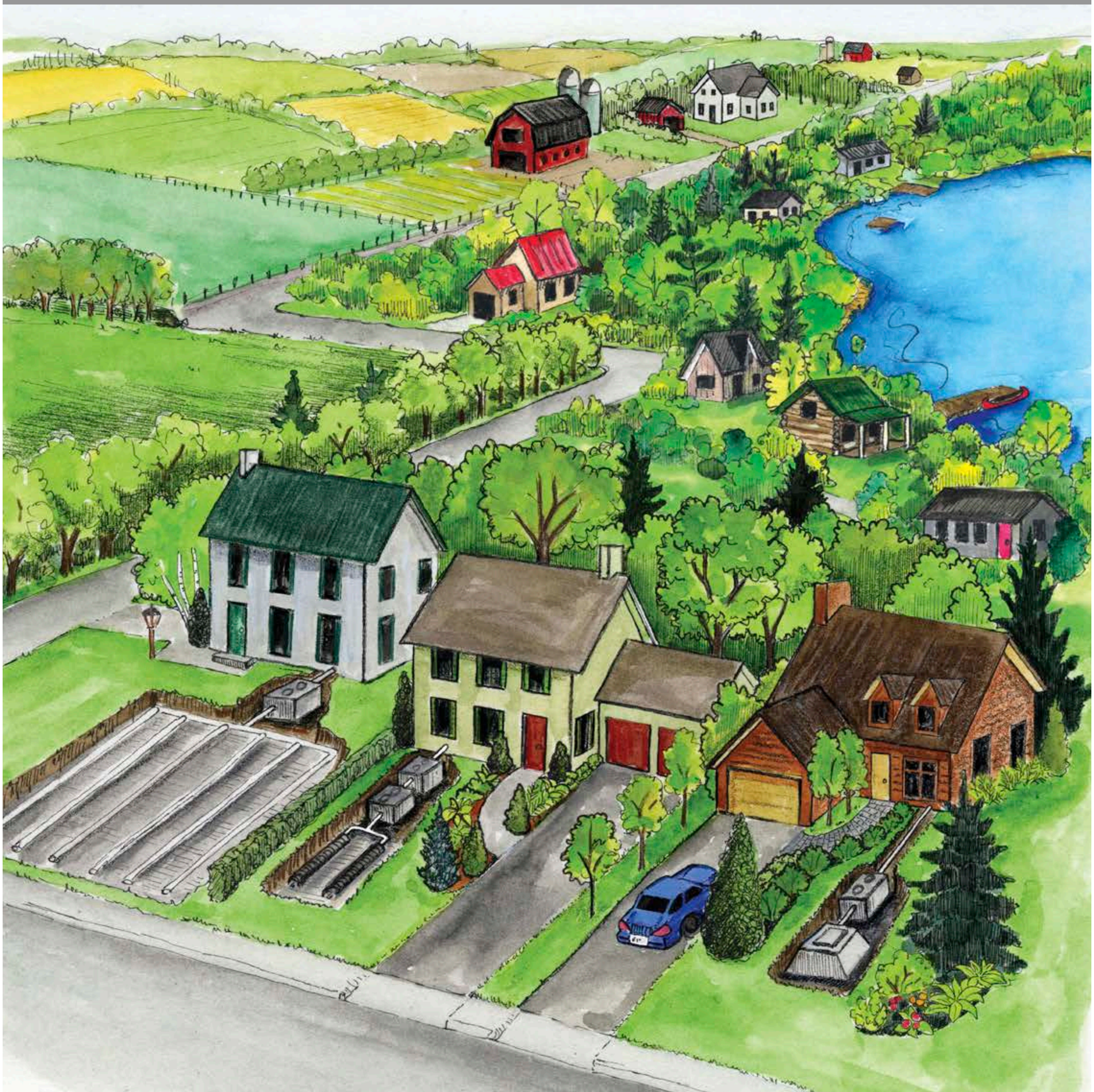
SepticSmart!

Understanding Your Home's Wastewater System



Revised 2022

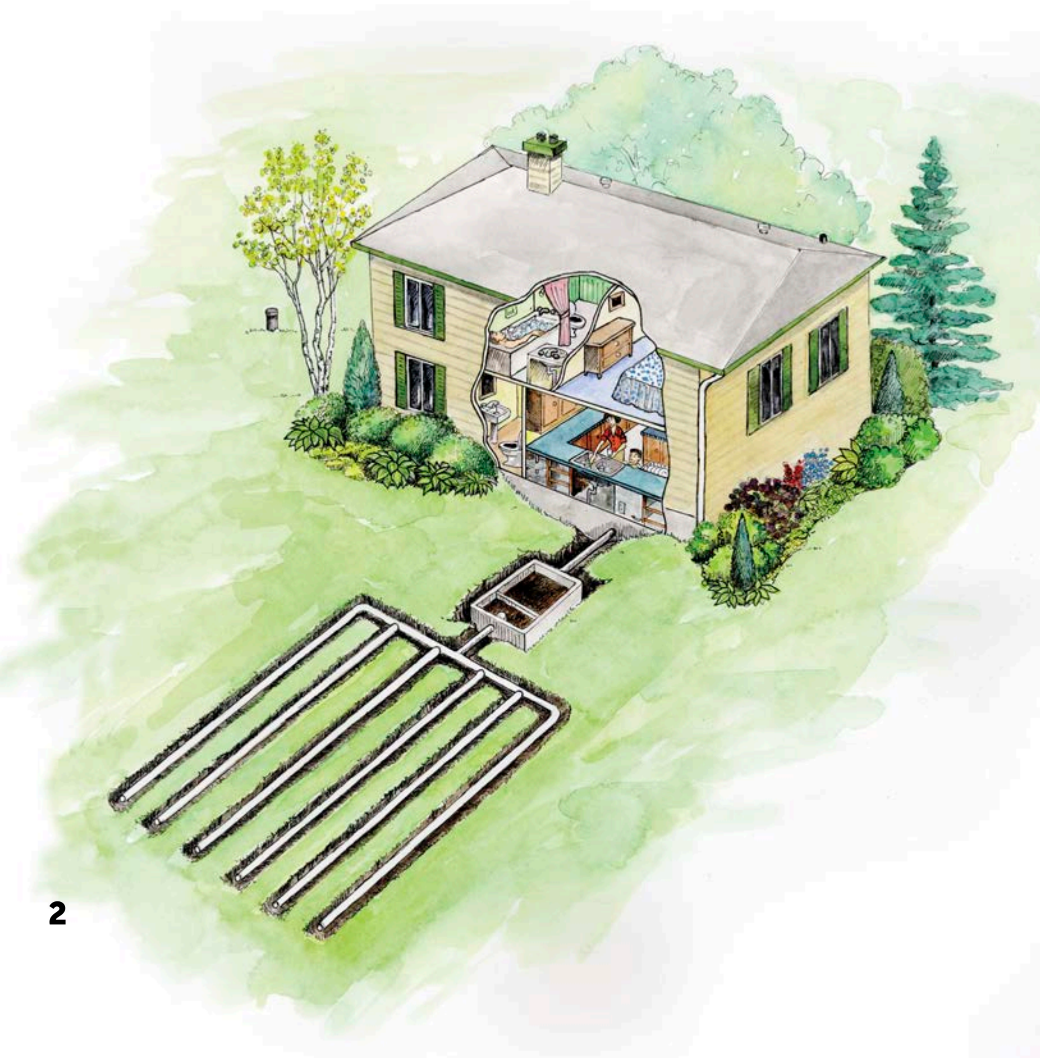
Rideau Valley Conservation Authority

Ontario

1 Introduction

If you live in a rural area, a small community or you have a cottage, chances are you have a septic system. Septic systems are onsite wastewater treatment units that fulfill the role of municipal sewers in rural areas. Anything that goes down the drain — every shower drip and every toilet flush — flows to the septic system. Septic systems, generally speaking, are comprised of a tank, a network of pipes and billions of organisms that process your waste.

This booklet will help you become familiar with how your system works and how to keep it working properly. It is important to know that you are responsible for your septic system and that it is in your best interest to take good care of it — from a health, financial and environmental perspective.



Septic systems are also known as:

- sewage systems
- on-lot systems
- onsite systems
- individual sewage disposal systems
- onsite sewage disposal systems
- onsite wastewater treatment systems
- sediment tank and treatment trench systems

2 Why are septic systems important?

There are many contaminants in wastewater that, if they enter drinking water, groundwater or surface water supplies, can negatively affect your health and the environment. These contaminants include nitrate, phosphorus and disease-causing bacteria, viruses and parasites.

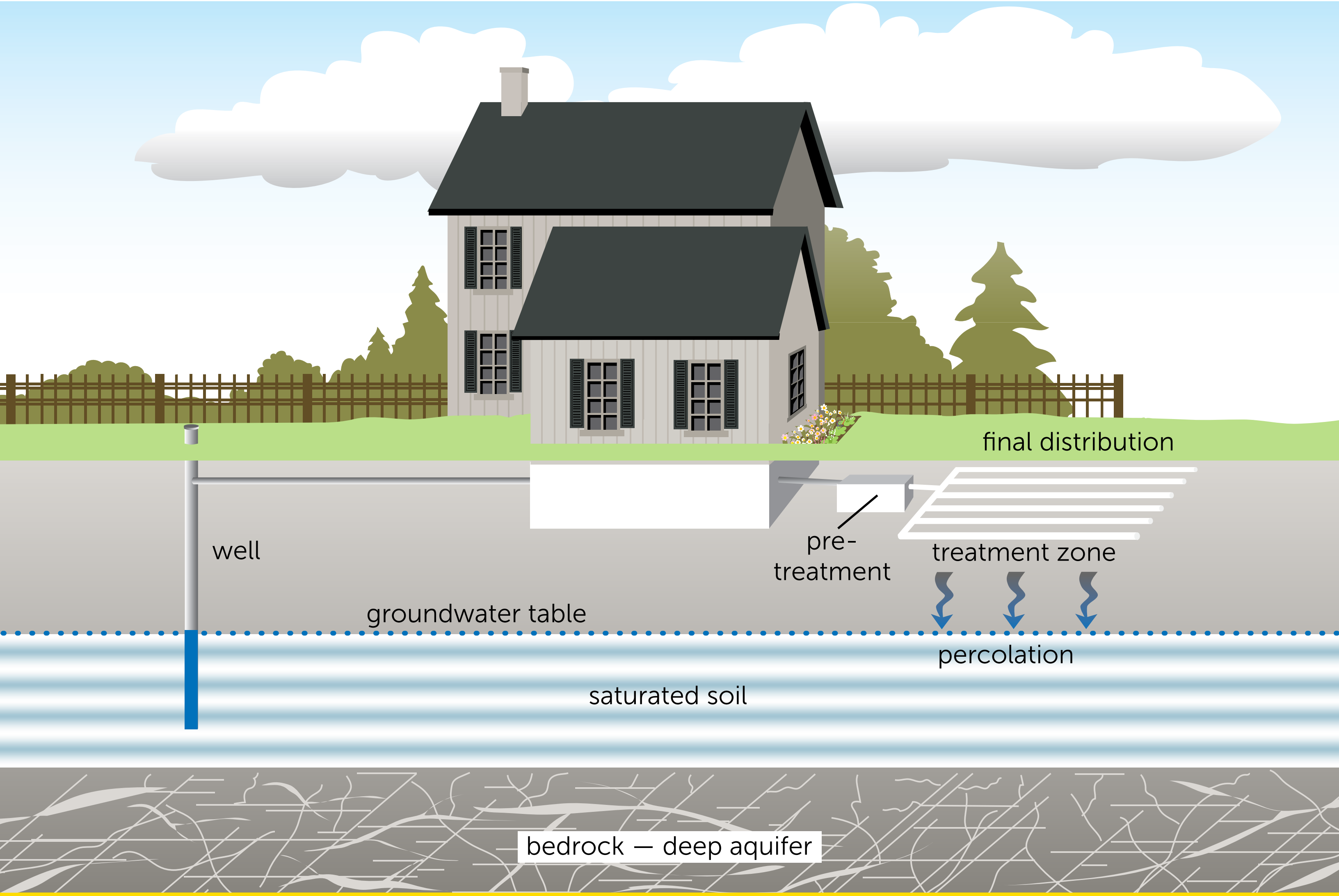


Figure 1. A properly functioning septic system is part of a healthy water cycle. Septic systems return used water (effluent) to the soil, recharging groundwater supplies. A poorly functioning septic system can impact the quality of your drinking water.

