MS4 Project –Example 1C – Infiltration Trench

Rev. 9-19-19

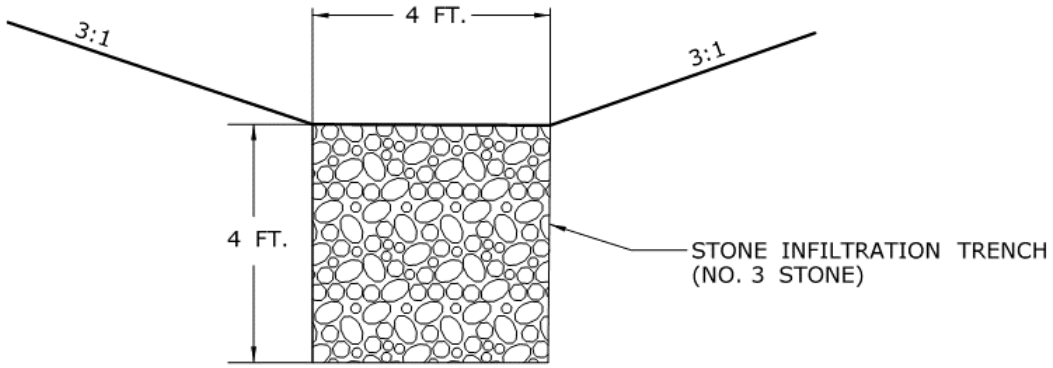
Examining the effect of putting an infiltration trench:

Overview: Infiltration trenches may be used in various ways, such as in a linear depression (such as in a median,) or in a mildly-sloped channel. Stormwater may flow into the infiltration trench from the top, or piped in via a small diameter pipe. In some cases grass may be utilized to help vegetative uptake (treatment,) and stone check dams may be added to increase retention.

Note: To utilize an infiltration trench in a channel in order to increase infiltration (retention):

- Trench Depth should be between 2 – 10 feet.
- Groundwater minimum 2 feet below the trench bottom.
- Soils must be sandy and suitable for infiltration
- Stone porosity 0.3 – 0.4
- Install a pre-treatment measure to capture sediment before it enters the infiltration trench.

For this example, assume the infiltration trench is located as the bottom of the channel described in Example 1 A. A preformed scour hole (18’ long) will be installed at the pipe outlet to serve as pretreatment. The dimensions of the infiltration trench will be 132’ long x 4’ wide x 4’ deep.



Determining the volume of the void space of the infiltration trench (assuming the stone porosity of 0.3.):

(132’ x 4’ x 4’) x 0.3 porosity = 633.6 c.f. = 0.0145 ac-ft. (round to 0.015 ac-ft)

This will be the WQV Retained by the infiltration trench.

Note that for this example, there is no longer grass in the bottom of the channel.

Enter WQV Retained by the Infiltration Trench in Section 4 of the worksheet.

Section 4: Stormwater BMP Selection Summary			
Design Phase ☐30% ☐60% ☐90% ☐FDP	WQV Retained (ac-ft)	WQV Treated (ac-ft)	Site Constraints
Disconnection			
No curb / natural dispersion	0.012	0.012	Insufficient Right-of-Way
Vegetative filter strip			Choose an Item.
Other			Choose an Item.
Conveyance & Disconnection			
Grass channel			Choose an Item.
Water quality swale (dry)			Choose an Item.
Other			Choose an Item.
Infiltration / Retention			
Infiltration basin			Choose an Item.
Infiltration trench	0.015		Choose an Item.
Underground infiltration system			Choose an Item.
Dry well			Choose an Item.
Other			Choose an Item.
Treatment			
Wet basin / wetland system			Choose an Item.
Extended dry detention basin			Choose an Item.
Hydrodynamic-oil/grit sys.			Choose an Item.
Bioretention with underdrain			Choose an Item.
Other			Choose an Item.
TOTAL	0.027	0.012	
Notes:	Infiltration Trench added: 145' long x 4' wide x 4' deep (0.3 stone porosity)		

Enter the new total WQV Retained and WQV Treated into DC2 and DC3 in Section 3 of the worksheet to obtain a new Total WQV that now includes the infiltration trench.

The change in DCIA associated with the installation of the infiltration trench will be based on the percentage % of the WQV for the drainage area to the Grass Channel retained by the infiltration trench. This was previously calculated to be 0.067 in Example 1A:

The WQV Goal (DC1) for the project was 0.079 ac-ft. It was determined that the stone check dams retained 0.012 ac-ft.

0.015/0.067 = 22.4 % of the WQV Goal

Referring back to the drainage area to the channel (example 1A): Of the total 3.37 acre drainage area, 0.7 acres was impervious.

22.4**% of 0.7 ac = 0.157 acres**

(This portion of the infiltration trenches impervious drainage area is now considered to be disconnected.)

Revising Post-Construction DCIA (DC5):

Previous Directly Connected Impervious Area (DCIA) for the project from only natural dispersion (in Example 1) was 0.66 ac. (Remember that for this example we cannot take credit for treatment due to grass in the bottom of our channel.)

0.66 – 0.157 = 0.503 acres (Round to 0.50 acres - enter into DC5)

The infiltration trench helps to provide a reduction in directly connected impervious area.

Section 3: Designed Conditions					
Water Quality Calculations		**30% Design**	**60% Design**	**90% Design**	**FDP**
DC1	WQV retention design goal ☑ Full ☐ 1/2"-WQV	ac-ft ☑ TBD	0.079 ac-ft	ac-ft	ac-ft
DC2	WQV goal ***retained*** (refer to page 2)	ac-ft	0.027 ac-ft	ac-ft	ac-ft
DC3	WQV goal ***treated*** (refer to page 2)	ac-ft	0.012 ac-ft	ac-ft	ac-ft
DC4	Total WQV *retained and treated*	0 **ac-ft**	0.039 **ac-ft**	0 **ac-ft**	0 **ac-ft**
DC5	Post-construction DCIA(acres)	ac. ☑ TBD	0.50 ac.	ac.	ac.
DC6	Pre-construction DCIA (refer to EC2 above)	ac.	0.62 ac.	ac.	ac.
DC7	Change in DCIA from pre- to post-construction *Can be positive (DCIA gained) or negative (DCIA lost)*	0 **ac.** ☑ **TBD**	-0.12 **ac.**	0 **ac.**	0 **ac.**

Discussion: