Section one: On-site Analysis

All sewage system applications must have completed soil sieve analysis to include with application.

Sewage System Design Height:

Depth of Ground Water Table or bedrock depth determined through test pit = _____

Proposed minimum height of raised bed (where required): _____

Description of New or Existing Water Supply (check which applies):

- ☐ Drilled well with 6m (19'-8") casing depth minimum.
- ☐ Dug well
- ☐ Other: _____

There are two critical pieces of information that must be known in order to design a sewage system.

1. The amount of sewage entering the system that is generated from the building during a 24-hour period. This value is expressed as 'Q'.
2. The percolation rate. This value is expressed as 'T'.

The percolation rate means the average time in minutes that is required for water to drop one centimeter during a percolation test on-site or determined through soils analysis.

The sewage system daily design flows will be calculated using the charts provided in section two.

Note: A building inspector will not design a sewage system. The owner, authorized and qualified agent of the owner, qualified contractor/installer, qualified design consultant or professional engineer must provide the design of the sewage system.

Section Two: System Design and Worksheets

Sewage System Permit Summary / Overview
Project Address:
Applicable Law: (Documents provided with permit – check all applicable) ☐ Conservation Authority Approval. ☐ Source Water Protection. ☐ Permit Application and Schedule One (Designer) and Two (Installer) forms completed. ☐ Minor Variance Approval. ☐ Site Plan Approval. ☐ Grading Plans (for raised beds). ☐ Construction in Hazard Lands.
Building Occupancy Type: ☐ Residential (Dwelling) ☐ Residential (Other) specify: _____ ☐ Other Occupancy specify:
Class of System: ☐ Class 2 Sewage System – Greywater System ☐ Class 3 Sewage System – Cesspool ☐ Class 4 Sewage System – Leaching Bed System ☐ Class 5 Sewage System – Holding Tank
Sewage System Components: Septic Tank Capacity (L): ☐ Pump Capacity (L): _____ ☐ Distribution Box ☐ Other (please specify): _____ ☐ Advanced Treatment Unit Capacity (L): _____ Manufacturer and Model:
Method of Distribution Pipe Detection: ☐ Magnetic Means ☐ Tracer Wire (14 gauge TW solid copper light coloured plastic coated). ☐ Other Means (please specify):

Worksheet A: Residential Dwelling – Daily Design Flow Calculations (Q)

A) Residential Occupancy		(Q) Litres	Total
Number of Bedrooms	1 Bedroom	750	
	2 Bedrooms	1100	
	3 Bedrooms	1600	
	4 Bedrooms	2000	
	5 Bedrooms	2500	
		Subtotal (A)	

B) Plus Additional Flow for: Note: Use the largest additional flow calculation to determine Daily Design Flow (Q). If none apply then Subtotal (B) = zero.				
		Quantity	(Q) Litres	Total
Either	Each bedroom over 5		500	
Or	Floor space for each 10m^2 over 200m^2 up to 400m^2		100	
	Floor space for each 10m^2 over 400m^2 up to 600m^2		75	
	Floor space for each 10m^2 over 600m^2		50	
Or	Each fixture unit over 20 fixture units (Total of Worksheet B – 20 = Quantity)		50	
			Subtotal (B)	
			Subtotal A + B = Daily Design Flow (Q)	

Worksheet B: Residential Dwelling – Fixture Unit Count

Fixtures	Fixture Units	Quantity	Total
Bath Group (Toilet w/flush tank, sink, tub or shower)	6.0		
Bathtub Only (with or without shower)	1.5		
Shower Unit/Stall	1.5		
Wash Basin / Lavatory (1.5” Dia. Trap)	1.5		
Water Closet (Toilet) Flush Tank	4.0		
Bidet	1.0		
Dishwasher (See notes)	1.0		
Floor Drain (3” Dia. Trap)	3.0		
Sink (single or double, or two singles with one trap)	1.5		
Domestic Washing Machine	1.5		
Combination Sink and Laundry Tray	1.5		
Garburator (See notes)			
Other:			
		Total Number of Fixture Units	

Notes:

