New Brunswick Technical Guidelines for On-site Sewage Disposal Systems

Version 6

Health

April 2020

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1 GENERAL

1.1 Abbreviations

cm	Centimetre
cm/sec	Centimetre per second (velocity or speed)
CSA	Canadian Standards Association
cu.	Cubic
CWA	*Clean Water Act*
ESF	Estimated Sewage Flow
EDSF	Estimated Daily Sewage Flow
ft	Foot
G	Gallon
g	Gram
ha	Hectare
hr	Hour
I	Hydraulic gradient
IG	Imperial gallon
IG per sq. ft	Imperial gallon per square foot
I gal	Imperial gallon per day (flow)
in	Inch
K	Soil permeability or hydraulic conductivity
kg	Kilogram
kPa	Kilopascals
l or L	Litres
L/p/yr	Litres per person per year
L/sq. m	Litres per square meter
lb	Pound
lpd	Litres per day (flow)
m	Metre
mi	Mile
min	Minute
mm	Millimetre
m/sec	Metre per second (velocity or speed)
m^2	Square metre
m^3/sec	Cubic metre per second (flow)
m^3	Cubic metre
NSF	National Sanitation Foundation
PHA	*Public Health Act*
PID	Property Identification Number
psi	Pounds per square inch
Q	Sewage flow
sec	Second
sq.	Square
USG	US gallon
yd	Yard

1.2 Conversion Factors

1 lb = 0.45359 kg
1 kg = 2.2046 lbs
1 in = 2.540 cm
1 cm = 0.3937 in
1 ft = 0.3048 m
1 m = 3.281 ft
1 yd = 0.9144 m
1 m = 1.094 yd
1 yd = 36.00 in
1 m = 39.37 in
1 mi = 1.609 km
1 km = 0.6214 mi
1 sq. in = 6.452 sq. cm
1 sq. cm= 0.155 sq. in
1 sq. ft = 0.093 sq. m
1 sq. m = 10.765 sq. ft
1 sq. yd = 0.836 sq. m
1 sq. m = 1.196 sq. yd
1 acre = 0.405 ha
1 ha = 2.471 acres
1 acre = 43560 sq. ft or 208.7 x 208.7 ft
1 hectare = 10,000 sq. m
1 sq. mi = 259 hectares
1 sq. kilometre = 0.386 sq. mi
1 sq. mi = 2.59 sq. km
1 cu. cm = 0.06102 cu. in
1 cu. in = 16.387 cu. cm
1 cu. dm = 0.0353 cu. ft
1 cu. ft = 28,317 cu. cm
1 L = 0.0353 cu. ft
1 cu. ft = 6.23 IG
1 cu. meter = 1.308 cu. yd
1 cu. ft = 28.3 L
1 cu. meter = 35.3 cu. ft
1 cu. yd = 0.765 cu. m
1 cu. m = 220 IG
1 cu. yd = 168 IG
1 cu. m = 1000 L
1 cu. yd = 765 L
1 L = 0.220 IG
1 IG = 4.546 L
1 L = 0.264 USG
1 IG = .0045 cu. m
1 USG = .028 cu. ft
1 IG = 277.42 cu. in
1 KPa = 0.145037 psi
1 IG water = 10 pounds
1,000 mm pressure head = 9.807 kPa
1 USG = 3.785 L
1 kPa = 102 mm pressure head
1 USG = .00378 cu. m
1 kPa = 0.335 ft pressure head
1 IG = 49 L per sq. m
1 L per sq. m = 0.020 IG per sq. ft
1 IG = 1.20 USG
1 L per sq. m = 1 mm depth of effluent
1 USG = 0.83 IG
1 IG per sq. ft = 1.92 in depth of effluent
1 ft pressure head = 304.8 mm pressure head
1 ft pressure head = 0.434 psi
1 psi = 2.301 ft pressure head
1 psi = 6.894757 kPa

1.3 Department of Public Safety (DPS), Technical Inspection Services Head Office

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2 INTRODUCTION

These Technical Guidelines have been established as part of, and in accordance with, regulations respecting On-site Sewage Disposal Systems under the *Public Health Act (PHA)*. These Guidelines outline the siting and technical requirements to install, repair, construct, or replace an on-site sewage disposal system in the Province of New Brunswick.

Use of the information contained herein will be fundamental to ensuring compliant installations and reducing the risk to public health and the environment. Licensees must follow manufacturer's Guidelines for all parts and materials in respect to the installation of any on-site sewage disposal system.

An "on-site sewage disposal system", as defined in the *PHA*, means a septic tank with subsurface disposal field and all other on-site sewage disposal systems that are not connected to a wastewater treatment facility approved by the Minister of Environment and Local Government under the *Clean Water Act* (CWA). An on-site sewage disposal system can be classified as either "conventional" or "non-conventional".

It is mandatory that anyone installing, constructing, repairing, and/or replacing an on-site sewage disposal system, or any of its parts, be licensed and have an approval. For additional information on what is considered a repair, please refer to Section 4.5.

Approvals are issued for wastewater generated from personal hygiene, sanitation, cooking, laundering, and other similar domestic purposes. This includes greywater but does not include liquid and water-carried wastes generated by industrial or manufacturing processes, sump pumps, gutters, drainage pipes, or runoff water.

2.1 Engineered Systems

Engineered designs for onsite sewage disposal systems are permitted. Such systems must be installed by a Licensee and designed by a Professional Engineer licensed through the Association of Professional Engineers and Geoscientists of New Brunswick.

Engineered systems are mandatory if:

- estimated daily sewage flows exceed 5,460 L/d
- soil or other site conditions are not suitable
- suitable imported sand is not available
- non-conventional systems, including pressure dosed systems are proposed, unless the installer has a non-conventional license for such a system
- the effluent exceeds the typical domestic wastewater strength, or
- otherwise as directed by DPS

For more detailed licensing and approval requirements please refer to *Regulation 2009-137* under the *PHA* or Section 5 of this document. You may also contact the Department of Public Safety, Technical Inspection Services Head Office listed under Section 1.3.

3 LOT EVALUATION

On-site sewage disposal systems are designed for buildings with adequate separation distances between neighbouring infrastructures, wells, impermeable soils, bedrock, watercourses, right-of-ways, easements, property boundaries and other limiting factors which may apply. When evaluating lots, consideration must be given to soil conditions, slopes, interceptor drains, rock outcropping, separation distances, lot layout and planning.

3.1 Soil Conditions

Soil type is one of the most important deciding factors in whether a lot will be suitable for an on-site sewage disposal system and what the design will be. The purpose of the soil is to provide for infiltration, dispersal, and final treatment of effluent before it reaches bedrock, groundwater or horizontal setbacks.

To appropriately assess the suitability of in-situ soils, it is necessary to conduct a visual examination of a test pit. Test holes shall be dug for all applications and be located within approximately 3m (10 feet) of where the proposed disposal field of the on-site sewage disposal system is to be located.

Digging a test hole directly in the existing field area could contaminate groundwater and is not recommended. The test hole shall be at least 1.8 m (6 feet) deep unless bedrock is encountered. Please refer to **Appendix C** for additional details on test hole requirements. The soil texture, density, structure, depth and colour in the test pit will

permit the Licensee to predict the permeability (i.e. the rate of water drainage) and classify the soil. The test hole will also show the presence or absence of groundwater, bedrock (the solid rock that underlies loose material such as gravel, sand, loam or clay, and includes material such as limestone, sandstone, shale, etc.) and/or impermeable soils (such as clay). All of this will determine whether an in-ground trench or raised mound trench sewage disposal field will be required as well as how much sand must be imported (if applicable). It is important to remember that an in-ground trench is permitted to be installed in "A", "B" or "C" soil.

The applicable soil texture of each horizontal soil profile (soil layer) in the test pit shall be evaluated and described in the field by using the "Flow Diagram for Estimating Soil Texture by Feel" which can be found in **Appendix A**. Installers must determine the applicable soil texture, but should also consider the soil structure, density and permeability. As the texture of the soil becomes more silty the permeability (the rate of water drainage) of the soil decreases.

Please refer to **Table 6** for a description of the various soil textures from sand to loam to clay and how these textures can be used to classify an in-situ soil as "A", "B", "C" or "D". Categories "A", "B" and "C" correspond to **Appendix B**.

Category "D" corresponds to soil that is too permeable (drains too fast) or soil that is impermeable (soil that does not drain well – such as clay) and therefore cannot be used to select a system. In these situations, a raised mound sewage disposal field or engineered design is required.

Technical Notes:

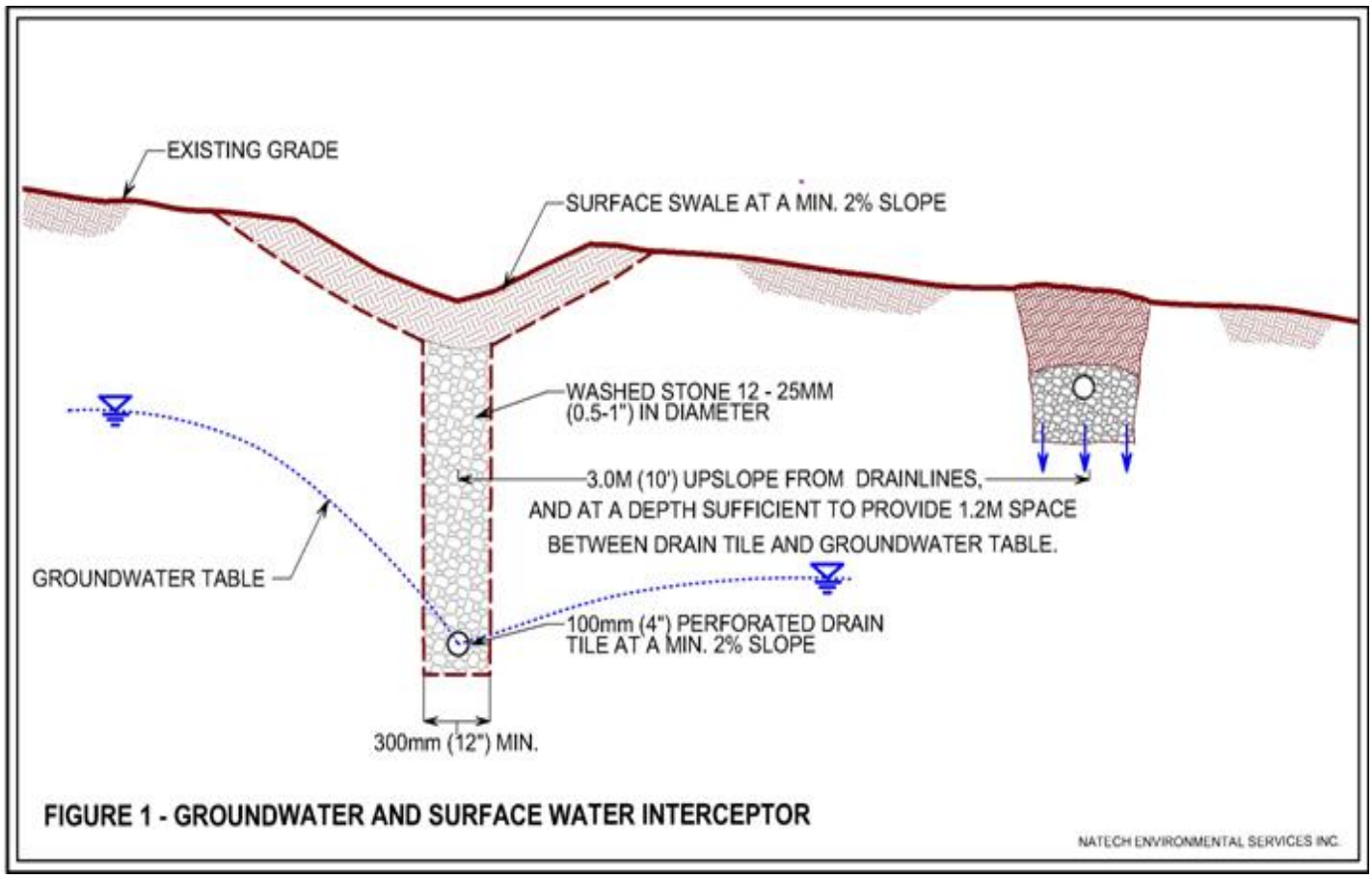
1) Soils that have a platy or massive structure, or are very compact to dense, may not meet the recommended permeability (i.e. field saturated hydraulic conductivity - which is abbreviated as K_{FS}) range predicted by soil texture alone. An *in-situ* permeability test can be conducted using a constant head permeameter, to verify that the permeability (K_{FS}) is within an acceptable range for the soil category. Please refer to the diagrams in **Appendix A** or call the Department of Public Safety, Technical Inspection Services Head Office for more information.

2) The hydraulic conductivity of the soils listed in **Appendix B & B1** are as follows:

Type "A" is $1x10^{-4}$ m/sec ≤ Kfs ≤ $6x10^{-4}$ m/sec.
Type "B" is $2x10^{-5}$ m/sec ≤ Kfs < $1x10^{-4}$ m/s
Type "C" is $3x10^{-6}$ m/sec ≤ Kfs < $2x10^{-5}$ m/s

3.2 Slope and Interceptor Drains

Slope will have an effect on the rate at which water from the distribution piping moves through the soil down slope of the field. As such slopes may limit the installation of various types of systems. An interceptor drain or diversion ditch may be required in certain situations to divert or intercept surface water and groundwater upslope of a disposal field. This will prevent surface and groundwater moving down the slope from saturating the soil of the disposal field during wet seasons. Please refer to **Figure 1.**



3.3 Separation Distances

Table 1 outlines required separation distances. Distances from the disposal field shall be measured from the nearest distribution line.

Table 1: Horizontal and Vertical Separation Distances

Feature	Septic Tank or Pump Chamber		Disposal Field	
	(m)	(ft)	(m)	(ft)
Drilled Well	15	50	23	75
Dug Well and/or Sandpoint Well	30	100	30	100
Bodies of water normal high water mark (not used as a designated potable water supply)	15*	50*	15*	50*
Bodies of water normal high water mark (used as a designated potable water supply)	90	300	75	250
Building Foundation, Foundation Drain and any part of	1.5	5	3.0	10
Property Line or Intermittent ditch	3.0	10	3.0	10
Limiting factors (such as impermeable soil, groundwater table, bedrock)	N/A	N/A	1.2**	4**

* Activity within 30m (100 ft) of a watercourse requires a Watercourse Alteration Permit from NB Department of the Environment and Local Government

** From the invert (bottom) of the pipe and/or pipe opening of unit

The “normal high water mark” is defined under the *Crown Lands and Forests Act* as the visible high water mark of a lake or river where the presence and action of water are so usual and so long continued in ordinary years as to mark upon the bed of the lake or river a character distinct from that of the bank thereof with respect to vegetation and the nature of the soil itself.

3.3.1 Watercourses & Wetlands

The separation distances from on-site sewage disposal systems to watercourses described in Section 3.3 differ from those in the CWA respecting setbacks for work within 30m (100 ft) of a wetland or watercourse. If any work is to be undertaken within this 30m (100 ft) setback it is the property owner's responsibility to ensure that the Department of Environment and Local Government is contacted and that all necessary permits are obtained before commencing the work.

A "watercourse" is defined in the CWA as the full width and length, including the bed, banks, sides and shoreline, or any part, of a river, creek, stream, spring, brook, lake, pond, reservoir, canal, ditch or other natural or artificial channel open to the atmosphere, the primary function of which is the conveyance or containment of water whether the flow be continuous or not.

A "wetland" is defined in the CWA as Land that (a) either periodically or permanently, has a water table at, near or above the land's surface or that is saturated with water, and (b) sustains aquatic processes as indicated by the presence of hydric soils, hydrophytic vegetation and biological activities adapted to wet conditions.

Wetlands include marshes, bogs, wet meadows, peatland and swamps. **It is the client's responsibility to confirm if the property is subject to wetland regulations.**

3.3.2 Wells

A "well" is defined in the CWA as an artificial opening in the ground from which water is obtained or an opening made for the purpose of exploring for or obtaining water. A "dug well" is defined in the *Water Well Regulation 90-79* under the CWA as a well constructed by digging, either manually or mechanically. A sandpoint well is currently not defined under this legislation; however, it is considered a dug well for the purposes of maintaining setbacks. As with dug wells, sandpoint wells are shallow and therefore susceptible to surface water contamination.

