CAPITAL REGION COUNCIL
OF GOVERNMENTS (CapCOG)

MANAGING STORMWATER IN THE CAPITAL REGION

PRESENTED BY ED FISHER
MAY 17, 2018

Light-Heigel & Associates, Inc.
ENGINEERS and SURVEYORS
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LANCASTER, PA HALIFAX, PA SCHUYLKILL HAVEN, PA
WEST LAWN, PA MONTANDON, PA PORTER TWP., PA

MUNICIPAL ENGINEERS, SURVEYORS, LAND PLANNING, ZONING
ADMINISTRATION, BUILDING and CODE INSPECTIONS

WHAT ARE THE REGULATIONS AND WHERE DO THEY COME FROM?

1. **CHAPTER 102 AND NPDES CONSTRUCTION PERMITTING (CHAPTER 102)**

- STATEWIDE REGULATIONS
- CHAPTER 102 INCLUDES FEDERAL NPDES PERMIT REGULATIONS
- APPLY EVERYWHERE
- ADMINISTERED BY THE COUNTY CONSERVATION DISTRICT THROUGH A DELEGATION AGREEMENT WITH DEP
- PERMITS ARE REQUIRED FOR EARTH DISTURBANCES EQUAL TO OR GREATER THAN ONE ACRE
- A POST CONSTRUCTION STORMWATER MANAGEMENT PLAN IS REQUIRED

2. **MUNICIPAL ORDINANCES**

- APPLICABLE WITHIN THE MUNICIPALITY WHERE THE ORDINANCE IS ADOPTED
- IN DAUPHIN COUNTY, THE LOCAL ORDINANCES ARE BASED ON A DEP MODEL ORDINANCE
- THE MODEL ORDINANCE WAS PART OF THE COUNTY WIDE ACT 167 PLAN FROM 2010
- ACT 167 REQUIRES MUNICIPALITIES TO ADOPT ORDINANCES CONSISTENT WITH THE PLAN

- AN AMENDMENT TO THE COUNTY WIDE ACT 167 PLAN WAS APPROVED IN 2013
- THE AMENDMENT PROVIDED GREATER FLEXIBILITY IN THE REQUIREMENTS
- SOME MUNICIPALITIES ADOPTED THE AMENDMENT. SOME DID NOT.

SUMMARY

PCSM IN EACH MUNICIPALITY IS REGULATED BY:

1. THE MUNICIPALITY THROUGH THE MUNICIPAL ORDINANCE
2. EPA AND DEP THROUGH CHAPTER 102

III. Tracking

- All Exemptions

4. Removal of ground cover, grading, filling, or excavation of an area:

   Total area of land disturbance _____ sq. ft.

   Type of regulated ground work activity (check all that apply):

   [ ] Ground Cover Change [ ] Grading [ ] Filling [ ] Excavation
   [ ] Other Earth Disturbance Activity (please describe) _____
   _____

5. Provide a copy of the Zoning or Building Permit Sketch.

By my signature below, I certify to the Township that, to the best of my knowledge, the following statements are true:

- The proposed activity will not result in the disturbance of land within floodplains, wetlands, environmentally sensitive areas, riparian forest buffers, or slopes greater than 15%.
- The proposed activity will not be conducted within any existing drainage or storm water easement created by or shown on any recorded plan.
- The proposed activity will minimize soil disturbance, take steps to minimize erosion during construction activity, and promptly reclaim all disturbed areas with topsoil and vegetation.
- The proposed activity will not adversely impact any existing known problem areas or downstream property owners or the quality of runoff entering any storm sewer.
- I will minimize soil disturbance, take steps to minimize erosion during construction activity, and promptly reclaim all disturbed areas with topsoil and vegetation.
- I will take steps to insure that runoff will be directed to pervious areas on the subject property. No runoff will be directed onto an abutting street or neighboring property.
- I acknowledge the Township's right to review the provided information, at my expense, and to deny this application or to revoke this permit application if any of the above statements are found to be false.

The undersigned hereby represents that, to the best of their knowledge and belief, all information listed above is true, correct and complete.