1. Bath group: A group of plumbing fixtures serving one room consisting of exactly one shower (single head) or bathtub, one lavatory (sink), and one water closet (toilet with flush tank). This would total seven (7) fixture units if added separately, but the Ontario Building Code provides a reduction for this grouping of plumbing fixtures.
2. Garburator: A domestic type of garbage disposal is permitted with no additional fixture unit load. A commercial type of garburator has a fixture load of 3.
3. Dishwasher: Only include dishwashers that are not connected to a domestic sink.
4. Refer to the Ontario Building Code Division B Table 7.4.9.3. for a complete listing of fixture types and fixture units.
5. Where laundry waste is not more than 20% of the total daily design flow, it may discharge to the sewage system. OBC 8.1.3.1.(2).
6. Sump pumps are not to be connected to the sewage system. Connection to a sewage system may lead to a hydraulic failure of the system.
7. Water softener and/or iron filter discharge may be directed to a sewage system provided the system has been designed to accept such discharge. Such discharge may lead to early failure of the system.

Worksheet C: Camp for the Housing of Workers

Camp for the Housing of Workers	Number of Employees	(Q) Litres	Total
Note: building size, number of bedrooms, and fixture counts are not required for a Camp for the Housing of Workers.		250	
		Daily Design Flow (Q)	

Worksheet D: Other Occupancy Daily Design Flow Calculation (Q)

To calculate the daily design flow for other occupancies, refer to the Ontario Building Code Division B, Part 8 Table 8.2.1.3.B.

Establishment	Load Variable Ex. Number of seats, per floor area, number of employees, etc.	Volume Litres	Total
		Daily Design Flow (Q)	

Worksheet E: Septic Tank Size
Note: The minimum septic tank size permitted by the Ontario Building Code is 3600 litres.

Occupancy Classification	Total Daily Design Flow (Q)	Multiplied by Factor	Minimum Tank Size (L)
Residential Occupancy House, Apartment, Camp for the Housing of Workers.		X2	
All other Occupancies		X3	

Worksheet F and G: Leaching Bed Calculations for Class 4 Sewage Systems.

Part 1: Complete All Parts
Type of Leaching Bed (select one) ☐ Absorption Trench ☐ Filter Bed ☐ Shallow Buried Trench ☐ Advanced Treatment System ☐ Type A Dispersal Bed ☐ Type B Dispersal Bed
Percolation rate of native/underlaying soil ("T" min/cm): _____
Name of Licensed Soil Testing Agency: _____
☐ In-ground system ☐ Raised bed system Height raised above original grade (metres): _
Mantel (where applicable) ☐ Imported Fill ☐ Native Soil Total expanded area in (metres squared): Q/Loading Rate: _____ (See OBC Div.B Part 8 Table 8.7.4.1.) Total expanded area configuration (length x width in metres): _____

Worksheet G: Complete One of A, B, C, D, E, F to suit the sewage system proposed.

☐ A. Absorption Trench Construction		
Total length of the distribution pipe	Conventional (QxT) ÷ 200 = _____m (Septic tank only – no advanced treatment system) Type 1 Leaching Chambers (QxT) ÷ 200 = _____m Type 2 Leaching Chambers (QxT) ÷ 300 = _____m Configured as:_____runs of_____m for a Total_____m	
☐ B. Filter Bed Construction		
Effective Area If Q ≤ 3000 litres per day use Q ÷ 75 If Q >3000 litres per day use Q ÷ 50 Level II-IV treatment units use Q ÷ 100	Effective area:_____(Q) ÷ _____(75, 50, or 100) =_____m Configured as:_____m x_____m Number of beds: _____ 15 m Mantle Required	
Distribution Pipe	Number of Runs:_____	Spacing of runs: _____m
Contact Area = (Q x T) ÷ 850	Contact Area: [_____(Q) x _____(T)] ÷ 850 = _____m^2	
Expanded Contact Area	ECA: _____m^2	
☐ C. Shallow Buried Trench Construction		
Percolation time (T) of soil in minutes: 1 < T ≤ 20 20 < T ≤ 50 50 < T < 125	Length of distribution pipe (metres): Q ÷ 75 metres Q ÷ 50 metres Q ÷ 30 metres	Total length of distribution pipe: (L)=_____(Q) ÷ (75, 50, 30) = _____m
☐ D. Advance Treatment System		
Provide BMEC or CAN/BNQ approval and manufacturer's system design documents.		
☐ E. Type A Dispersal Bed		
Stone layer: If Q ≤ 3000 l/day use Q ÷ 75 If Q > 3000 l/day use Q ÷ 50 Sand layer: 1 < T ≤ 15 Use (Q x T) ÷ 850 T > 15 Use (Q x T) ÷ 400	Stone layer =_____ (Q) ÷_____(75 or 50) = _____ m^2 Sand layer = [_____(Q) ÷_____(T)] ÷ (850 or 400) = _____m^2	
☐ F. Type B Dispersal Bed		
Area = (Q x T) ÷ 400 Linear Loading Rate (LLR) T < 24 min. use 50 L/min. If T ≥ 24 min. use 40 L/min. Distribution Pipe	Area = [_____ (Q) x _____ (T)] ÷ 400 = _____m^2 Pump chamber capacity =_____L Length (Q ÷ LLR) =_____m Bed configuration =_____m x_____m x_____m Number of beds = _____ Configured as:_____runs of_____m Total:_____m	