A properly functioning septic system will remove most contaminants to acceptable levels. However, treated wastewater that percolates through the soil may still contain some contaminants that can enter the groundwater table (Figure 1).

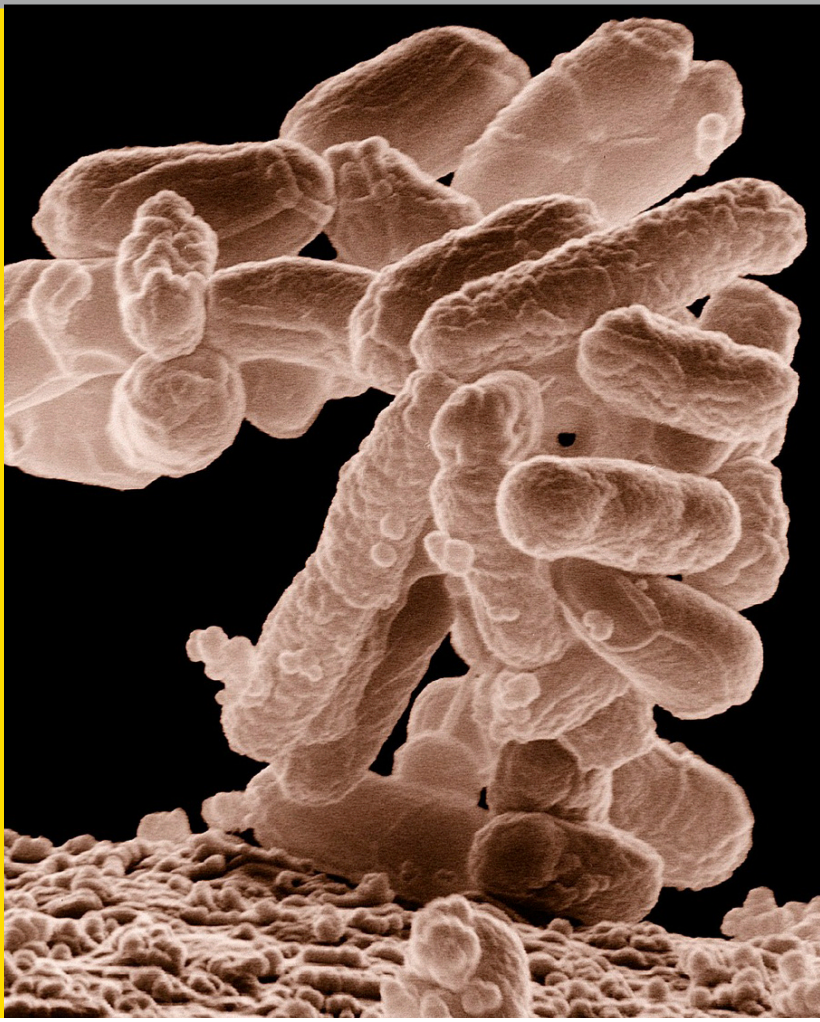
To reduce the risk to nearby ground or surface water supplies, the location of your septic system is critical.

There are legislated minimum separation distances required between your septic system and your home and well, neighbouring homes and wells, and nearby bodies of water. Respecting these distances and planning your lot accordingly will lead to a healthier, longer-lasting system (see Section 8, Figure 12 on page 26). To learn more about the basics of rural wells, check out *Groundwater — An Important Rural Resource, Private Rural Water Supplies*.

Did you know?
Septic systems are vital in the treatment of various contaminants, especially *Escherichia coli (E. coli).*

Escherichia coli (E. coli) is a species of bacteria that is naturally found in the intestines of humans and warm-blooded animals. However, some types can cause illness in humans, including diarrhea, abdominal pain, fever, and sometimes vomiting. A proper functioning septic system protects groundwater and surface water from fecal contamination.

Presence of *E.coli* in water is an indication of contamination.



E. coli bacteria

3 How do septic systems work?

Septic systems provide onsite wastewater treatment. They are your home or cottage's sewage treatment facility. Hidden from view, this "facility" is hard at work collecting all your wastewater through your plumbing, treating it and returning it back to the soil.

While there are different types of septic systems, most include the following steps in the treatment process:

1 **Collection of wastewater** — Anything that goes down the drain into your plumbing flows to one location for pre-treatment.

2 **Anaerobic pre-treatment of wastewater** — This is the first step in the treatment process. Wastewater typically enters a two-compartment septic tank. Solids settle to the bottom of the tank, while the fats, oil and greases float to the top. There is also anaerobic digestion of organic material which remains in the tank. Partially treated effluent flows for final distribution in the native soil unless aerobic treatment is required.

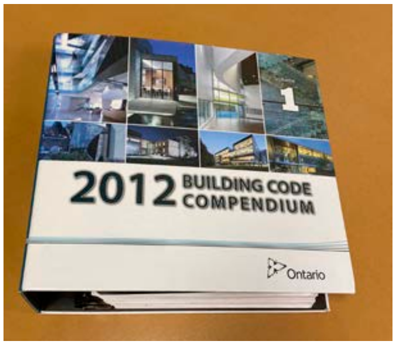
3 **Aerobic treatment** — Some systems require additional wastewater treatment using aerobic systems following the anaerobic process (i.e., septic tank). In these systems, oxygen is introduced to the effluent. This allows for a biological process to occur that enhances the growth of oxygen-loving bacteria which further feed on and digest the effluent. It also removes additional suspended solids, nutrients, and organic materials from the effluent prior to final distribution into native soil.

4 **Final distribution** — The final step takes place when the effluent is released to the native soil. Soil contains billions of bacteria and organisms that treats the effluent as it percolates downwards. Eventually this cleaned effluent safely returns to the groundwater system.

Did you know?
Wastewater is typically not consistent in quantity or quality. Changes in wastewater characteristics vary as a result of individual water use within the building being serviced.

Wastewater is composed of pathogens, nutrients, solids, fats, oils and grease, metals, organics, and gases.

4 Who does what?



In Ontario, the *Ontario Building Code* (OBC) governs nearly all rural septic systems. Part 8 of the OBC regulates sewage systems with a daily flow not exceeding 10,000 litres per day. This covers most homes, but also small businesses such as restaurants, dental clinics, churches and schools.

The OBC prescribes approved design and construction requirements for septic systems and determines who may do what — including the licensing of designers, installers and inspectors. When installing, repairing, upgrading or replacing a system, you are required to work with designers and installers who practice under the OBC and are qualified and registered by the Ministry of Municipal Affairs and Housing (MMAH). Professional Engineers, with relevant expertise may also support your project and do not require certification under the OBC.

All installations, repairs and upgrades to your septic system must also be inspected and approved by your local regulatory authority. The regulatory authority may be your local or regional municipality, health unit or conservation authority. They will inspect systems, issue permits, maintain records and enforce the laws regarding septic systems under the OBC.

Installers	• install new and replacement systems • design systems that they will install • repair systems • conduct site evaluations • conduct inspections of existing systems • investigate and troubleshoot failing systems
Designers and Engineers	• design systems for any licensed installer • conduct site evaluations • conduct inspections of existing systems • investigate and troubleshoot failing systems
Inspectors	• review permits submitted for approval • inspect installations of new and replacement systems • inspect repairs of existing systems • investigate complaints

5 Types of systems

There are five classes of systems identified by the *Ontario Building Code* to deal with waste, but most aren't applicable for everyday family living. Classes 1, 2, 3 and 5 have very specific and limited uses. Most rural homes, cottages, and businesses use a Class 4 septic system that disperses the effluent into soil.

Class 1 — Privies

- "porta-potty" (portable privies), outhouses (earth pit privies), vault privies, chemical toilets, composting toilets, incinerator toilets
- human waste only, no discharge of greywater collected from household fixtures such as dishwashers, washing machines, sinks and showers
- used in remote or temporary locations

Class 2 — Greywater systems

- only used for the treatment and disposal of greywater collected from household fixtures such as dishwashers, washing machines, sinks and showers

Class 3 — Cesspool

- used for the treatment of human waste from a Class I system
- usually discouraged because the human waste will quickly clog the soil particles and slow down its operation
- have a short life and are not recommended unless all other possibilities for treatment have been rejected

Class 4 — Distribution systems with Level I and Level IV effluent treatment

- used for rural homes, cottages and small businesses
- size and placement will vary from site to site as the specific design is based on flow volumes from the house, space available in the yard, topography, soil material and depth to bedrock and/or other issues related to the property such as proximity to surface water and groundwater
- requires routine maintenance and periodic pumping

Class 5 — Holding tank

- holds all household waste and provides no treatment of waste
- requires frequent pumping by a licensed sewage hauler

6 Class 4 systems

Level I and Level IV effluent treatment units and final distribution options

The *Ontario Building Code* recognizes four levels of treatment for Class 4 systems. Levels I and Level IV are typically used throughout Ontario. Both categories offer different treatment options and approaches for final distribution into the soil. Distribution options vary depending on the level of treatment (Figure 2). This document explores which unit best suits your needs and what the site will accommodate.

