

DE-CENTRALIZED SANITARY SYSTEMS VS. CENTRALIZED SANITARY SYSTEMS (Part II)

If you are just now joining us, we are discussing septic fields vs. centralized sanitary treatment. You will need to get the previous issue to catch up, if you haven't read it already. Here is the continuation of that article.....

Secondly, the system has to be maintained. The two primary zones that require maintenance are the septic tank and the leach field. The septic tank has to be pumped out regularly to make sure the tank has enough capacity for the liquid to allow settling of the solids. If the tank is virtually full of solids, the effluent will run straight through the tank and begin depositing lots of solids in the leach field. The leach field requires maintenance to make sure that the site drainage (surface and sub-surface water) is functioning properly, the vegetation is maintained above the leach field, and that there is no solids build-up in the field, itself.

Septic systems have an anticipated design life just like any other system. Typical design life for a septic field is 25 years, but they can sometimes remain effective for up to 30 years. Lack of maintenance can cause failure in less than 10 years.

CENTRALIZED TREATMENT

The typical centralized sanitary treatment option is a WWTP operated by a municipality or a private utility company. The basic idea behind this option is that there is usually no treatment of the sanitary effluent on the customers property. All the raw effluent is transported to a centralized facility for treatment and disposal.

The transport mechanism for the raw effluent is normally a system of pipes and/or pumps, but it can actually be carried to the plant in trucks in rare circumstances. The cost of transporting the effluent is a major factor in the cost of overall treatment, so

trucking the effluent is rarely chosen as a viable alternative due to the extremely high price per gallon paid for the transport.

Once the effluent is delivered to the treatment plant, the treatment can begin. Typical treatment of sanitary waste involves the following steps:

- 1-Preliminary Treatment
- 2-Primary Treatment
- 3-Secondary Treatment
- 4-Final Treatment
- 5-Solids Processing

Preliminary Treatment

Preliminary treatment of the effluent is normally accomplished by passing the effluent through bar screens to capture any large solid objects that might be present in the flow. In addition, the raw effluent (minus the large solid objects) is passed through a tank at a slow enough velocity to allow gravel, sand, and other grit to settle to the bottom. This grit (like the other large solids



SANITARY SYSTEMS...CONT.

captured by the bar screen) is typically disposed at a sanitary land fill. The purpose of this treatment is to remove objects that could cause a problem to the rest of the plant.

Primary Treatment

Primary treatment is very similar to the septic tank discussed previously. The raw effluent is held in a tank for an extended period of time to allow greases and oils to float to the top and other (smaller) solids to settle to the bottom. The liquid in the middle is then relatively clean, but still has biological contamination to be removed from it.

Secondary Treatment

After sitting in the primary tanks for some time, the water is then passed into the secondary treatment tanks. In these tanks micro-organisms eat the remaining dissolved organic materials in the presence of oxygen (aerobic process.) The oxygen is typically introduced to the effluent through compressed air that is passed through bubblers and diffusers to make sure the fluid maintains a minimum level of dissolved oxygen.

After a sufficient time in the secondary treatment process, the effluent is passed on to the clarifiers, where the remaining solids settle out of the effluent and some of the micro-organisms can be reclaimed and put back into the secondary treatment tanks.

Final (Tertiary) Treatment

After a stay in the clarifiers, the clear water is then released to the final treatment center. This process will vary depending on the region and the terms of the permit, but in general the water will be disinfected and could also be subjected to another process which will remove excess nitrogen and/or phosphorous. Once the effluent passes the tertiary treatment stage it is generally released into a stream or river.

WHAT COULD GO WRONG? (CONS)

Whenever you're having a contest (septic fields vs. municipal sewer), you have to take a look at the pros and cons. I usually like to start with the cons--so here goes:

Decentralized Treatment

Septic fields, like many other house items, typically suffer from poor maintenance. Out of sight, out of mind. After all,

most of us don't have bi-annual maintenance on our furnaces, or seal the cracks in our driveways and sidewalks once a year, either. I would guess that the most common failure mechanism for septic fields is the leach field receiving too many solids from the septic tank due to a lack of pumping and removal of the solids from the tank. Pumping a septic tank only needs to be done every 3-4 years in a well-designed system and that is just long enough to forget about it.

Another common failure mechanism is through the introduction of groundwater to the leach field. This one will get your attention because your mower will get stuck in your yard, and it won't smell very good, either. This problem can come about due to poor design or construction, but it can also happen to changing circumstances ten years into the life of the system. If you or your neighbor builds a pond, for example, that can drastically impact your septic field by changing the drainage pattern on your property.

Centralized Treatment

When a septic field fails, the environment suffers from excessive sanitary contamination from one home. If a centralized treatment plant fails, the environment could be receiving raw waste from hundreds of thousands of homes and factories. It's the old "putting all your eggs in one basket" idea, only your eggs are your sanitary waste and the basket is the Treatment Plant. Fortunately, Treatment Plants don't fail frequently, but that issue has to be considered.

The most common complaint about Treatment Plants is wet-weather overflow. These overflow events have to be reported to state agencies, so the information is public knowledge and the press really likes to report that information to sell newspapers and air time. I'm not saying it isn't a big deal, but there are a lot of other big deals that never make the paper. For example, some guy out in the country that has a failed septic system which is draining directly into a stream or river never has to report it and may never be discovered.

When centralized treatment plants have a wet-weather overflow event they must

estimate how many gallons of effluent were released into the river. This is usually a very big number and that is what grabs headlines.

Let's say the community of Fort Wayne has a wet-weather overflow event during and after a 2 inch rain of their combined (storm and sanitary in one pipe) system and the volume reported is 100 Million Gallons over the course of two days. That sounds like a huge number, right?

A two-inch rain results in a flow in the Maumee River (the receiving stream for the Fort Wayne Plant) of approximately 17,500 Cubic Feet per Second, and 100 Million still sounds like a big number, right? Well, 100 Million gallons spread over two days is about 75 Cubic Feet per Second. So this major overflow would contribute an additional 0.43% to the overall flow of the river. Every parking lot, road, cow pasture, and goose in the watershed is also contributing contamination to that flow, so the Maumee wasn't exactly pristine to begin with, right?

In any event, I'm not saying that overflows from Treatment Plants are something we are trying to promote--I'm only saying that the raw data you see in the newspaper doesn't really capture the whole picture.

WHAT'S NICE? (PROS)

We can't just talk about the negatives, right? After all, each system must have some positive aspects.

Decentralized Treatment

Probably the biggest single positive aspect of septic fields is that they allow people to live where they want to live and still treat their household wastes appropriately. You may not have considered this, but without modern septic fields every home in the country would still have an outhouse, or a tile connection to the nearest ditch or stream. Septic fields have allowed us to pursue our rural homes and still protect the environment.

Hang in there for the last installment of this article next month.

See you then!!



email: dabec@dabrownengineering.com website: www.dabrownengineering.com

5419 Co. Road 427, Suite C
Auburn, IN 46706

ph: 260.925.2020
fx: 260.925.1212

510 Lincolnway East, Suite A
Mishawaka, IN 46544

ph: 574.288.5599
fx: 574.288.9484