INFILTRATION TRENCH CALCULATION WORKSHEET

Property Owner: _____

Site Address: _____ Zone: _____

Step 1. Calculate the treatment volume

The treatment volume (b) is twice the volume of 1.1 inches of rain multiplied by the additional impervious surface area calculated in the impervious surface calculation worksheet. This is the volume you are required to capture in the trench drain and infiltrate into the ground. This volume of runoff can be routed to the trench drain from any on-site impervious surface.

	Item	Total
(a)	Area of impervious surfaces requiring mitigation (square feet)	
(b)	Treatment volume (cubic feet)	

(a) from impervious surface calculation worksheet
(b) = 2 x (a) x (1.1/12)

Step 2. Determine the size of the infiltration trench

Calculate the length, width, and depth of the infiltration trench required to capture and store the treatment volume calculated above in (b). This calculation assumes vertical sides and a 40% void space in the washed stone/gravel.

	Item	Total
(c)	Required volume of infiltration trench (cubic feet)	
(d)	Dimensions of infiltration trench	L = W = D =

(c) = (b) / 0.4
(d) Choose a length, width, and depth (in feet) of the infiltration trench. Multiply length x width x depth = (d). *(d) must be greater than or equal to (c).*

Step 3. Determine the infiltration rate of the native soil under the infiltration trench and the check the time to infiltrate.

The treatment volume is required to be infiltrated into the native soils within 48 hours.

	Item	Total
(e)	Infiltration rate of on-site soils beneath infiltration trench (in/hour)	
(f)	Time to infiltrate (hours) *Must be equal to or less than 48 hours*	

(e) = half of on-site testing result or value from Appendix A
(f) = depth of infiltration trench x [12/(e)]

Calculated by: _____ **Date:** _____

Staff Approval by: _____ **Date:** _____

Appendix A. Design Soil Infiltration Rates

Hydrologic soil group	Infiltration rate (inches/hour)	Infiltration rate (centimeters/hour)	Soil textures	Corresponding Unified Soil Classification
A	1.63[a]	4.14	gravel sandy gravel silty gravels	GW - well-graded gravels, sandy gravels GP - gap-graded or uniform gravels, sandy gravels GM - silty gravels, silty sandy gravels SW - well-graded gravelly sands
	0.8	2.03	sand loamy sand sandy loam	SP - gap-graded or uniform sands, gravelly sands
B	0.45	1.14		SM - silty sands, silty gravelly sands
	0.3	0.76	loam, silt loam	MH - micaceous silts, diatomaceous silts, volcanic ash
C	0.2	0.51	Sandy clay loam	ML - silts, very fine sands, silty or clayey fine sands
D	0.06	0.15	clay loam silty clay loam sandy clay silty clay clay	GC - clayey gravels, clayey sandy gravels SC - clayey sands, clayey gravelly sands CL - low plasticity clays, sandy or silty clays OL - organic silts and clays of low plasticity CH - highly plastic clays and sandy clays OH - organic silts and clays of high plasticity

Source: Minnesota Stormwater Manual, 2016

Appendix B. Example Infiltration Trench Cross Section

Hydrologic soil group	Infiltration rate (inches/hour)	Infiltration rate (centimeters/hour)	Soil textures	Corresponding Unified Soil Classification

Depth

Width

Fill with washed stone or gravel (no fines)

Install permeable filter fabric around sides and bottom of trench