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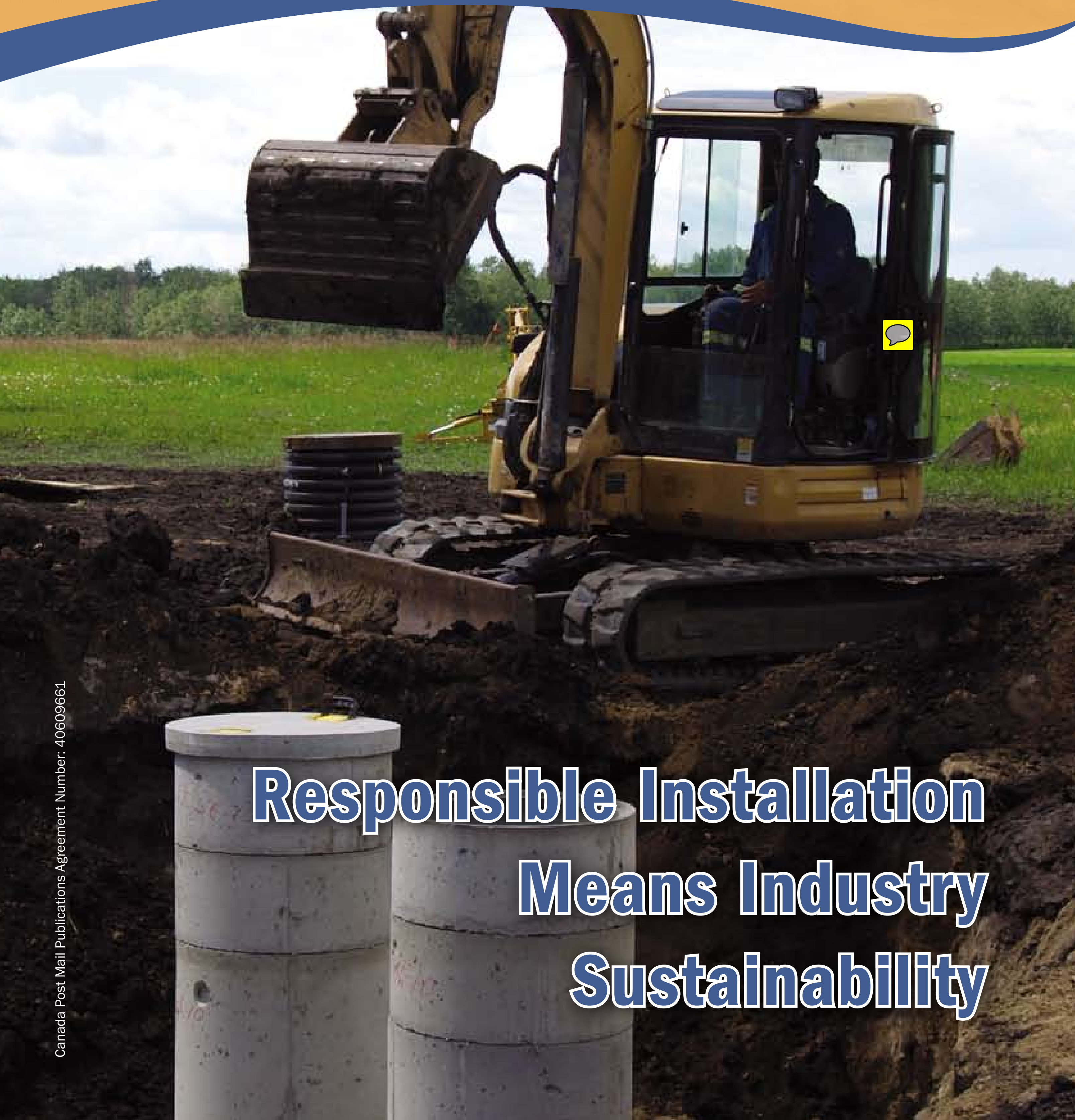