_____ _____

Date Signature of Owner / Applicant

IV. Plan Processing

- Exemptions – Staff Review
  1. Log in date received
  2. Complete application/correct fee submitted?
  3. Review for compliance
     - Less than the Ordinance threshold?
     - Impervious coverage from previous projects?
     - Steep slopes?
     - Existing stormwater problems?
     - Limit of earth disturbance noted?

IV. Plan Processing

- Small Projects (Minor Plans)
  1. Log in date received
  2. Complete application/fee/plan sketches submitted?
  3. Review for compliance
     - Less than Ordinance threshold?
     - Impervious coverage from previous projects?
     - Steep slopes?
     - Existing stormwater problems?
     - Sketch showing limit of earth disturbance?

IV. Plan Processing

- Full Stormwater Plan Applications (Major Projects)
  1. Log in date
  2. Is the application complete?
  3. Correct number of copies?
  4. Correct fee?

VI. Inspections

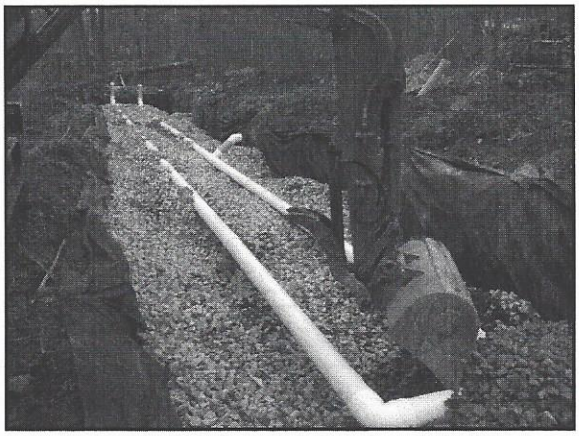
- Exemptions
  1. Built what they applied for?
  2. Disturbed area as noted?
  3. Check for erosion of the soil
  4. Impact to adjoining properties?

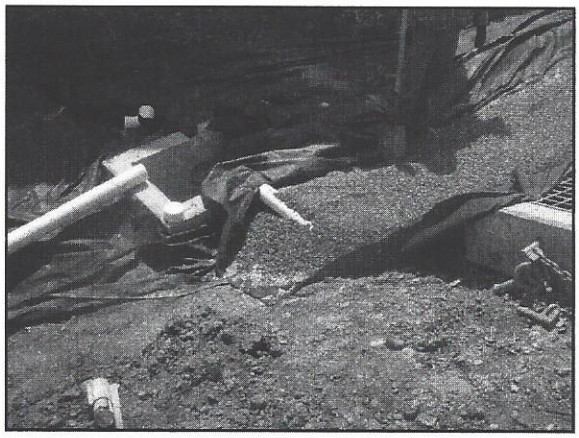
VI. Inspections

- Small Projects – Municipal Engineer or Staff
  1. Type of SW Management facility?
  2. Have all connections been made?
  3. Is it operational as intended?
  4. Is the disturbed area as noted on the sketch plans?
  5. Is there any soil erosion?
  6. Is there impact to adjoining properties?

