COMMERCIAL SEPTIC SYSTEM DESIGN

Our licenced Professional Engineers have extensive experience in designing commercial onsite septic systems in Ontario including Brant County, City of Hamilton, Halton Region, Haldimand County, Norfolk County, Niagara Region, Wellington County, Dufferin County, City of Guelph, York Region, Peel Region, City of Peterborough, Haliburton County, City of Kawartha Lakes, Durham Region, Simcoe County, District of Muskoka, Grey County and Bruce County.

Commercial and industrial properties in rural areas rely upon onsite septic systems for their sewage disposal. In the 1970s, the responsibility for overseeing the installation of commercial septic system systems in Ontario was transferred from the Ministry of Health to the Ministry of Environment.

Afterwards, regulations governing private onsite septic systems were then transferred from the Ministry of Environment to the Ministry of Municipal Affairs and Housing and subsequently incorporated into the Ontario Building Code. Part 8 of the Ontario Building Code governs the design, construction, operation and maintenance of onsite commercial septic systems up to a capacity of daily sewage flow of 10,000 litres on one individual lot.

The Building Code Act, 1992 makes municipal councils responsible for enforcing the Act and the Building Code, and as such, they are responsible for the new provisions related to septic systems. Municipalities can enter into agreements with upper-tier municipalities, public health units or conservation authorities to carry out septic inspections and approvals. Municipalities make the decision as to which of these options is best suited to their local situation.

January 1st, 1999 the responsibility for sewage (septic) systems plans review and inspections was transferred from public health units which acted on behalf of Ministry of Environment to area municipalities, which are required to enforce the Building Code Act and the Ontario Building Code. In Northern Ontario, previous delivery agents (boards of health and one conservation authority) have been assigned septic standards enforcement responsibilities by regulation.

In most areas, the local municipality's Building Department examines building permit applications for proposed construction of commercial septic system, issues building permits for construction of commercial septic systems, and does inspections for commercial septic systems regulated under the Part 8 of the Ontario Building Code. In some areas, this approval responsibility has been delegated to local Conservation Authorities or Health Units.

Onsite commercial septic systems that are greater than daily sewage flow of 10,000 litres, or if a single property contains several small commercial septic systems (less than daily sewage flow of 10,000 litres each) but the combined capacity of the systems exceeds daily sewage flow of 10,000 litres, are subject to Ministry of the Environment and Climate Change approval. In Ontario, an engineered design is required for all commercial septic systems with a Design Flow greater than daily sewage flow of 10,000 litres and is administered by the Ministry of the Environment and Climate Change.

The two main factors that dictate the size and complexity of a commercial septic system are the maximum amount of waste water that the building could produce on a daily basis, and soil/site conditions. Geotechnical investigation including proper soil testing ensures the septic system meets the specific requirements of a site. Enlisting the help of a qualified and registered professional engineering firm is a key element to the successful commercial septic system design. Our licensed professional engineers design onsite commercial septic systems that will work best for the property based on the specific site-specific characteristics including:

- Soil conditions (percolation rate, soil type and depth)
- Height of groundwater table and bedrock
- Nature of the wastewater produced
- Sewage flow per day

The rate at which the waste water will be absorbed into the soil is called a "T" time. "T" time is equal to the number of minutes it takes for the water level to drop per cm in a water filled hole in the receiving soil. In sandy soil a typical T time is less than 10 (meaning it took less than 10 minutes for the water level to drop 1 cm in the water filled hole). But in sandy loam soil the T time could be 20 or more because the smaller soil particles are slowing the rate of absorption. The worst soil though is clay where the T time is typically well over 50 because clay particles are so fine and tightly packed. Once the maximum amount of waste water that the building could produce on a daily basis (Daily Sewage Flow) and the "T" time is identified, we can then figure out how large the septic system has to be. Each type of system then has a different equation to be used to figure out the size of the septic system.

Municipal Health Units provide permits for and inspects all new construction of commercial septic systems to ensure that minimum requirements of the Part 8 of the Ontario Building Code are met.