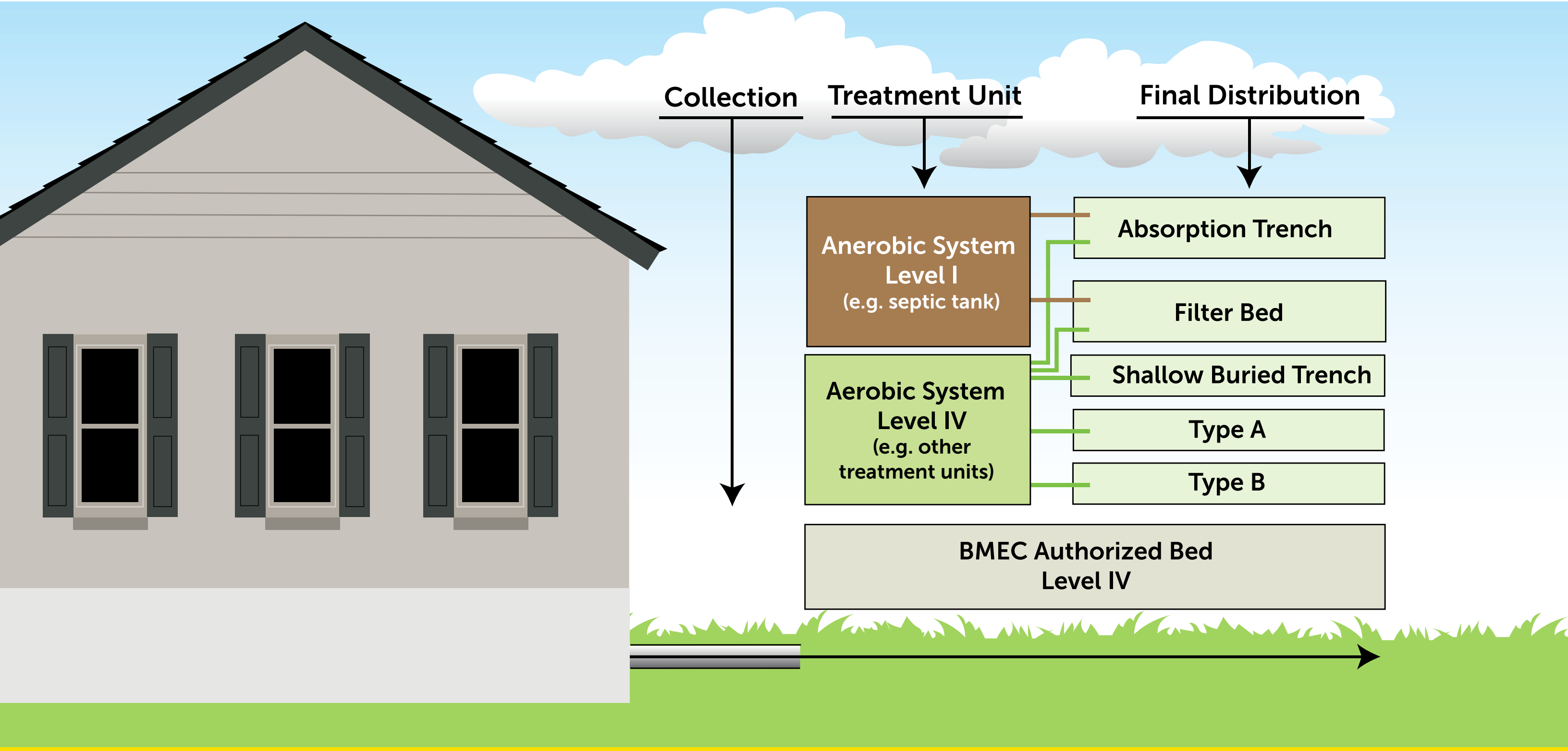


Figure 2. Treatment and distribution options for Class 4 systems.

6a Septic Tank — Level I Effluent (conventional two-compartment septic tank with absorption trench or filter bed)

An anaerobic or septic tank system (Level I effluent) is commonly used in Ontario. It has two main components: a septic tank and an absorption trench or filter bed (Figure 3).

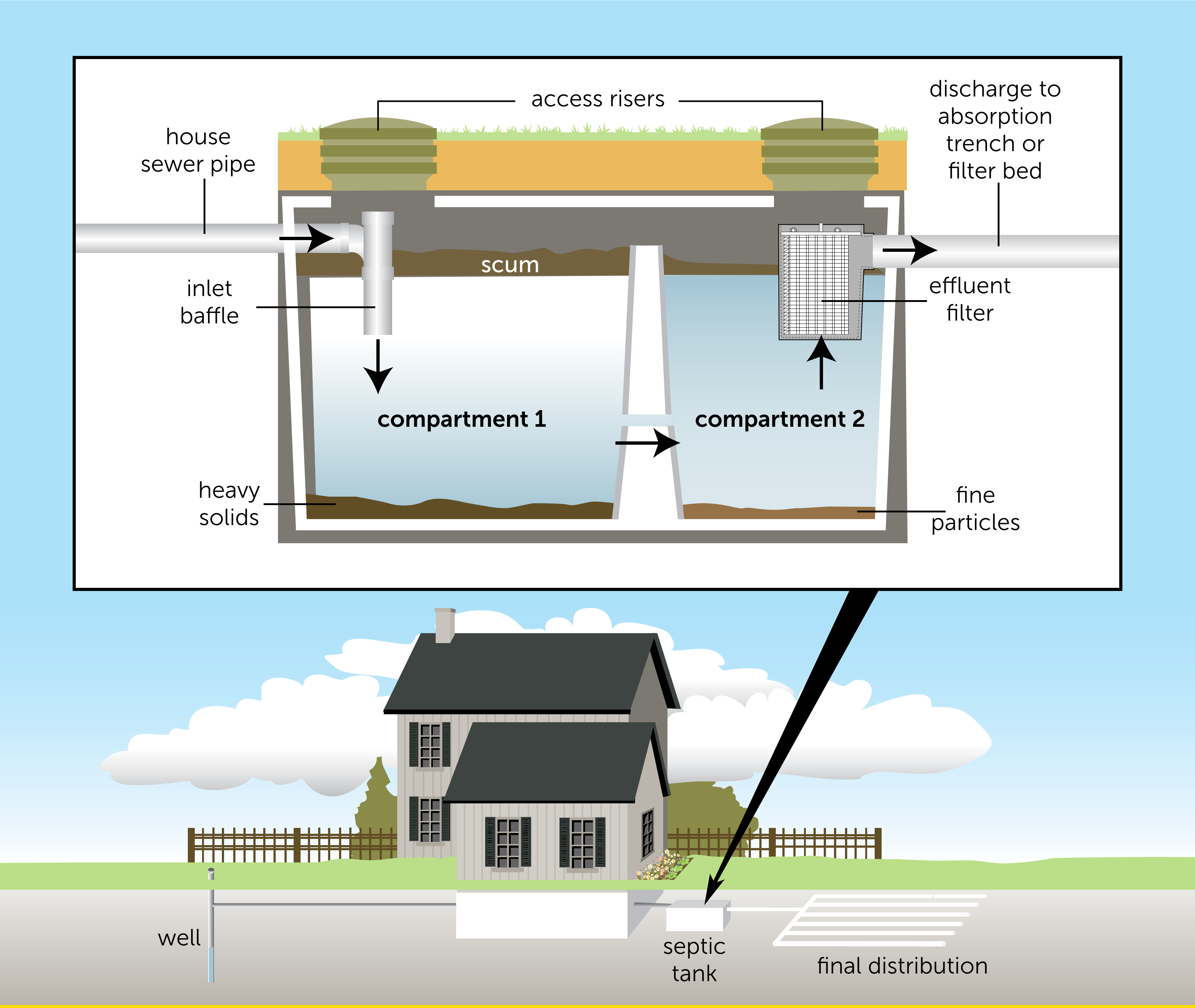


Figure 3. Level I effluent using a septic tank for anaerobic pre-treatment before final distribution to soil using an absorption trench or filter bed.

All household wastewater exits your home through an underground pipe that leads to the buried septic tank. The waste flows to the first compartment of the septic tank where the heavy solids settle and the lighter materials (fats, oils and grease) float to the top as scum.

In the second compartment, finer particles settle to the bottom. Anaerobic microbes break down the organic materials found in the tank. An effluent filter (screen) prevents the scum layer and suspended solids from escaping the tank.

From the tank, the effluent moves through a final distribution system that allows the liquid to seep into the ground where bacteria and other organisms process the effluent further. The effluent is fed through the system either by gravity or a pump depending on site conditions.

Be Septic Smart!
A conventional anaerobic system uses the natural filtering benefits of soil. They are economical and easy to maintain.

In an anaerobic system, 30 to 50 percent of the wastewater treatment is done in the septic tank and 50 to 70 percent is done in the soil (ref. US Environmental Protection Agency, Chapter 4.6.1). Soils below the stone in the trench bottom act as a biological, chemical, and physical filter to remove most remaining organic and biological contaminants.

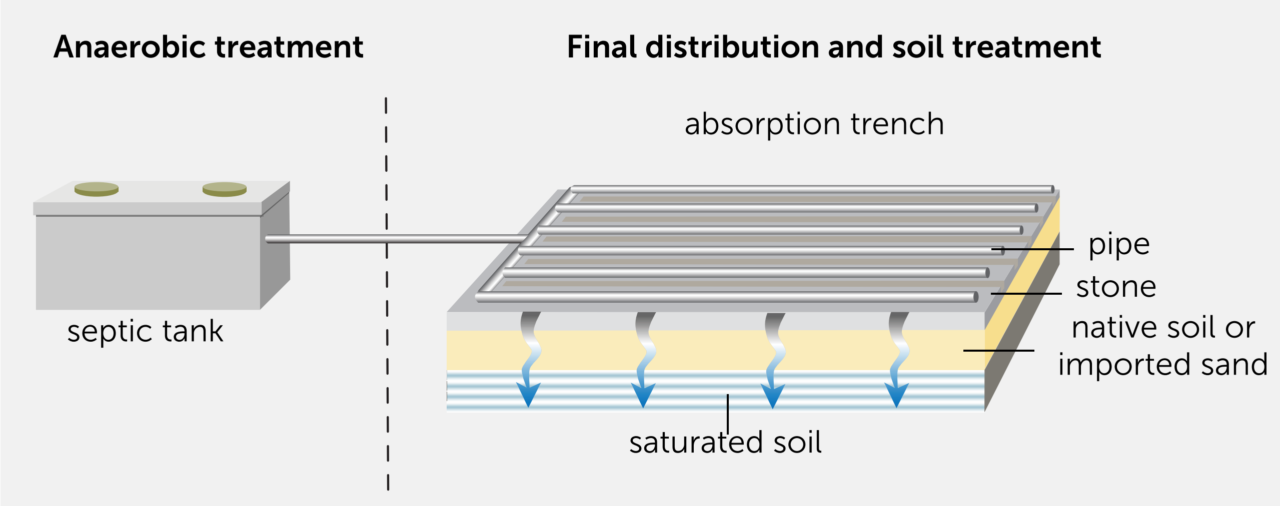


Figure 4. Typical layout of a Class 4 Level I system

6a (i) Final Distribution for Anaerobic Systems (Level I Effluent)

Two final distribution options can be used with an anaerobic system: absorption trench or filter bed. When designing an absorption trench or filter bed, site constraints such as a high groundwater table, bedrock or fine-grained (clay) soil will dictate the size of the bed and the elevation of the bed relative to the existing grade (Figures 5a to 5d).

- **Absorption Trench**
  An absorption trench is typically a network of perforated polyvinyl chloride (PVC) drain pipes on a layer of septic stone (crushed stone). This sits on unsaturated native soil or imported sand fill. The pipe is then covered with crushed stone and a non-woven geotextile followed by sand and topsoil. An absorption trench can also use plastic leaching chambers instead of PVC drain pipes. These half-moon chambers sit directly on unsaturated native soil or imported sand fill. The chambers are backfilled with sand and topsoil.