For the design of a Class 4 System, complete the following summary chart and the associated worksheets for the chosen type of Class 4 sewage system.

Class 4 System – complete summary selection for proposed system (A,B,C,D,E, or F)		
A: Absorption Trench ☐ In-Ground ☐ Raised ☐ Leaching Chambers Type 1 ☐ Leaching Chambers Type 2 ☐ Total Pipe Length: _____ ☐ Mantle Required _____ ☐ Expanded Contact Area: _____	B: Filter Bed ☐ In-Ground ☐ Raised ☐ Effective Area: _____ ☐ Contact Area: _____ ☐ Leaching Chambers Type 1 ☐ Leaching Chambers Type 2 ☐ Total Pipe Length: _____ ☐ 15 M Mantle Required ☐ Expanded Contact Area Required _____	C: Shallow Buried Trench ☐ Type: _____ ☐ Length of Chamber: _____
D: Advanced Treatment System (BMEC & CAN/BNQ): ☐ BMEC authorization provided ☐ CAN/BNQ authorization provided ☐ Service agreement provided ☐ Mantle Required/Area: _____ ☐ Stone Layer Area: _____ ☐ Sand Layer Area: _____ ☐ System Specifications Provided. ☐ Manufacturer's Installation Manual Provided.	E: Type A Dispersal Bed: ☐ In-Ground ☐ Raised ☐ Length of Pipe: _____ ☐ Mantle Area: _____ ☐ Stone Layer Area: _____ ☐ Sand Layer Area: _____	F: Type B Dispersal Bed: ☐ In-Ground ☐ Raised ☐ Stone Layer Area: _____ ☐ Linear Loading Rate 40L/m ☐ Linear Loading Rate 50L/m

Worksheet H: Sewage System Site Plan

Please provide the following information on this worksheet:

- Location of the sewage system and components (tank, leaching bed, pump chamber, etc.)
- Location of all buildings, pools, waterbody, wells on the property and adjacent properties.
- Locate and show minimum clearances for treatment units and distribution piping. Refer to Ontario Building Code, Division B. Table 8.2.1.6.A, 8.2.1.6.B, and 8.2.1.6.C
- Location of property lines, easements, and utility corridors.

Worksheet I: Cross Sectional Drawings

Cross sectional drawings are required for all sewage system designs.

- Location of existing grade
- Measurements to each component, distances to water table and/or bedrock
- Label each septic system component

Acknowledgement of Above Ground Electrical Conductors

Sentence 3.1.19.1. of the Ontario Building Code indicates that a building shall not be located beneath existing above ground electrical conductors and dictates the minimum horizontal clearances measured from the maximum conductor swing to a building as such:

a) Be not less than 1m for electrical conductors carrying voltages 750V or less, except where necessary to connect the electrical wiring of the building;
b) Be not less than 3m for electrical conductors carrying voltages greater than 750V but not exceeding 46kV;
c) Be not less than 3.7m for electrical conductors carrying voltages greater than 46kV but not exceeding 69kV, or
d) Conform to the requirements of CAN/CSA-C22.3 No.1, "Overhead Systems" for electrical conductors carrying voltages greater than 69kV.

The Ontario Building Code and Building Code Act defines a sewage system as a "Building". The following acknowledgement is to ensure that the location of the sewage system will meet OBC requirements for clearances from above ground electrical conductors.

Signature of Applicant: _____ Date _____