Where an abandoned well exists on a property that is within setbacks to the on-site sewage disposal system an Approval will not be issued until the well has been properly decommissioned or after being provided sufficient proof that a well has been or is to be decommissioned (i.e., receipt or letter of intent from property owner). In such cases, the Licensee shall be referred to DENV for advisement on proper decommissioning. Proof of decommissioning must be submitted along with the Notice of Installation.

3.3.3 Exemptions

For lots with existing services, an approval may be granted where separation distances or lot size requirements specified in these Guidelines cannot be met, only if the design and location being proposed is reducing the risk of a health hazard. A risk assessment will be conducted by the Department to determine appropriate exemptions.

Vacant Lots

For vacant lots, minimum separation distances must be met for conventional system installations. **Appendix B & B1** apply when determining lot size and configuration requirements.

For vacant lots smaller than 4000 m^2 (1 acre) approved by the Planning Commission prior to 1976, the Department may grant an exemption to approve on-site sewage disposal system up to a maximum of 1365 L/day EDSF as long as all required separation distances are met.

Non-conventional technology

Where an approval is being granted for a non-conventional technology, separation distances and lot sizes may be reduced where documentation is provided to indicate the effluent going into the soil has been pre-treated to improve its quality (Ex: BOD, TSS, etc.) with secondary treatment after the septic tank.

Documentation must be stamped by a professional engineer licensed to practice engineering in NB.

For non-conventional technologies without pre-treatment (such as contour and sloping sand filters) separation distances must be respected.

3.4 Lot Layout

When planning the layout of a lot, it is important to consider everything which will eventually be on the lot to help avoid unnecessary cost or future limitations. Wherever possible, the well should be located up slope of the on-site sewage disposal system with the required separation distances outlined in Section 3.3.

The following should be considered when assessing a lot:

- Property size and dimensions, including location of easements, right of ways, and driveways;
- Percentage and direction of slope;
- Dimensions and layout of the on-site sewage disposal system;
- Original and expected finished ground elevations where the system is proposed to be located, or is currently located in the case of a repair, replacement, etc.;
- Separation distances between both the septic tank and disposal field and house and other buildings, property lines, property wells, adjacent wells, and bodies of water within 100m (330 ft) of any part of the proposed system;
- Estimated daily sewage flow to be treated by the system;
- Soil characteristics as determined by a test pit inspection and, where required, hydraulic conductivity test, soil sieve analysis, and/or another soil evaluation method acceptable to the Minister;
- Identification of any limiting factors such as bedrock, groundwater table, and/or impermeable soil;
- Interceptor drains or diversion ditches and foundation draining system; and
- Any future development on the lot, such as swimming pool, garage, etc.

3.5 Planning

Housing developments or subdivisions where many houses are located on minimum sized lots with on-site sewage disposal systems and wells can be problematic for a number of reasons, namely the required separation distances for location of wells and on-site sewage systems. Potential buyers of such lots in subdivisions should consult a licensed septic system installer to ensure that the lot they intend to purchase and develop is suitable for an on-site sewage disposal system (i.e., separation distances, flood plains, future development, etc.). Other regulations may also apply; therefore, one must be certain to consult with the local Municipal or Planning Authority to ensure all laws, regulations and by-laws can be met.

If you are purchasing an existing dwelling or building with an on-site sewage disposal system, you should obtain details on its design, condition and location prior to purchase.

4 ON-SITE SEWAGE DISPOSAL SYSTEM DESIGN

4.1 Estimated Daily Sewage Flow

Estimated daily sewage flows for on-site sewage systems shall be calculated based on design flow criteria attached as **Appendix D**. Lot dimensions and area (see **Appendix B**) must be considered once the total daily sewage flow is calculated.

4.2 System Sizing

A conventional on-site sewage disposal system typically consists of a septic tank and a disposal field. On-site sewage systems are designed and sized based on the estimated daily sewage flow that the system will be receiving while also considering the soil conditions and permeability rates (i.e. how quickly the water drains), as estimated by a test pit assessment (or other method).

Coarse and medium sands have the greatest capacity to drain water and clay has the least. Soil must receive the septic tank effluent at a rate which will allow for additional treatment and reduce the potential for groundwater contamination while at the same time prevent breakout and flooding or ponding within the disposal field. The disposal field shall be sized based on the soil with the slowest permeability within 1.2m (4 feet) below the distribution pipe.

Soil types which conduct water too slowly or too rapidly will require a mound or built-up disposal field. Please refer to **Appendix B** for disposal field sizes in relation to soil permeability and estimated daily sewage flow. The disposal field size increases as the flow increases and soil permeability decreases. If the situation warrants, the Licensee may employ soil evaluation methods such as a hydraulic conductivity test of the soil in the proposed area.

4.3 Septic Tank

All septic tanks shall be installed level. Therefore, it is necessary to ensure the pad is level prior to lowering and installing the tank.

Prefabricated septic tanks must conform to the most recent version of CSA Standard B66 and shall:

- Have a visible stamp. If the stamp is unclear or not visible on the tank, the Licensee may be required to provide proof that the tank conforms to the CSA Standard.
- Have a minimum liquid capacity of 3410L.
- Be designed to carry a minimum of 600 mm of earth cover. The earth cover shall not exceed the maximum burial depth for which the tank is designed.
- Be constructed with two compartments, where the liquid capacity of the first compartment is equal to two-thirds of the total septic tank capacity. Note the

capacity of a siphon or pump compartment is not included as part of the septic tank capacity.

- Be constructed with baffles at the inlet and outlet ends to prevent "short-circuiting" or direct flow through of effluent. For an example, please refer to **Figure 2**.
- Be constructed of concrete, fibreglass or polyethylene. (Steel tanks are not permitted as they are subject to corrosion rates significantly higher than the others and may have a shorter life depending upon ground conditions).
- Be water-tight.
- Be located, including depth below grade, so that they are accessible for septage removal, service, and maintenance. Access shall be provided to each compartment with openings at or above grade.
- Be equipped with an effluent filter meeting NSF Standard 46 that is easily accessible for maintenance, as per the manufacturer's Guidelines. Unless otherwise stated by manufacturer's guidelines, it is recommended that effluent filters have a permanently attached handle that extends to within 150 mm of the access riser rim. The handle should be of such a material that allows easy removal and replacement.
- Ensure that all access openings have a secure lid or cover.
- Ensure that all piping connections shall be watertight and not allow groundwater and surface water infiltration or wastewater leakage.
- Ensure that all pipe joints from building to the septic tank and from the septic tank to, and including, the header are water tight. (e.g. solvent cement joint, mechanical joint or as approved by the pipe manufacturer)

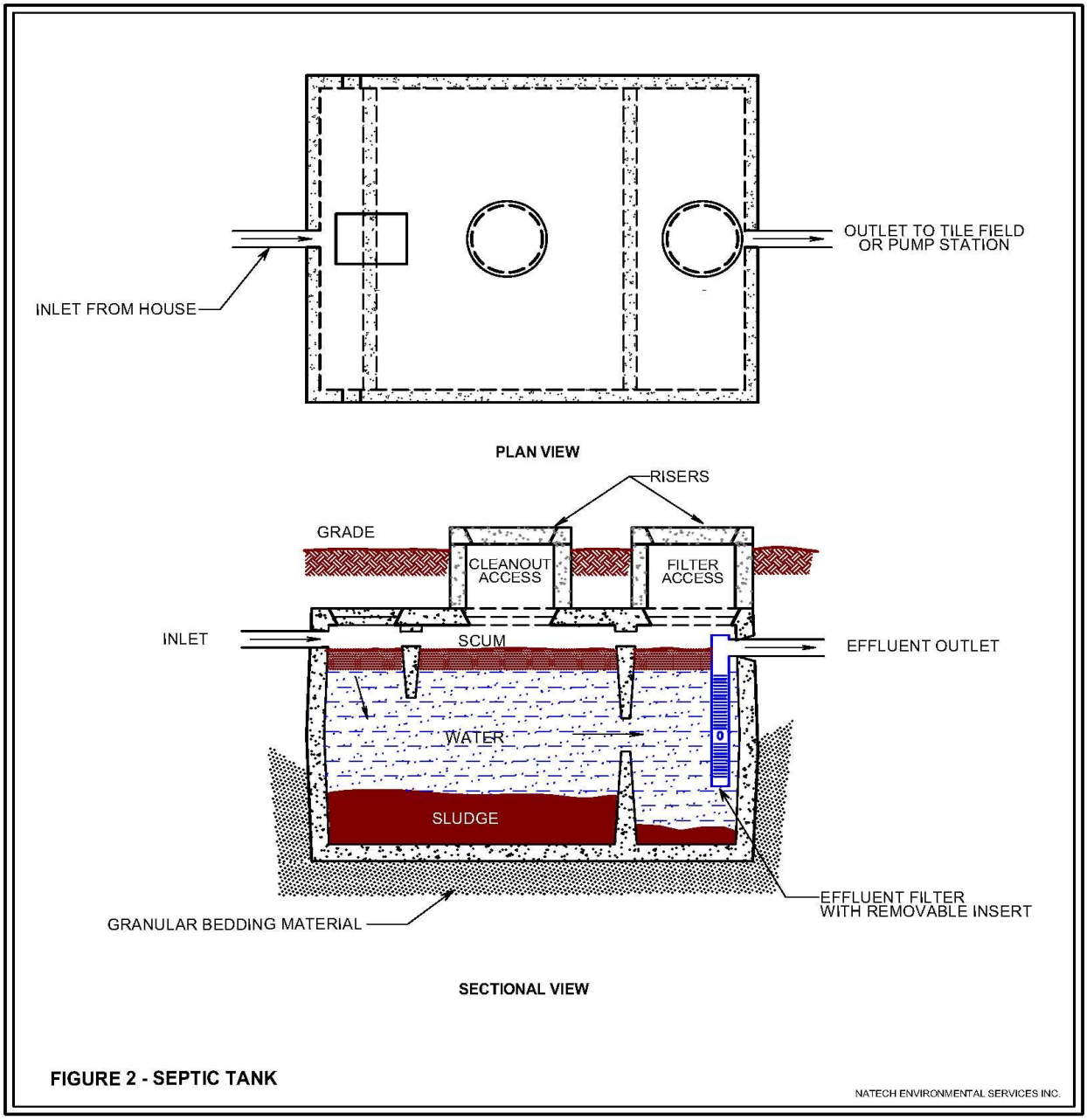
Decks or other structures that can limit access should not be built over septic tanks or pump chambers. The location and depth below grade of a septic tank should not exceed the suction elevation of vacuum trucks. Septic tanks should be protected from overhead loads or stresses greater than the tank-load-bearing capabilities.

Each type of tank has specific installation requirements to ensure proper operation and longevity. Septic tanks may need to be secured against hydraulic uplift in areas where there is potential for high groundwater levels. The minimum slope in the pipe from the house to the septic tank is 3mm per 300mm of length or 1%. Also, for more details, please refer to the most recent version of the National Plumbing Code of Canada that is being used by the Department of Public Safety.

The CSA standard specifies inlet and outlet connections, air space, and access openings among others. The minimum liquid depth in a tank is 0.9m (3ft).

Compaction of bedding material under inlet and outlet piping is essential to support piping. Please refer to the most recent version of the National Plumbing Code that is being used by the Department of Public Safety.

Refer to **Figure 2** for an illustration of the interior of a septic tank.



The manufacturer's instructions for placing and backfilling septic tanks, which may include the use of pea gravel, must be followed. Empty septic tanks have been known to lift out of the ground under high water table conditions. Therefore, septic tanks under high water table conditions must be secured to prevent uplift.

Two-piece septic tanks that arrive on-site with joining damaged edges, or those that have been installed with improper caulking, will be rejected and shall be removed from the installation.

Information on septic tank sludge and scum accumulation rates can be found in **Appendix F**.

4.4 Conventional Design

A conventional sewage disposal system, as defined in *Regulation 2009-137*, is an on-site sewage disposal system with a septic tank and subsurface disposal field system with sewage flows not exceeding 5460 lpd and includes a sewage holding tank and pit privy but not a contour system. This does not include a pressure-dosed infiltrative plastic chamber system.

Approvals for conventional on-site sewage disposal systems are issued only for wastewater* generated from personal hygiene, sanitation, cooking, laundering, and other similar domestic purposes. This includes greywater but does not include liquid and water-carried wastes generated by industrial or manufacturing processes, sump pumps, gutters, drainage pipes, or runoff water.

*For expected influent raw wastewater strengths please refer to **Appendix E**.

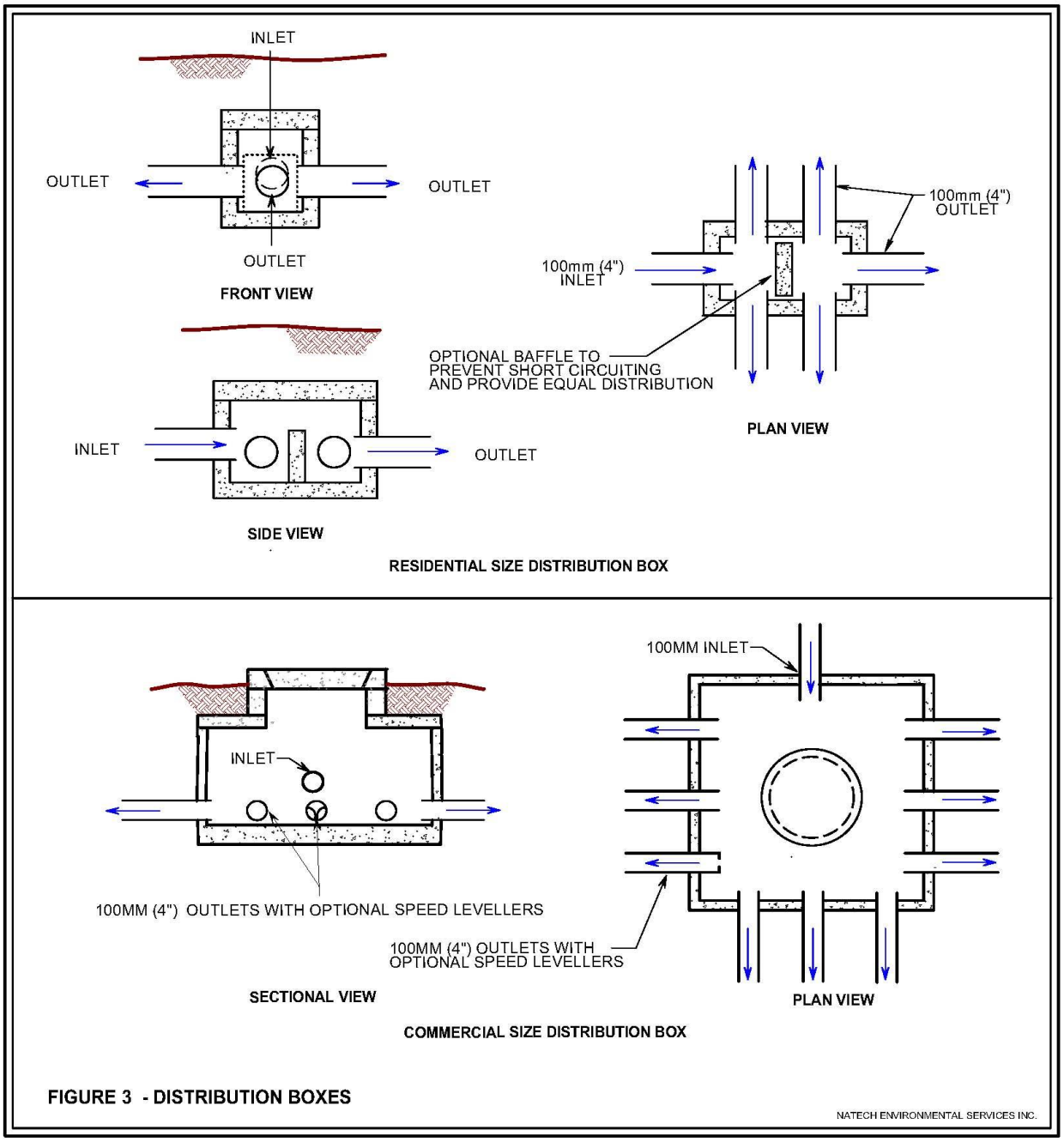
Other types of wastes, such as metals or persistent organic chemicals, should be collected and treated separately. Facilities such as car washes or hospitals where chemicals may upset the tank and disposal field treatment processes need to be considered prior to design and may require an engineered system. Pre-treatment for grease or sand may be necessary depending on the facility.