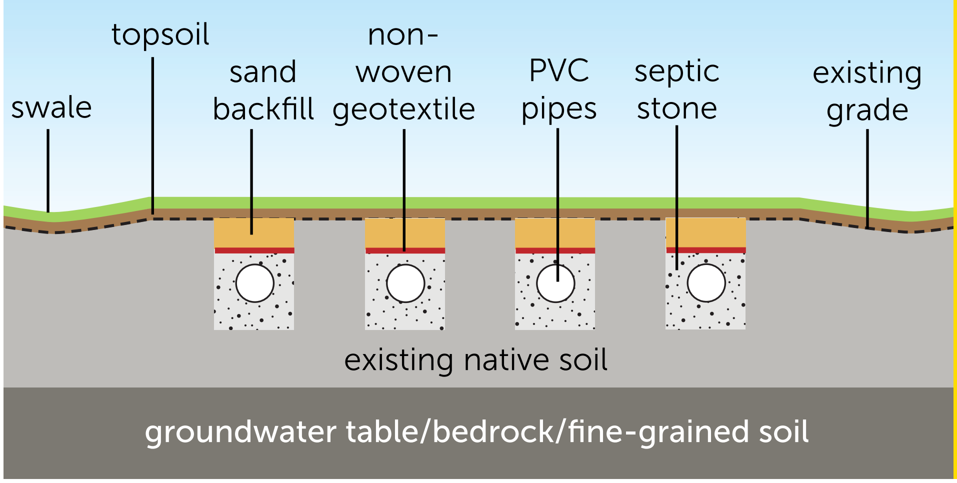


Figure 5a. In-ground absorption trench

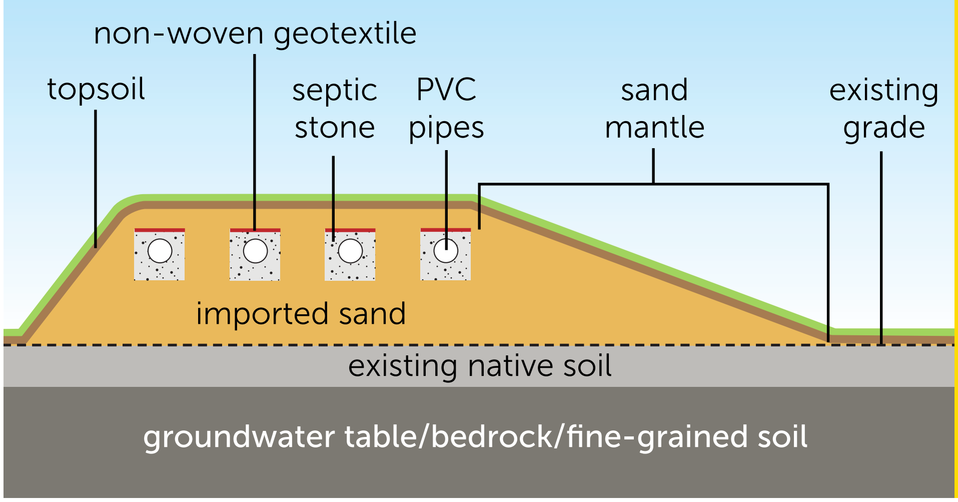


Figure 5b. Raised absorption trench

- **Filter Bed**
  A filter bed consists of a common layer of crushed stone that sits on a bed prepared with a special "filter sand" that is a specified grain size to allow for optimum percolation while treating the effluent. A filter bed has a smaller footprint making it ideal for small lots where separation distances may be an issue (see Figure 12, page 26).

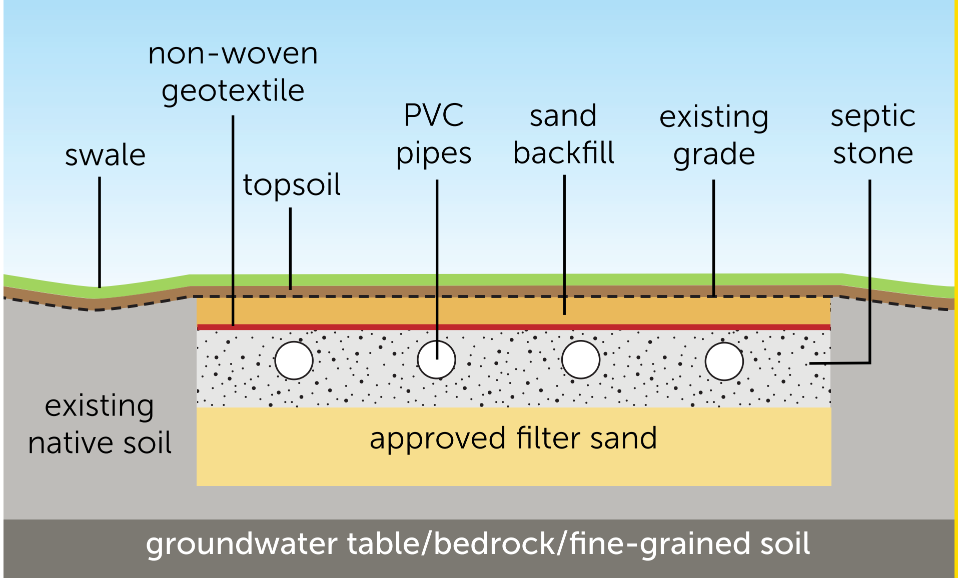


Figure 5c.
In-ground filter bed

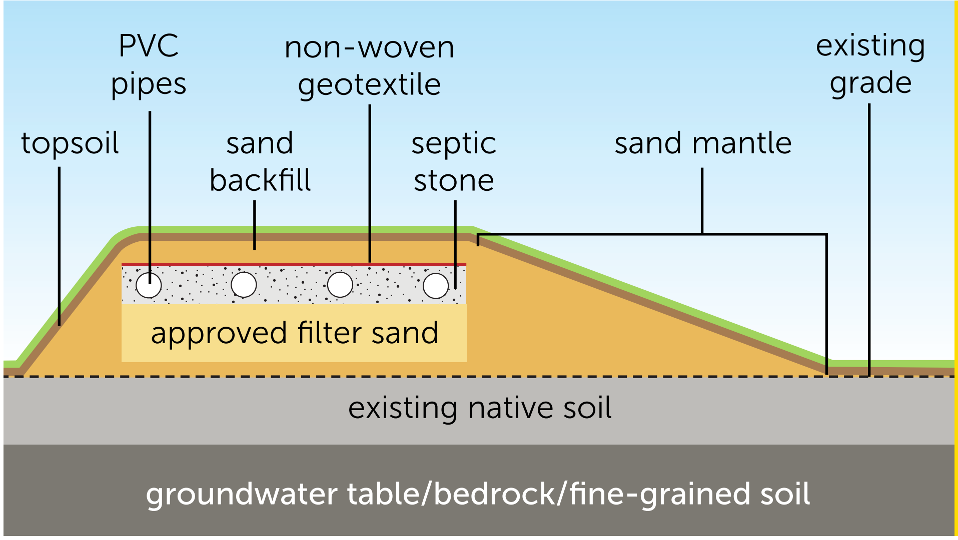


Figure 5d.
Raised filter bed

Be Septic Smart!
Raised distribution options (absoption trench or filter beds) are the same as in-ground distribution options except they are above existing grade. Raised distribution options are built above grade because regulations require certain separation distances between the bottom of the stone layers and high groundwater levels, bedrock or impervious soils.

Comparing Absorption Trenches and Filter Beds

Absorption Trench	**Filter Bed**
Description: • a series of trenches with stone on the trench bottom and perforated PVC drain pipes above • stone and geotextile fabric cover the drain pipes • backfilled with sand and topsoil • the length and number of absorption trenches depends on percolation rate of the native soil and daily sewage design flow	**Description:** • no trenches, one large bed • the bed is prepared with a special "filter sand" that is a specified grain size to allow for optimum percolation while treating the effluent • perforated PVC drain pipes are laid on a continuous stone layer over the filter media sand
Advantages: • less expensive if existing soil has a percolation time that meets design requirements • usually a gravity-fed system where no pumps are required	**Advantages:** • has a smaller footprint making it ideal for small lots where separation distances may be an issue
Disadvantages: • space may be an issue on smaller lots • raised absorption trenches are more expensive than the in-ground type because imported sand is required to construct the trenches • raised absorption trenches require increased separation distances	**Disadvantages:** • filter sand is costly because it is hard to find and, in most cases, needs to be processed to a specific criteria • can't process heavy flows as effectively as a conventional bed • raised filter beds are more expensive than the in-ground type because imported sand is required to construct the bed • raised filter beds require increased separation distances

6b

Aerobic Systems — Level IV Effluent

Unlike conventional systems, aerobic systems use oxygen to break down organic matter. In fact, approximately 90 percent of the wastewater treatment is done prior to it being returned to the soil (ref. US EPA, Chapter 4.6.1). This aerobic treatment provides an enhanced level of effluent treatment which in turn allows for alternative soil distribution options. There are many properties that are not suitable for the installation of conventional anaerobic systems Level I effluent due to poor site conditions.

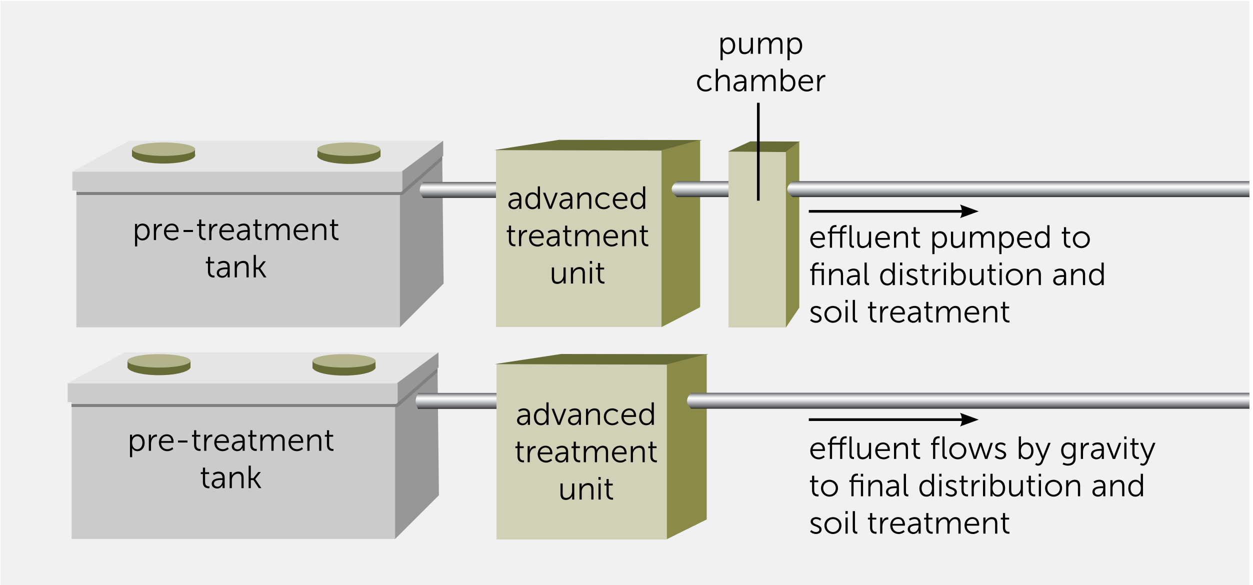


Figure 6. Level IV treatment

Homeowners may turn to Level IV treatment units when:

- dealing with properties with inadequate conditions for Level I effluent treatment
- coping with small lots that can't accommodate the size of a conventional absorption trench or filter bed
- replacing a failed septic system
- rejuvenating failing absorption trench or filter bed
- building on hard-to-access properties where finding and/or transporting traditional materials for conventional systems is costly or difficult
- wanting to provide additional protection to groundwater or surface water by additional nitrate or phosphorus reduction

Level IV Treatment Systems: Advantages and Disadvantages

Advantages:
- provide the opportunity to service sites not suited for conventional Level I effluent systems
- have the potential to remove significantly more bacteria and organic material than a conventional Level I effluent system
- may extend the life of an existing absorption trench or filter bed
- take up less room in yard
- require mandatory maintenance (ensures the unit is functioning properly)
- may reduce nutrient output (depending on type)

Disadvantages:
- may be more expensive to purchase and install depending on the site characteristics
- are more expensive to operate than a septic system (e.g., yearly electrical costs, media replacement)
- includes more mechanical parts that can breakdown or need replacement
- requires mandatory maintenance (increases cost)

There are three types of Level IV aerobic systems: aerobic treatment units, filtration units and BMEC authorized beds.

6b (i) Aerobic Treatment Units (ATUs)

ATUs treat wastewater by injecting and circulating air into the wastewater so that oxygen-dependent bacteria can thrive (Figure 7). These bacteria break down organic matter, reduce pathogens and transform nutrients (e.g., ammonia to nitrate) to produce a cleaner effluent.

Similar to other septic tank systems, wastewater from household plumbing fixtures first enters a septic tank where the scum and solids are separated and stored before the effluent flows to an aeration tank. In the aeration tank, air is added to the effluent by a compressor and diffuser.

