guide you through the proper channels.

Section 319 of the Clean Water Act provides the statutory authority for EPA's non-Point Source Program. This program provides funds to states to restore waters adversely affected by non-point source pollution, and to protect waters endangered by such pollution. Most states have non-point source management plans that allow for the use of section 319 funds for decentralized wastewater system projects. In some states, the 319 program has provided money to small communities and state agencies to construct decentralized wastewater systems in areas where they are more cost effective than centralized systems.

USDA Rural Utilities Service (Rural Development)

USDA Rural Utilities Service (RUS) Water and Waste Disposal Loans and Grants are available to develop water and waste disposal (including solid waste disposal and storm drainage) systems in rural areas and towns with a population less than 10,000. The funds are available to public entities such as municipalities, counties, special-purpose districts, Indian tribes, and nonprofit organizations. Grant funds are available to reduce water and waste disposal costs to a reasonable level for rural users. Grants may be made for up to 75 percent of eligible project costs in some cases. RUS also guarantees water and waste disposal loans made by banks and other eligible lenders. The facilities financed must be owned and controlled by the borrower/grantee. Financed decentralized systems would have to be owned and managed by the RUS borrower/grantee.

Each state must approve a source of loan repayment as part of the application process. Though finding a source of repayment may prove challenging, it does not have to be burdensome.

Indiana Options for Funding Small Community Cluster Systems

Indiana funding sources for small community cluster systems are the same as for conventional wastewater collection and treatment systems. The following chart on funding sources is extracted from a handout published and distributed by the Indiana Rural Community Assistance Program titled "Financing Sources for Water and Wastewater Projects."

The document lists a summary of major funding sources for water and wastewater projects as of February 2000. The information should not be used as an exhaustive listing of all possible funding sources, especially when dealing with local infrastructure finance options, such as Economic Development Income Tax, County Option Income Tax, municipal bonds, etc. RCAP continually updates the handout as new funding sources become available, or when rules and regulations regarding funding sources change. For a more detailed explanation of the following funding sources you may obtain a copy of the handout by contacting the Indiana Rural Community Assistance Program. RCAP can be reached at 1-800-382-9895 or the agencies can be contacted directly. There are no fees for their services.

EIWG Contact:

Executive Director, IN Rural
Development Council
150 West Market Street, ISTA Center,
Suite 414
Indianapolis, IN 46204
(317) 232-8776, Fax: (317) 232-1362

Summary of Steps to Complete a Community Wastewater Project

1. Assess the level of need for a project.
   a. Hold public meetings
   b. Discuss the possibility of a project with local organizations/agencies/residents
   c. Determine history of problems, and level of resident interest
   d. Review records/gather data to document problems
2. Identify likely funding sources for the project.
   a. Perform an income survey to see if the community qualifies for grant assistance
   b. Discuss the project with various funding agencies (Indiana Department of Commerce, State Budget Agency, Indiana Department of Environmental Management, Rural Development); bring project to EIWG
3. Conduct an engineering study to determine the most practical way to solve wastewater problems in the target community.
   a. Locate funding to finance the study (study costs can range from $5,000 to $50,000, depending on size of community and the availability of funds)
   b. Apply for grant or other assistance
   c. Choose an engineer:
      1) Appoint/select a committee to review qualifications (usually made up of local residents)
      2) Send out a request for qualifications
      3) Select 3-5 firms to interview
      4) Conduct interviews and select the best firm
      5) Negotiate a contract with the selected firm
   d. Sign a contract (if the community is unincorporated, contracts are usually signed by the county commissioners)
   e. Assist the engineer, as needed, in completing a Preliminary Engineering Report (PER). It usually takes 3-6 months to complete a PER. **Until this step is completed, the monthly sewer bill cannot be estimated.**

Summary of Federal and State Grants and Loans
For Water and Wastewater Planning and Facilities Construction

Community Needs Funds for:	Types of Funding Available & Source	Application Deadlines	Amount Available	Benefits of Program	Eligible Applicants
Problem Definition and Planning	**CFF Planning Grant** Indiana Dept. of Commerce 800-824-2476	Monthly	Up to $50,000 with 10% match.	Non-competitive process.	51% low to moderate income-General-purpose government.
Problem Definition and Planning	**Community Planning Fund** Indiana Dept. of Commerce 800-824-2476	Monthly	Up to $10,000 with 50% match.	Requirements not as stringent as CFF Planning Grant.	Counties, cities, non-profit corporations.
Problem Definition and Planning	**Supplemental Wastewater Assistance Fund** IDEM-317-232-8655 SBA – 317-232-0759	Contact State Budget Agency SRF coordinator.	Up to $30,000 for testing and $30,000 for facilities plan.	Helps communities that cannot finance a study on their own.	Anyone eligible for an SRF loan. Recipients must close on an SRF loan within 2 years.
Either Water or Wastewater System Design and Construction	**RUS Grants and Loans** Area 1- 219-248-8924 Area 2- 812-346-7577 Area 3- 812-384-3517	Pre-Application approved by USDA Rural Development District Office.	Grants up to 75% of eligible costs if MHI is 80% below state level, or 55% of eligible costs otherwise.	Both grants and loans can be used for nearly any cost associated with project.	Legal entities up to 10,000 residents.

