



BMP T5.10A Downspout Infiltration Systems

What is the purpose? Downspout Infiltration Systems are underground trenches or dry wells filled with rock that are designed to infiltrate runoff from roof downspout drains into the soil.

Where should it be used? Downspout Infiltration Systems are designed to infiltrate runoff from residential roof downspout drains and cannot be used to directly infiltrate runoff from pollutant-generating surfaces (e.g. driveways).

How do I build it? There are two main types of Downspout Infiltration Systems: Infiltration Trenches and Infiltration Drywells. See the drawings attached and pick the type of system that best suits your site. If you don't know what type to use, contact the City of Centralia Engineering Department for help.

How do I maintain it? Infiltration systems require little to no maintenance as long as debris does not get inside it and clog up the system. Check the catch basin at least twice a year and remove any debris that has accumulated.

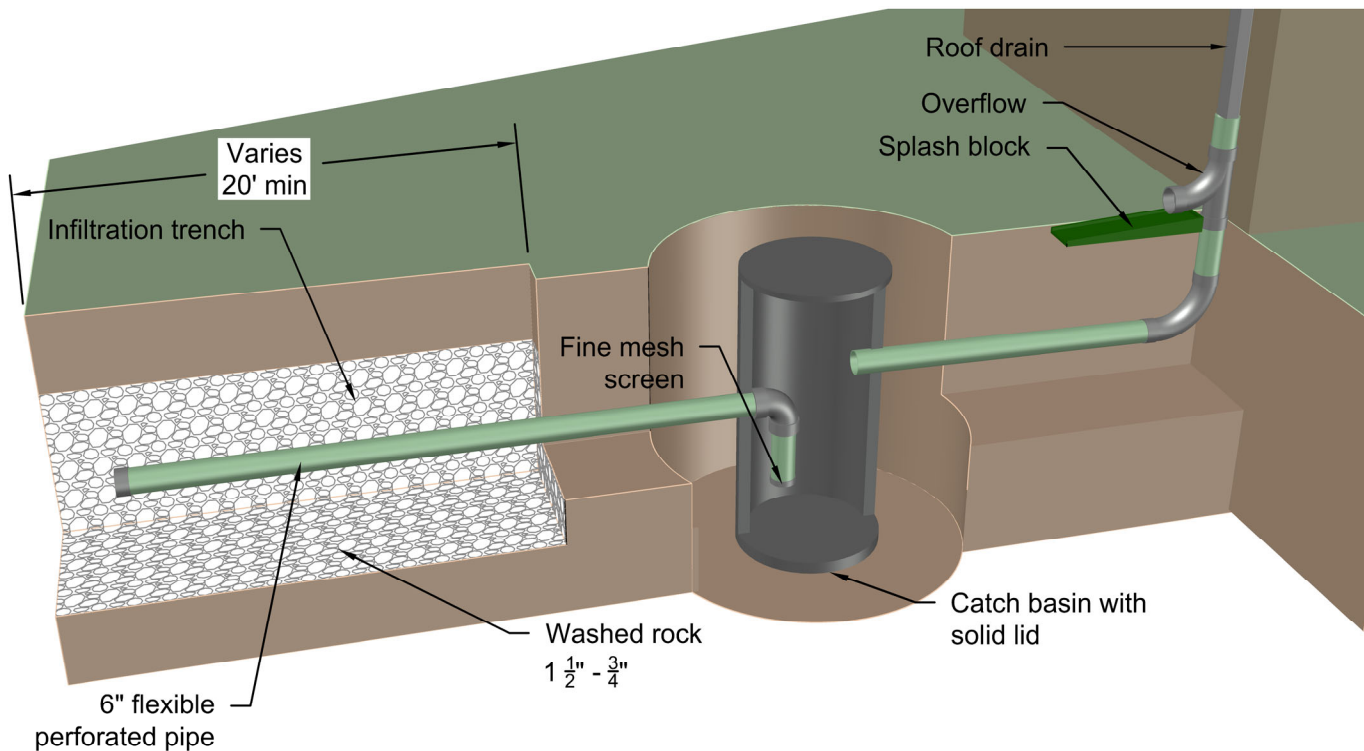
Minimum Sizes For Residential Construction Without Onsite Infiltration Testing or Soil Analysis		
Roof Area	Infiltration Trench	Infiltration Drywell
1000 sq. ft.	1 Trench 2'x3'x71'	4 Each (6ft dia. x 4 ft deep)
1500 sq. ft.	2 Trenches (2'x3'x53') Or 1 Trench (3'x3'x71')	4 Each (6ft dia. x 5.5 ft deep)
2000 sq. ft.	2 Trenches (2'x3'x71') Or 1 Trench (3'x3'x94')	4 Each (7ft dia. x 4.5 ft deep)
2500 sq. ft.	2 Trenches (2'x3'x89') Or 1 Trench (4'x3'x89')	Not Recommended
3000 sq. ft.	2 Trenches (3'x3'x71') Or 1 Trench (4'x4'x80')	Not Recommended