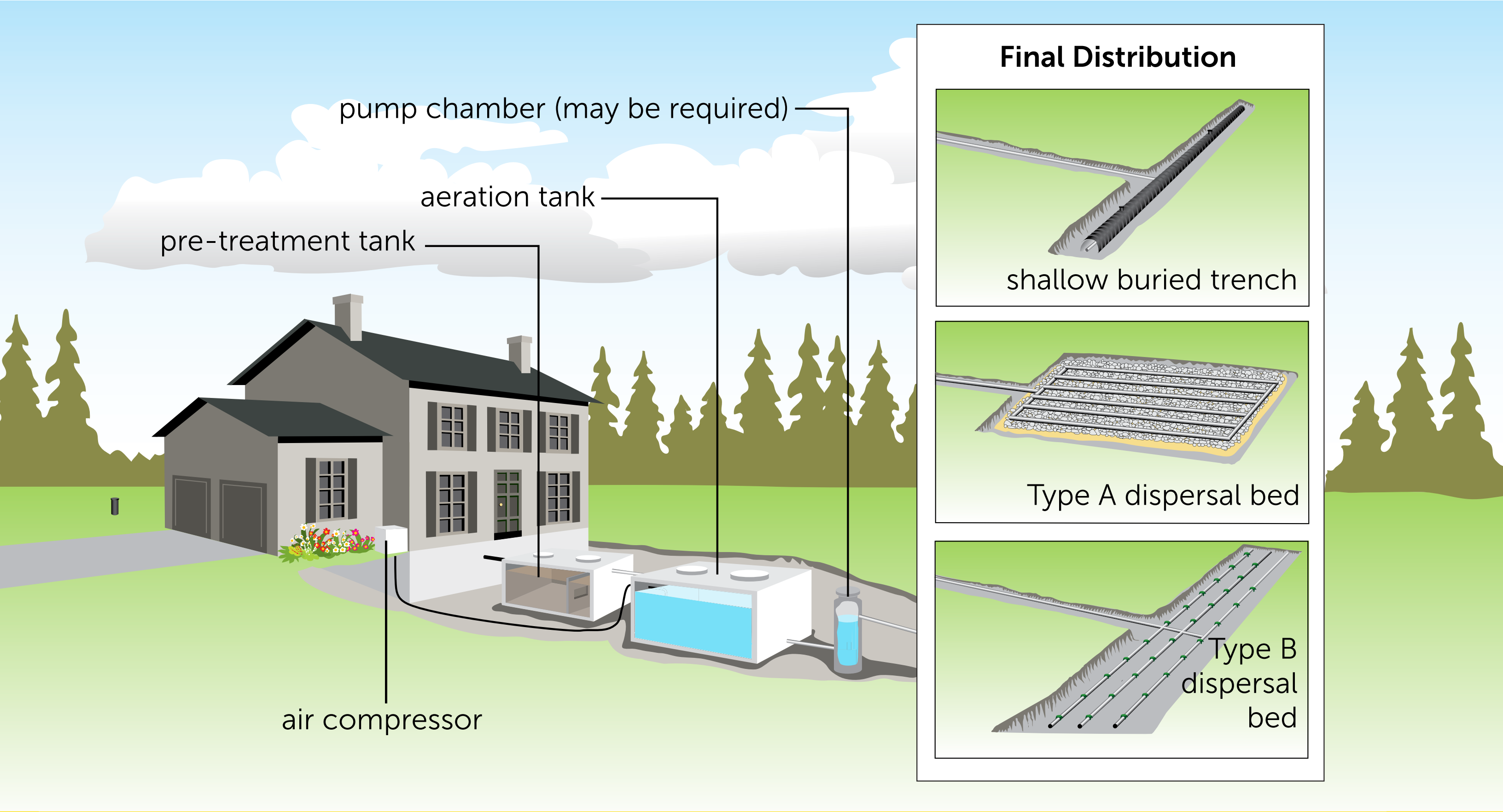


Figure 7. Aerobic treatment units provide Level IV effluent treatment. This allows for a final distribution system that has a smaller footprint.

Generally, ATUs are classified based on the status of bacteria in the wastewater within the treatment unit. There are two types of ATUs: suspended growth treatment units and attached growth treatment units.

In **suspended growth treatment units** the wastewater flows from the pre-treatment tank into the aeration chamber where an air compressor and air diffuser supply oxygen and mix the liquid waste. The air keeps the bacteria "suspended" or floating in the liquid waste. It does not attach to any surface. The oxygen supports the growth of the bacteria and other micro-organisms that break down the wastewater and solids.

In **attached growth treatment units** the aeration tank contains pieces of plastic or other synthetic material. The bacteria attach, grow and thrive on the synthetic material (e.g., plastic shavings, balls, etc.). An air diffuser provides continuous aeration around the synthetic material to enhance bacterial activity and water treatment.

Aerobic Treatment Units:

- can be part of a new system, a replacement system or added to an existing conventional system to prolong the life of the distribution bed
- require air compressors and in most cases pumps
- can use an absoption trench or filter bed for final distribution and treatment but would require a larger footprint
- can use a shallow buried trench, a Type A dispersal bed or Type B dispersal bed for final distribution and treatment which require smaller footprints (Figure 7)
- can be used for residential, communal and commercial applications
- require an annual maintenance agreement

6b (ii) Filtration Units

Filtration units use gravity to trickle effluent over a filtering medium like foam or peat moss to provide additional treatment to the effluent. Similar to the other systems, the wastewater flows from the home to a pre-treatment tank to settle solids and separate scum. Wastewater is then piped or pumped into the top of the filtration unit that is filled with materials such as synthetic foam cubes, peat moss or coconut fibers. As the wastewater trickles or percolates down through the filtration unit, a bacterial slime grows and thrives. Trapped air fills the voids and encourages aerobic conditions where bacteria break down the waste. The effluent then flows to a shallow buried trench or a Type A or Type B dispersal bed (Figure 8) for final distribution and treatment in the soil.

Effluent is distributed onto a synthetic media – foam cubes, peat moss or coconut fiber — for aerobic treatment.

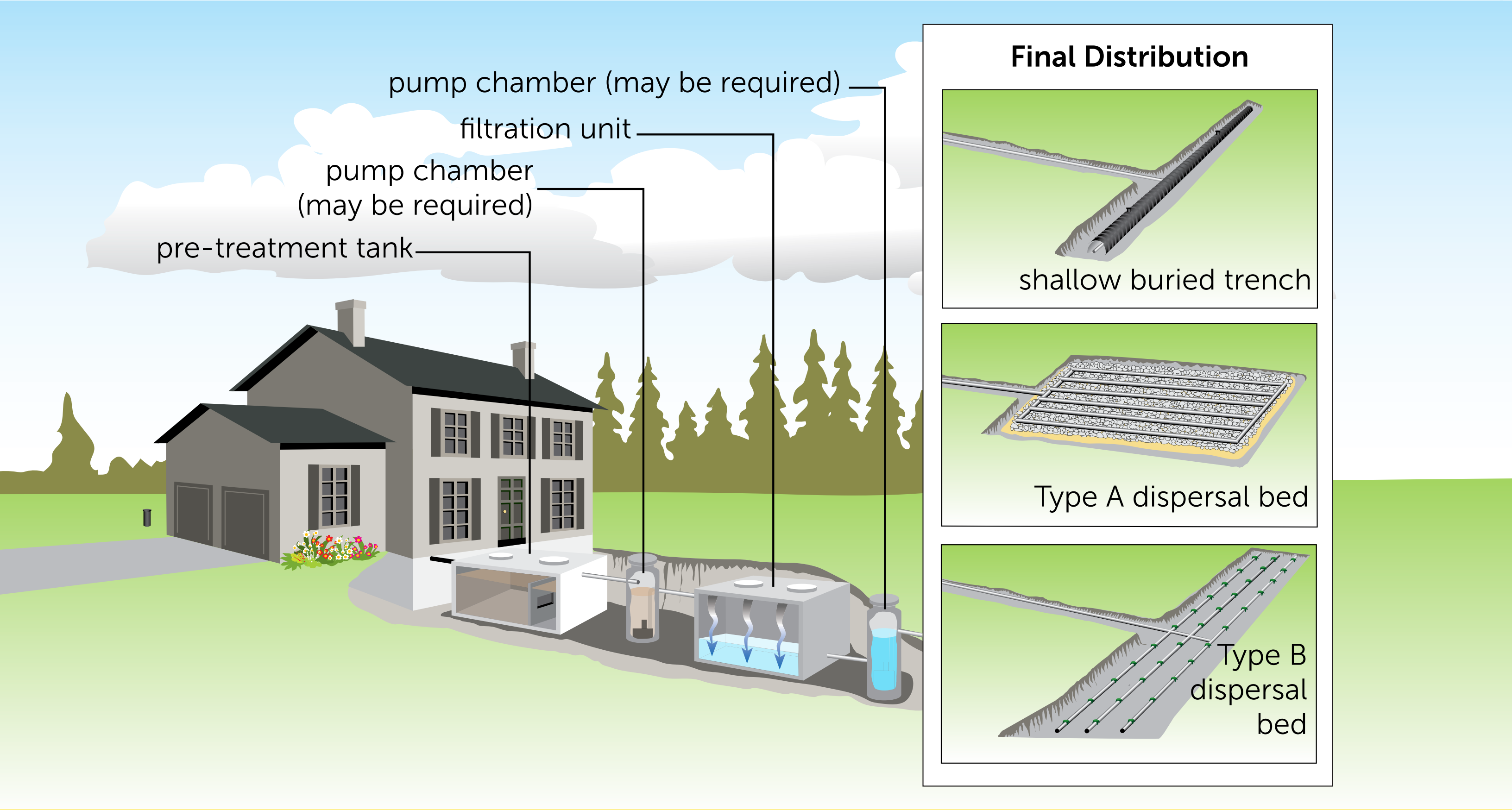


Figure 8. Filtration units provide Level IV effluent treatment which allow for in-ground treatment options with smaller footprint.

Filtration units can use several different options for final distribution: absorption trench, filter bed, shallow buried trench (SBT), Type A dispersal bed and Type B dispersal bed (Figures 9 and 10).

Filtration Units:

- can be part of a new system, a replacement system or added to an existing conventional system to prolong the life of an absorption trench or filter bed
- require pumps for in-ground installation
- can use a shallow buried trench, a Type A or B dispersal bed for final distribution and treatment which require smaller footprints (Figure 8)
- can use an absorption trench or filter bed for final distribution and treatment but require larger footprints
- can be used for residential, communal and commercial applications
- require a maintenance agreement
- require replacement of filter material (peat, sand or synthetic material) approximately every 8–15 years

6b (iii) Final Distribution for ATUs and Filtration Units (Level IV Effluent)

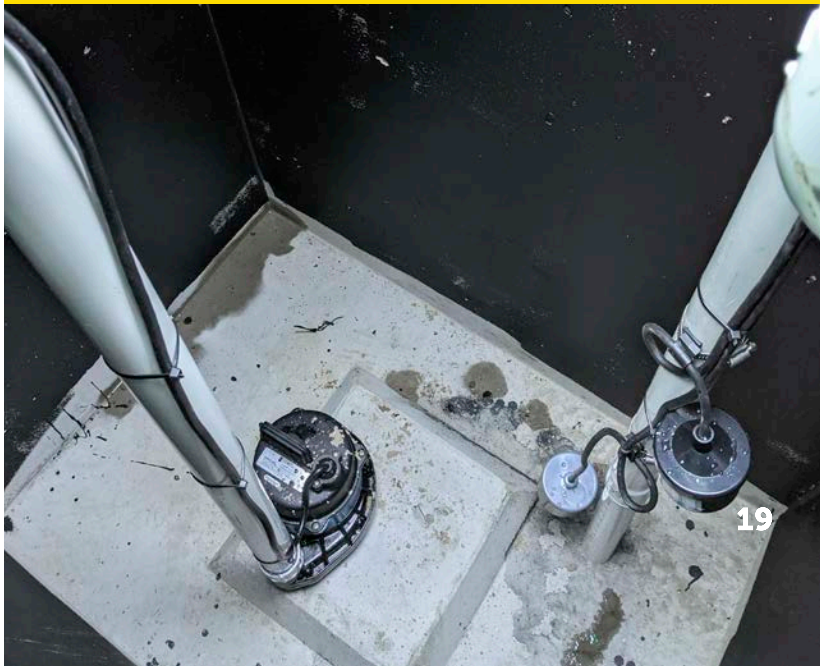
ATUs and filtration units are both Level IV treatment systems, meaning they are very effective in treating wastewater. With cleaner effluent leaving these units, the size of the final soil distribution component needed to complete the treatment is smaller than for those using septic tanks only. Although absorption trenches and filter beds (Figures 5a–5b) can be used for final distribution, ATUs and filtration units typically use shallow buried trenches (SBT), Type A dispersal beds or Type B dispersal beds (Figure 9, 10 and 11).