VI. Inspections

- Major SW Plan Projects
  1. Defer to Municipal Engineer for all inspections





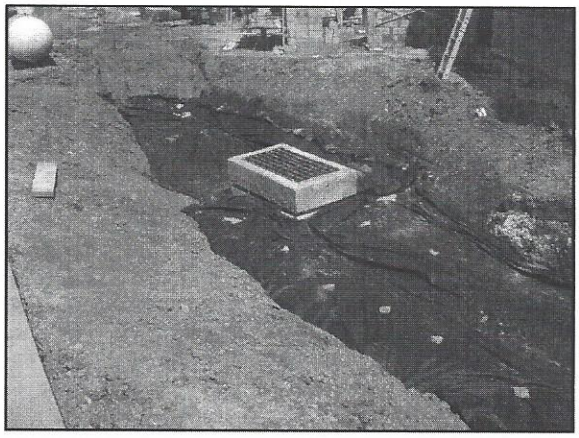


TABLE 5.2
Runoff Coefficients for the Rational Equation*

LAND USE	A Soils[1]			B Soils[1]			C Soils[1]			D Soils[1]		
	< 2%	2 - 6%	>6%	< 2%	2 - 6%	>6%	< 2%	2 - 6%	>6%	< 2%	2 - 6%	>6%
Cultivated land	0.08	0.13	0.16	0.11	0.15	0.21	0.14	0.19	0.26	0.18	0.23	0.31
Pasture	0.12	0.20	0.30	0.18	0.28	0.37	0.24	0.34	0.44	0.30	0.40	0.50
Meadow	0.10	0.16	0.25	0.14	0.22	0.30	0.20	0.28	0.36	0.24	0.30	0.40
Forest	0.05	0.08	0.11	0.08	0.11	0.14	0.10	0.13	0.16	0.12	0.16	0.20
Residential lot size 1/8 acre	0.25	0.28	0.31	0.27	0.30	0.35	0.30	0.33	0.38	0.33	0.36	0.42
Residential lot size 1/4 acre	0.22	0.26	0.29	0.24	0.29	0.33	0.27	0.31	0.36	0.30	0.34	0.40
Residential lot size 1/3 acre	0.19	0.23	0.26	0.22	0.26	0.30	0.25	0.29	0.34	0.28	0.32	0.39
Residential lot size 1/2 acre	0.16	0.20	0.24	0.19	0.23	0.28	0.22	0.27	0.32	0.26	0.30	0.37
Residential lot size 1 acre	0.14	0.19	0.22	0.17	0.21	0.26	0.20	0.25	0.31	0.24	0.29	0.35
Industrial	0.67	0.68	0.68	0.68	0.68	0.69	0.68	0.68	0.69	0.69	0.69	0.70
Commercial	0.71	0.71	0.72	0.71	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
Streets	0.70	0.71	0.72	0.71	0.72	0.74	0.72	0.73	0.76	0.73	0.75	0.78
Open Space	0.05	0.10	0.14	0.08	0.13	0.19	0.12	0.17	0.24	0.15	0.21	0.28
Parking	0.85	0.86	0.87	0.85	0.86	0.87	0.85	0.86	0.87	0.85	0.86	0.87
Construction Sites - Bare packed soil, smooth	0.30	0.35	.040	0.35	.040	0.45	0.40	0.45	0.50	0.50	0.55	0.60
Construction Sites - Bare packed soil, rough	.020	0.25	0.30	0.25	0.30	0.35	0.30	0.35	0.40	0.40	0.45	0.50

* Runoff Coefficients for storm recurrence intervals less than 25 years

Adapted from McCuen, R.H., Hydrologic Analysis and Design (2004)