Community Needs Funds for:	Types of Funding Available & Source	Application Deadlines	Amount Available	Benefits of Program	Eligible Applicants
Either Water or Wastewater System Design and Construction	**CFF Construction Funding** Indiana Dept. of Commerce 800-824-2476	Two Rounds per Year	Up to $500,000 with 10% match.	Funds awarded to limit rate increases.	51% low to moderate income- General-purpose government.
Either Water or Wastewater System Design and Construction	**U.S. DOC, Public Works and Economic Adjustment** USDOC/EDA 614-469-7314	Pre-Application needs to be approved.	Up to 50% of project cost, or 80% for severely depressed communities.	Funding will aid any construction that will help attract/ retain employers.	Counties, cities, regional water or sewer districts, townships, or economic development corps.
Wastewater System Design and Construction	**State Revolving Fund** IDEM-317-232-8655	Yearly- April of the year before funding. Projects can be added quarterly.	Project cost.	Covers almost any needed pollution abatement project, low interest rates.	Counties, cities, non-profit corporations, such as regional sewer districts/ conservancy districts.
Wastewater System Design and Construction	**EPA Hardship Grants for Rural Communities** IDEM-317-232-8655	Application for SRF needed first.	Varies according to need.	Aids smaller communities with limited resources.	Communities with less than 3000 residents and less than 80% of national average per capita income.
Either Water or Wastewater System Design and Construction	**Hoosier Lottery Build Indiana Fund (BIF)** Contact your local State Representative	Application for a BIF Grant can be obtained from your State Rep. No Deadlines	Need and funding Varies according to need and available funds	Grant funds. Aids communities lower their capital construction cost	Counties, cities, regional water or sewer districts, townships, or economic development corps.
Water System Design and Construction	**Drinking Water State Revolving Fund** IDEM-317-232-8655	Guidelines are forthcoming from IDEM.	$30 million available statewide.	Aids communities with limited water systems.	Similar to SRF for wastewater.
Water System Design and Construction	**Rural Community Water Supply Systems** Indiana Dept. of Natural Resources 317-232-4162	Ordinance for approving water supply project needed- contact DNR.	$150,000 loan.	Interest rate is 1.5% for 8 years, 5% for next 12 years.	Communities have the authority to own a water supply system, have fewer than 1250 residents, and cannot obtain a commercial loan.

   f. Submit the PER to the community for approval, then to the Indiana Department of Environmental Management or Rural Development (depending on source of funding)
4. Begin applying for funding as identified in Step #2 above. This step can include procuring a grant administrator, conducting an environmental and historic review, evaluating the need to obtain easements, etc.
5. Construction of selected alternative, ongoing activities necessary to comply with funding requirements.

Representatives of the Indiana Rural Community Assistance Program can assist communities with all of the above steps *at no cost to the community.* If you would like more information about our services, please call 1-800-382-9895.

Related Information Sources for Small Communities

Health Departments: If you would like more information about alternative sewers or are interested in utilizing one, contact your local health department or the Indiana State Department of Health at (317) 233-7177 for assistance. (Local health department phone numbers are usually listed in the government section of local phone directories.)

National Small Flows Clearinghouse (NSFC): The National Small Flows Clearinghouse, which specializes in on-site technology, operation, maintenance, regulations, management, finance, and education, has a variety of free and low-cost products available. NSFC can be reached at (800) 624-8301.

Purdue Extension Service: Purdue Extension service offices can provide assistance and information about many of the wastewater treatment issues discussed. To locate the extension office in your area, call Purdue University at (888) 398-4636, the U.S. Department of Agriculture at (202) 720-3377 or NSFC.

A QBS user's guide is available to Indiana community leaders by contacting:

QBS
One Virginia Avenue, Suite 250
Indianapolis, Indiana 46204-3616
317-637-3316, Fax 317-637-9968
E-mail: qbs@ai.org,
Web site: <www.ai.org/qbs>

References

1) The On-site Revolution: New Technology, Better Solutions. Stephen P. Dix, P.E., and Valerie I. Nelson, Ph.D. This article was originally published in Water Engineering & Management.

2) EPA Initiatives for Decentralized Wastewater Treatment, Stephen Hogye, Office of Wastewater Management, U.S. Environmental Protection Agency, Mail Code 4204, 401 M Street SW, Washington, DC 20460.

3) Cluster System Installed near Northeast Texas Lake, From Insights Volume 6, Number 4: December 1997.

4) Baseline Information on Small Community Wastewater Needs and Financial Assistance Oct, '99 EPA 832-F-061.

5) Financing Decentralized Systems — The Clean Water State Revolving Fund.

6) Alternative Sewers: A Good Option for Many Communities, *From Pipeline* by* ***National Small Flows Clearinghouse***.

NOTES

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