ONSITE
WASTEWATER NEWS
ONTARIO ON-SITE WASTEWATER ASSOCIATION NEWSLETTER

InSide

- **Letter to the Editor**
- **Decentralized Systems**
- **What's Right for your Town**
- **Ontario On-Site Wastewater Association**
- **Frequently Asked Questions**
- **Control Panels 101** — Learning the Basics

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Technical Review
Doug Joy

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News from the Ontario Rural Wastewater Centre

by Doug Joy

Since the last newsletter the Ontario Rural Wastewater Centre has remained active on both the training and research side of the Onsite industry. This short article is intended to bring you up-to-date on some these activities.

A highly successful Manure Application Workshop was held near Ottawa in September. Don Hilborn, Steve Clarke and Harold Cuthbertson of OMAFRA were invited to give presentations. The event was attended by 90+ local farmers and others interested in the latest methods and regulations regarding nutrient management practices. They were treated to a lively talk on safe nutrient management practices by Don and also given a hands on demonstration of some of the more modern pieces of equipment available. The seminar took place at the Schouten farm in North Gower and was sponsored in part by the Regional Municipality of Ottawa Carleton. Also in the agricultural field, the ORWC gave a seminar "The Farm in the Rural Ecosystem" in French to students at Collège d'Alfred. The seminar, which included several demonstrations and a laboratory experiment on phosphorus treatment, was co-facilitated by Chris Kinsley, Anna Crolla and Martin Perron, all of the ORWC.

New courses recently offered included two courses focussing on soils: "Introduction to Soils for On-Site Wastewater Technologies" and "Field Evaluation of Soils for On-Site Wastewater Technologies" and a new course "Field Inspection Techniques" — all offered at Guelph. Robert Vander Dolen of Chung & VanderDoelen Engineering Ltd. facilitated the soils courses — both of which included significant hands-on components while the Inspection course was co-facilitated by Shelly Bonte-Gelok and Terry Davidson of the ORWC. In addition to these courses repeat offerings of courses targeted at Real Estate Professionals and Homeowners were offered at both Baxter and Guelph. See the sidebar for upcoming ORWC courses.

The ORWC has begun a project to help the Ministry of Municipal Affairs and Housing to develop an internet-based course for Part 8 of the Building Code. This course will be entirely offered over the Internet with opportunities for those taking the course to correspond with all other students taking the course and the instructor as well as use active links to, among other things, appropriate sections of the Building Code. Projected completion date of this project is August, 2001. The Centre efforts on this project are being lead by Shelly Bonte-Gelok.

Research continues to be an active component of the Centre. Current projects include:

- Phosphorus removal from septic wastewater;
- Use of ground penetrating radar to locate and assess buried tile lines;
- Evaluation of rehabilitation techniques;
- Monitoring of a new on-site treatment unit;
- Constructed wetlands for the treatment of municipal lagoon effluent, domestic wastewater, barnyard runoff, and milkhouse washwaters;
- Treatment of manure pile runoff and milkhouse washwater using a two step flocculation — peat filtration system;
- Treatment of whey permeate for the production of fuel ethanol; and
- Pre-treatment of landfill leachate with peat filters.

continued on page 2

Letter to the Editor — Installers Take Notice

The recent water quality problems associated with the Walkerton outbreak should be a wake-up call for the on-site sewage industry.

On-site sewage systems play a vital role in the treatment and disposal of residential sewage. The on-site installation industry must be aware of their responsibilities in protecting groundwater sources from coliform and parasitic contamination.

The present state of mind of most installers is installing systems to the minimum, both through the code and economically. The consumer, in making decisions about which type of system to install, generally look at the cheapest solution. Installers must be a voice in communicating the value and technical advantages of on-site sewage treatment systems. They should rise to the challenge by seeking information on how sewage is treated and the processes involved in reducing contaminant levels into the groundwater. Installers have a duty to provide the best system possible so that residential property owners can be assured that their sewage is being properly treated to thus prevent another potential *E.coli* outbreak.

David Cooke
Coordinator,
Sewage System Program
Kingston, Frontenac, Lennox and
Addington Health Unit

continued from page 1

Centre staff have also been active outside the Centre. We shared a booth with OOWA at the OASIS Conference in October in Waterloo; Doug Joy spoke at the Ontario Precasters Conference in December in London; several members attended the NOWRA conference in October in Grand Rapids; Doug Joy spoke at the First Nations Environmental Conference in November in London. Presentations were also given by Anna Crolla and Chris Kinsley at the Millennium Wetland Event in Quebec City in August and at the 7th International Conference on Wetland Systems for Water Pollution Control in November at Orlando.