Distribution of sewage in a disposal field must be equal. Distribution lines shall be laid parallel to the contour (across the natural slope of the land) and perpendicular to the groundwater flow in the area where the on-site sewage disposal system is proposed.

The use of geotextile is recommended to be placed over the crushed rock (10mm-50mm) before backfilling. Geotextile helps prevent the infiltration of fine soil into the trench gravel.

A distribution box (see **Figure 3**) may be used instead of a level header between the septic tank and gravity-fed disposal field to ensure all distribution lines are loaded equally. Distribution boxes may be concrete or plastic and consist of one inlet with a varying number of outlet holes.

A distribution box must be installed level. A distribution box must be designed to provide a manageable flow and to prevent short-circuiting and have a baffle in front of the inlet. It is recommended that distribution boxes are insulated for frost protection, as well as be installed on a gravel base. Adjustable flow equalizers may be used to ensure equal distribution even if a distribution box does not remain level.



4.4.1 Pipe and Stone In-ground Trench

Where in-situ soil conditions permit (see **Section 3 – Lot Evaluation**), the field design may be an in-ground trench. The type of design is constructed with trenches dug into original ground. It is important to remember that an in-ground trench is permitted to be installed in “A”, “B” or “C” soil.

A trench field consists of several individual trenches of one or more level headers with equal distribution, or of a distribution box, dug into existing soil with clean crushed rock on which the perforated pipe is laid and graded. The perforated pipe is also covered with clean crushed rock.

The perforated distribution pipe must meet CAN/CSA Standards B181.1, B181.2, B182.1 and B182.2. The ends of the distribution lines are capped in a trench field. **Table 2** and **Figures 4 & 5** outline trench construction details.

Table 2: Trench Construction Details for Pipe and Stone Systems

Trench information	Size Requirement	
	Metric Units	**Imperial Units**
Minimum Trench Width	450mm	18”
Maximum Trench Depth	900mm	36”
Maximum Trench Length	15m	50’
Trench Separation (centres)	1.5m	5’
Minimum Total Field Length	60m	200’
Depth of clean crushed stone (under/over pipe) *Size of crushed stone*	200mm / 50mm *10mm – 50mm*	8” / 2” *½” – 2”*
Slope of Perforated Pipe	50mm per 15m	2” per 50’
Top Header in Field	non-perforated and level	non-perforated and level

The disposal field requires a minimum 30cm (12 in) of soil cover that allows air to permeate. The cover layer should be able to support vegetation and must consist of at least 10cm (4 in) of topsoil and **should be finished with sod or seed to prevent erosion and aid in evapotranspiration**. The cover should not exceed 60cm (24 in) in thickness unless alternative means of aeration are provided.

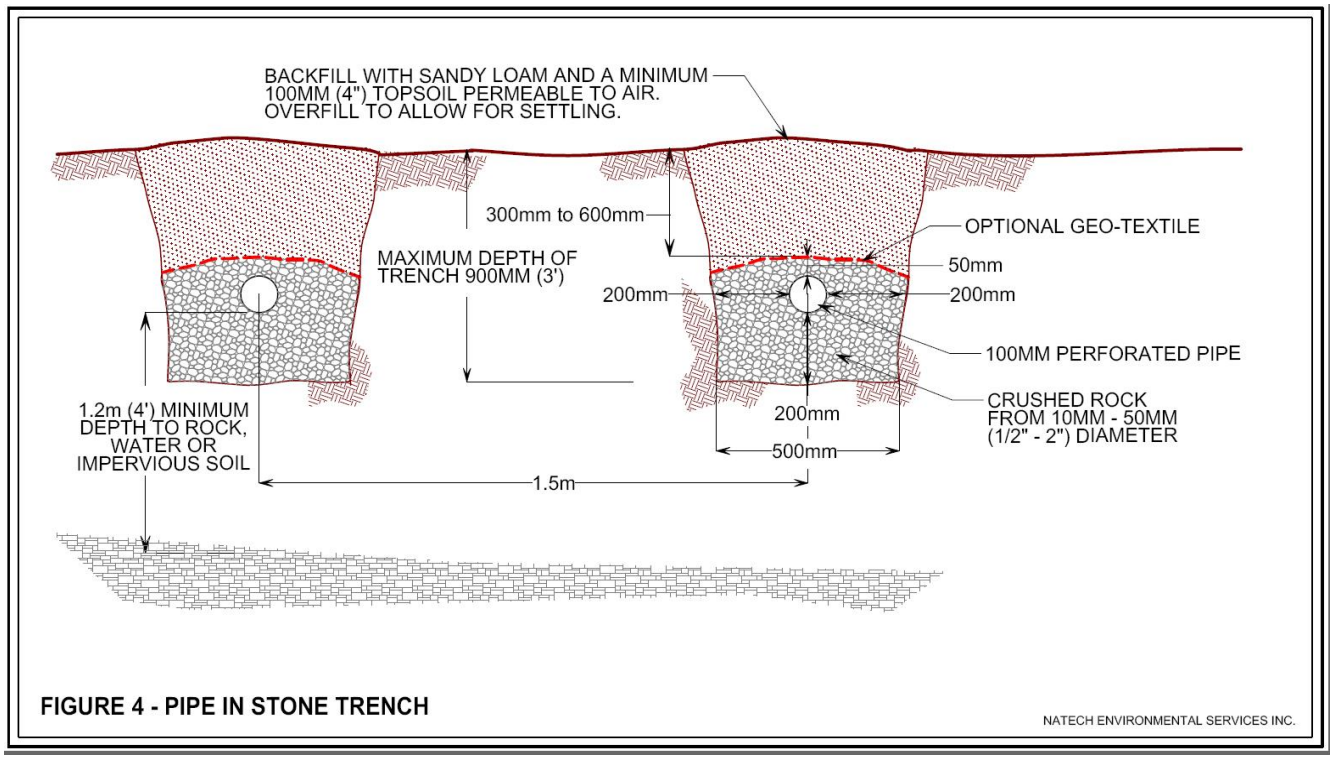


FIGURE 4 - PIPE IN STONE TRENCH

NATECH ENVIRONMENTAL SERVICES INC.

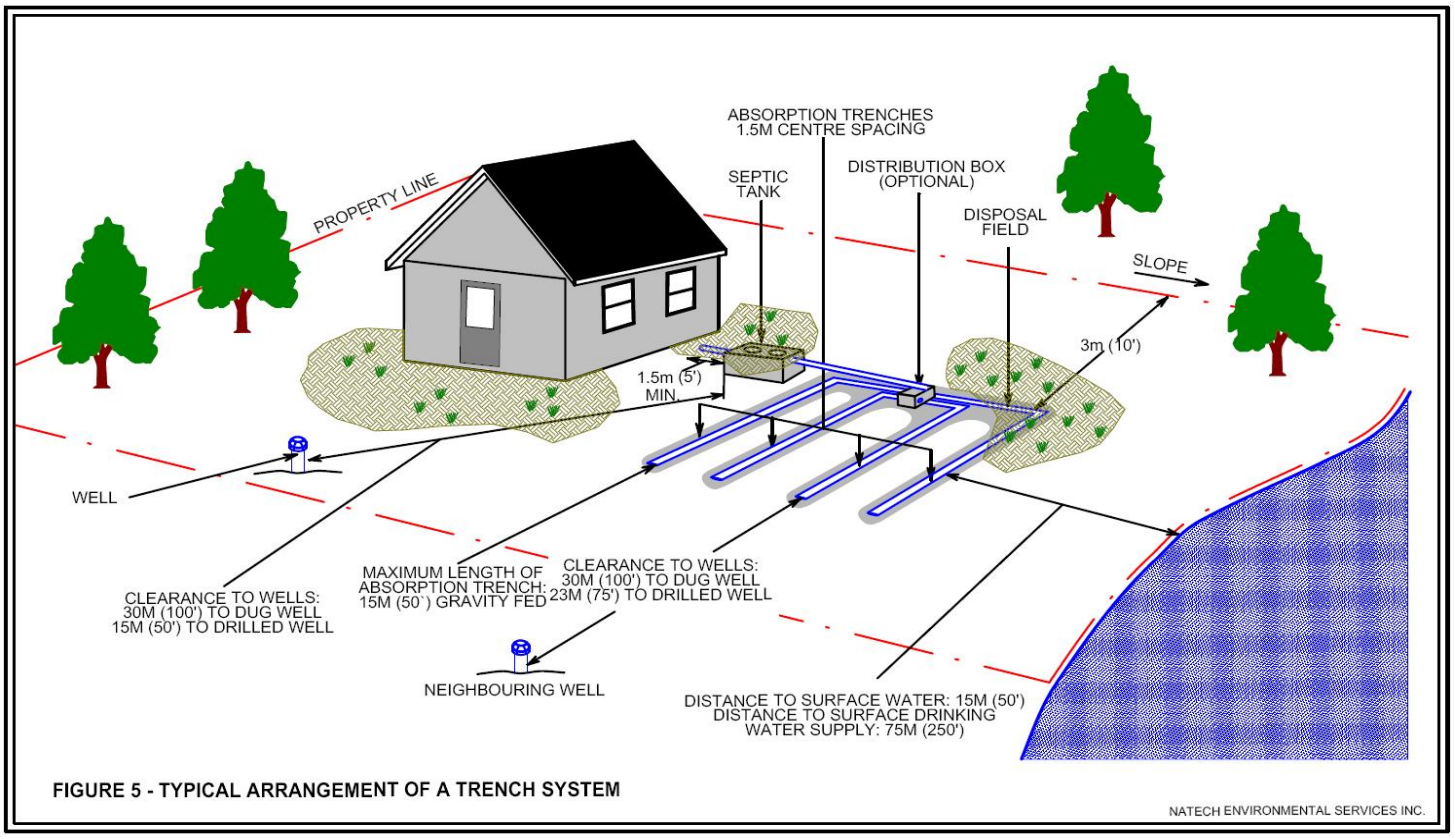


FIGURE 5 - TYPICAL ARRANGEMENT OF A TRENCH SYSTEM

NATECH ENVIRONMENTAL SERVICES INC.

4.4.2 Raised Mound Trench System

When a test pit evaluation identifies that limiting factors are present, it is necessary to increase the distance from the invert of the distribution pipe to the limiting factor by adding imported sand. Limiting factors include bedrock, groundwater or seasonal high water table, impermeable soil (like clay) or soil that is too permeable (i.e. drains too fast such as very coarse and gravelly sands). Disposal fields which are raised in this manner are called mounds. The depth of imported sand required is determined by the in-situ soil conditions in the area as determined by a test pit inspection. If a portion of the in-situ soil is to be used to construct the mound, the system shall be sized based on the soil classification (“A”, “B” or “C”).

The area under the proposed mound must be scarified parallel to the slope. "Scarification" means loosening and breaking up the soil in a manner that prevents smearing of the soil surface while at the same time maintaining soil structure. This is necessary to help allow the passage of effluent into the native soil. A cultivator, mould board plough, or chisel plough should be used to scarify the native soil. No equipment shall be driven over the scarified area.

Stumps shall be removed, and sod and root layers shall be stripped before the imported sand is placed.

Imported sand should be placed so that it is level with the top of the proposed trench. The trench should then be excavated into the sand with the trench bottom level in both width and length. This must be done to ensure that there is sufficient sand under the field to meet separation distances and limiting factors.

Imported sand shall be placed in lifts not exceeding 300 mm, as this will help ensure that the sand does not settle after placement.

Distribution lines shall be laid parallel to the contour (across the natural slope of the land) and perpendicular to the groundwater flow in the area where the on-site sewage disposal system is proposed.

The ends of the distribution lines in gravity fed disposal beds are to be connected with either solid or perforated distribution pipe so as to be level. (Note: for sloped mounds the ends must be capped unless the distribution pipes are located on the same level in which case they shall be connected). If perforated distribution pipe is used for this purpose, it shall be surrounded by clean crushed rock and shall not be considered in the total linear system length.

4.4.2.1 Imported Sand

Imported sand that meets the specifications in **Table 3** is required to be used in a mound or above-ground system. The selection of suitable sand is critical to the proper design and function of a mound system. Sandstone does not typically meet the requirements to be considered a suitable sand. Material containing too many fines (e.g.: clay and silt) cannot accept septic tank effluent at an acceptable rate without severe clogging. Material which is too coarse (e.g. predominantly very coarse sand or gravels) will allow septic tank effluent to pass through too quickly and may not achieve an acceptable level of treatment. Note: For plastic infiltrative chambers sand meeting manufacturers specifications must be used.

It is important to remember that material in a pit may vary and this can be particularly true for pit-run sand that is dug out of the bank. Manufactured sands that have been produced by crushing and/or screening tend to have the most consistent results. However, different stockpiles of material produced at different times can still vary in gradation, resulting in varying permeability.

It is time-consuming and expensive to remove and replace material that does not meet the specification. It is much better to be confident that the sand brought to the site is suitable.

Table 3 Material specifications for Imported Sand

Grain Size Distribution	Specifications
9.5 mm (⅜ in)	80 to 100% passing
4.75 mm (No. 4)	80 to 100% passing
75 µm (No. 200)	***≤8% passing in the sand (4.75 mm minus) fraction
D_{10} in the sand (4.75 mm minus) fraction	0.15 to 0.50 mm
Cu = D60/D10 (unit-less) in the sand (4.75 mm minus) fraction	1 to 6.0
Permeability	
K_{FS}	5×10^{-5} to ≤ 6×10^{-4} m/s

A lower percentage passing is better. Less than 5% is recommended.

Compliance with **Table 3** can be determined by conducting *either* a sieve analysis to verify the grain size distribution, D_{10} and C_U, or a permeability test to determine K_{FS}.

To determine the grain size distribution a sieve analysis must be completed. This is typically completed at a soils-testing laboratory. The analysis is conducted by passing a representative sample of sand through a set of sieves of known mesh sizes. The sieves

are mechanically vibrated, and the weight of material retained on each sieve is measured and converted into a percentage passing by weight. A report is prepared to document the percent passing for each sieve size.

The D_{10} and C_U value listed in **Table 3** are scientific values that are calculated from the results of the sieve analysis. They provide a quick indication of the expected permeability (the rate effluent will flow through) of the sand.

D_{10} (effective size)
The particle size for which, by weight, 10% of the sample is finer than. The smaller the D_{10} number, the more silt, fine and very fine sand particles are contained in the imported material. This can be an indicator of a low permeability.

Cu (uniformity coefficient)
Indicates the range of particle sizes contained in the sand fraction of an imported material. The higher the Cu number, the greater the range of particle sizes. Therefore, high Cu number generally means the sand will have a lower permeability because the small particles fill the void between the medium particles, and the medium particles fill the voids between the larger particles.

K_{FS} (Field saturated hydraulic conductivity)
Permeability (rate effluent will flow through sand) is expressed scientifically as hydraulic conductivity (abbreviated K_{FS}).

The K_{FS} of imported sands can be determined through:

a) field permeability conducted in a representative bed or test pad of imported sand materials (i.e., of appropriate vertical thickness and density) by use of a Constant Head Permeameter;
b) Simplified Falling Head Permeability test on representative samples of imported sand materials;
c) *****laboratory hydraulic conductivity testing (K_S);

*****Note: Laboratory hydraulic conductivity testing determines K_S. K_{FS} is typically $K_S/2$.

4.4.2.2 Apron and Taper

In mound disposal fields, proper design of the surrounding apron and taper is crucial to minimize breakout at the sides. The apron is to consist of 6m (20 feet) on all down slope ends of the disposal field and 3m (10 feet) on all other sides. The taper is to be at a 4:1 (horizontal:vertical) ratio of slope from the edge of the apron material to original ground elevation.

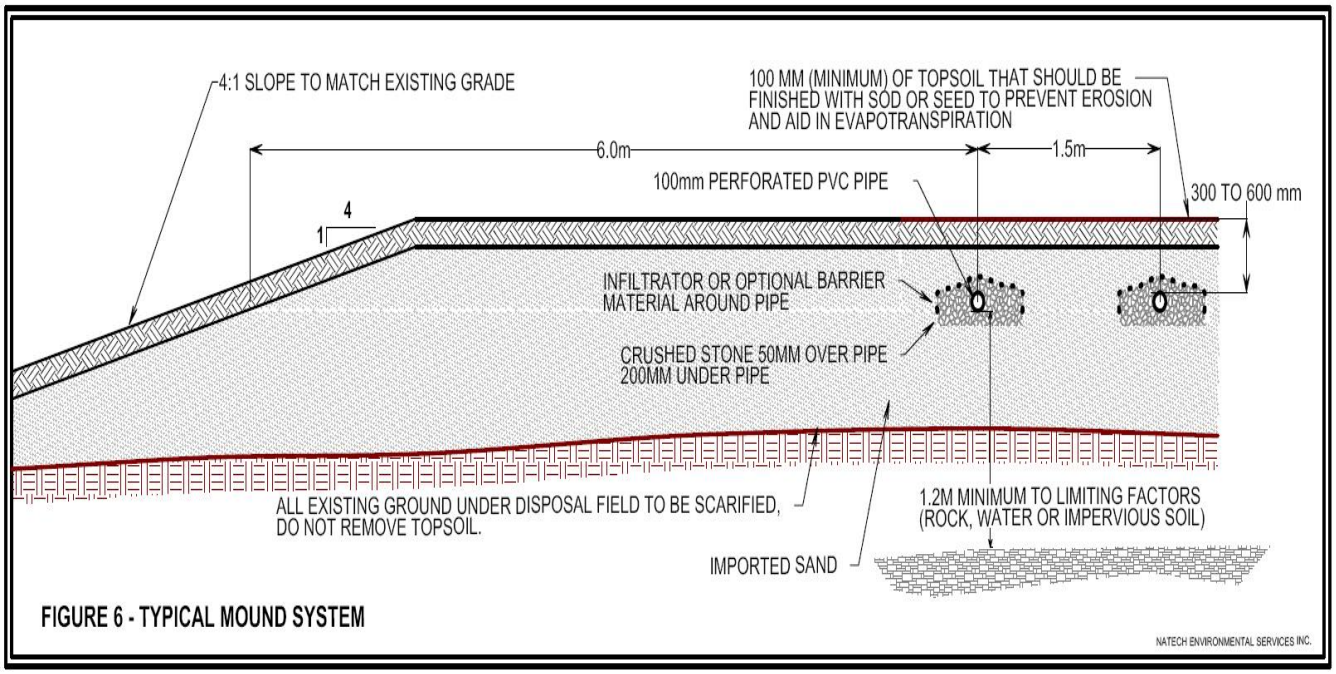
To construct the apron:
At the top of the soil absorption area (i.e. the bottom of the pipes, plastic chamber or concrete leaching galley inlet) extend the sand “buffer” horizontally from the end of the

trench out as far as is necessary (3m or 6m if downslope). The 4:1 taper then begins at the end of this apron (sand "buffer") and should slope to match finish grade. The mound must then be completed by extending the 4:1 taper upwards from the end of the apron to the finished elevation.

Finished elevation means the required 0.3m (1ft) to 0.6m (2ft) of backfill (with sandy loam or topsoil) above the top of the pipe. The top 100mm (minimum) should consist of topsoil that is finished with sod or seed to prevent erosion and aid in evapotranspiration. This is in addition to and after placement of the required 50mm (2in) of gravel over the pipe.

Absorption area means that area in a subsurface disposal field in which wastewater is distributed for infiltration to the soil. This begins at the pipe invert or equivalent.

Figure 6 provides for an overview of a typical mound system.



4.4.3 Leaching Chamber (Concrete)

Leaching chambers are concrete units that can be used in place of perforated pipe and stone in distribution lines. A clogging mat will develop in these units resulting in a long-term permeability similar to other systems. Leaching chambers must have a perforated pipe that extends through the length of the units and be capped at the end. Leaching chambers must be installed level. This is done by placing a sufficient quantity of sand (see specification in **Table 3)** under each unit. The units must have a minimum of 30cm (12 in) coarse gravel around the outside. Coarse gravel is classified as 19mm to 76mm (3/4in to 3in) consistent with the Unified Soil Classification System.

Where more than one row of leaching chambers is required they must be placed at a minimum of 6m (20 ft) centre to centre.

A leaching chamber field must be covered with a minimum of 30cm (12 in) of soil cover that allows air to permeate. The cover layer should be able to support vegetation and must consist of at least 10cm (4 in) of topsoil and should be finished with sod or seed to prevent erosion and aid in evapotranspiration. The cover should not exceed 60cm (24 in) in thickness unless alternative means of aeration are provided.

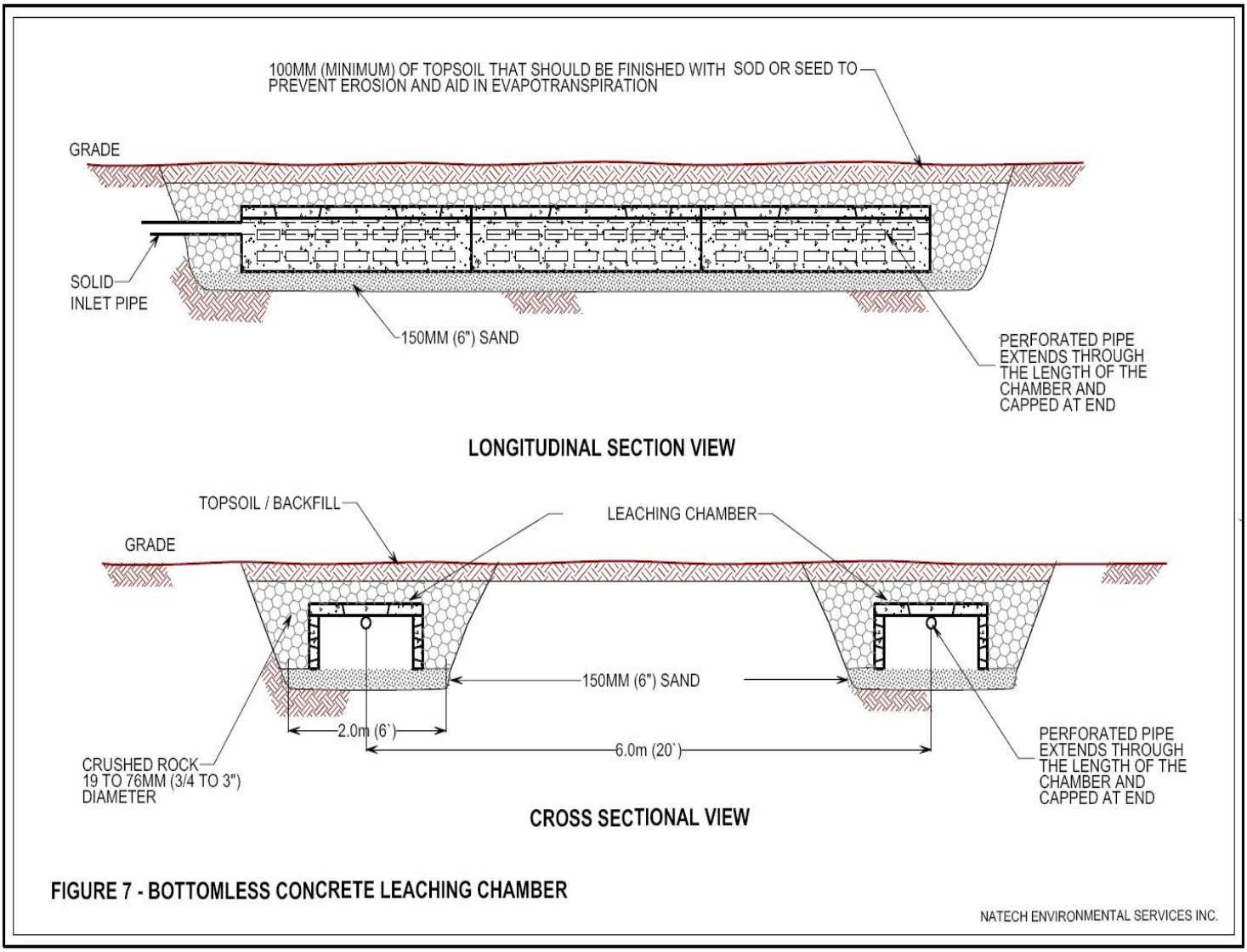
The size approved for use in New Brunswick is 1.2m x 2.4m x 0.6m deep. See **Appendix B1**.

Due to the weight of concrete leaching chambers, it is very important that the sand underneath be compacted to prevent settling of these units.

For concrete leaching chambers, the distance to limiting factors shall be measured from the bottom of unit and not the invert of the pipe. The bottom of the unit shall be at least 1m (3.3 ft) from the limiting factors. **Figure 7** provides graphic representation of a bottomless concrete leaching chamber. Please note that various designs can be considered such as “interlocking”. The bottom of the unit must be measured to the limiting factor.

Table 4: Trench Construction Details for Leaching Chambers

Trench information	Size Requirement	
	Metric Units	**Imperial Units**
Minimum Trench Width	2 m	6’
Maximum Trench Depth	900mm	36”
Maximum Trench Length	15m	50’
Trench Separation (centres)	6m	20’
Minimum Total Field Length	6 units	6 units
Crushed Rock (sides of galleys) *Size of Crushed Stone*	300 mm *19mm – 76mm*	12” *¾” – 3’*
Slope of Galleys	level	level
Top Header in Field	non-perforated and level	non-perforated and level
Depth to Limiting Factor from the bottom of the infiltrator	1m	3’



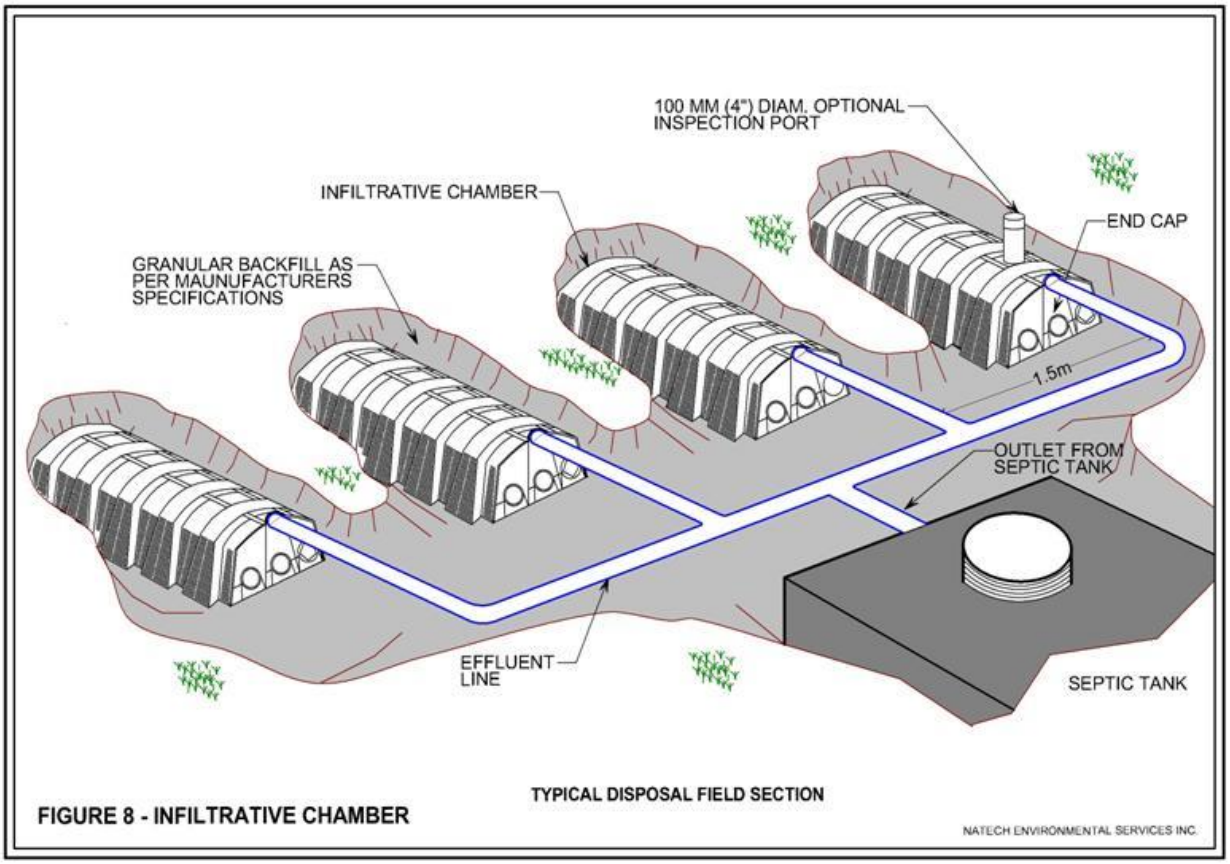
4.4.4 Infiltrative Chamber (Plastic)

Infiltrative (plastic) chambers shall be installed in keeping with the technical intent of trench and mound fields. Systems shall be designed to distribute the effluent evenly. Distribution lines shall be laid parallel to the contour (perpendicular to the natural slope of the land) in the area where the on-site sewage disposal system is proposed and no one line shall exceed 15m (50ft).

Sand must meet manufacturer's specifications. If uncertain, it is recommended to have a soil analysis completed.

Please refer to **Figure 8** for a diagram of an infiltrative chamber.

As previously stated, the vertical separation distance between the invert (bottom) of a distribution pipe in a sub-surface disposal field and limiting factors shall be at least 1.2m (4 ft). Similarly to concrete leaching chambers, the distance from the bottom of the trench to the limiting factor shall not be less than 1.0m (3.3 ft). For infiltrative (plastic) chambers, the distance to a limiting factor of 1.0m (3.3 ft) must be measured from the bottom of the trench (or unit) in which the infiltrative chamber is installed.



It is the responsibility of the Licensee to ensure that infiltrative chambers are installed as per Manufacturer's Handling and Installation Guides. Please contact the manufacturer or their distributors directly for more information.

4.4.4.1 Approved For Use in New Brunswick

Following is a list of infiltrative chambers currently approved and available for use in New Brunswick. The corresponding length of each unit is indicated in brackets.

Note that this list is subject to change.

Infiltrator Water Technologies, LLC:

Quick4 Standard (4ft)
Quick4 High Capacity (4ft)
H-10 Standard (6.25ft)
H-10 High Capacity (6.25ft)

Standard BioDiffuser (6.25ft) ARC 36 High Capacity (5ft)
ARC 36 Standard (5ft)

Each of the infiltrative chambers listed above will receive a 50% reduction in total length of that required for a perforated pipe and stone distribution system.

4.4.5 Holding Tank

Applications for holding tanks must be submitted in accordance with Section 5.4 of these Guidelines. Separation distances shall be the same as those for septic tanks outlined in **Table 1**.

Holding Tanks, or total retention tanks, are considered only in the following circumstances:

- When a conventional or non-conventional on-site sewage disposal system cannot be installed on an existing building lot and all separation distances listed in **Table 1** can be met. A lot is considered an existing building lot if it currently has an existing building (including cottages, travel trailers, etc.) with wastewater services or proof of having such services is provided.
- For temporary use such as special events or construction/work camps not exceeding 12 months. Seasonal use of cottages, travel trailers, other dwellings, etc. are not considered “temporary use”.
- As an interim measure on a building lot that will be serviced by a communal sewerage system within 1 year with written confirmation from the municipality.
- For non-residential use (i.e., guard house) with an estimated daily sewage flow not exceeding 90 lpd.

The Chief Plumbing Inspector reserves the right to use his or her discretion and, depending on local conditions or circumstances, approve only an above-ground holding tank.

Holding tanks shall:

- Conform to the most recent version of CSA Standard B-66 or have certification of equivalency acceptable to the Minister.
- Be sized for the estimated daily volume of sewage with a minimum size of 9000L (2000 IG).
- Be pumped by a licensed septage hauler at a frequency dictated by usage.
- Be located, including depth below grade, so that they are accessible for septage removal, service, and maintenance. Decks or other structures that can limit access should not be built over holding tanks.
- Have access openings and extensions, risers, and piping connections that are watertight and do not allow groundwater and surface water infiltration or wastewater leakage.

- Be water-tight without joints or seams with the exception of welded or manufactured watertight seams and shall have no holes other than the inlet and access for pumping. A leak test on a 2-piece tank assembled on-site may be required by the Inspector where site conditions are high risk, such as when a tank is installed on fissured bedrock and any leakage could contaminate groundwater. Leak testing involves filling the tank with water to a level above the tank inlet pipe at least 24 hours prior to requesting a final inspection of the system.
- Be connected to the plumbing via a water-tight connection.
- Be equipped with a signalling device consisting of a switch and alarm which will provide a visible or audible signal when the tank is 80% full. Other forms of warning devices which achieve the same result and are reliable may be accepted. **The licensee must contact the Department of Public Safety (DPS) for inspection of electrical components.**
    - If used with a pump, the tank must have a warning device inter-wired with the pump so as to prevent pump operation when the tank is 90% full.
- Be anchored with strapping to a concrete slab of sufficient weight where there is concern with hydraulic pressure.