Responsible Installation Means Industry Sustainability

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Contents

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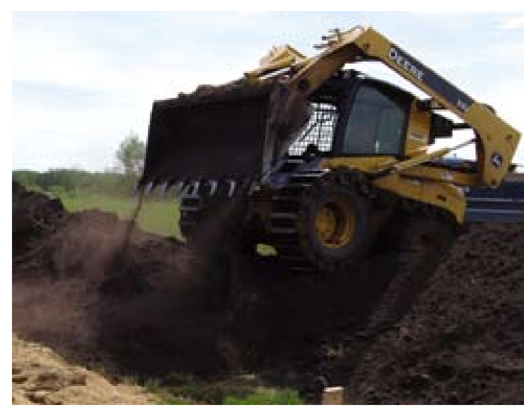

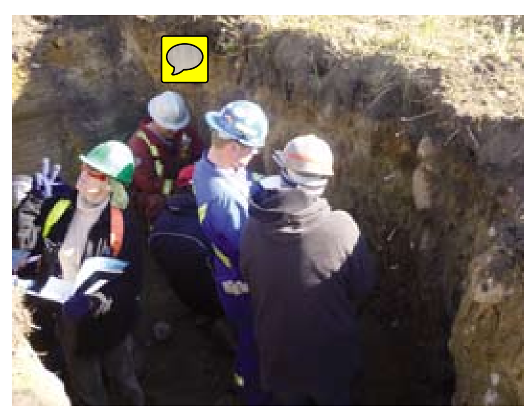

Maintaining and Troubleshooting Advanced Onsite Systems: Git 'er Done!

This is part 2 of a 3-part series. Part 1 was presented in the Winter 2010-2011 issue of Onsite Informer.

By T.R. Bounds, Grant Denn, N. Tristian Bounds

Basic troubleshooting and diagnostic tips

When sampling or other indicators suggest a problem with system performance, here are some useful avenues of investigation with which every service provider should be familiar.

Verify flows and loading rates: Influent loading rates higher than those shown in Table 2 will result in higher effluent BOD_5 and TSS (and require greater cleaning frequencies). Service providers should investigate the cause for high flows; leaking fixtures are a common culprit.

Verify wastewater characteristics: Verifying wastewater strength is necessary because it's quite common to see huge variations in strength between similar facilities with similar flows, because of the differences in user practices. Typical wastewater characteristics can be found in Table 2 and in Crites and Tchobanoglous 1998. With higher influent strengths, maintenance may increase, although with a diligent service and monitoring program, performance is not expected to suffer. As waste strengths approach extremely high levels, however, *changes in user practices will need to be made or else additional process steps will need to be implemented*, such as pretreatment for high-strength waste from restaurants or food processing facilities.

Document usage of household chemicals: A wide variety of detergents, disinfectants, and other household cleaning compounds are discharged into the wastewater stream daily. Under normal usage, these compounds are diluted and don't generally retard septic tank performance. A study (Gross, 1987) was conducted at the University of Arkansas at Little Rock Graduate Institute of Technology. The study investigated quantities of specific household chemicals that caused destruction or degradation of septic tank performance. The study also monitored the rate of microbial recovery following the excessive chemical overloads and concluded that natural recovery periods typically range between 30 and 60 hours, without the aid of any special additive. Service providers need to ensure that users are informed about the impact of household chemicals on their septic systems and are encouraged to practice care in this regard.

Determine if low-flow fixtures are affecting performance: Low-flow fixtures tend to reduce the hydraulic load to the system, as well as the benefits of dilution, which cause elevation of wastewater constituents (i.e., higher concentrations of BOD_5, TSS, TKN, etc.).

Assess integrity of system components: The quality of materials used is critical to the successful operation of any equipment, and onsite wastewater systems are no exception. Service providers must be alert to the differences in controls, motors, pumps, etc., as well as critical subcomponent details, like impeller quality and resistance to wear and tear. Poor quality products result in unnecessary service calls and component replacements, thus increasing long-term costs. Proper equipment selection will extend the time between service calls and will result in lower operation and maintenance costs.