Downspout Infiltration System Size Worksheet

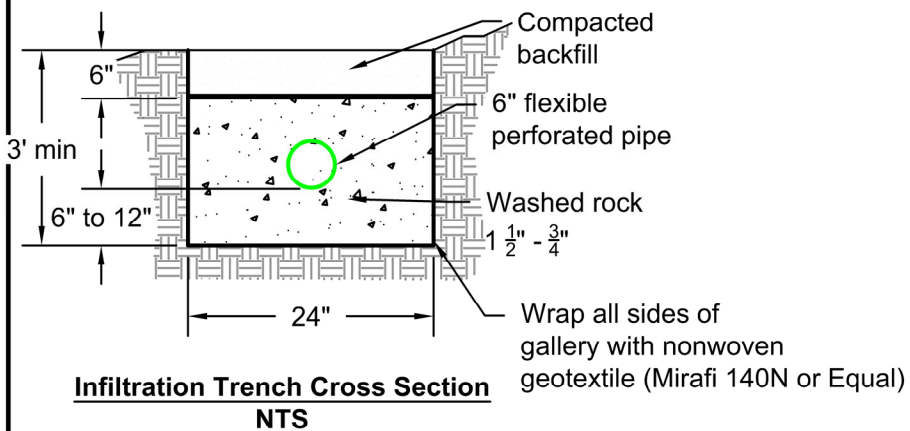
Complete this worksheet for sizing without doing onsite infiltration testing or soil analysis

Step 1: Calculate Roof Area		
House (length x width):	A	
(Round up to the nearest Foot for all Measurements)	Garage (length x width):	B
	Other Roof Area:	C
	Add lines A, B and C (Line "D" is your total roof area)	D
Step 2: Calculate Required Infiltration System Volume		
	Multiple line D by .425:	E
	(Line "E" is the required total infiltration system volume)	
Step 3: Determine Infiltration Trench Size		
	Width of Trench:	F
		(typical 2 ft)
	Depth of Trench:	G
		(typical 3 ft)
*If using infiltration chambers divide line I by 3 to determine trench length	Divide line E by line F:	H
	Divide line H by line G:	I
		(feet)
Number of Downspouts _____	Divide line I by the number of downspouts: (if J < 20, enter 20)	J*
		(feet)
*Line "J" is the length of trench required at each downspout location based on the width and depth of trench selected. Minimum length 20 feet. If line "J" is greater than 100 feet, then you will need to split the roof area to smaller areas and install more trenches.		
Alternate Step 3: Infiltration Drywell Size		
	Diameter of Drywell:	F
		(Min. 6 ft)
<u>If line F equals</u>	<u>Enter on line G</u>	
6	28 --->	
7	38.5 --->	
8	50 --->	
9	63.5 --->	
10	78.5 --->	G
	Divide line E by line G:	H
Number of Downspouts _____	Divide line H by the number of downspouts:	I*
		(Feet)
*If line "I" is greater than 6 feet, increase the diameter on line "F" and recalculate. Line "I" is the depth of drywell required at each downspout location based on the diameter.		