It is the responsibility of the Licensee to ensure holding tanks are installed as per Manufacturer's Handling and Installation Guides.

Where manufacturer's instructions are not given, normal construction practices shall be followed to provide a stable foundation for the tank. The bottom of the tank shall be supported evenly over its length or, if appropriate, at specific loading points. The Licensee is responsible to take appropriate measures to prevent uneven settlement.

4.4.6 Pit Privy

A privy is a small building having a toilet pedestal, or bench with a hole or holes, through which human excretion falls into an excavated pit or water-tight holding tank or vault. It shall be constructed to adequately contain waste to prevent contamination of water sources and be located so as to be accessible for removal of waste. The same separation distances apply as indicated for septic tanks in **Table 1**.

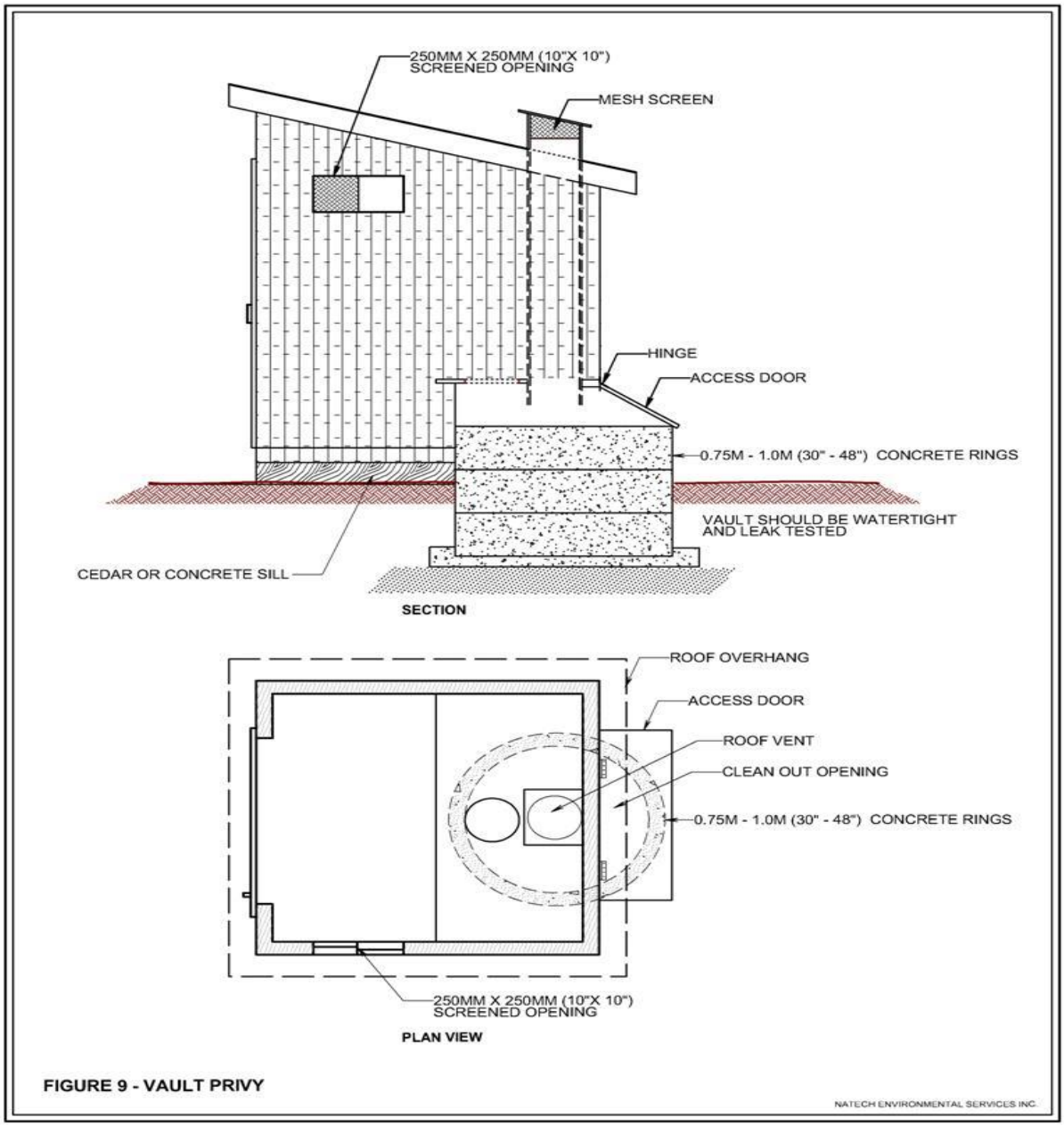
An earthen pit or vault privy will only be considered when the lot has no gray water being discharged (i.e., no well, no electricity). Refer to **Figure 9** for a vault privy.

If a water-tight holding tank is used, it shall have the following:

- An opening to facilitate pumping.
- A vent terminating above the roof of the privy.
- Child protection bars to prevent accidental entry to the tank when used in a location where public access is expected. The child protection bars shall be:
    - Spaced so that a spherical object with a diameter of 100mm (4 in) cannot pass though.
    - Aligned to minimize the accumulation of waste material.

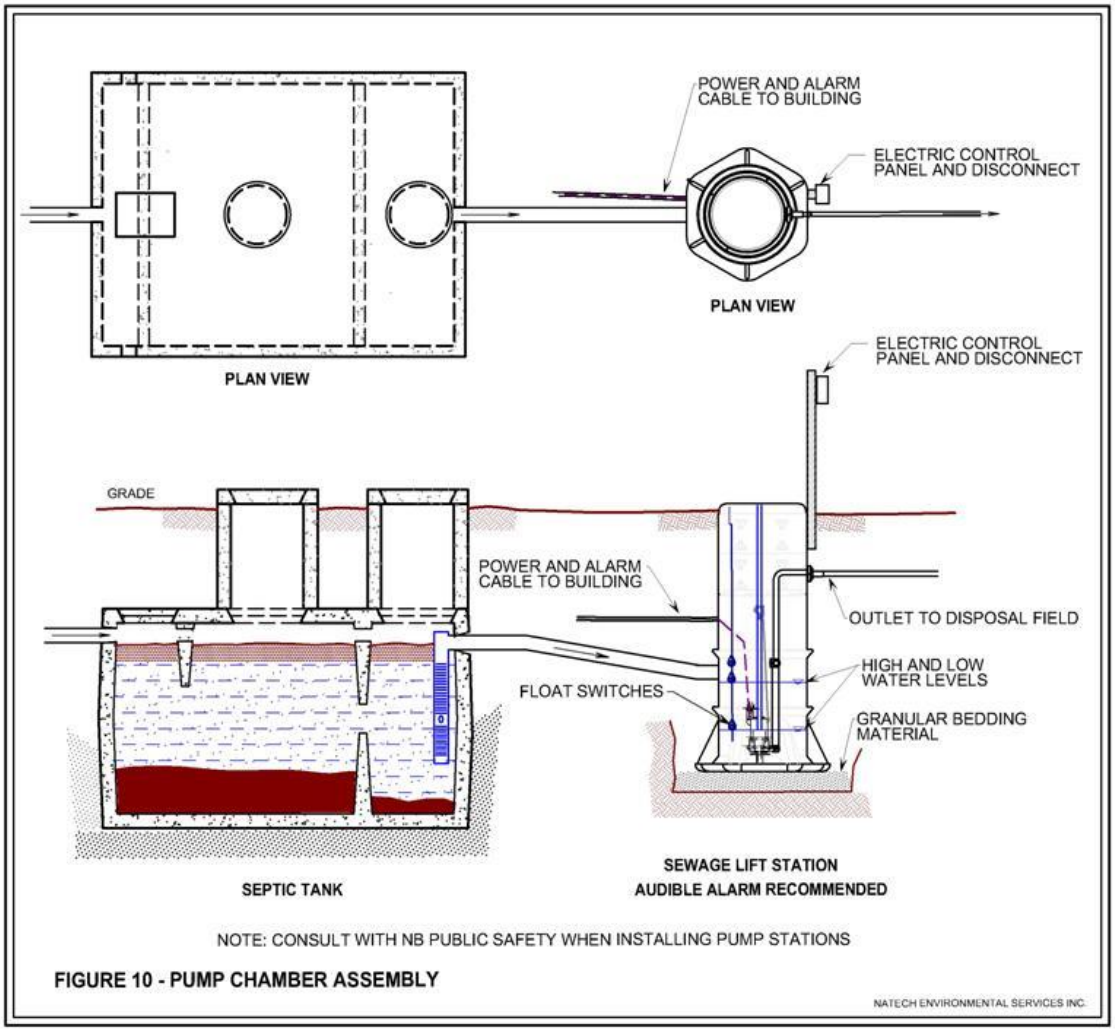
If an earthen pit is used, soil conditions shall be considered as for a trench or mound disposal field. There shall be a minimum 1.2m (4ft) separation to limiting factors. The depth of an earthen pit shall not be greater than 1.2m (4ft) below original grade.

Any privy shall be equipped with a self-closing door and insect proof screens on ventilation openings. A privy must be located where it will not be subject to pooling of surface water runoff. Sizing of a privy holding tank shall be structurally capable of carrying the load of the privy building and person traffic. Refer to Section 4.3 for tank specifications.



4.4.7 Pump

Pressure distribution is the introduction of dosed quantities of septic tank or treated sewage effluent to a sub-surface disposal field under low pressure using either a pump or siphon. Where a pump and/or siphon are used, the same separation distances apply for the pump chambers as indicted for septic tanks in **Table 1**. Please refer to **Figure 10** for an installation of a pump chamber assembly.



A pump/siphon is required when:

- Elevation does not permit the effluent from the septic tank to flow by gravity to the disposal field.
- The total linear length of the disposal field exceeds 150m (500 ft) if pipe and stone or 75m (246 ft) of plastic infiltrators.

If the pump is needed due to elevation alone, the disposal field is not considered pressure-dosed. However, if the pump is needed due to the disposal field size, the field must be pressure-dosed and designed accordingly. If pressure-dosed, the pump and chamber must be of a capacity to dose the distribution field at 50-75% of total capacity at any one time. Please refer to **Table 5** for % dosing and pump chamber capacity.

Pumps should be installed between the septic tank and disposal field. **The licensee must contact the Department of Public Safety (DPS) for inspection of electrical components prior to covering the pump chamber assembly**.

Pump stations are confined spaces and must be designed in such a manner that all mechanical equipment can be accessed and serviced. Pumps/siphons must be wired in accordance with all electrical codes. This may include any electrical disconnects and alarm functions. All pumps must be approved for a sump pump and bear a Certification label acceptable to DPS. There shall be no receptacle or junction box inside the sump. All feeders shall be installed by a licensed electrical contractor. Please refer to **Figure 10.1**.

Plastic infiltrative chamber disposal fields with pump installations where pressure-dosing is required are not considered a conventional design and as such cannot be designed by a Licensee. This is a non-conventional design as described in Section 4.5.

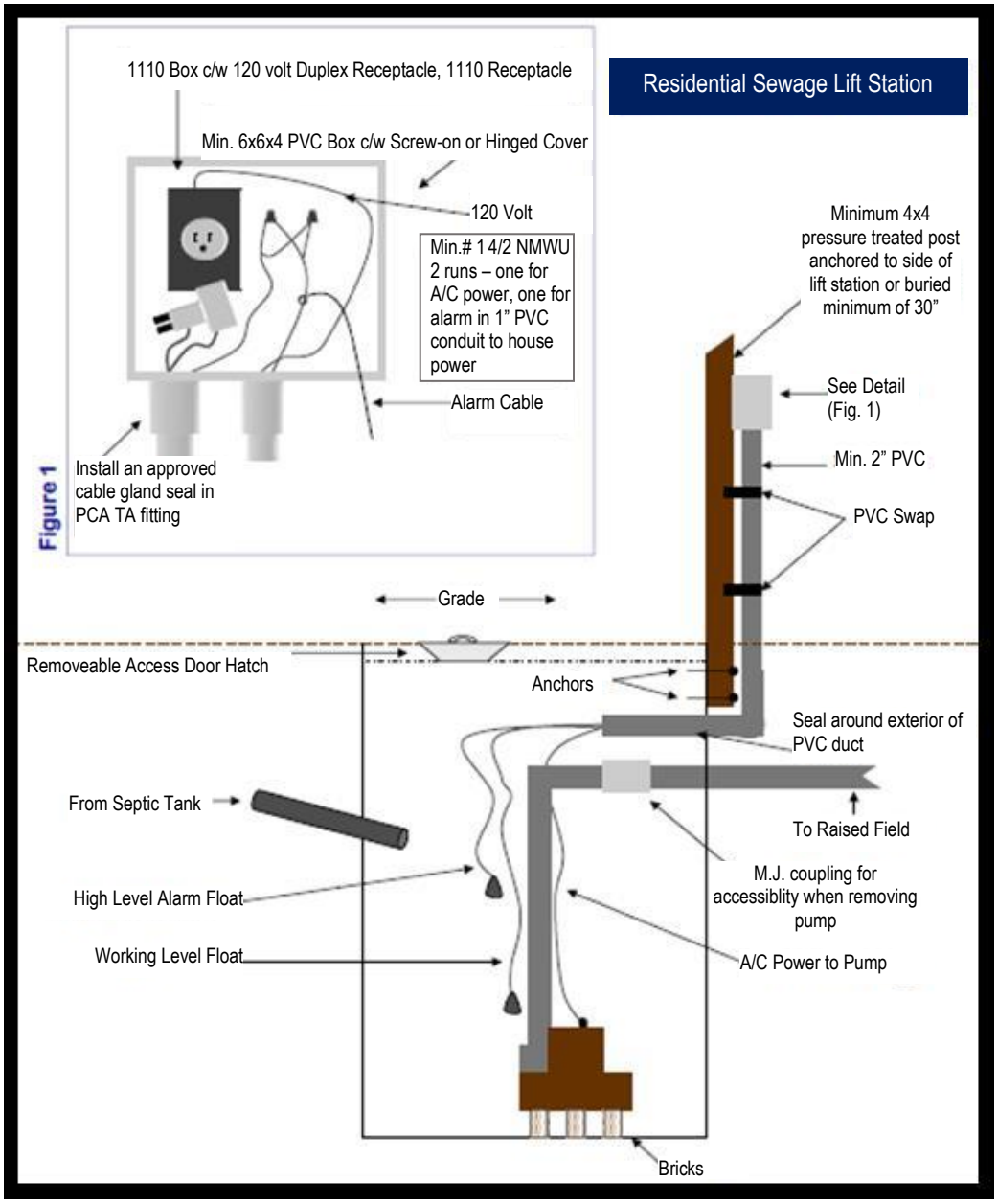


Figure 10.1 Pump Chamber Details

Table 5: Percentage (%) Dosing Chart for a 100mm (4") diameter pipe

Total Length of Perforated Pipe		Total Volume of Distribution Pipe		Dosing (L)*		Dosing (Igal)*	
(m)	(ft)	(L)	(IG)	50%	75%	50%	75%
55	180	445	98	222	334	49	73
61	200	494	109	247	371	54	82
76	250	618	136	309	463	68	102
91	300	741	163	371	556	82	122
107	350	865	190	432	649	95	143
122	400	988	217	494	741	109	163
137	450	1112	244	556	834	122	183
152	500	1236	271	618	927	136	204
168	550	1359	299	680	1019	149	224
183	600	1483	326	741	1112	163	245
198	650	1606	353	803	1205	177	265
213	700	1730	381	865	1297	190	285
229	750	1853	408	927	1390	204	306
244	800	1977	435	988	1483	217	326
274	900	2224	489	1112	1668	245	367
305	1000	2471	544	1236	1853	272	408
335	1100	2718	598	1359	2039	299	448
366	1200	2964	652	1482	2223	326	489
396	1300	3212	707	1606	2409	353	530
427	1400	3460	761	1730	2595	381	571

* Values do not account for friction and head loss.