A wide range of visitors continue to come and visit the Centre. Recent visitors include: Alan Werker, Department of Civil Engineering, University of Waterloo; Chandra Madramootoo, Brace Centre for Water Resources Management, McGill University; Joyce Sinclair of the Ministry of Economic Development and Training; Kitchener, Guelph, and Wellington County area Building Officials; and delegations from Egypt, Romania and Chad.

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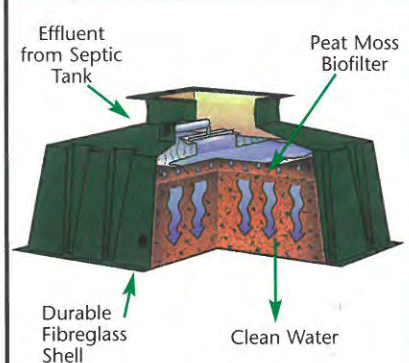

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Decentralized Systems Offer Flexibility

Article from: *Pipeline*, Fall 2000 Vol. 11, No.4

A decentralized system employs a combination of onsite and/or cluster systems and is used to treat and dispose of wastewater from dwellings and businesses close to the source. Decentralized wastewater systems allow for flexibility in wastewater management, and different parts of the system may be combined into "treatment trains," or a series of processes to meet treatment goals, overcome site conditions, and to address environmental protection requirements.

Managed decentralized wastewater systems are viable, long-term alternatives to centralized wastewater treatment facilities, particularly in small and rural communities where they are often most cost-effective. These systems already serve a quarter of the population nationwide and half the population in some states. They should be considered in any evaluation of wastewater management options for small and mid-sized communities.

So, how does a community decide which management approach is right for its wastewater treatment? Community leaders first need to ask some questions and then create a management plan. What circumstances are causing a reevaluation of present wastewater treatment? Are local septic systems failing? Is residential development stifled because of a lack of adequate wastewater treatment facilities? An organized plan will help managers clearly define the problems, review the possibilities, and assess the costs associated with each potential solution.

Many options now exist for wastewater treatment and disposal in rural areas and small communities. Each technology has advantages, as well as limitations, so a treatment technology must be selected specifically to meet be selected specifically to meet local conditions and treatment objectives. Similarly, every community's own financial, physical, and regulator factors must be evaluated to find the best technology for their circumstances.

Onsite systems now include a number of alternatives that surpass conventional septic tank and drainfield systems in their ability to treat wastewater. Alternative onsite processes, such as sand filters, peat filters, aerobic treatment units, pressure distribution systems, drip irrigation, and disinfection systems, can be employed in a wide range of soil and site conditions. Alternative systems require more monitoring and maintenance, making a strong case for these systems to be managed.

continued on page 5

Why decentralize?

The decentralized approach to wastewater treatment is seen as beneficial for a number of reasons. This approach:

- saves money by deciding on a preventive strategy (such as assessing a community's needs and conditions) to mange wastewater before a crises occurs, thereby avoiding unnecessary cost;
- allows homeowners to continue to use their properly functioning septic systems;
- enables better watershed maintenance by eliminating the large transfers of water from one watershed to another that happens with centralized treatment;
- may be the most cost-effective treatment strategy for rural communities with sparse populations; and
- is appropriate for varying site conditions including ecologically sensitive areas-treatment methods can be tailored to suit different site conditions.

Article from: *Pipeline*, Fall 2000 Vol. 11, No.4

Key terms

An onsite system is a natural system or mechanical device used to collect, treat, and discharge or reclaim wastewater from an individual dwelling without the use of community-wide sewers or a centralized treatment facility. A conventional onsite system includes a septic tank and a drainfield. Other types of alternative onsite systems include at-grade systems, mound systems, media filters, small aerobic units, and pressure distribution systems.

A cluster system is a wastewater collection and treatment system that serves that serves two or more dwellings, but less than an entire community. Individual septic tanks or aerobic units may pretreat wastewater from several homes before it is transported through low cost, alternative sewers to a treatment unit that is relatively small compared to centralized systems.

A decentralized system is an onsite or cluster wastewater system that is used to treat and dispose of relatively small volumes of wastewater, generally originating from individual or groups of dwellings and businesses that are located relatively close together. Onsite and cluster systems are commonly used in combination.

Adapted from the Response to Congress on use of Decentralized Wastewater Treatment Systems.

Article from: *Pipeline*, Fall 2000 Vol. 11, No.4

What's Right for Your Town?

