Primary Effluent Treatment Field

Trench Bottom Surface Area & Length Sizing

This design worksheet was developed by Alberta Municipal Affairs and Alberta Onsite Wastewater Management Association.

The complete system is to comply with Alberta Private Sewage Standard of Practice 2021
This worksheet does NOT consider all of the requirements of the mandatory Standard
***Use only Imperial units of measurement throughout (feet, inches, Imperial gallons, etc…)**

Step 1) Determine the expected volume of sewage per day:

Note: Use Table 2.2.2.2.A. (p.26) & 2.2.2.2.B. (p.28) to determine expected volume of sewage per day. Provide allowance for additional flow factors as detailed in Table 2.2.2.3. (p.25)

Assess the initial sewage strength against the requirements of 2.2.2.1.(1) (p.25)
Effluent quality must meet the requirement of Article 8.1.1.6(1)(a) (p. 85).

Expected Peak Volume of Sewage per Day

IG/day **F1**

Step 2) Determine the design soil effluent loading rate:

Texture	&	Structure	&	Grade	=	Soil Effluent Loading Rate [30 - 150 mg/L $cBOD_5$ column]	
	&		&		=		IG/ft²/day **F2**

If result is less than 0.2 gal/ft²/day a treatment field cannot be used. Article 8.2.1.13. (1) Page 93

Note: Effluent loading rate MUST be determined from soil texture, structure, and grade classification according to Imperial Table A.1.E.1. (p.141) (For metric measurement use Table 8.1.1.10 on Page 87)

Step 3) Calculate optional credits for effluent loading rate:

Primary treated effluent requires a minimum 5 feet Vertical Separation below infiltration surface area.
Refer to Article 8.1.1.4. (1)a) and 8.1.1.4. (1)d) p. 84.

Effluent loading rate factors cannot be taken for soils with textures Coarse Sand (COS), Medium Sand (MS), Loamy Coarse Sand (LCOS), Loamy Medium Sand (LMS) and;
Coarse Sandy Loam (COSL) or Medium Sandy Loam (MSL) having Prismatic, Blocky or Granular structure of Grade 2 or 3.

	Effluent Loading Rate		Factor		Effluent Loading Rate with Factor Applied	
Pipe & Rock Trench - Gravity Distribution	From F2	X	1	=	ELR	F3
OR						
Pipe & Rock - Pressure Distribution	From F2	X	1.2	=	ELR	F3A
OR						
Chambers - Gravity Distribution[1]	From F2	X	1.1	=	ELR	F3B
OR						
Chambers - Pressure Distribution[1]	From F2	X	1.3	=	ELR	F3C

*****See Article 8.2.1.8.1) regarding calculation of trench bottom using gravel. Page92 AB SOP 2021. See Article 8.3.1.5.(1) regarding calculation of trench bottom area using chambers. Page 98 AB SOP 2022*****

Note: Ensure infiltration loading rate chosen does not exceed loading rates as set out in 8.1.2.2. (p. 89).

Step 4) Calculate the minimum required infiltration surface area for the soil using adjusted effluent loading rates:

Expected Peak Volume of Sewage per day		Effluent Loading Rate with Factor Applied		Minimum Soil Infiltration Area Required	
	÷		=		F4
IG/day		IG/ft²/day		ft²	
From F1		From F3, F3A ,F3B or F3C			

Step 5) Type and width of trench bottom used:

Actual Pipe & Rock Trench Width in inches.						
	inches	÷	12	=	feet	F5
Actual Chamber Width in inches						
	inches	÷	12	=	feet	F5A

' **Note: Chamber width is calculated using the exterior width at the base of the chamber. (Article 8.3.1.4, p. 90)**

Step 6) Determine total weeping lateral trench length required:

Infiltration Area Required		Width of Trench		Minimum Weeping Lateral Trench Length Required		
	ft² ÷		ft =		feet	F6
From F4		From F5 or F5A				

Step 7) Select number of weeping lateral trenches and determine length of each of trench:

Minimum Weeping Lateral Trench Length Required		Number of Weeping Lateral Trenches Required		Minimum Length of Each Weeping Lateral Trench		
	ft ÷		=		feet	F8
From F6		F7				
		See Note Below²				

² **Refer to Article 8.2.1.12. (p.93) Treatment Field Layout with regards to Linear Loading and potential for groundwater mounding**

Step 8) Summary:

F1		IG/day - Peak Daily Flow, including any additional fixtures.
F2		IG/ft²/day - Soil Effluent Loading Rate.
F3 - F3C		IG/ft²/day - Effluent Loading Rate with Factor Applied
F4		Ft² - Minimum Soil Infiltration Area Required
F5 or F5A		Ft - Actual Width of Gravel Trench or Chambers.
F6		Ft - MINIMUM Weeping Lateral Trench Length Required.
F7		Total Number of Weeping Lateral Trenches.
F8		Ft - Length of Each Weeping Lateral Trench.