Classifications of septic systems:

- Class 1 Septic System - Composting toilet, pit privy, vault privy.
- Class 2 Septic System - Leaching pit (used for the treatment and dispersal of grey water only).
- Class 3 Septic System - Cesspool (used for the treatment and dispersal of the contents of a Class 1 septic system only).
- Class 4 Septic System - A conventional septic system includes a septic tank and leaching bed. An alternative septic system includes a septic tank and treatment unit (used for the treatment and dispersal of all septic sewage).
- Class 5 Septic System - This septic system is a holding tank (contents must be pumped as often as is required). Holding tank is permitted only by exemption under the Building Code.

Approval for onsite commercial septic system is required in all parts of Ontario including Brant County, City of Hamilton, Halton Region, Haldimand County, Norfolk County, Niagara Region, Wellington County, Dufferin County, City of Guelph, York Region, Peel Region, City of Peterborough, Haliburton County, City of Kawartha Lakes, Durham Region, Simcoe County, District of Muskoka, Grey County and Bruce County.

Ontario Building Code Design Standards

General Requirements

Site Evaluation

(1) A site evaluation shall be conducted on every site where a new or replacement sewage system is to be installed.

(2) The percolation time shall be determined by,

- (a) conducting percolation tests, or
- (b) classifying the soil according to one of the following methods,
  - (i) the Unified Soil Classification System as described in MMAH Supplementary Standard SB-6, "Percolation Time and Soil Descriptions", or
  - (ii) the Soil Texture Classification as described in Chapter 3 of USDA, "Soil Survey Manual".

(3) Where the percolation time is determined by a percolation test, there shall be a minimum of 3 locations selected, suitably spaced to accurately evaluate the leaching bed area, with the highest percolation time of the tests being used.

Sewage System Design Flows

Where a building contains more than one establishment, the total daily design sanitary sewage flow shall be the sum of the total daily design sanitary sewage flow for each establishment. Where occupancy is not listed in the Ontario Building Code, the highest of metered flow data from at least 3 similar establishments shall be acceptable for determining the total daily design sanitary sewage flow.

Establishments	**Volume (Litres)**
Assembly Hall, Churches and Similar Places of Worship - per seat	
a) No food service,	8
b) Food service provided	36
Barber Shop/Beauty Salon - per service chair	650
Factory (excluding process or cleaning waters) - per employee per 8 hour shift	
a) No showers,	75
b) Including showers	125
Food Service Operations	
Restaurant (not 24 hour), per seat	125
Restaurant (24 hour), per seat	200
Restaurant on controlled-access highway, per seat	400
Paper service restaurant, per seat	60
Donut shop, per seat	400
Bar and cocktail lounge, per seat	125
Drive-in restaurant per parking space	60
Take-out restaurant (no seating area)	
i) per 9.25 sq m of floor area, and	190
ii) per employee per 8 hour shift	75

Food outlet

i) excluding delicatessen, bakery & meat department, per 9.25 sq m of floor space	40
ii) per 9.25 sq m of delicatessen floor space,	190
iii) per 9.25 sq m of bakery floor space,	190
iv) per 9.25 sq m of meat department floor space, and	380
v) per water closet	950

Long-Term Care Homes, etc. - per bed	450

Office Building

a) Per employee per 8 hour shift, or	75
b) Per each 9.3 sq m of floor space	75

Service Stations (no vehicle washing)

a) Per water closet, and	950
b) Per fuel outlet, or	560
c)per vehicle served	20

Shopping Centre (excluding food and laundry) - per sq m of floor space	5
Stadiums, Race Tracks, Ball Parks - per seat	20

Stores

a) Per sq m of floor area,	5
b) Per water closet	1,230

Warehouse

a) Per water closet, and	950
b) Per loading bay	150

Minimum Clearances

For Treatment Units

• Structure	1½m
• Well, Lake, Pond, Reservoir, River, Spring, Stream	15m
• Property Line	3 m

For Distribution Piping

• Structure	5m
• Well with a watertight casing to a depth of at least 6 m	15m
• Any other well	30m
• Well, Lake, Pond, Reservoir, River, Spring, Stream	15m
• Property Line	3m

On-site private septic system has two basic parts: a septic tank which receives the untreated sewage and in which solids settle out, and a leaching bed (tile bed) through which the liquid waste portion of the sewage is dispersed into the soil. The main function of the septic tank is to allow solids to settle and to let clear effluent flow to the tile bed. Biological reactions within the tank will break down some solids to liquids and gases, but the retained solids will eventually accumulate in the tank. Only clear liquid waste should be discharged from the tank to the tile bed. This liquid waste will then undergo further biological break-down and treatment. To ensure efficient operation of the entire system, it is important that the sludge, scum and solids which can accumulate in the septic tank do not enter the leaching bed (tile bed). The septic tank should be inspected by a licensed professional at least once every two years and the tank pumped out when necessary.