Article from: *Pipeline*, Fall 2000 Vol. 11, No.4

When town leaders face having to upgrade wastewater treatment, the first choice usually is to build a centralized collection and treatment facility. However, centralized collection and treatment may not be the right answer for every community's wastewater disposal needs (see table below).

Small and rural communities often cannot afford these expensive facilities, and their populations may be too spread out to make centralized treatment a realistic option. Additionally, some existing onsite systems may function effectively, so they don't need to be replaced.

In circumstances like these, decentralized wastewater treatment is often the best solution for wastewater management. Decentralized treatment involves using a combination of treatment technology options, both traditional and innovative, where they are most appropriate in a community. Conventional onsite systems, cluster systems for groups of homes and businesses,and some use of centralized treatment can all be included when considering decentralized community wastewater management. The decentralized system is then managed (with varying degrees of control) to ensure each component functions properly.

Two Options Usually Considered

In the time since wastewater treatment has been an issue, only two options were ordinarily considered, the previously mentioned centralized systems and conventional septic systems. Onsite systems have been used for centuries, evolving from simple outhouses to cesspools to septic tanks and drainfields to the more advanced treatment units available now.

A conventional septic system, consisting of a tank and drainfield, treats wastewater at its source. But, older septic systems that were built without thought of adequate soil depth and/or that have not been properly maintained can fail, leading to surface and groundwater contamination. This potential for failure most often results from neglect of maintenance or inappropriate drainfield siting. Nevertheless, this process remains an option where soils are suitable.

Centralized systems require a network of collection pipes (sewers) leading from all homes and businesses to a central wastewater treatment facility. Urban and suburban areas with high population densities (more than three to four dwellings per acre) would probably be better served by centralized wastewater collection and treatment, but these facilities may be cost prohibitive for more sparsely populated, rural communities. Centralized treatment facilities also face increasing environmental constraints on discharging effluent into surface waters.

Septic systems have often been considered a temporary solution to be used only until public sewerage becomes available. So when deciding between options, many people consider onsite systems to be "second class" or the less desirable choice for treating wastewater.

Although opinions are changing, this prejudice against onsite systems still exists today. However, onsite systems still exist today. However, onsite systems are available now that treat wastewater more thoroughly than septic tanks. When operated under a management program, these systems can be used as a true alternative to large treatment plants.

Decentralized Systems
Hypothetical EPA rural community technology costs

Technology option	Total capital cost	Annual O&M cost	Total annual cost (annualized capital plus O&M)	Average monthly cost per per household
Centralized systems	$2,585,600–$4,176,590	$33,110-$44,830	$241,480–$381,410	$149–$235
Alternative SDGS** collection and small cluster systems	$666,040	$8,120	$61,800	$38
Onsite systems	$567,940	$14,920	$60,690	$37

Note:
The rural community consists of 450 people in 135 homes.
* O&M means operation and maintenance
** SDGS stands for small-diameter gravity sewers

(Adapted from the Environmental Protection Agency, 1987 — extrapolated to year 2000 costs
Costs in US funds

Ontario On-site Wastewater Association

The Association's Web Site is now up and running at www.oowa.org. Previous copies of the newsletter and the membership application form can be downloaded.

At the last meeting of the Board of Directors on September 20, 2000 in Guelph, the vision statement for the Association was approved and is as follows:

"Permanent Wastewater Servicing Through Onsite Treatment"

There was much discussion at this meeting on ways to promote our organization and promote onsite sewage disposal as an economical and environmentally friendly option for wastewater treatment. Keeping this in mind, the Board would like to hear from its members or non-members on what tools the Association can provide to you, the individual out in the field promoting onsite sewage systems.

In addition, the membership committee is working to increase the membership numbers from 158 in 2000 to 200 members in 2001. Therefore, if you are at a winter meeting or local coffee shop talking to any one about septic systems, please promote our association.
If you have any questions, please contact:

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Ottawa-Carleton Septic System Office
1127 Mill Street, Manotick, Ontario, K4M 1A5
(613) 692-0160 ext. 107 tkdpeng@rideauvalley.on.ca

ONTARIO ONSITE WASTEWATER ASSOCIATION

continued from page 3

Small satellite treatment plants or soil absorption systems that have low-cost collection sewers are called cluster systems. Cluster systems treat wastewater from a group of dwellings and/or businesses and are most appropriate in moderately populated areas. These systems serve two or more dwellings (but not usually an entire community) and are located near the building they serve.

The wastewater from each dwelling or business flows into its own interceptor (septic) tank to settle out and allow solids to break down. From the tank, the effluent is able to travel through smaller diameter, therefore less expensive, collection pipes.