1. According to the USDA NRCS Hydrologic Soils Classification System

APPENDIX B-6 - MANNING'S EQUATION "n" ROUGHNESS COEFFICIENTS

Description	Manning's "n"
Smooth-Wall Plastic Pipe	0.011
Concrete Pipe	0.012
Smooth-Lined Corrugated Metal Pipe	0.012
Corrugated Plastic Pipe	0.024
Annular Corrugated Steel And Aluminum Alloy Pipe (Plain or Polymer Coated)	
68 mm x 13 mm (2 2/3 in x 1/2 in) Corrugations	0.024
75 mm x 25 mm (3 in x 1 in) Corrugations	0.027
125 mm x 25 mm (5 in x 1 in) Corrugations	0.025
150 mm x 50 mm (6 in x 2 in) Corrugations	0.033
Helically Corrugated Steel And Aluminum Alloy Pipe (Plain or Polymer Coated)	
75 mm x 25 mm (3 in x 1 in), 125 mm x 25 mm (5 in x 1 in), or 150 mm x 50 mm (6 in x 2 in) Corrugations	0.024
Helically Corrugated Steel And Aluminum Alloy Pipe (Plain or Polymer Coated)	
68 mm x 13 mm (2 2/3 in x 1/2 in) Corrugations	
a. Lower Coefficients*	
450 mm (18 in) Diameter	0.014
600 mm (24 in) Diameter	0.016
900 mm (36 in) Diameter	0.019
1200 mm (48 in) Diameter	0.020
1500 mm (60 in) Diameter or larger	0.021
b. Higher Coefficients**	0.024
Annular or Helically Corrugated Steel or Aluminum Alloy Pipe Arches or Other Non- Circular Metal Conduit (Plain or Polymer Coated)	0.024
Vitrified Clay Pipe	0.012
Ductile Iron Pipe	0.013
Asphalt Pavement	0.015
Concrete Pavement	0.014
Grass Medians	0.050
Grass - Residential	0.030
Earth	0.020
Gravel	0.030
Rock	0.035
Cultivated Areas	0.030 - 0.050
Dense Brush	0.070 - 0.140
Heavy Timber (Little undergrowth)	0.100 - 0.150
Heavy Timber (With underbrush)	0.40
Streams:	
Some Grass And Weeds (Little or no brush)	0.030 - 0.035
Dense Growth of Weeds	0.035 - 0.050
Some Weeds (Heavy brush on banks)	0.050 - 0.070

Notes:

* Use the lower coefficient if any one (1) of the following conditions apply:

a. A storm pipe longer than twenty (20) diameters, which directly or indirectly connects to an inlet or manhole, located in swales adjacent to shoulders in cut areas, shoulders in cut areas or depressed medians.

b. A storm pipe which is specially designed to perform under pressure.

** Use the higher coefficient if any one (1) of the following conditions apply:

a. A storm pipe which directly or indirectly connects to an inlet or manhole located in highway pavement sections or adjacent to curb or concrete median barrier.

b. A storm pipe which is shorter than twenty (20) diameters long.

c. A storm pipe which is partly lined helically corrugated metal pipe.

Practice Exercise: 30'x30' Addition; 12'x20' Patio (A)

STORM WATER MANAGEMENT SITE PLAN EXEMPTION APPLICATION
YOUR TOWNSHIP

Owner's Name: Mr. & Mrs. Smith

Address: 121 Back Road

Your Municipality

Project Location: 121 Back Road
Phone #: _____ Fax #: _____
Email: _____

Person to be completing the work: Al Contractor
Address: _____
Phone #: _____ Fax #: _____
Email: _____

Description of Existing Conditions and Proposed Activity

1. Has any impervious surface been installed on this property since the enactment of this Storm Water Management Ordinance (Dec 2010)?

   [X] No

   [ ] Yes; total area of previously installed impervious surface _____ sq. ft.

2. Are you removing existing impervious surface as part of this project?

   [X] No

   [ ] Yes; total area of impervious surface to be removed _____ sq. ft.

3. Addition of impervious surface with this project (must be less than 1,000 sq. ft.):

   Total area of new impervious surface proposed 900 sq. ft.