Our licenced Professional Engineers design commercial septic system to match the quantity and quality of waste water of the facility. A coffee shop or a gas station at a busy highway may have thousands of visitors per day, many of whom use the toilet facilities - that's why they stop at a coffee shop or a gas station. Waste water from a typical restaurant may contain fat, oil, grease, liquid food waste including coffee and soup, flour, food scraps, cleaners, disinfectants and degreasers – all of which need to be properly treated and or disposed to avoid damage to the septic bed. Design of an onsite septic system for new construction on a typical lakefront property is always a challenge because of the very limited area available for the septic system due to the the required minimum setbacks from the lake, well, property lines and the proposed structure.

A more holistic commercial septic system design approach is required when designing commercial septic systems for facilities and buildings that produce high strength sewage. Challenges of high-strength sewage applications include high organic and nitrogen loading, highly variable flow rates, use of disinfectants, and untrained employees. The Ontario Ministry of the Environment and Climate Change requires strip malls, shopping plazas, truck stops, service stations, motels, restaurants, bars or lounges, coffee shops, service stations, campgrounds, golf courses, etc., to treat their sewage before it enters the natural soil. Organics and solids are to be removed before subsurface disposal, and treatment objectives for phosphorus, nitrate-nitrogen, and pathogens are becoming more prevalent before subsurface disposal.

Septic treatment systems are required when:
- dealing with properties with inadequate conditions for conventional systems
- coping with small lots that can’t accommodate the size of conventional leaching bed
- replacing a failed septic system
- rejuvenating failing conventional leaching beds
- 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 by additional nitrate reduction which some of the treatment units could provide

Septic tanks do not use oxygen as part of the septic treatment. This is known as anaerobic treatment.

Advanced septic treatment units use oxygen to enhance septic treatment. This is known as aerobic treatment. Aerobic septic treatment units treat septic sewage by adding air. Aerobic septic treatment units inject and circulate air so that oxygen-dependent bacteria can thrive. The bacteria break down organic matter, reduce pathogens and transform nutrients (e.g., ammonia to nitrate). Aerobic septic treatment units often have a pre-treatment tank where the scum and solids are separated and stored before the effluent is passed to an aeration chamber. At the aeration chamber, air is added to the effluent, which allows the bacteria to feed on the contaminants thereby producing cleaner effluent. Generally, Aerobic septic treatment units are classified based on the status of bacteria in the wastewater within the treatment unit. Bacteria are either suspended in the liquid or attached to some media. Aerobic septic treatment units require air compressors and in most cases pumps, and use an area bed or shallow buried trench for final distribution and treatment

In suspended growth septic treatment units, 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. The effluent then flows into a shallow buried septic trench or area bed. Suspended Growth Treatment Units presently used in Ontario include Whitewater, Aquarobic, Aqua Safe and Aqua Air, Biocycle, Clearstream, Norweco Singulair, and WSB.

In attached growth treatment units, wastewater from the pre-treatment tank flows into an aeration tank that contains pieces of plastic or other synthetic material. Attached growth units rely on oxygen-dependent bacteria to break down wastewater and solids similar to suspended growth units. The difference is that attached growth units let 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 waste treatment. Some attached growth treatment units require an air compressor. The effluent then flows to a shallow buried trench or area bed. Attached growth treatment units presently used in Ontario include Bionest, Bio-Microbics — FAST, Nayadic, and Rotordisk.