These pipes are buried at a shallower depth than full sewers and run relatively short distances to smaller, less maintenance-intensive treatment and disposal units. These units often use soil absorption fields or effluent recycling rather than discharging the treated wastewater into surface waters.

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Up-Coming Events

- ASAE 9th National Symposium on Individual and Small Community Sewage Systems
  March 11–14, 2001
  Fort Worth, Texas
  call: 616-429-0300
- 2nd Annual Ontario On-Site Wastewater Conference and Exhibit
  March 26–27, 2001
  Mississauga, Ontario
  call: 519-824-4120 ext. 4687
- 30th Annual Water Environment Association of Ontario Conference
  April 1–3, 2001
  Toronto, Ontario
  call: 905-726-1300
- 54th Annual Canadian Water Resources Association Conference
  June 6–8, 2001
  Guelph, Ontario
  visit: cwra.org

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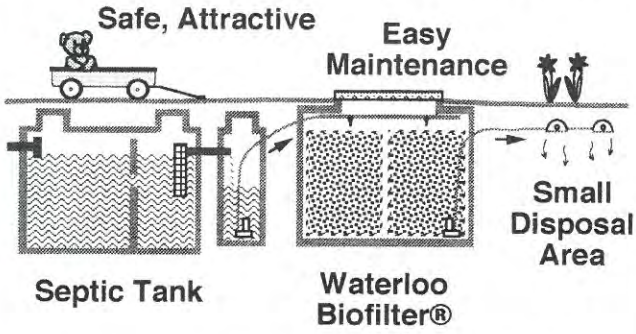

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Frequently Asked Questions — About Sewage Systems and the Ontario Building Code

Q ▸ When installing a raised absorption trench leaching bed or a raised filter media bed and a pump is required, can the effluent be distributed over the leaching bed using pressurized pipe instead of 3 inch gravity fed pipe?

A ▸ Yes, as along as the pressure pipe is not less than 1 inch trade size. (Section 8.7.3.3.(1)(a) OBC).

Q ▸ What is a "biomat" and how is it formed?

A ▸ As effluent from the septic tank is applied to the gravel/soil interface, a restrictive layer (biomat) develops at this zone. This black slimy layer is composed of accumulated suspended solids, minerals, bacterial cells, microorganism fragments, polysaccharides, and polyuronides. Ranging from less than one centimetre to several centimetres thick, the biomat acts as an active biological site for treatment of the septic tank effluent. Biomats are effective at removing bacteria and pathogens from the effluent as well as removing a large portion of the BOD. The biomat controls infiltration of the wastewater into the soil by reducing the soil pore volume and reduces the hydraulic capacity of the soil absorption field. As the sewage system ages, the biomat layer matures and progress along the distribution pipes down slope from the header until the bottom of the soil absorption area is clogged or crusted and effluents becomes ponded in the bed.

Q ▸ I have obtained my installer / inspector's license in April 1998. The licence indicates that it will expire after three years. Do I have to renew it? and if so, how?

A ▸ Yes, you have to renew your license. The Ministry of Municipal Affairs and Housing will be mailing out a letter reminding each license holder of the renewal date. A license renewal form will be attached with the letter. You must fill out the renewal form and send it back to the Ministry together with a money order or certified cheque for the renewal fee.

Further information on septics can be obtained by visiting the Housing Development and Buildings Branch's home page at http://obc.mmah.gov.on.ca

Control Panels 101 — Learning the basics

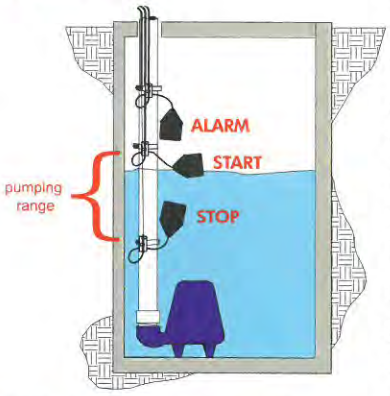
By Joe Zimmerman, SJE-Rhombus

Many pump systems are adequately controlled by a single pump switch and high water alarm. Others may require a higher degree of control due to the need for larger horsepower pumps, multiple pumps, a wider degree of pumping ranges, more precise dosing and pump monitoring. In these situations the best alternative is a control panel. Control panels are used in many water/wastewater applications encompassing varying sizes of pumps, voltages, and the operation of more than one pump.

Control panels can operate larger horsepower pumps that a single pump switch cannot. For instance, a typical pump switch is rated for 13 to 15 FLA (Full Load Amps); FLAs higher than 15 may overload the switch. Panels on the other hand use motor contactors to switch the heavy electrical load. Motor contactors can handle FLAs in excess of 100 amps.