6b (iv) Typical Equipment for ATUs and Filtration Units

ATUs and filtration units can have numerous mechanical elements including pumps, blowers and compressors. As a result, electrical control panels are integral to the operation of the system. ATUs and filtration units also include an alarm system that can trigger a beacon light and/or buzzer to notify homeowners of any potential problems. Some alarms have additional battery backup to provide an extra layer of protection in the case of power failure or a tripped circuit breaker. Newer units may have remote telemetry capabilities that can send messages to service providers and/or homeowners.

Left: Electrical control panel with red beacon alarm.

Below: Pump chamber showing operating floats and effluent pump.



- **Shallow Buried Trench**
  A shallow buried trench consists of small-diameter pipes running through open-bottom plastic chambers (Figure 9). Effluent from the Level IV treatment unit is pumped under pressure through distribution pipes at regular intervals (time-dosed). The pressurized piping has small holes on the top that allow for even distribution of the effluent on the soil surface under the plastic chamber. This pressurized distribution allows for small doses to be evenly distributed along the entire length of the trench. This greatly enhances the soil's ability to receive and treat the effluent. SBTs are typically installed in the natural soil close to the surface of the ground, allowing plant roots and bacteria in the soil to take up additional nutrients. SBT can be installed as one row or several rows to meet minimum trench length standards as required by the *Ontario Building Code*. This method is versatile because the trench can follow an irregular pattern (e.g., around trees).

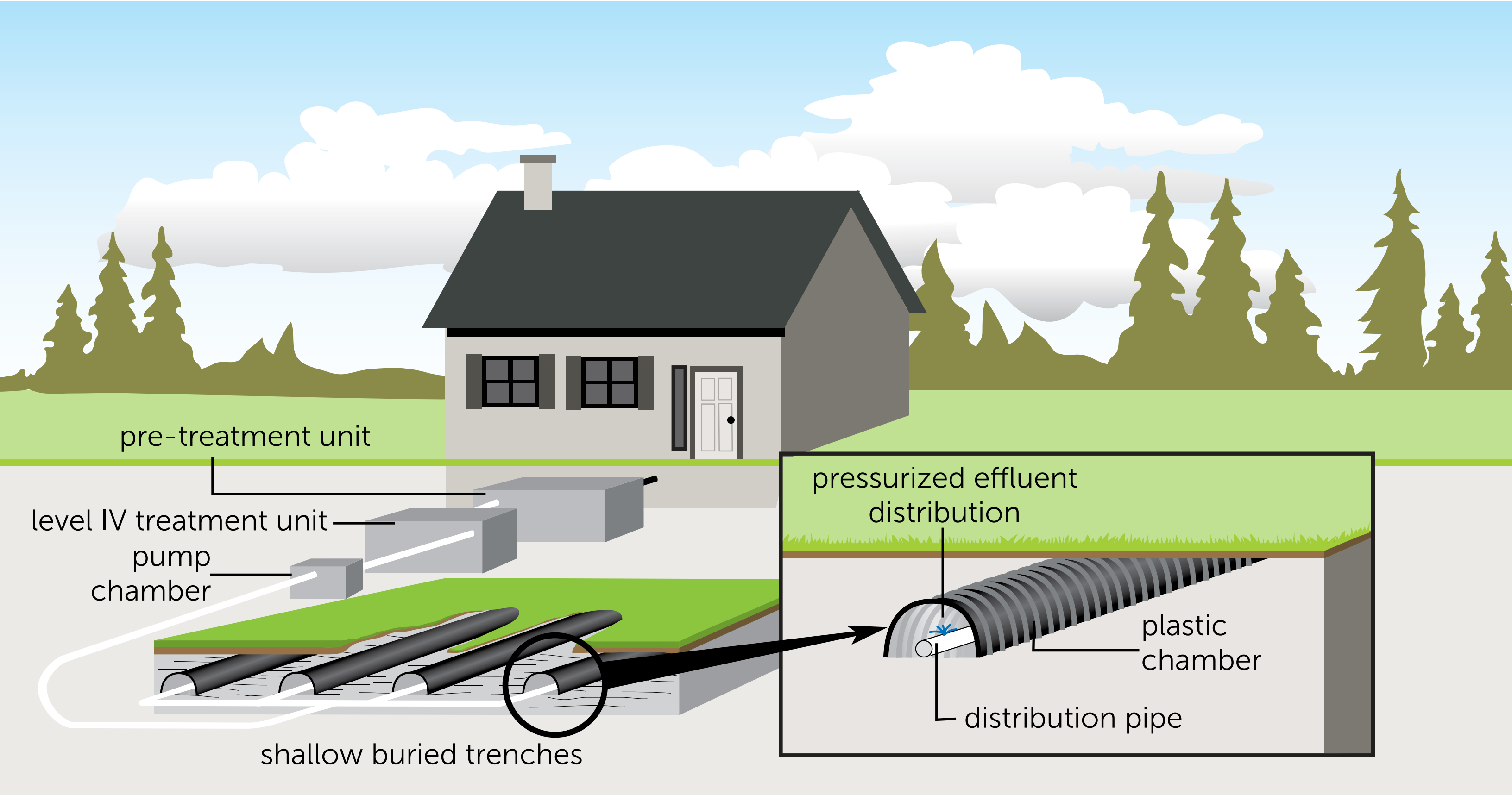
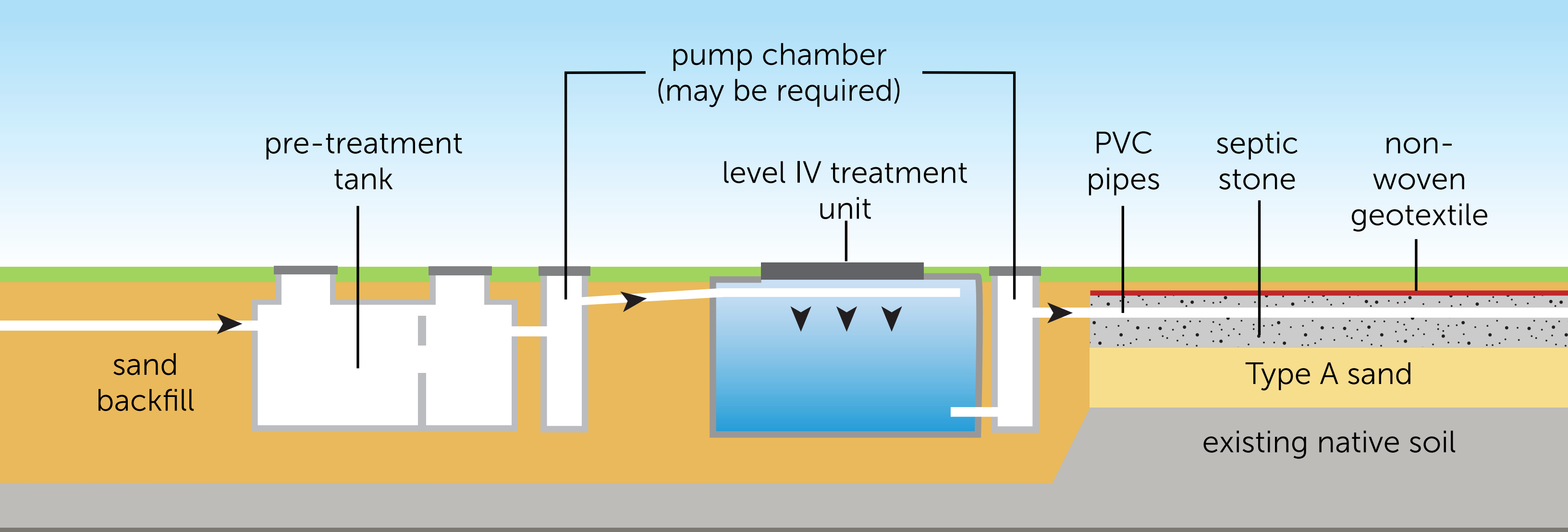
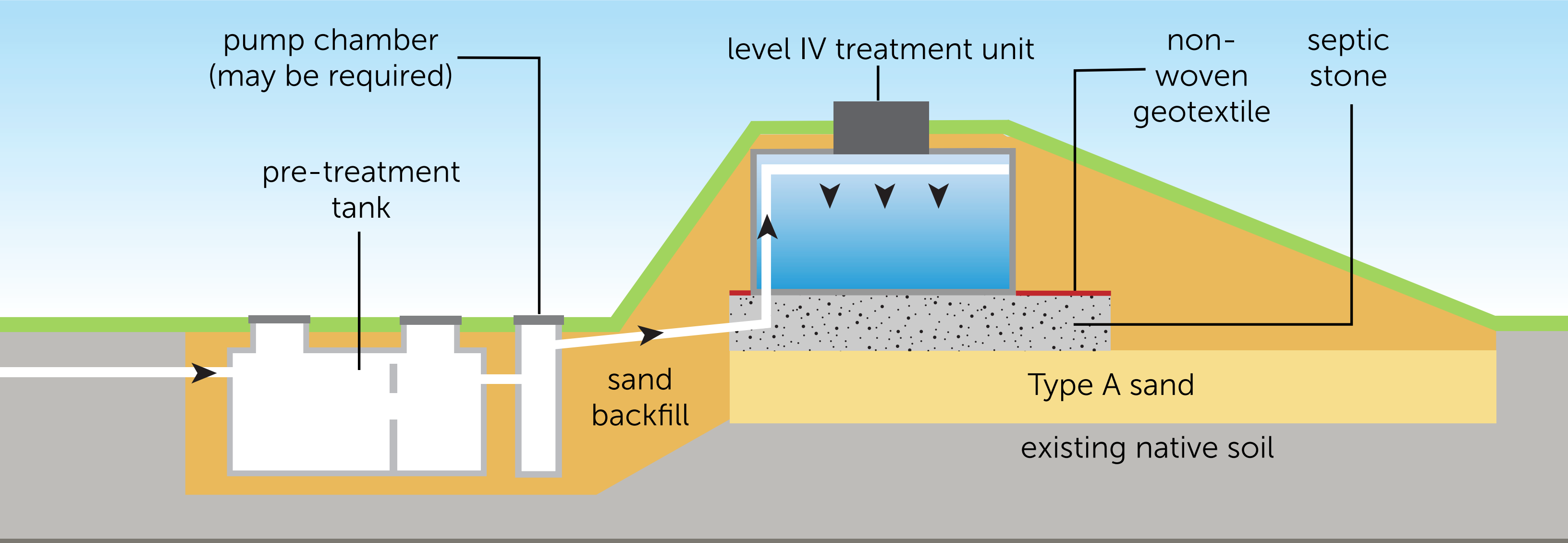


Figure 9. Shallow buried trenches provide distribution back into the native soil for additional treatment.