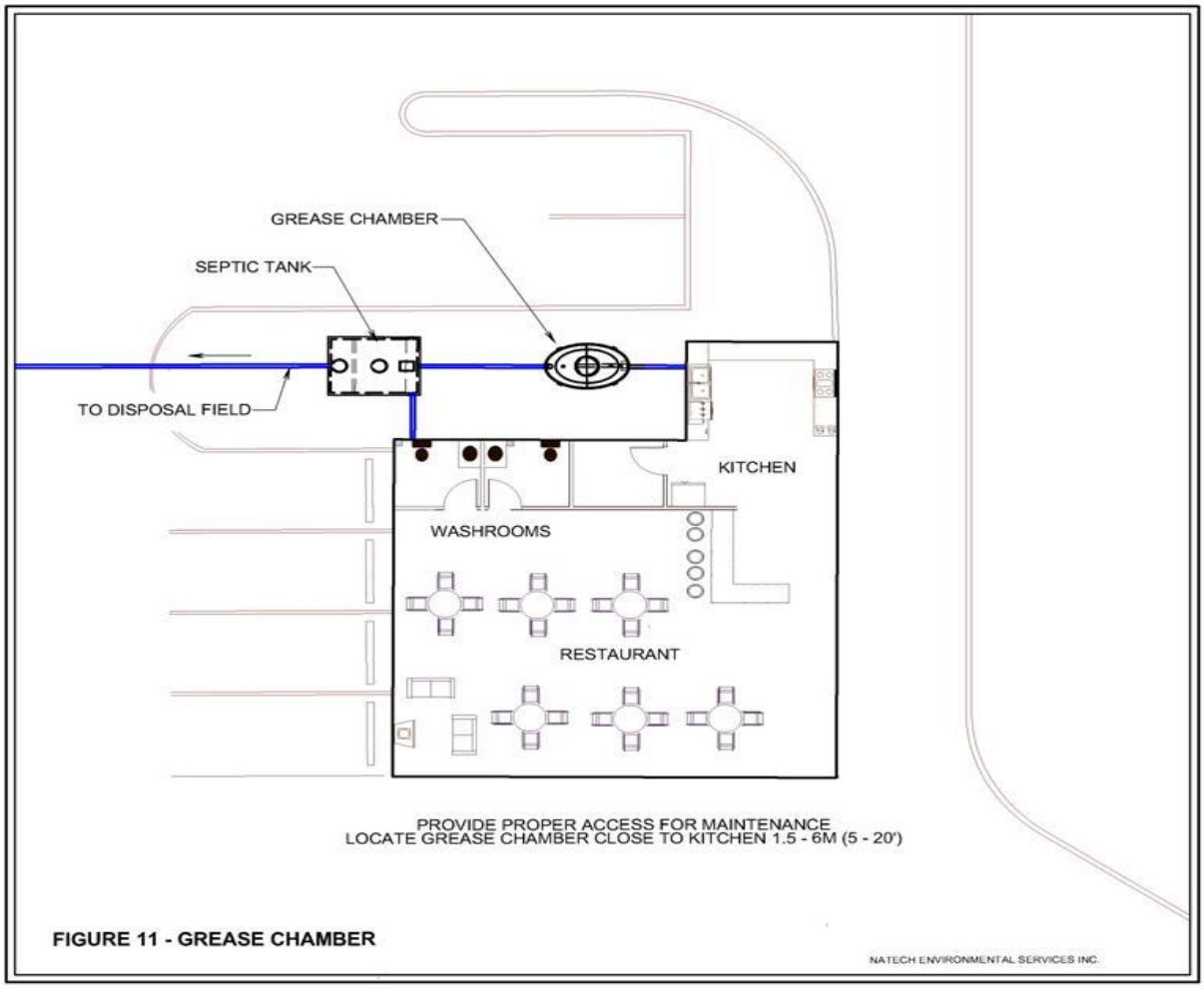
4.4.8 Grease Trap or Chamber

A grease chamber is a container where cooled grease floats to the surface while cleaner water underneath is discharged to the on-site sewage disposal system. If this grease is not removed before entering the septic tank, grease may accumulate and block the lines in the disposal field.

Grease chambers are not usually required on residential waste lines. In some commercial and institutional applications, such as restaurants or school cafeterias, grease chambers are required.

The liquid volume of a grease chamber must be large enough to permit the water to cool so the grease can separate and rise to the top of the chamber. Chambers must be sized and maintained in accordance with manufacturer's instructions.

Please refer to **Figure 11** for an illustration of a grease chamber.



To allow for proper maintenance, cleanout manholes must be extended to finished grade. Care must be taken to prevent unauthorized entry. To reduce problems with grease solidifying in the waste line, the chamber should be located close to the building. Chemical compounds that dissolve grease must not be added to grease traps. Such chemicals will clean out the trap, allow dissolved grease to re-solidify in the disposal field, and may cause the system to fail.

For further direction on grease trap installation, please refer to the National Plumbing Code of Canada, or contact your local Department of Public Safety Office. Further information on testing, sizing and selection of grease traps can be found in the CSA B481-07 standard series for Grease Interceptors.

4.4.9 Oil / Water Separator

Effluent from an oil/water separator is not permitted to be discharged to a domestic on-site sewage disposal system. It is the applicant's responsibility to contact the

Department of Environment and Local Government to determine the appropriate means of disposal. There are several references available which indicate that small amounts of chemicals such as paints, solvents, or thinners, can kill the bacteria that break down the organic matter in an on-site sewage disposal system. Any of these chemicals may be present in the effluent of an oil/water separator.

4.5 Repairs

Section 24 of the *Public Health Act* states that an approval is required to install, construct, repair or replace an on-site sewage disposal system.

Examples of activities that are considered repairs and which require application for approval include, but are not necessarily limited to:

- relocation of septic/holding tank (horizontal & vertical).
- relocation, repair, or replacement of a pump chamber (lifting upward or complete relocation).
- replacement of apron or taper (partial or full), whether one side or more.
- anytime an excavation is required within the limits of the disposal field, including the apron or taper.
- replacement of pipe from tank to field.
- installation of a system intended to augment the function of the septic tank and/or drain field such as a mechanical ventilation system.

If an investigation is required to determine the scope of repairs, an Approval must first be obtained. The application for approval must include a description of the planned investigative actions. Before proceeding with any repairs, the Approval must be revised to include the corrective action required.

If you are unsure if your activity requires an approval, please contact the Department of Public Safety, Technical Inspection Services Head Office (see Section 1.3)

4.6 Non-Conventional Design

A conventional sewage disposal system is defined in *Regulation 09-137* as “an on-site sewage disposal system with a septic tank and subsurface disposal field system with sewage flows not exceeding 5460 litres per day, and includes a sewage holding tank and a pit privy, but not a contour system.”

A non-conventional sewage disposal system is defined in *Regulation 09-137* as “an on-site sewage disposal system other than a conventional sewage disposal system.”

The following are examples of types of non-conventional systems:

- Contour Systems
- Sloping Sand Filters
- Aerobic/Anaerobic package plants which pre-treat effluent

- Pressure-dosed infiltrative chamber system
- Peat or other sand-type filters
- Constructed Wetlands
- Large diameter matted pipe
- **Any system** with an estimated daily sewage flow > 5460 lpd (1200 IGPD).

The use of Contour Systems has been approved by the Department of Health. Installers licensed to install Contour Systems must do so in accordance with the most recent version of the "Selection & Installation Manual for *Contour Sewage Disposal System*s in New Brunswick".

Installers licensed to install any other non-conventional on-site sewage disposal system must do so in accordance with the Department of Health's requirements for the technology and any additional manufacturer specifications.

A non-conventional license can be applied for in writing to the Department of Public Safety with appropriate proof of training.

Any non-conventional system that has not been approved by the Department of Health must be installed by a Licensee and designed by a Professional Engineer licensed through the Association of Professional Engineers and Geoscientists of New Brunswick. Professional Engineers are to be wholly accountable for their design while Licensees are responsible for the installation of the system. A Licensee is not permitted to design this type of system. The Licensee must submit the following for assessment:

- Completed application with payment.
- A design proposal completed, and stamped, by the Professional Engineer with all the pertinent information with regard to system design specifics and separation distances.

Once the Department of Public Safety, Technical Inspection Services issues an Approval (Form A), the Licensee may install the system or begin construction activities. Once installation is complete the Notice of Installation must be submitted at least three (3) full business days prior to covering. Once the system is covered, the following documents must be submitted:

- The Licensee must submit the Certificate of Compliance to the homeowner and mail a copy to the Department of Public Safety, Technical Inspection Services Head Office within ten (10) days after the on-site sewage disposal system is covered.
- The Professional Engineer must submit to the Department of Public Safety, Technical Inspection Services Head Office the as-built drawings signed and dated with his/her stamp confirming that the installed system is in accordance with the approved design along with Form B.
- The Licencee must provide the homeowner within ten (10) days of completion:

- A copy of the plan of the installation, construction, repair or replacement of the on-site sewage disposal system; and
- The operating instructions for the system.

The designing Professional Engineer is responsible to complete a final review of the installation and provide the Department of Public Safety, Technical Inspection Services with as-built record drawings containing the Engineer's stamp, signature and date. The Licensee is responsible to submit the Notice of Installation and the Certificate of Compliance. The Notice of Installation must be submitted to an inspector of the Department of Public Safety, Technical Inspection Services at least three (3) full business days prior to covering the system. The Certificate of Compliance must be provided to the Department of Public Safety, Technical Inspection Services , with a copy provided to the homeowner, within ten (10) days of covering the system.

The Notice of Installation and Certificate of Compliance may be received in person, by fax or by email. All forms must be complete with signatures.

Note that since a licensee is responsible to follow the normal procedure for both conventional and non-conventional system installations, all on-site sewage systems are subject to a full audit of the installation process.

5 ADMINISTRATION

5.1 Licensing

Installers may be licensed to install either conventional or non-conventional systems. The type of licence will determine which type of on-site sewage disposal system the Licensee will be permitted to install.

A licence to install conventional systems will allow a Licensee to install an on-site sewage disposal system with a septic tank and subsurface disposal field system with sewage flows up to 5460 lpd where the disposal field is a mound system or a trench or an area bed using pipe and stone, leaching chambers, and/or infiltrative chambers, but excludes a contour system or an infiltrative chamber pressure-dosed system, and includes a sewage holding tank and pit privy.

A licence to install a non-conventional system will allow a Licensee to install a specific type of non-conventional on-site sewage disposal system as described in future versions of these Guidelines. Applicants for this type of licence must first possess a licence to install conventional systems.

Conventional licensees may install a non-conventional system provided the system is designed by a Professional Engineer.

5.2 Licensing Requirements

Conventional licensing requirements are as follows:

- Complete and submit an application form;
- Successfully complete and pass the New Brunswick On-site Sewage Disposal System course and exam prepared by the Department of Health; and
- Pay a licensing fee of $400.

Non-conventional licensing requirements are as follows:

- Successfully attend the required course and pass the exam;
- Complete and submit an application form;
- Include a complete description of the type of non-conventional sewage disposal system with respect to the application submitted; and
- Pay a licensing fee of $350.

5.2.1 Issuance

Licenses are issued to a company/business. A licensed company/business may appoint an employee to fulfill the licensing requirements (i.e., attend the course and pass the exam) but those employees names who have fulfilled the licensing requirements will not appear on the licence. Therefore, it is a Term and Condition of all licenses that:

> "A licensed company/business must employ at all times at least one person who has successfully completed a course and passed an exam as per *Regulation 09-137* Section 6(a)(b)."

The company/business must maintain a list of employees who have met the licensing requirements of Section 6 of the Regulation. The Department of Public Safety, Technical Inspection Services must be notified if the company/business no longer employs such a person. Should this happen, the company/business cannot construct, install, repair or replace an on-site sewage disposal system. If the company/business wishes to retain the same licence number, it shall appoint an employee to fulfill the licensing requirements within 30 days of the employee's termination date. Otherwise, the licence will be revoked after 30 days.

Renewal: Licenses expire on March 31st of each year.

5.2.2 Revoking a licence

An installer's licence may be revoked due to non-compliance with the *Public Health Act*, *Regulation 2009-137*, these Guidelines, or an Approval to Install obtained from the Department of Public Safety.

If an installer's license is revoked, the licensing requirements outlined in *Regulation 2009-137* apply. That is, the applicant must complete and submit an application, pay the licensing fee, attend the course and successfully pass the examination.

5.3 Course and Exam

The New Brunswick On-site Sewage Disposal Systems Provincial Installer Course will be offered by Health Protection Services (HPS) in April of each year. Courses may also be made available in summer (June – August) and fall (September – October) should there be sufficient demand. **To be eligible for the course the applicant must pre-register with Health Protection Services at least three (3) weeks before the start of the month.** During registration the applicant must specify their language preference.

Health Protection Services Contact Information

East Regional Office: (506) 856-2814
Central Regional Office: 1-844-553-2830
North Regional Office: (506) 737- 4400
South Regional Office: 1-888-652-1333

A Certificate of Attendance will be issued within 10 business days of the course date to those who have fully attended the course. Certificates may be sent via regular mail.

During the exam, candidates are permitted to have the course slides and Technical Guidelines from the course handout package. A time limit of three hours will be granted for completion of the exam. The passing grade of the exam is 85% and persons will be notified if they have successfully challenged the exam by letter. Those who do not pass the exam may re-write by scheduling a time with the Regional Health Protection Branch Office. Those that are unsuccessful twice must take the course before again attempting the exam.

Table 6: New Brunswick Soil Category Definitions

NB Soil Category	Applicable Soil Textures	Soil Description and Characteristics
A: Good	Coarse and medium sands.	Clean sands containing very little silt or clay and having a dominant grain size from 0.25 mm to 1.0 mm. Moist sand will not hold together in a ball or "cast" when squeezed.
	Loamy sand (under certain conditions)	Loamy sand (see description below) or other soil for which $1x10^{-4}$ m/sec ≤ Kfs ≤ $6x10^{-4}$ m/sec.
B: Moderate	Fine sand	Clean fine sand containing very little silt or clay, and having a dominant grain size from 0.10 mm to 0.25 mm. Moist sand will not hold together in a ball or "cast" when squeezed.
	Loamy sand	Moist sand will form a ball or "cast" when squeezed, but it cannot be handled without breaking apart. Moist soil may barely form "flakes" but will not form even a short "ribbon".
	Sandy loam (under certain conditions)	Sandy loam (see description below) having any moderate to strongly developed structure besides Platy or Massive. Soil for which $2x10^{-5}$ m/s ≤ Kfs < $1x10^{-4}$ m/s.
C: Fair	Sandy loam	Moist soil will form a weak ball or "cast" when squeezed, which will only stay together if handled carefully. Moist soil will form "flakes" or very short "ribbons" (1.5 to 2.5 cm long). Soil feels grainy and not sticky, or only very slightly sticky when wetted.
	Loam (under certain conditions)	Loam (see description below) having any moderate to strongly developed structure besides Platy or Massive. Soil for which $3x10^{-6}$ m/s ≤ Kfs < $2x10^{-5}$ m/s.
D: Not Permeable (too slow) Kfs < $3x10^{-6}$ m/s	Silt loam	Moist soil will form a weak ball or "cast" when squeezed, which will only stay together if handled carefully. Moist soil will form thin "flakes", but not "ribbons". Feels floury with only slight graininess and slight stickiness.
	Loam	Moist soil will form a good ball or "cast" and stay together despite moderate handling. Moist soil will form weak, thick, ribbons which are very short (< 2.5 cm). Feels smooth and gritty, but only slightly sticky.
	Clay loams or Clays.	Any soil which when moistened, forms a strong, durable ball or "cast" which will stay together after tossing from hand to hand several times. Any soil which when moist, forms a medium "ribbon" 2.5 cm or longer. Any soil which when wetted, feels sticky or very sticky. Any soil which develops a shine when rubbed against a hard, smooth object such as a knife blade or thumb nail.
D: Too Permeable (too fast) Kfs > $6x10^{-4}$ m/s	Very coarse sand	Clean sands containing very little silt and clay and consisting mainly of grain sizes larger than 1.0 mm. Kfs > $6x10^{-4}$ m/s
	Gravelly sand, Sandy gravel	Soils which have more gravel than sand.

5.4 Application Process

An application is required for the installation, construction, replacement and/or repair of an on-site sewage disposal system. The application fee is $150 and must be received from the applicant (Licensee) prior to an assessment being conducted. This includes multiple applications for the same lot. Application fees will not be reimbursed once Department of Public Safety, Technical Inspection Services has started processing the application.

The application is not complete unless all information is provided.