These calculations are based on well-draining soil. If your site does not drain well, other options must be considered. Contact the Engineering Department for guidance.



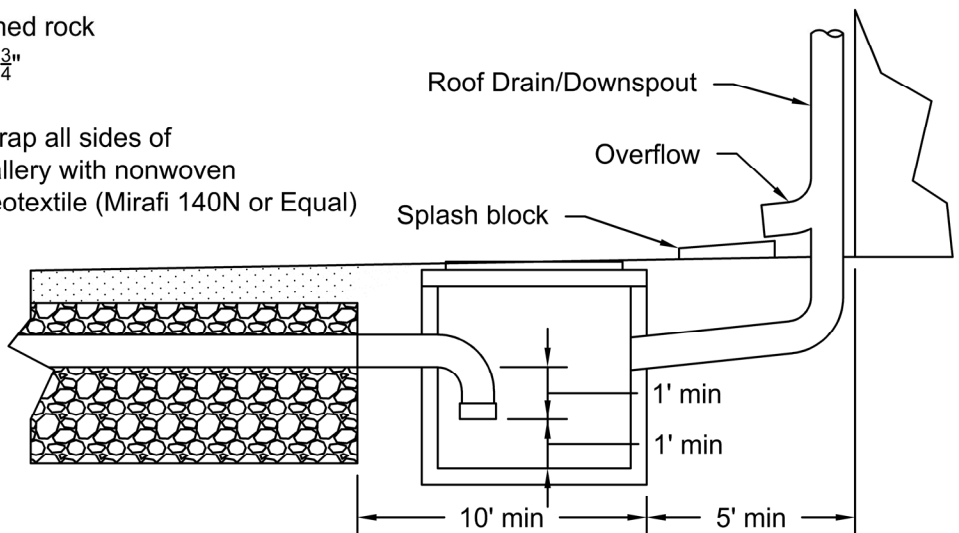
Infiltration Trench Detail
NTS



Infiltration Trench Cross Section
NTS

Notes:

1. Applicable for well-draining soils.
2. 20' length at each downspout per 1000 sq. ft. roof area.

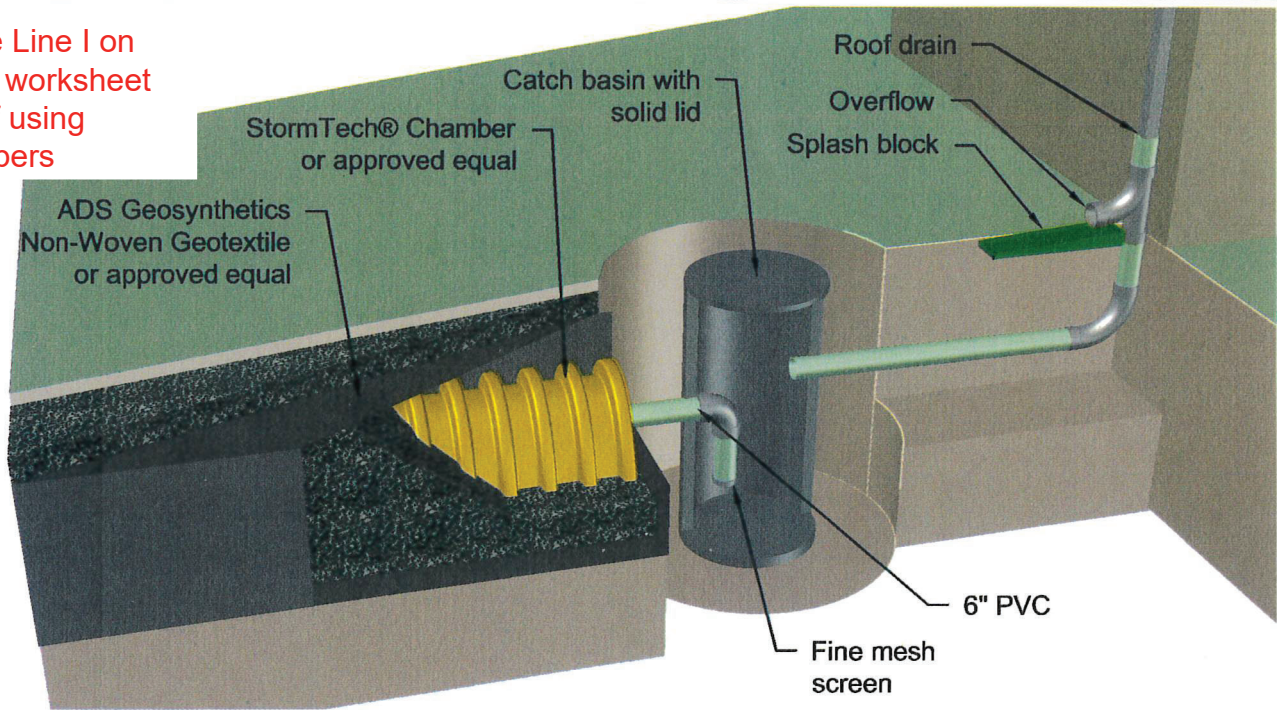


Infiltration Trench Minimum Separations
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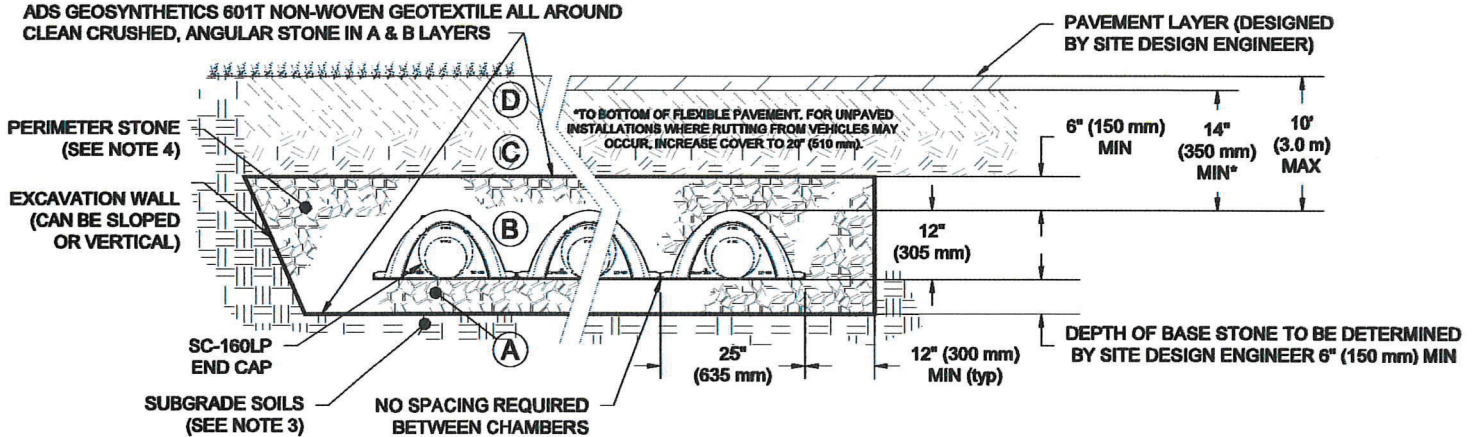
**Typical Residential Downspout
Infiltration Trench**

Divide Line I on
sizing worksheet
by 3 if using
chambers



Infiltration Gallery Detail
NTS

ADS GEOSYNTHETICS 601T NON-WOVEN GEOTEXTILE ALL AROUND
CLEAN CRUSHED, ANGULAR STONE IN A & B LAYERS



MATERIAL LOCATION	DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	FINAL FILL: FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	INITIAL FILL: FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 14" (355 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	AASHTO M145 ¹ A-1, A-2-4, A-3 OR AASHTO M43 ¹ 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 88, 9, 10	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	EMBEDMENT STONE: FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	AASHTO M43 ¹ 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	FOUNDATION STONE: FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	AASHTO M43 ¹ 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE ^{2,3}

PLEASE NOTE:

- THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
- STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 6" (150 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
- WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.



Typical Downspout Infiltration Chamber