- **Type A Dispersal Bed**
  A Type A dispersal bed consists of a stone layer overlying a sand layer, using a sand with specified properties. This sand is known as Type A dispersal bed sand. The sand layer may vary in depth and size depending on the treatment unit used. Some Level IV treatment systems have open bottoms that sit right on top of the stone layer while others have PVC pipes placed in the stone layer for effluent distribution (Figure 10). Effluent from the Level IV treatment unit will flow by gravity to the dispersal bed. Some systems have a pump as an integral part of the system and other times a pump is added to overcome an elevation difference between the advanced treatment unit and the Type A dispersal bed.



Option A — Level IV treatment followed by a Type A dispersal bed

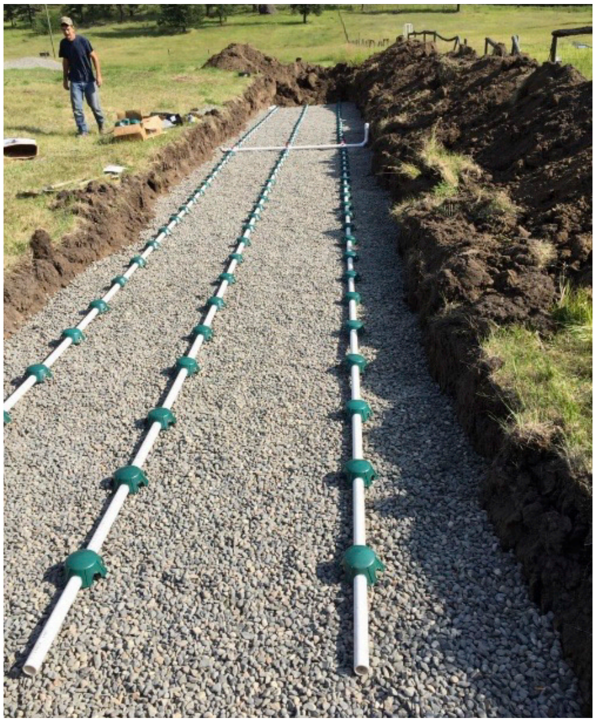


Option B — Level IV bottomless treatment unit on top of a Type A dispersal bed

Figure 10. Type A dispersal beds take up a small footprint and rely on septic stone and native soil to process Level IV effluent.

Be Septic Smart!
If you have a high water table, bedrock or clay soil you will need to use a raised bed. If you are concerned with the landscaping impacts, a Type A dispersal bed's height above existing grade is less than a raised leaching or filter bed.

- **Type B Dispersal Bed**
  Type B dispersal beds are a newer type of treatment bed that was accepted into the *Ontario Building Code* in 2017. The distribution pipe network is placed in a stone bed and is pressurized to ensure even distribution. As with a shallow buried trench, the pump chamber must be sized and controlled so that effluent is evenly dosed over a 24-hour period (Figure 11). Type B dispersal beds can only accept Level IV effluent. A Type B dispersal bed is rectangular with the long dimension parallel to site contours to spread the effluent across the slope.



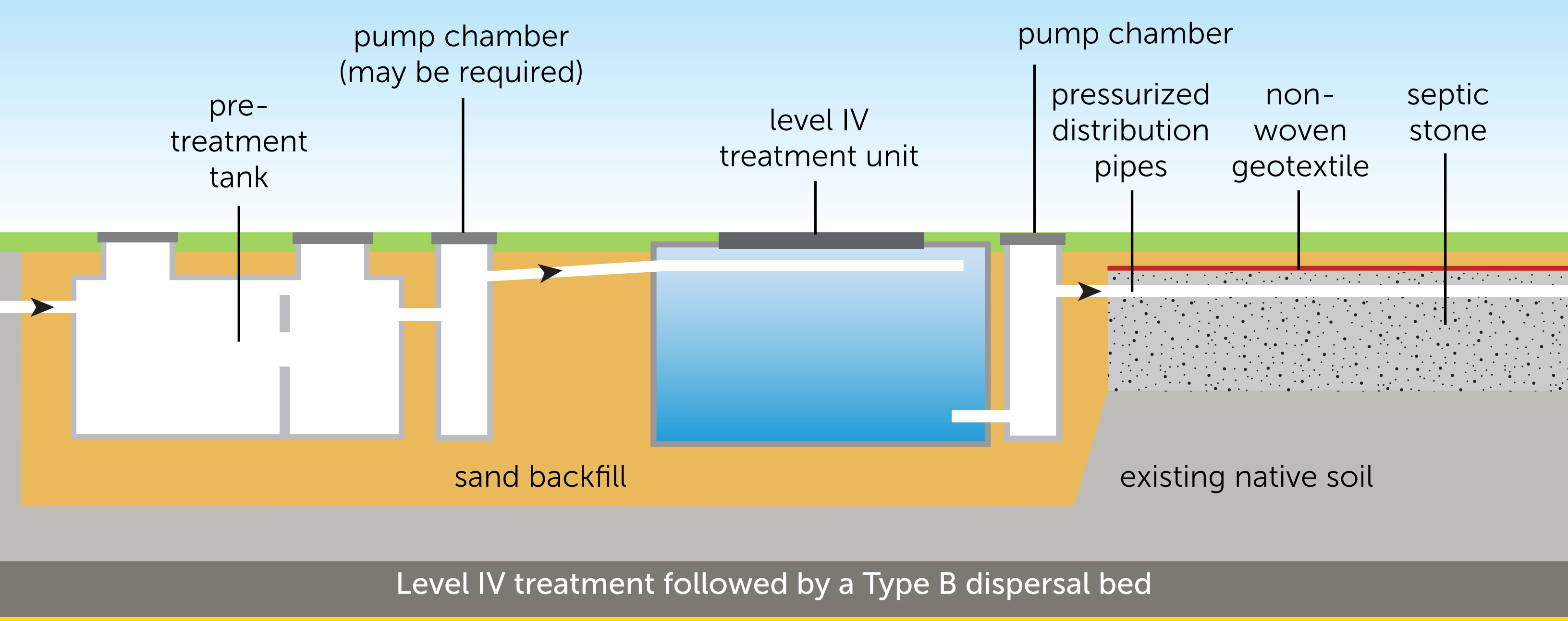


Figure 11. Type B dispersal beds take up a small footprint and rely on septic stone and native soil to process Level IV effluent.

6b (iv) BMEC Authorized Systems

The Building Material Evaluation Commission (BMEC) is a regulatory agency authorized under the *Building Code Act* whose mandate is to examine the use of innovative materials, systems and building designs and issue authorization for use province-wide.

The BMEC has approved new technologies which are known as BMEC Authorized Systems. All currently approved systems provide aerobic treatment and include a septic tank with effluent filter and special dispersal pipe and sand bed system to treat wastewater.

Similar to other aerobic systems (Level IV effluent), the effluent flows into the septic tank where waste is treated through the two compartments. From the tank, the effluent moves to a proprietary dispersal pipe or module that is surrounded by synthetic materials. This material supports the growth of microbes around the pipes or modules and provides additional aerobic treatment. The effluent then infiltrates into sand with a specified grade for final distribution and treatment.

There are several approved BMEC authorized systems that offer aerobic treatment surrounding dispersal pipes or modules following the septic tank.

7

Design considerations

Which system is best for you?

So which system is best for you? That depends on a number of factors including existing site conditions, your plans for your property and your budget. Each system has advantages and disadvantages, as we've already discovered.

Your property's site conditions may limit your choices. Lot size, soil conditions, property access may require the use of one system over another to meet design and construction requirements outlined in the *Ontairo Building Code*. For new home construction, you may have special plans for the property including pools, decks, wells, sheds, gardens and trees. How will it all fit and look on your property? You also may want to consider your budget for not only the construction of the system but also the long-term or possible annual costs of maintaining your system.

Consult with an OBC-approved designer or contractor to ensure the final product will suit your short- and long-term objectives. Your team of septic experts will help you consider options following a site evaluation, determine the total daily demand of waste and balance your property use and budget. They can recommend the type of treatment unit and final distribution system for your situation.

Things to consider ...

- the area required for a septic system is based on the sewage flow from the house and the ability of the native soil to absorb effluent
- high sewage flows and slow absorbing soils will require a larger septic system (large footprint) for treatment
- small lots may not have the space for a Level I effluent treatment unit due to its large footprint
- where space is limited a Level IV treatment unit or BMEC authorized system may be your only choice

Case Study: Sizing your septic system

Scenario: an existing home needs a new septic system. The system is in the backyard as the drilled well is located in the front yard. The homeowner is considering an inground pool, so they want a system that requires the smallest footprint. The owner has asked the designer to determine the footprint for different Class 4 systems based on the following:

- a four bedroom home with a daily flow of 2,000 litres per day
- native soil is a fine-grained soil (i.e., clay)

Design Results:

System	Footprint
Level I effluent with absorption trench	500 square metres
Level I effluent with filter bed	500 square metres
Level IV effluent with Type A bed	250 square metres
Level IV effluent with Type B bed	250 square metres
Level IV effluent with Shallow Buried Trench	89 square metres
BMEC Authorized System	250 square metres

Be Septic Smart!
There are a lot of different systems on the market. Protect yourself and your investment by ensuring your system meets the *Ontario Building Code* requirement, certification (Can/BNQ 3680-600). Visit bnq.qc.ca for certified Level IV systems and visit www.ontario.ca/page/building-materials-evaluation-commission-decisions for BMEC approved system. This ensures your system meets established performance standards for residential wastewater treatment technologies.

8 Minimum separation distances

Septic systems need space to work. To work effectively, they need to be a safe distance from wells, watercourses, trees, pools, sheds and other amenities. Be sure to protect your system by maintaining minimum separation distances (Figure 12).