A complete application is required for any new installation, partial or full replacement, and/or any repair made to an on-site sewage disposal system, and includes an application fee of $150. Once the complete application is received by the Department of Public Safety, Technical Inspection Services Head Office to process the application, the Inspector will complete an application assessment within seven (7) business days. It is the Licensee's responsibility to notify the Department of Public Safety, Technical Inspection Services Head Office in writing via a Notice of Installation form at least three (3) full business days prior to covering the system.

Once this office has received written notice that the on-site sewage disposal system will be covered at the end of three (3) business days, the Inspector may conduct a final audit inspection of the sewage disposal system within that time period.

Septic Tanks (Repair or Replacement):
The three (3) day requirement is waived for septic tank repairs or replacements that meet all regulations and do not require an exemption. However, the **Notice of Installation is still required to be submitted**. Any septic tank repair or replacement that requires an exemption will still require the three (3) day notice and is subject to the audit final inspection

If an Inspector finds, upon inspection, that the design, location, repair and/or replacement of an on-site sewage disposal system or any of its parts do not comply with the Regulation, these Guidelines or the approval, he/she shall advise the Licensee of any deficiencies. The Licensee shall rectify the defects and shall not cover the system until it has been inspected again by an Inspector. If a re-inspection is required, the Licensee shall pay a re-inspection fee of $150 which is due prior to conducting each re-inspection. Re-inspection fees will not be refunded. Re-inspection fees will also apply to non-conventional systems.

The Licensee shall provide the following to the Owner of an on-site sewage disposal system within ten (10) days after the system has been covered:

- Certificate of Compliance for the system;
- A copy of the plan of the installation, construction, repair or replacement of the on-site sewage disposal system; and
- The operating instructions for the system.

The Licensee must submit the Certificate of Compliance to the homeowner and mail a copy to the Department of Public Safety, Technical Inspection Services Head Office within ten (10) days after the on-site sewage disposal system is covered.

A Licensee, or former Licensee, shall keep the following documents for a minimum of seven (7) years:

- A copy of each application for approval with the supporting information required to obtain the approval;
- A copy of each approval issued by the Minister of Public Safety; and
- A copy of each certificate of compliance issued by the Licensee

Waiting Period

An approval or refusal (with comments) will be submitted within seven (7) business days once a complete Application has been received by the Department of Public Safety, Technical Inspection Services Head Office.

This waiting period is applicable provided that all the items that must accompany the application have been received and fees have been paid.

a. Expiry

An Approval to Install has an expiry date of twelve (12) months from the date issued. If the system has not been installed before the approval has expired, the applicant must apply for a new approval and pay the fee.

b. Fees

A fee of $150.00***** must be paid before any application will be reviewed. Once the review has commenced, the fee will not be reimbursed if the client decides not to install the on-site sewage system.

See Section 5.4.3 for more details.

***** Please make cheque or money order payable to the Minister of Finance.

5.5. Revoking an Approval to Install

Regulation 2009-137 allows authority for an approval to be revoked if the licensee:

- violates or fails to comply with a term or condition of his or her licence,
- violates or fails to comply with section 24 or 24.1 of the *Act* or any provision of the *Regulation*, or
- makes a false statement in an application for a licence or an approval or in any report, return or certificate required to be provided under the *Act* or *Regulation.*

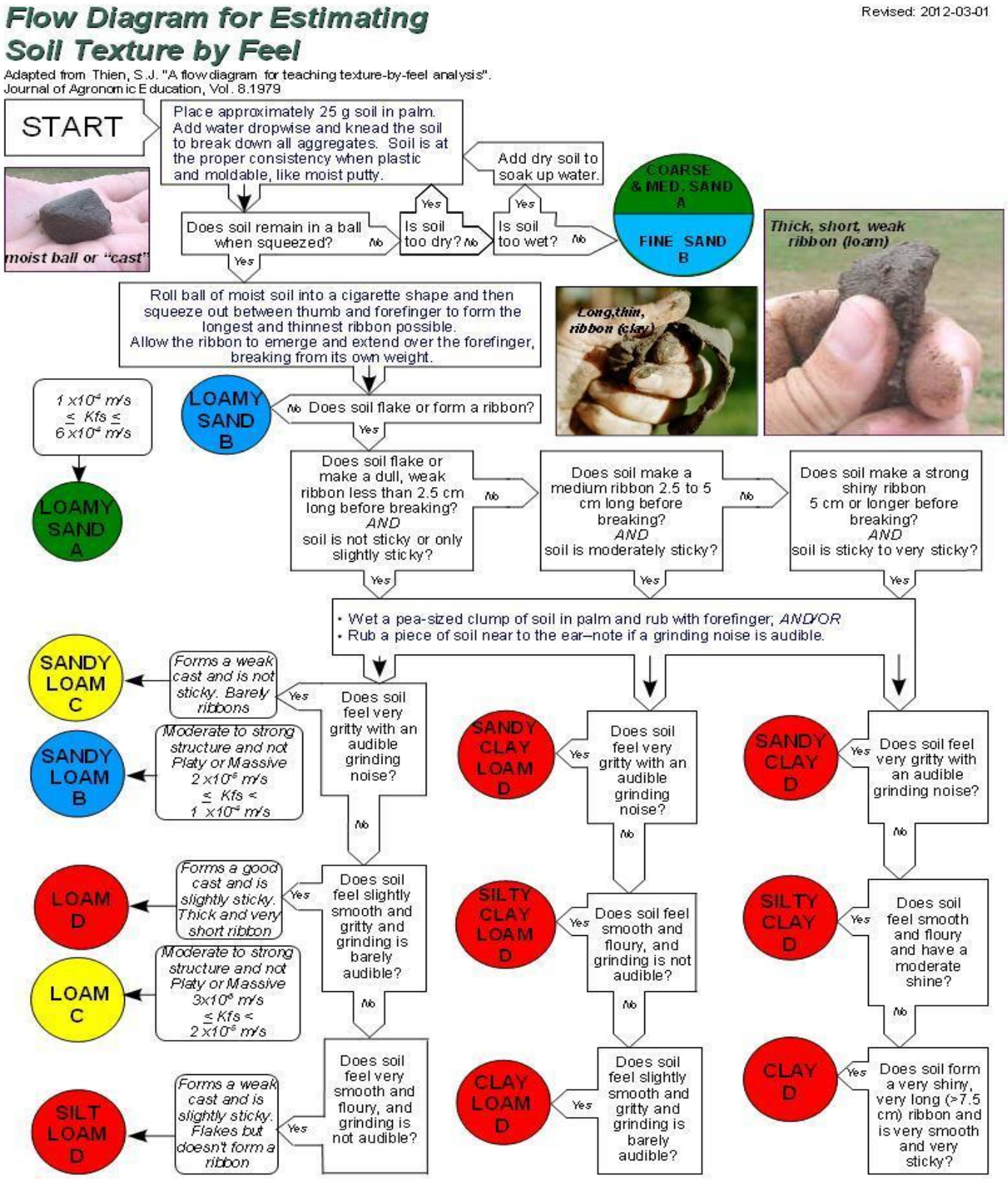
Where an Approval is revoked, the applicant must provide the necessary corrections to the satisfaction of the Inspector or Chief Plumbing Inspector in order for the Approval to be reinstated.

5.5.1 Certificate of Compliance

The Licensee must submit a Certificate of Compliance within ten (10) days after the on-site sewage disposal system is covered as per Section 16(2) of *Regulation 2009-137.*

6 APPENDICES

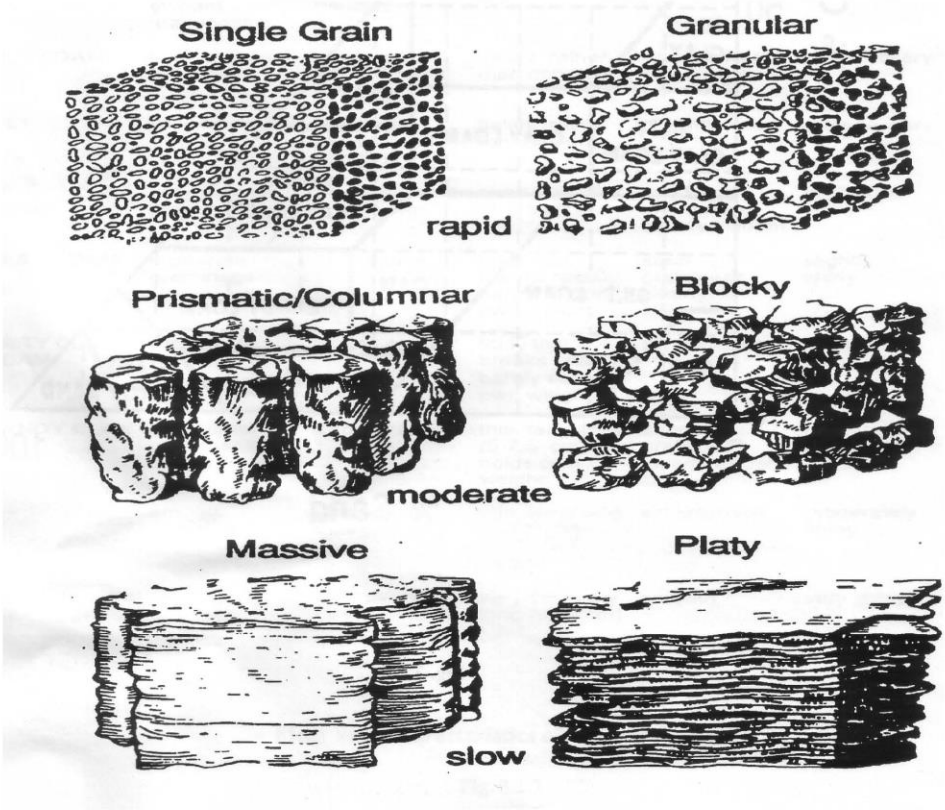
APPENDIX A: Flow Diargram for Estimating Soil Texture by Feel & Structure Types



STRUCTURE TYPE

Type (shape)	Typical Permeability	Description	Comments
Structureless - Single grain	Rapid	No observable aggregation or joining of individual soil particles	Loose, incoherent mass of individual particles as in clean sands.
Granular	Rapid	Particles are joined into relatively small spherical units.	Peds look like "cookie crumbs". Common in topsoil and uppermost soil layers.
Blocky	Moderate	Soils joined together to form larger units bounded by flat or rounded surfaces.	Observable sharp or rounded surfaces on peds.
Prismatic / Columnar	Moderate	Structure is arranged in a vertical plane. Peds have relatively flat vertical surfaces.	Peds formed in a vertical arrangement. Not common in the Maritimes.
Platy	Slow	Peds are arranged in layers on a horizontal plane.	Horizontal layering appearing as plates. Often associated with soils high in clay content.
Structureless - Massive	Slow	Solid structure. No evidence of any distinct arrangement of soil particles.	Appears as a solid mass.

STRUCTURE TYPE



STRUCTURE GRADE

Weak
Weakly formed peds that are barely observable in place.

Moderate
Moderately well formed peds that are moderately evident in place. Soil material of this grade, when disturbed, breaks down into a mixture of many distinct entire peds, some broken peds, and little disaggregated material.

Strong
The peds are clearly evident in place. They adhere only weakly to one another, and the peds separate from each other and remain largely intact when the soil material is disturbed. When displaced, soil material of this grade consists very largely of entire peds and includes few broken peds and little disaggregated material.

APPENDIX B

Minimum size building lot and septic tank, and minimum length of distribution pipe in an in-ground trench on-site sewage disposal system in relation to estimated daily sewage flow and permeability

Estimated sewage flow Litres/Day (L/d)	Working capacity of septic tank in litres (L)	Minimum lot size in square metres (m^2)	*Minimum width in metres (m)	**Minimum depth in metres (m)	***Total length of distribution pipe in metres (m) in relation to soil permeability as per Table 6		
					A	B	C
0-1365	3410	4000	54	38	60	82	100
1366-1705	4090	5350	59	38	72	103	125
1706-2055	4090	5350	59	38	87	124	150
2056-2730	6136	5350	59	38	115	165	200
2731-4090	6136	6700	63	38	175	245	300
4091-5460	8180	8050	68	38	235	330	400

*Width is measured parallel to road and is not necessarily measured at the road frontage.
**Depth is measured perpendicular to road.

***If required, the hydraulic conductivity rates associated with the A, B & C soil categories can be found in Section 3.1.

The yellow-highlighted areas require a pressure dosed system due to the linear length of the field. Please see Section 4.4.7 for more information.

APPENDIX B1

Minimum size building lot and septic tank, and minimum number of 4'x8' concrete units in an in-ground trench on-site sewage disposal system in relation to estimated daily sewage flow and permeability

Estimated sewage flow Litres/Day (L/d)	Working capacity of septic tank in litres (L)	Minimum lot size in square metres (m^2)	*Minimum width in metres (m)	**Minimum depth in metres (m)	***Total number of concrete units in relation to soil permeability as per Table 6.		
					A	B	C
0-1365	3410	4000	54	38	6	8	10
1366-1705	4090	5350	59	38	8	10	12
1706-2055	4090	5350	59	38	10	12	16
2056-2730	6136	5350	59	38	12	16	20
2731-4090	6136	6700	63	38	18	24	30
4091-5460	8180	8050	68	38	24	32	40

*Width is measured parallel to road and is not necessarily measured at the road frontage.
**Depth is measured perpendicular to road.

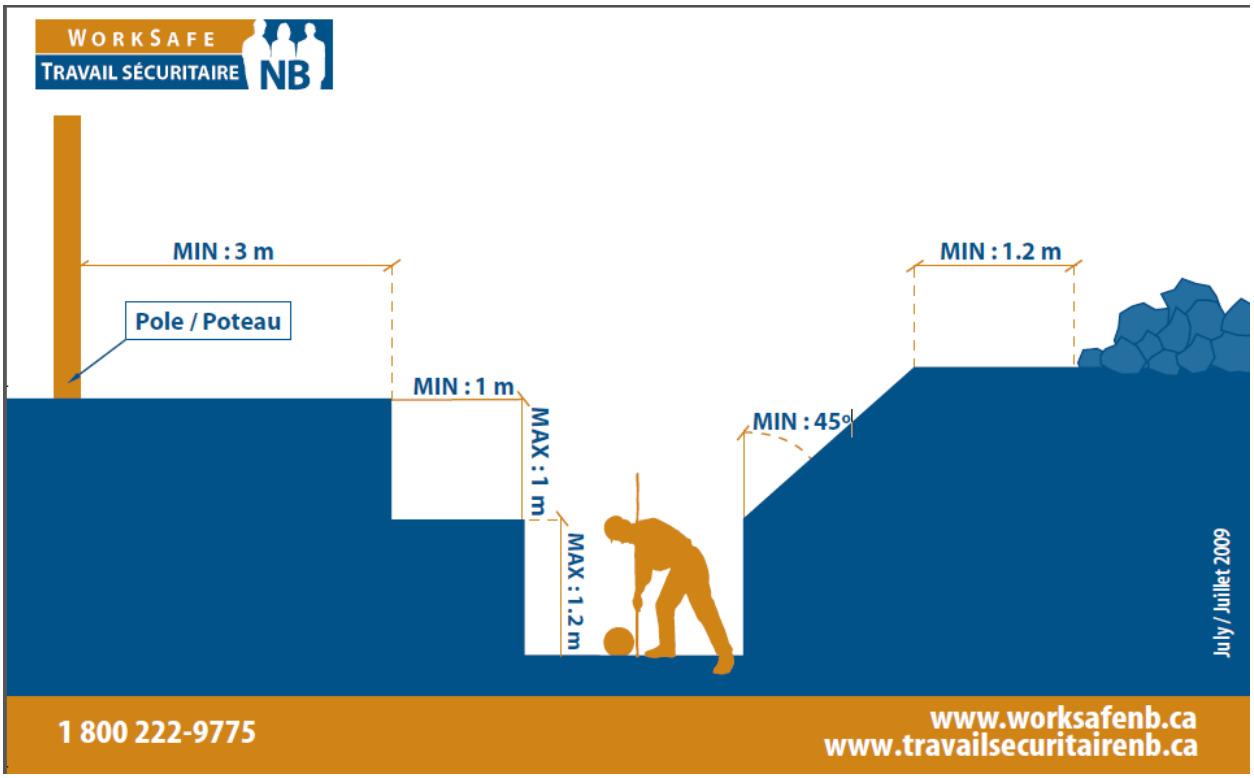
***If required, the hydraulic conductivity rates associated with the A, B & C soil categories can be found in Section 3.1.