The BIONEST system is an advanced generation of onsite wastewater treatment systems. It is a biological process consisting of an extended aeration fixed film reactor. Biomass (good bacteria) develops and firmly attaches to both sides of the BIONEST ribbon shaped polymer media. The high population of bacteria and the support offered by the media for their growth provide the reactor with an outstanding performance level and resistance to hydraulic shock (peak flow). Unlike activated sludge systems which require daily sludge 'wasting", the extended retention time in the BIONEST system minimizes the biological sludge production. The BIONEST system is designed to ensure sufficient opportunity time for the biomass to remove pollutants. The major portion of the reactor is aerated through linear air pumps and fine bubble diffusers, which provide turbulent conditions to ensure enhanced treatment. Multiple pumps are used to supply air to the reactor allowing for redundancy, thus ensuring continuous treatment even during maintenance or failure of one or more air pumps. In the remaining portion of the BIONEST reactor, a high level of dissolved oxygen further assists in the oxidation process, in a calmer environment. This calm zone ensures that no solids escape the reactor and that the final effluent is extremely clear. The BIONEST system incorporates a recirculation loop that makes the system a multi-pass process bringing performance to a very high level.

Filtration units utilize trickling filter technology. Wastewater flows to a pre-treatment tank. Wastewater then flows from the pre-treatment tank into the filtration unit that is filled with materials such as peat moss, sand or a synthetic medium. As the wastewater trickles or percolates down through the filtration unit, a bacterial slime grows and thrives. Typically, trapped air fills the voids in the medium and encourages aerobic conditions where bacteria break down the waste as it slowly moves through the filter medium. The effluent then flows to a shallow buried trench or an area bed for final distribution and treatment in the soil. Filter beds can be made verifiable by installing underdrains, which would keep the sand free-draining and aerobic. High-quality effluent from filter beds, peat or foam filters can then be placed in a “shallow area bed” for low-risk disposal. The shallow area septic bed technology, used in Ontario since 1994, affords a two-stage filtration septic treatment train. The “roughing filter” of sand, peat or foam removes ~95% of the organics and >99% of E. coli.

The second “polishing filter” is the fine sand layer in the shallow area septic bed that removes the remaining E. coli for a total of 99.9993% removal before entering the natural environment. The soil and the groundwater are both protected, and health risks are minimized. The double safeguard of septic filtration treatment followed by filtration disposal is similar to the preferred “multiple-barrier” approach to drinking water safety. The multi-barrier approach or defence in depth has been an approach which has long been used by the drinking water industry to provide safe and secure supplies of drinking water. The single biomat barrier in soil based septic systems does not provide the safety of the multiple-barrier approach.

Synthetic Media Filter Treatment Units presently used in Ontario include Waterloo Biofilter and Orenco AdvanTex. The Waterloo Biofilter is an aerobic trickling filter that uses an absorbent synthetic filter material developed by researchers at the University of Waterloo and first installed in Ontario in 1991. Septic tank effluent is applied intermittently to the top of the filter media. The synthetic media is a support for microbiological growth, and these microorganisms are responsible for the aerobic breakdown of the wastewater. The core of the Waterloo Biofilter system is a synthetic, absorbent filter medium that is configured as a free-draining, attached growth, biological trickling filter to treat sewage and process wastewaters. This patented, engineered Waterloo Biofilter medium is consistent in its physical properties and has been optimized to:

- Be stable and consistent over very long periods of time without the need for cleaning or replacement
- Maximize the surface area to volume ratio thereby reducing the system footprint
- Accept very high, long-term loading rates without plugging or compromising treatment – typically up to 10 times greater than sand filters or soils
- Simultaneously provide aerobic, anaerobic, and anoxic environments for biological treatment – without air compressors and their high energy use and aerobic sludge production
- Absorb and retain wastewater thereby increasing retention time and providing higher levels of treatment
- Maintain biological populations even during periods of no use – enabling consistent treatment levels in seasonal applications like cottages, golf courses, and campgrounds
- Eliminate short-circuiting of untreated sewage to the environment during events such as surge flows or power failures

The absorbent Waterloo Biofilter filter medium creates an ideal environment for microbial attachment. Beneficial bacteria colonize the interior surfaces of the absorbent Waterloo Biofilter filter medium where they are protected from predators, desiccation, and freezing. These microbes degrade and oxidize organic pollutants, coliform bacteria, ammonium, and other contaminants as the wastewater is retained in the absorbent Waterloo Biofilter filter medium by capillarity. Air passively circulates throughout the absorbent Waterloo Biofilter filter medium providing an aerobic treatment environment without the need for forced aeration. This attached growth process (also referred to as a fixed film process, intermittent filter, packed bed media filter, or percolating filter) outperforms activated sludge or suspended growth (suspended sludge) processes with lower energy requirements, fewer moving parts, simpler operation, less maintenance, and a better ability to handle shock loads of chemical addition or hydraulic overloads. Waterloo Biofilter is proven in frigid -50°C temperatures, treating cold sewage with influent temperatures as low as 3°C.