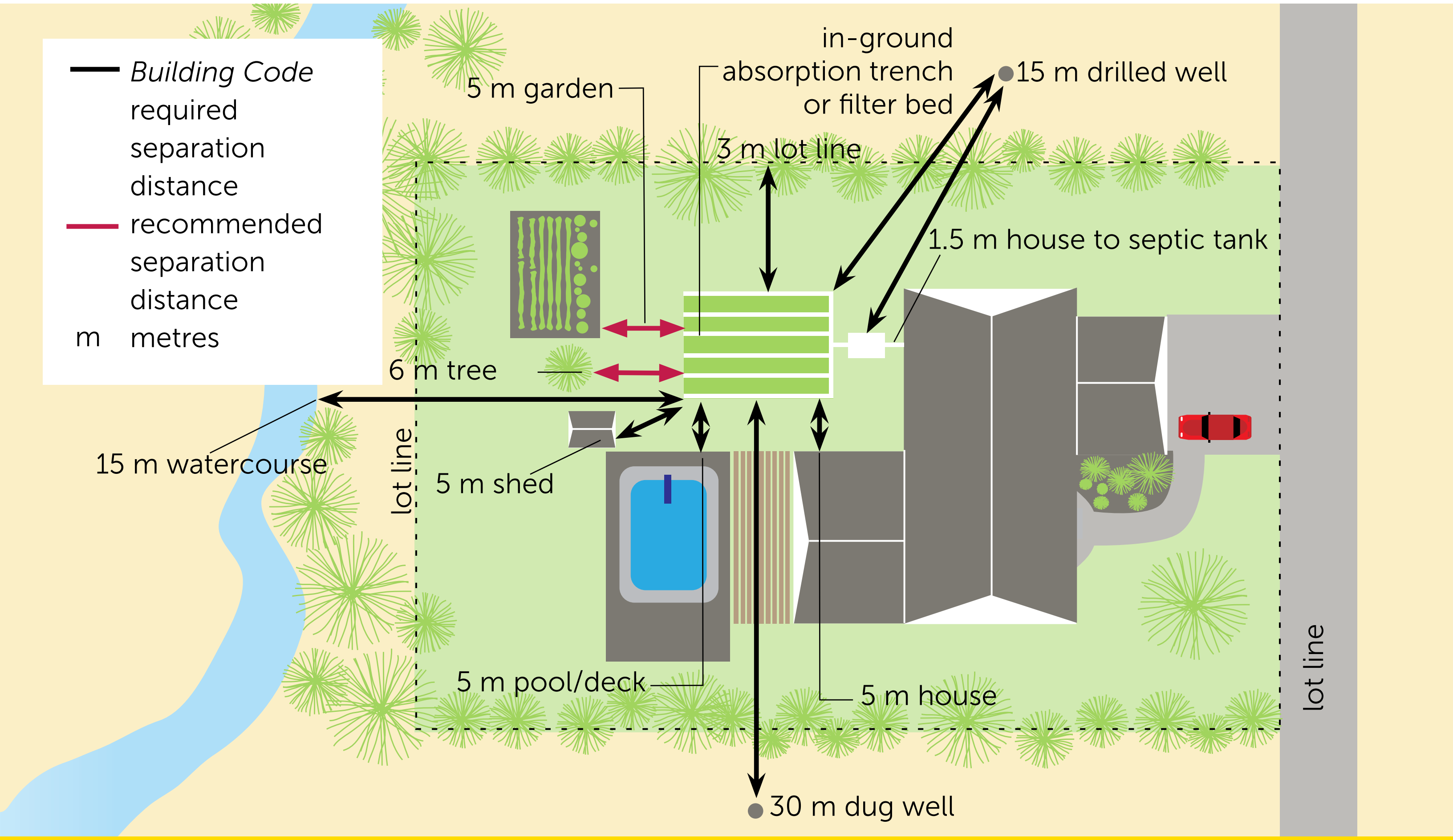


Figure 12. The *Ontario Building Code* requires separation distances for septic systems in residential settings.

Raised absorption trenches and filter beds have increased separation distances. It is calculated as (final elevation - existing grade) x 2. The result is added to the minimum separation distances.

For Example:

- the difference between existing grade and finished grade elevation = 1.5 metres
- therefore, 1.5 metres x 2 = 3 metres
- add 3 metres to all separation distances i.e., 15 metres to drilled well now becomes 18 metres

9 Septic system maintenance

Did you know that septic systems are the responsibility of the homeowner? It is up to you to keep your system working properly to protect your environment, your health and your investment.

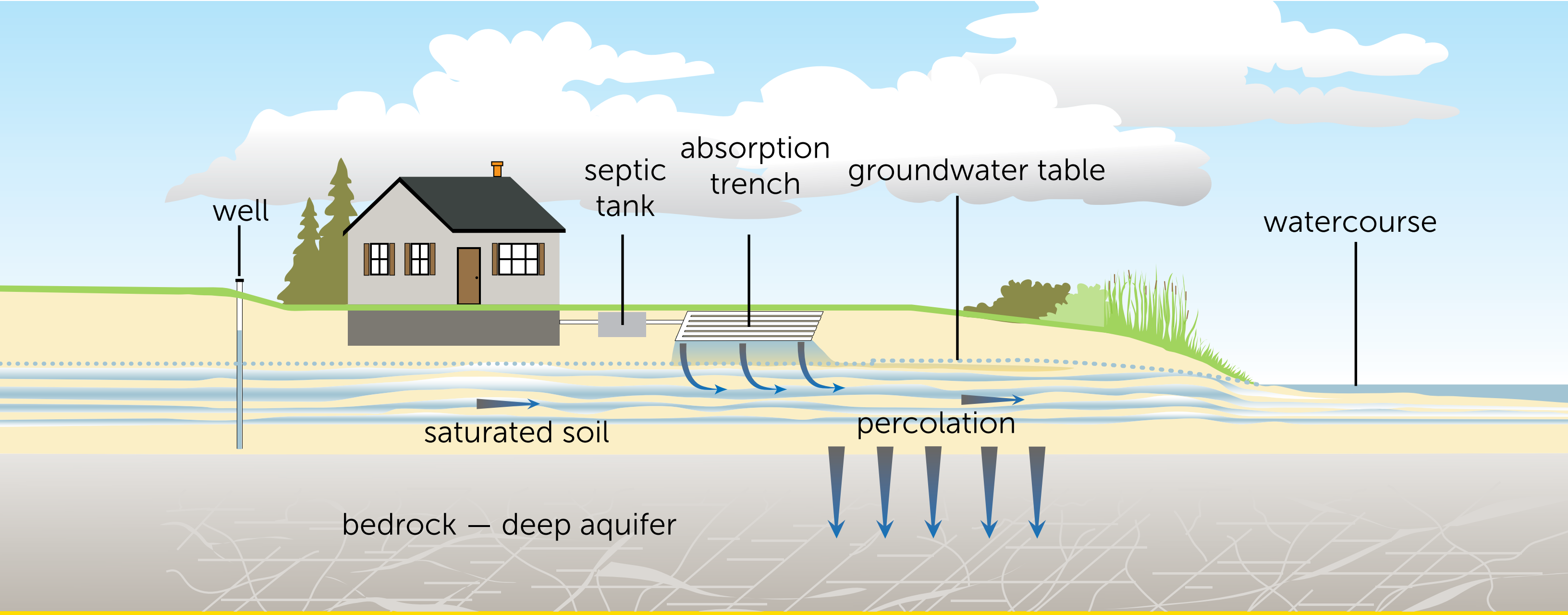


Figure 13. Maintenance of your septic system is critical in the protection of groundwater and surface water resources. A failed system can contaminate local water resources including drinking water sources and the water quality of lakes and watercourses.

When properly designed, constructed and maintained, a septic system should provide long-term, effective treatment of your household wastewater. If you take good care of your system, you will save time, money and worries involved in replacing a failed system. Failed systems can be hazardous to your health and the environment. It can degrade water supplies, reduce your property value and be expensive to repair or replace. The following are some valuable tips to ensure the longevity of your system.

Do:

- familiarize yourself with the location of your system
- keep the tank access lid secured to the riser at all times
- keep an as-built system diagram in a safe place for reference
- keep accurate records of septic system maintenance and service calls
- test your well water at least three times a year — spring, summer and fall — for indicator bacteria
- have your tank inspected for sludge and scum buildup on a regular basis (3-5 years) and clean out when a third of the depth of your tank is full of sludge and scum
- have your effluent filter checked and cleaned every year; if you don't have an effluent filter, consider adding one
- divert surface water away from your distribution system
- conserve water in the house to reduce the amount of wastewater that must be treated
- repair leaky plumbing fixtures
- replace inefficient toilets with low-flush models
- consider installing a lint filter on your washing machine's discharge pipe
- spread the number of loads of laundry throughout the week

Don't:

- enter a tank — gases and lack of oxygen can be fatal
- put cooking oils or food waste down the drain
- flush hazardous chemicals, pharmaceuticals, cigarette butts or sanitary products
- use a garbage disposal unit/ garburator unless your system has been designed for it
- use special additives that are claimed to enhance the performance of your tank or system — you don't need them!
- dig without knowing the location of your distribution system
- drive or park over your tank or distribution system
- pave over your distribution system
- allow livestock on the distribution system
- plant trees or shrubs too close to the septic tank or distribution system
- connect rain gutters, storm drains, sump pumps or allow surface water to drain into a septic system
- connect distribution system or greywater system to agricultural field drainage
- discharge water softener backwash to the septic system unless your system has been designed for it
- drain hot tub and spa water to the septic system

Be Septic Smart!
A licensed sewage hauler or onsite sewage system professional should remove the septic tank cover and inspect the system every three to five years and pump out the solids and scum when required.

All septic systems need regular care and maintenance. This includes periodic pumping of the septic tank to remove sludge and the regular cleaning of effluent filters.

To meet regulatory requirements, homeowners with Level IV treatment units and BMEC Authorized systems require a maintenance contract with an authorized representative of the manufacturer of their treatment technology. Maintenance agreements outline the inspection schedule required for the treatment unit components. These systems also require effluent sampling to ensure the system is performing in compliance with the *Ontario Building Code*. Following the maintenance requirements and schedules outlined by the manufacturer in the operations manual will ensure the advanced system operates effectively and efficiently.

Remember, regular and annual maintenance will help guarantee small problems don't become larger, resulting in more expensive repairs.

Be Septic Smart!

- put all your approvals, construction and pumping information, service and maintenance agreements in a safe place
- keep accurate and up-to-date records on maintenance, pumping and repairs
- if selling a property with a Level IV treatment unit or BMEC Authorized system, ensure the purchaser is aware of maintenance requirements
- identify effluent filter maintenance

Regular care and maintenance will help prolong the life of your septic system.

10 What happens when there's a problem?

Septic systems have a lifespan of approximately 15 to 40 years. To maximize the lifespan of your system, follow the "Do and Don't" list on page 28.

Symptoms of a Malfunctioning Septic System:

- household drains slow down
- toilets back up
- sewage smell in yard
- grass over septic system is unusually green and/or spongy
- bacteria or nitrate contamination shows up in well water
- surface ponding of effluent

A malfunctioning septic system is easy to see ... and smell. If you suspect you have a problem with your septic system, it is important to fix the problem quickly. A malfunctioning septic system is a risk to the local environment and your health. It can quickly contaminate groundwater and surface water used as drinking water sources.

If failure occurs shortly after construction, it may be the result of poor site assessment, poor design, poor construction practices or homeowner abuse.

Effluent flowing out of septic tank lids means blockage in effluent filter or a saturated distribution system. This scenario is hazardous to your health, as wastewater pathogens include parasites, bacteria and viruses.

If you think there's a problem, start by having the septic system inspected. The tank may just need a cleaning. However, if there is a problem with the distribution system, you will want to speak to an onsite sewage system professional for their advice. Onsite sewage system professionals include installers, professional engineers, certified engineering technologists and registered sewage system designers. A second opinion is always recommended.

If a homeowner has a malfunctioning septic system, the big question is, "Do I have to replace the whole system?" Repairs can range from cleaning a few lines to replacing the entire distribution system and removing contaminated and clogged soils.

If repairs are required to correct your septic system problem, contact your local regulatory agency to obtain the appropriate permit before proceeding. The local regulatory agency varies from municipality to municipality. Contact your municipality to learn who administers the septic program in your area. Local grant programs may also exist to help you with repair costs.

A failed distribution system can leak contamination into local ditches, streams and watercourses. Wastewater contains high levels of phosphorus. Excess phosphorus causes excessive algae and weed growth in surface water.

Information provided in this publication is not intended to convey legal advice. The reader should not rely on the information presented for the specific design of a system. Refer to recent codes and check with local authorities and individual manufacturers for the most up-to-date information.

Several factors will guide your decision regarding septic system design, including: the physical features of the site, practicality, level of performance, cost, maintenance, availability and personal preference. While care has been taken to ensure accuracy, the examples and explanations in this booklet are given for the purpose of illustration only. Readers must refer to the actual wording of the *Ontario Building Code* or other authorization issued by the BMEC. When in doubt, consult a professional.

Cover Illustration

From left to right: conventional system, Level IV treatment unit with shallow buried trench and Level IV treatment unit with Type A dispersal bed.

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