APPENDIX C
Test Hole Requirements

Test Pits must be dug and left open ready for assessment by the inspector until the Licensee is in receipt of an approval or refusal.

It is a shared responsibility of the Licencee and property owner to clearly flag test pits to ensure the inspector can locate them and to prevent accidents.

The test pit must be 1.8m (6 feet) in depth and be constructed as per one of the following methods (i.e. stepped sides or sloped sides as shown). Test pits must be easy and safe to enter and exit. Please refer to www.worksafe nb.ca. for further information on requirements for Excavations and Trenches.



APPENDIX D

Estimated Daily Sewage Flows

An on-site sewage disposal system shall be designed and constructed so as to adequately treat and dispose of the expected maximum sewage flow.

The disposal system must be designed to receive all sewage from the building or structure except cooling water, roof, foundation or surface drains or backwash from water treatment devices, unless otherwise approved by the Department of Public Safety, Technical Inspection Services.

The design sewage flows from other residential, commercial, industrial and institutional buildings or structures should be based on the design wastewater flows prescribed in this Appendix. The minimum design flow from other residential, commercial, industrial and institutional buildings or structures shall be 500 L/day. In the case where a minimum design flow of 500 L/day is utilized, the minimum system length shall be at least 60m.

Where actual metered flow data indicating maximum daily flows are available,
this data may be substituted for the sewage flows listed in this appendix, under the following conditions:

- They should cover the most recent 6-12 month period of continuous operation (or 3 full seasons).
- They must be from the same or a similar facility in terms of size, activity, geographical location, open hours, production or occupancy, volume, usage pattern, etc.
- A 20-50% increase factor should be used in the design flow to accommodate potential future flow increases, occasional peaks, etc.
- If less than 6-12 months of flow data is available, or only average flows for the entire measured period exists (i.e., no daily readings but only the average for the entire period), they should be increased by up to 100 percent in the design (or seasonal activity).

Flow meter data should also include information regarding actual occupancy or production volume when unit flows are calculated.

When water-saving fixtures or devices are used, the peak daily flow estimates shall not be reduced from the values set out in this Appendix unless adequate consideration of the increased wastewater strength is made. Reduced water usage resulting from the use of water conservation measures or fixtures will increase wastewater strength a corresponding amount so no reduction in treatment area should be applied.

Design flows in this appendix are recommended minimal design flows and if evidence of larger flows exist or are expected, the larger flows should be used.

APPENDIX D - Estimated Daily Sewage Flows

FACILITY	PEAK FLOW (LPD)
RESIDENTIAL	
1 bedroom unit 2bedroom unit 3 bedroom unit 4 bedroom unit Each additional bedroom unit	750 1022 1365 1705 350 per bedroom
ASSEMBLY HALLS/THEATRES/FUNERAL PARLOURS, etc.	
With kitchen Without kitchen	30 per seat/person (based on occupancy load) 20 per seat/person (based on occupancy load)
MEDICAL/PERSONAL CARE	
Dental Office Medical Hospital (no resident personnel) Medical Office Mental Institutions Nursing Homes	760 per chair plus 75 per staff 630 per bed 275 per practitioner plus 75 per staff 400 per bed plus 75 per staff 450 per bed plus 75 per staff
INSTITUTIONAL	
Church With kitchen Without kitchen Correctional Facilities Fire / Police Station With kitchen Without kitchen	 30 per seat/person (based on occupancy load) 20 per seat/person (based on occupancy load) 136 per inmate and 23 per staff 30 per seat/person (based on occupancy load) 20 per seat/person (based on occupancy load)

Special Care Homes/Adult or Child Residential Facilities	450 per bed plus 75 per staff
Daycare centre	90 per child plus 75 per staff
Senior Citizen Residence or Complex	350 per room plus 75 per staff
SCHOOLS	
Elementary School	50 per student plus 75 per staff
Middle School	50 per student plus 75 per staff
High School	60 per student plus 75 per staff
Boarding Schools	280 per student plus 75 per staff
Note: Add additional flow for any school with a cafeteria	
FOOD-SERVICE	
Bakery (no seating)	70 per employee
Bar or other liquor licence establishments	113 per seat plus 75 per staff
Café (as part of another premise)	4 per m^2 plus 75 per staff (if applicable)
Cafeteria (where applicable)	25 per seat
Coffee and doughnut shop	125 per seat plus 75 per staff
Restaurants	
Open 24 hours and located on highway	400 per seat plus 75 per staff
Open 24 hours, not on highway	225 per seat plus 75 per staff
Not open 24 hours	125 per seat plus 75 per staff
Take-out	20 per m^2
COMMERCIAL	
Airport	20 per passenger plus 40 per employee
Automobile Repair or Service Station (not including restaurant)	530 per fuel outlet plus 75 per staff
Beauty Salon, Hair Dresser, etc.	650 per station
Convenience Store (no food prep)	5 per m^2 or 1230 per toilet, whichever is higher, plus 75 per staff.
Department Store / Shopping Centre	5 per m2 or 1230 per toilet, whichever is higher, plus 75 per staff.
Dog Kennel	75 per enclosure plus 75 per staff
Laundromat	2100 per machine

Pet Grooming	650 per station
Spa, Aesthetician, etc.	650 per station
Supermarket	1700 per washroom plus 75 per staff per food prep area (such as bakery, deli, butcher and other ready-to-eat) plus café if appropriate.
Veterinary Clinic	275 per practitioner plus 75 per staff plus 75 per kennel
HOSPITALITY	
Bed & Breakfast	320 per room
Hotel or Motel	320 per room
With bar or restaurant	See Food-Service Section
OFFICES / INDUSTRIAL	
Office	75 per employee
Industrial Building	
With showers	100 per employee
Without showers	75 per employee
Warehouse	75 per employee
RECREATION & PARKS	
Cabin resort, cabin clusters	450 per bedroom
Comfort Stations at Parks, Beaches, etc.	
With shower	50 per person
Without shower	30 per person
Cottages (individual)	As per Residential
Day Camp	
With meals	57 per person
Without meals	49 per person
Luxury Camp or similar w/ private bath	370 per person

Recreation Vehicle Park	
Un-serviced lots with comfort stations	*200 per space
With water and/or sewer	*450 per space
*Special consideration should be made for RV waste as it may have formaldehyde that could cause systems to fail	
Visitor Centre	30 per person
Work or Construction Camps (with toilets)	220 per person
Youth Camps (overnighting, with toilets)	170 per person

SPORTING FACILITIES

Bowling Alley	105 per alley
With restaurant or bar	See Food-Service Section
Country Club, Golf Club, Ski Lodge, etc.	45 per person plus 75 per staff
With restaurant or bar	See Food-Service Section
Fitness / Workout Centre	40 per person plus 75 per staff
Gymnasium	20 per person
Ice Rink	20 per seat
Outdoor Sporting Facility (arena, etc.)	20 per person, based on capacity design
Public Swimming Pool	30 per person, based on designed bather load
Tennis/Racquetball Facilities, etc.	950 per court
Water Park	20 per person

MISCELLANEOUS

Floor drains	unit	190
Catch basins - Garages, service stations, etc.	unit	375

APPROXIMATE FLUSHING FREQUENCIES

Facility	Minimum Design Flow
Residential	5 flushes/resident/day
Schools	2 flushes/student/day
Hotel/motel room	4-6 flushes/guest/night
Restaurant	0.5 flushes/meal/day
General commercial	2-4 flushes/employee/8hr
Industrial	3 flushes/employee/8hr
Ski areas	1 flush/skier/day

Campgrounds with facilities	3 flushes/person/night
Public restroom - Stay under 0.5hr	0.4 flushes/visitor/hr
Public restroom - Stay from 0.5-1hr	0.6 flushes/visitor/hr
Public restroom - Stay from 1-2hr	0.8 flushes/visitor/hr
Public restroom - Stay over 2hr	1.0 flushes/visitor/hr

FIXTURES WITH ADDITIONAL CAPACITY	
Hydro-massage and soaker tubs (fill and drain style)	[Volume of tub in L (- 340 L) x 2] [Volume of tub in IG (- 75G) x 2]
Water softener discharge	15% increase in peak daily wastewater volume
Other high capacity fixture	Add a volume reasonable anticipated from the specific fixture
High flow volume showers which discharge more than 13L (3IG) per minute	Add 50L for every 6L (1.5 IG) per min or portion thereof that exceeds a 13L (3IG) per minute discharge (normal shower discharge)
Garbage grinder	Residential: 5% increase in peak daily wastewater volume, 30% increase to the wastewater strength, and 50% increase in the projected volume of sludge storage required in a septic tank Other developments: specific calculations should be identified in the design

APPENDIX E

Influent Wastewater Quality

The expected influent raw wastewater strengths, expressed as maximum 30-day averages, are as follows:

BOD_5 of 300 mg/L;
TSS of 350 mg/L; and
Fats, oils, and greases content of 35 mg/L.

Notes:

a) These concentrations are nominally based on mass loadings of 50 to 60 g of BOD_5 or TSS per person per day.
b) The wastewater strength can be expected to increase when an under-the-sink food grinder is installed.
c) The wastewater quality and chemistry can be affected by the use of water treatment devices (such as water softeners) and by their waste discharge.

If the wastewater strength is projected to exceed the values set out in these Guidelines, the system shall:

a) Include additional treatment capacity to achieve the effluent quality required for the downstream component,
b) Have the downstream component include additional treatment capacity appropriate for the higher wastewater strength, or
c) Have a combination of the requirements referred to in clauses (a) and (b).

The projection of wastewater strength shall not be less than the highest maximum strength determined by:

a) Wastewater strength projections set out in published information that is acceptable to the Department of Public Safety, Technical Inspection Services or
b) Wastewater strength that has been measured from similar developments.

All systems, except for a lagoon, shall include an effluent testing port or readily accessible location that enables sampling of the effluent at a point downstream of any required effluent filter and prior to discharge to the soil-based treatment component. Sampling from the effluent chamber may be acceptable if there is no filter required downstream of the pump.

For a system where the anticipated wastewater strength exceeds typical wastewater, the effluent discharged to the soil infiltration area shall be tested once the system is commissioned to confirm the design has achieved the effluent quality intended by the initial treatment components.

APPENDIX F

Septic Tank Sludge and Scum Accumulation Rates for Other Than Residential

Premises	Fixtures	Sludge/Scum Rate # Persons P1	Rate: L/p/yr S
Note: Calculate each use and add to obtain total capacity Note: The term *average* or *highest daily number* over an "x" day period means the highest number in any 12-month period			
Recreational Vehicle Parks			
Permanent Occupation	wc/urinal, basin, bath/shower, laundry, kitchen sink	Total number of sites x 3.5	80
Casual Occupation	wc/urinal, basin, bath/shower, laundry, kitchen sink	Average number of sites occupied per year x 3.5	48
Child Day Care Centers			
	wc/urinal, basin, bath/shower, laundry, kitchen sink	Total number of children and staff	48
Churches, Public Halls, etc.			
	wc/urinal, basin, kitchen sink (tea service area only)	Average daily number over 7-day period	25 up to 4 days use/week 40 over 4 days use/week
Addition:	Where kitchen area provided for catering		Add 10 to either of above
Clubs			
Membership entry only Members/guests & staff using facilities	wc/urinal, basin, bath/shower, kitchen sink (tea service area only)	Average daily number over 7-day period	35
Licensed area Bar trade only	wc/urinal, basin, bar sink, glass washer	Average daily number over 7-day period	5
Licensed bar & restaurant/meals area	wc/urinal, basin, kitchen sink, dishwasher	Average daily number over 7-day period	10

Coffee/Tea Shops/Kiosks			
E.g., light refreshments and prepared food, cakes, etc.	Wc/urinal, basin, kitchen sink	Average daily number over 7-day period	30
Construction Camps – Temporary			
	Wc/urinal, basin, shower, laundry, kitchen sink, dishwasher	Total number of persons using facilities	80 x number of years to be used
Holiday Camps			
E.g., scout, youth and church centers with casual occupation	Wc/urinal, hand basin, shower, kitchen sink	Total number of beds (single equivalent)	48
Staff and/or residential caretaker data to be included where applicable			
Hospitals and Nursing Homes			
Accommodation and resident staff	Wc/urinal, basin, bath/shower, laundry, kitchen sink, dishwasher	Total number of beds plus resident staff	80
Non-resident staff	Wc/urinal, basin, kitchen sink (tea service area only)	Number of employees per shift x number of shifts	25
Hotels/Motels/Live-in Conference Centers			
Accommodation	Wc/urinal, basin, bath/shower, kitchen sink, laundry	Total number of beds (single equivalents)	48
Permanent residents, staff, etc.	Wc/urinal, basin, bath/shower, kitchen sink, laundry	Total number of live-in staff	80
Bar trade	Wc/urinal, basin, bar sink, glass washer	Average daily number attending in 7-day period	5
Dining room lounge area non-resident use	Wc/urinal, basin, kitchen sink, dishwasher	Average daily number of diners per 7-day period	10
Non-resident staff	Wc/urinal, basin, kitchen sink (tea service area only) With shower	Number of employees per shift x number of shifts	25

Medical Consulting Rooms			
E.g., doctors, dentists, etc. Staff Consulting rooms	Wc/urinal, basin, kitchen sink (tea service area only) With shower	Number of persons using system per shift x number of shifts Per consulting room	40 80
Public Swimming Pools			
Include kiosk, e.g., take away food	Wc/urinal, basin, shower, kitchen sink (tea service area only)	Average daily number over 7-day period	20
Public Toilets			
  Addition:	Wc/urinal, basin Where shower provided	Average daily number over 7-day period As above	20 5
Restaurants			
No liquor licence With liquor licence	Wc/urinal, basin, kitchen sink, dishwasher Wc/urinal, basin, kitchen sink, dishwasher, glass washer	Average daily number over 7-day period plus staff Average daily number over 7-day period plus staff	35 35
Rest Homes, Boarding & Lodging Houses			
Accommodation and resident staff Non-resident staff	Wc/urinal, basin, bath/shower, laundry, kitchen sink Wc/urinal, basin, kitchen sink (tea service area only) With shower	Total number of beds plus resident staff (single equivalents) Number of employees per shift x number of shifts	80 25

Road-houses/Service Stations			
Staff	Wc/urinal, basin, kitchen sink (tea service area only) With shower	Number of employees per shift x number of shifts	25
Public toilets	Wc/urinal, basin	Average daily number over 7-day period	20
Restaurant take away and sit down meals	Wc/urinal, basin, kitchen sink, dishwasher	Average daily number over 7-day period	10
Schools			
Including kiosk facilities, e.g., take away food	Wc/urinal, basin, kitchen sink	Total number of students plus staff	25
Where canteen facilities provided, e.g., plated hot and cold meals	Kitchen sink, dishwasher With shower	As above	10
Seminar/Conference Rooms			
No meals	Wc/urinal, basin, kitchen sink (tea service area only)	Total seating capacity plus staff	25
Meals No liquor licence	Wc/urinal, basin, kitchen sink, dishwasher, glass washer	Total seating capacity plus staff	35
Meals With liquor licence	Wc/urinal, basin, kitchen sink, dishwasher, glass washer With shower	As above	5
Restaurant take away and sit down meals	Wc/urinal, basin, kitchen sink, dishwasher	Average daily number over 7-day period	10
Shopping Centers			
Staff	Wc/urinal, basin, kitchen sink (tea service area only)	Number of employees per shift x number of shifts	25
Public	Wc/urinal, basin	Average daily number over 7-day period	20
Shop Facilities	Double bowl sink basin	Per shop	20
Supermarket	Double bowl sink basin, cleaners sink	Per supermarket	40

Sports Centers			
E.g., health and fitness clubs, squash courts, indoor hockey, basketball	Wc/urinal, basin, shower, kitchen sink (tea service area only)	Average daily number over 7-day period plus staff	25
Staff Ablutions, Work Place Installations			
E.g., factories, commercial, office	Wc/urinal, basin, kitchen sink (tea service area only) With shower	Number of employees per shift x number of shifts	25
Where canteen facilities provided for kiosk meals, e.g., pies, pastries, sandwiches	Kitchen sink		
Where plated meals provided, e.g., hot/cold meals prepared on-site	Kitchen sink, dishwasher	As above	10
Wine Tasting			
	Wc/urinal, basin, kitchen sink, glass washer	Average daily number over 7-day period	5

7 REFERENCES

CSA Standard B65, March 2012, Installation code for decentralized wastewater systems

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