Control panel operation is simple. Control panels require a sensing device to measure the level in the tank. The most common means is with control (narrow angle) switches. A typical simplex (one pump) control panel will require three control switches which all perform a different function [see figure a]. The lowest float in the tank is the stop float. The next float is the start float. The distance between the stop and start float is the pumping range. To adjust the pumping range you simply adjust the distance between the stop and start float. During normal operation the liquid level in the tank reaches the start float and starts the pump. The pump will run until the level in the tank drops below the stop float. If a failure occurs or the pump cannot keep up with the incoming liquid, the alarm float will be reached and the audio and visual alarms are activated.

figure a

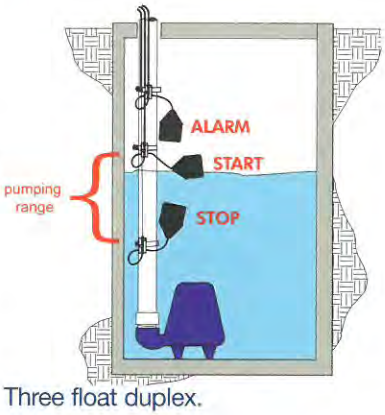


Three float simplex — pump down installation.

In a duplex (two pump) alternating system, the control panel can still use three control floats [see figure b]. The system alternates between the two pumps every other pump cycle. When the level in the tank reaches the lead float, the control panel will operate pump 1 and evacuate the tank. The next pump cycle the control panel operates pump 2 and so on. If a failure occurs, the level in the tank will reach the lag/alarm float, which activates both pumps and the alarm. It is also common for a duplex system to use four control floats [see figure c]. In these applications, the alarm and lag features operate on independent control floats.

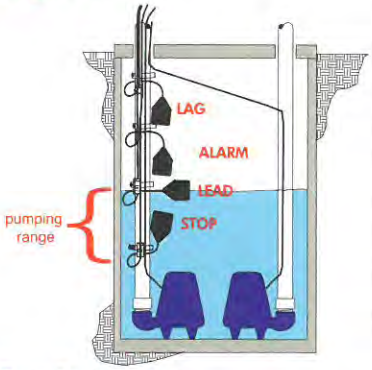
Many pump systems require additional options to meet state or county specifications. Popular options include Elapsed Time Meters or ETMs. ETMs keep track of total pump run time. Another common option is Event or Cycle Counters. Event Counters record the number of times a pump is called to run. Recording the pump run time and number of cycles offers valuable information about the system. This information can be used to monitor excessive water use and ground water infiltration. Options such as these may also help prevent system failures if the information is recorded and traced via a maintenance contract between the installer or maintenance provider and the homeowner. A popular trend in onsite wastewater systems is utilizing a timer to dose the system. Look for a future article to cover the specifics of timed dosing. For more information on control panels contact SJE-Rhombus at 1-888-DIAL SJE (1-888-342-5753) or visit our website www.sjerhombus.com.

figure b



Three float duplex.

figure c



Four float duplex.

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To register for courses at Baxter, contact:
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Course	Date	Location
Living with your Septic System	January 20, 2001	Guelph
Milking Centre Washwater Treatment and Disposal	February 20, 2001	Baxter
Part 8 Installer & Inspector Course and Exam	February 5–8, 2001	Guelph
Part 8 Installer & Inspector Course and Exam	February 26–March 2, 2001	Baxter
On-Site Wastewater & Water Systems for Real Estate Professionals	February 28, 2001	Guelph
Field Inspection of On-Site Wastewater Systems	March 07, 2001	Baxter
Alternative Technologies	March 28, 2001	Guelph
On-Site Wastewater & Water Systems for Real Estate Professionals	April 04, 2001	Baxter
Living with your Septic System	April 07, 2001	Guelph
Living with your Septic System	April 07, 2001	Baxter
From Well to the Faucet	April 07, 2001	Baxter
Alternative Technologies	April 11, 2001	Baxter
Introduction to Soils for On-site Wastewater Technologies — Soils 100	April 6, 2001	Guelph
Introduction to Soils for On-site Wastewater Technologies — Soils 100	April 19, 2001	Baxter
Field Evaluation of Soils for On-site Wastewater Technologies — Soils 101	April 20, 2001	Guelph
Field Evaluation of Soils for On-site Wastewater Technologies — Soils 101	April 25, 2001	Baxter
On-Site System Inspection: Field Course	April 27, 2001	Guelph

THE 2ND ANNUAL

Ontario On-Site Wastewater Conference and Exhibition

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