Compared to other media-based trickling filters, the Waterloo Biofilter does not slough off microbes in the form of aerobic sludge, maintains high treatment levels even in very cold climates, has longer retention times, and can accept much higher organic and hydraulic loads without plugging. Waterloo Biofilters consistently provide tertiary, sand filter quality effluent (< 10 mg/L cBOD & TSS) that is clear and odourless. Highly treated effluent is easily and safely dispersed back into the soil via small, shallow disposal beds or trenches, or can be reused onsite for purposes such as irrigation, truck washing or toilet flushing.

Peat Filter Treatment Units presently used in Ontario include Premier Tech — Ecoflo and Puraflo. The Ecoflo Biofilter is a trickling filter that uses peat to treat wastewater. The Ecoflo Biofilter consists of an open-bottomed fibreglass shell full of harvested peat. Effluent from a septic tank is delivered by pump or by gravity (depending on relative elevations) to the top of the peat media. Wastewater percolates downward through the peat and then through the infiltration zone, which consists of 200 mm of clear stone & 300 mm of clean sand. After moving through this infiltrative zone, wastewater infiltrates into the native soils. The peat acts both as a place for aerobic bacteria to anchor and treat wastewater as it passes through the filter and as a physical filter.

Some limited chemical reactions are also achieved. Aeration of the unit is passive, i.e. there are no blowers or fans to enhance air movement through the peat. The peat must be replaced approximately every 8 years.

Sand Filter Treatment Units presently used in Ontario include Orenco.

Advanced septic treatment systems are very effective in treating septic sewage. With cleaner effluent leaving these advanced septic treatment systems, the size of the soil component (leaching bed) that is needed to complete the septic treatment is smaller than for those using septic tanks only. Advanced septic treatment systems could use one of two small leaching bed systems that are currently approved, or authorized in Ontario: shallow buried trench and area bed. Advanced septic treatment systems can be used with a variety of above ground and in-ground distribution options and offer several unique final distribution options.

Advanced control panels, auto-dialer alarm systems, and remote monitoring service make operation of the septic system simple and efficient.

Effluent Filter
An effluent filter installed at the outlet of the septic tank, dramatically improves the quality of effluent being discharged to the leaching bed, effectively extending its life. The addition of an effluent filter to all systems is strongly recommended. Sewage enters the first chamber of the septic tank through an inlet baffle or tee. Most of the larger particles settle out and the effluent enters the second chamber. The second chamber (much smaller than the first) further enhances the settling process. If flows are heavy at times, solids can pass through both compartments and enter the leaching bed. The effluent filter minimizes this. Effluent filters in accordance with NSF/ANSI 46, "Evaluation of Components and Devices Used in Wastewater Treatment Systems" must now be sized to filter out particles of 1.6 mm [1/16"] and have a minimum area of 550 cm^2[85 in^2], in addition to being installed in accordance with the manufacturers requirements. Effluent filters:

- Assist in the settling of both large and small particles,
- Help slow down flow to further enhance particle settling before damage is done to the leaching bed.
- Improves effluent quality.
- Extends leaching bed life.
- Can be used in any septic tank.
- May be installed in a new system, or retrofitted into an existing tank.
- Corrosion proof construction.
- Relatively simple installation.
- Simple maintenance.
- Can be equipped with an alarm to warn that filter needs cleaning.

Pumps and Siphons

- Where the total length of distribution pipe required is 150 m or more, the sewage system shall have at least one pump or a siphon contained in a dosing tank that may be a separate compartment within the tank structure, for distribution of the effluent.
- Alternating siphons shall not be installed in a sewage system.
- Where 2 or more pumps are employed within a dosing tank, the pumps shall be designed such that the pumps alternate dosing, and dosing shall continue in the event that one pump fails.
- Where a pump or siphon is required, the pump or siphon shall be designed to discharge a dose of at least 75% of the internal volume of the distribution pipe within a time period not exceeding fifteen minutes. Septic systems dispose of sewage and rely on the soil to absorb and disperse waste water. They are designed to keep effluent underground and to filter waste water before it reaches groundwater, streams or lakes. "Sewage" can include domestic waste water from toilets, showers and bath tubs and kitchen and laundry wastes.