Corrosion is a condition that is inherent to any wastewater application and, because of their designs, onsite and pressure sewer systems tend to enhance corrosive conditions. Attack from this environment may destroy a component or impair its performance; therefore, selecting equipment constructed of corrosion-resistant materials improves system performance. For example, high-strength plastics and stainless materials are more inert to wastewater degradation than bronze, and bronze is more inert than brass, and brass is more inert than cast metals.

Be sure to regularly exercise all valves. (And also make sure the valves are back in their proper positions before leaving the site.)

Relation between liquid levels and filter cleaning: Generally, when the liquid level difference between the inside and outside of the vault is two inches or more, that's a sign that the in-tank filter or screen may need to be cleaned. (That relationship should fall within the typical inlet and outlet liquid level differential.) However, you may need to check with the manufacturer of the filter. If the tank's filter can't be checked, you should consider replacing the filter with one that can be.

Filters will occasionally clog, but when that happens it is viewed as a success rather than a failure, because the filter is keeping excessive solids from discharging into the dispersal system. There are some unusual problems that will cause premature clogging, like excessive sludge or scum accumulation, high infiltration or inflow rates, high water usage, leaky tanks that allow the scum

Soil Characteristics—Demystifying Dirt

By Marilyn Noah, NESC Writer/Editor

Soil is the foundation of conventional onsite wastewater treatment. The drainfields used with onsite systems work because the soil around the trenches acts as a filter and removes organic matter, some of the nutrients present in wastewater, bacteria, and other pollutants before the water returns to the groundwater. Every site has unique soil characteristics that are critical in determining the size and type of onsite wastewater treatment system required.

Soil conditions are one of the most important elements in site evaluation and system design. Other restricting site parameters include the topography, separation distances, owner's preferences, existing water sources, depth to any limiting layer, and landscape position. But the ability of the soil to accept and transmit the effluent from the dispersal system is the most crucial element. (See Figure 1 - Soil Terminology.)

It is necessary to evaluate the soil to ensure that a drainfield is designed properly and will not fail prematurely. Information about the depth of the soil and how quickly it will absorb water determines the suitability of the dispersal area. Soils that accept water too quickly will not treat wastewater adequately, and soil conditions that do not allow the effluent to move quickly enough into and through the soil also create problems.

In a site evaluation, the designer must be concerned with not just how to get the effluent into the soil, but he or she must also determine the best way to introduce the effluent into the soil horizon, how it will move across the site, and in what condition the effluent will be in when (or if) it moves across property lines.

Soil consists of four components in various proportions: mineral particles, organic particles, water, and air. See Figure 2 on page 11 for a simple pie chart representing these proportions. Note that only about half of the soil volume consists of solid material. The other half consists of pore spaces filled with air or water.

Soil types are a result of the underlying rock types, climate, native vegetation,

Figure 1 - Soil Terminology

Drainfield – an area of perforated piping that carries wastewater from the septic tank to the soil providing both disposal and treatment of the effluent, also referred to as the leachfield or dispersal field.

Separation distance – the physical space between the bottom of the trench and the limiting layer.

Limiting layer – anything that changes the normal flow of water through the soil profile, such as bedrock or the water table.

Effluent – clarified wastewater from the septic tank.

Topography – the configuration of a surface in relation to natural and man-made features, described in terms of differences in elevation and slope; in other words, the lay of the land.

Nutrients – elements including nitrogen and phosphorus necessary for plant growth

Percolation rates – indicates how fast the water will move down through the soil.

Soil texture – determined by the proportions of the different-sized soil particles.

Soil structure – relates to the grouping or arrangement of soil particles.

Soil horizons – layers of soil composed of different minerals and amounts of organic matter; each layer exhibits similar colour and texture; horizons make up the soil profile as seen in the test pit.

Hydraulic conductivity or permeability – the ability of a porous media or soil to conduct water through its pore spaces.

Permeameter – an instrument used to measure hydraulic conductivity of soil.