Area Bed
An area bed is an infiltrative zone similar to that of a filter bed. Area beds have very small footprints, are are only allowed in conjunction with alternative treatment units providing tertiary level treatment. Area bed generally consists of a clean stone layer 250 mm thick underlain by a sand layer 200 to 300 mm thick. The sand layer may vary in depth and size depending on the septic treatment unit being used. Some advanced septic treatment systems have open bottoms that sit right on top of the stone layer while others have distribution network of PVC laterals placed in the stone layer for effluent distribution.

Typically effluent from the advanced septic treatment system will flow by gravity to an area bed. However, some systems have a pump as an integral part of the system, and sometimes a pump is added to overcome an elevation difference between the advanced septic treatment system and the area bed. The header and distribution pipes within area beds must be designed and built in such a way that they can be detected by one of the following:

- Magnetic means.
- 14 gauge TW solid copper light colored plastic coated tracer wire.
- Any other type of subsurface detection.

Landscape design should not interfere with the natural functioning of a septic system. A balanced combination of oxygen and organisms will maintain healthy soils necessary for the septic system.

Shallow Buried Trench

A shallow buried trench is an alternative to a conventional leaching bed. Shallow buried trenches may only be used when the wastewater has been treated to tertiary standards. A shallow buried trench consists of small-diameter PVC laterals running through open-bottom plastic chambers. The laterals are perforated at regular intervals on the top of the pipe. Effluent from the advanced septic treatment system is pumped under pressure through distribution pipes at regular intervals (time-dosed). When the dosing pump is activated, wastewater is forced along the entire length of the lateral and prayed upwards where it hits the chamber and trickles down into the soil. By sizing the pump correctly, the entire footprint of the system is dosed at the same time, ensuring much more efficient distribution and use of the soil absorption system. This pressurized distribution allows for small doses to be evenly distributed along the entire length of the trench and greatly enhances the soil's ability to receive and treat the effluent. Shallow buried trenches 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.

Shallow buried trenches 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 septic trench can follow an irregular pattern (e.g., around trees). The footprint of a shallow buried trench system is much smaller than a conventional system, because the soil is not relied upon to complete very much treatment. In addition, shallow buried trenches may be installed in native soils with a T-time up to 125 min/cm. Shallow buried trench system is appropriate for sites with a high water table, shallow depth to bedrock or tight soils.

Ontario Building Code Requirements for Shallow Buried Trench Construction

- The treatment unit used in conjunction with a leaching bed constructed as a shallow buried trench shall provide an effluent quality that does not exceed 10 mg/L Carbonaceous biochemical oxygen demand (cBOD) & Suspended Solids (TSS) concentrations
- The effluent shall be distributed through a pressurized distribution system having a pressure head of not less than 600 mm when measured to the most distant point from the pump.
- The pump chamber shall be sized to provide sufficient storage volume so that the effluent is evenly dosed on an hourly basis over a 24-hour period.
- A shallow buried trench shall not be constructed unless the soil or leaching bed fill is sufficiently dry to resist compaction and smearing during excavation.

- Every shallow buried trench chamber shall be as wide as the shallow buried trench in which it is contained, and the cross sectional height of the chamber at its centre point shall not be less than half the width of the trench.
- Every shallow buried trench chamber shall contain only one pressurized distribution pipe.

Reduce the use of phosphate-based detergents, soaps and cleaners since phosphorus in detergents, soaps and cleaners doesn't break down in a septic system. When the phosphorus leaches into nearby bodies of water, it can promote algae growth and can impair water quality and fish habitat.

CAN/BNQ 3680-600 Canadian national standard is based on the methodology of standard NSF 40 for onsite residential wastewater treatment technologies. Similar to standard NSF 40, the CAN/BNQ 3680-600 standard includes a six-month period with limitations and frequent sampling; this period is followed by an additional six months of less frequent sampling to verify the reliability of the treatment system during the four seasons of the Québec climate.
Effective January 01, 2017. CAN/BNQ 3680-600 will replace the current criteria for treatment units set out in the Ontario Building Code, and the list of treatment units found in Supplementary Standard SB-5 which are deemed to meet these Code requirements. To be certified under CAN/BNQ 3680-600 and maintain a valid certification, all treatment units shall, in addition of the certification Standard, comply with the Protocol (Policies) BNQ 3680-900 defining all the terms and conditions required to maintain a product's certification. Once a year, the BNQ will refer to the manufacturer's database to select randomly a number of 10 sites to be inspected and sampled. The entire process is managed by the BNQ.

During the visit, the independent assessor shall first ensure that the system is functioning correctly and is receiving design flows and loads. 24h composite sampling will be performed by a local accredited laboratory. The manufacturer should be free to choose a representative of his choice to accompany the laboratory technician and the independent assessor.
If the system is not functioning correctly and the device or component responsible for the malfunction is not manufactured by the manufacturer, the assessor shall advise in writing only the owner of the malfunction. In all other cases, the assessor shall advise in writing both the owner and the manufacturer

Effluent from 80% of the sites inspected shall comply with the performance standard applicable for the said system. If not, a resampling is performed for the non-complying results. If the 80% of compliance is still not reached, another series of samples from systems that obtained substandard results shall be drawn. If the results of these new analyses confirm initial results obtained and more than 20% of the systems remain substandard, another set of new site inspection/sample equal to twice as many sites as initially will have to be carried out. In this case, it is mandatory that 80% of the sites be compliant.

All costs are entirely at the manufacturer's expense. Manufacturer shall be kept informed of all results coming out of this process and, when applicable, informed in writing of any non-conformities and corrective measures required to assure the compliance of the systems under investigation. Manufacturer shall introduce appropriate changes and advise certification and regulatory entities in writing. Some cases of nonconformity may require an additional audit visit and testing.

In cases where the non-conformity is caused by occupant overloading or abusing the system and that the owner does not agree to a modification to the design, the manufacturer shall notify the regulatory agency that shall be responsible to require compliance. Tests are conducted according to the procedures specified in the Certification Requirements for CAN/BNQ 3680-600 and compliance to the requirements (80%) is part of the conditions for certificate renewal every 2 years. Failure to successfully pass the field performance audit process could lead to certification revocation and consequently automatic de-listing of the product from BNQ official public listing.

Our licenced Professional Engineers design variety of advanced, innovative, predictable, permanent, robust, cost-effective, compact, low energy, low maintenance, visually subtle, and efficient onsite septic systems for off-sewer commercial developments including decentralized commercial and light industrial properties such as strip malls, shopping plazas, truck stops, service stations, motels, restaurants, bars or lounges, coffee shops in Ontario including Brant County, City of Hamilton, Halton Region, Haldimand County, Norfolk County, Niagara Region, Wellington County, Dufferin County, City of Guelph, York Region, Peel Region, City of Peterborough, Haliburton County, City of Kawartha Lakes, Durham Region, Simcoe County, District of Muskoka, Grey County and Bruce County..

Our septic system designs meet requirements of Ontario Building Code and Ministry of the Environment and Climate Change, and offer the most affordable, long-lasting site specific septic system design. Inappropriate septic system design, bad construction practices, or poor maintenance can all lead to septic system failure.

A small building with a maximum daily flow rate of about 1,000 liters / day, and if that system is being installed in sandy soil (which has a high absorption rate) then the system could be quite small and be installed at a cost of a few thousand dollars. On the other hand, a building with a maximum daily sewage flow rate of 9,000 Liters / day and hard clay soil (which can only absorb 4 liters, per square meter, per day) then the cost could be over $50,000 because a tertiary system may need to be installed.

Onsite Septic System Experts

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Our service area includes Brant County, City of Hamilton, Halton Region, Haldimand County, Norfolk County, Niagara Region, Wellington County, Dufferin County, City of Guelph, York Region, Peel Region, City of Peterborough, Haliburton County, City of Kawartha Lakes, Durham Region, Simcoe County, District of Muskoka, Grey County and Bruce County.