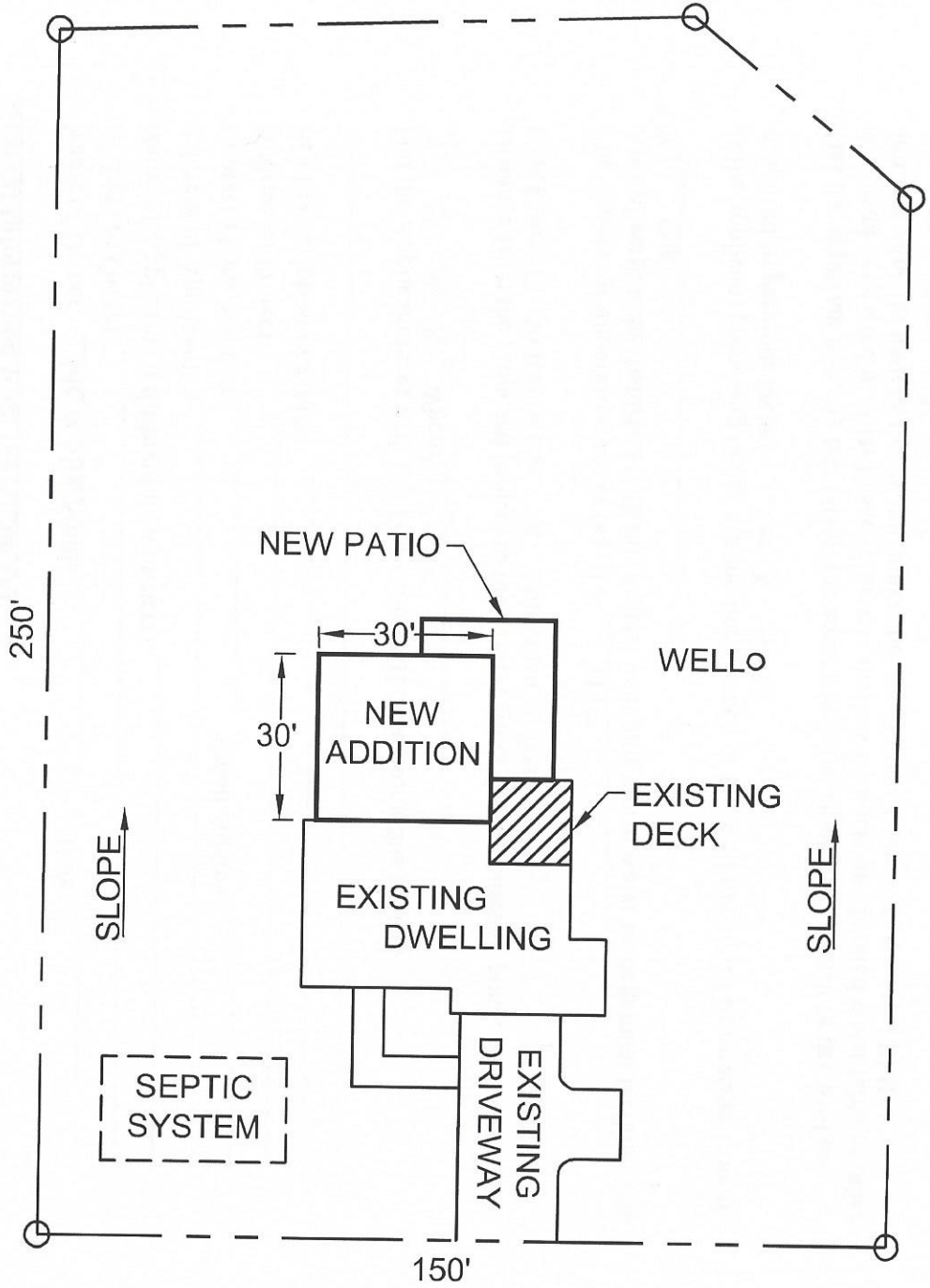
   Type of new impervious surface:

   [ ] Driveway [ ] Shed [ ] Garage [ ] Deck [ ] Walkway [X] Patio [X] Building Addition

   [ ] Other (please describe) _____

4. Removal of ground cover, grading, filling, or excavation of an area:

   Total area of land disturbance 1500 sq. ft.



EXEMPT: YES___ NO___

Simplified SWM Site Plan

Attach a Simplified SWM Site plan (i.e. sketch plan) an example is shown on the next page.

This sketch plan should include:

1. The approximate location of the property lines.
2. Existing sidewalks, buildings, driveways, or other impervious areas with dimensions in feet and areas in square feet.
3. The location where the proposed impervious area is going to be located with dimensions in feet and areas in square feet.
4. Dimensions from the property line to the proposed impervious areas.
5. Arrows showing the general stormwater flow direction across the project area.
6. The location of the proposed stormwater control facilities with dimensions and distances from the existing/proposed structures.
7. The location of existing utilities (water, sewer, gas, etc.).
8. Pa 1 Call number.
9. The area of disturbance delineated on the plan showing the area in square feet.

I acknowledge the Township's right to review the provided information, at my expense, and to deny this application or to revoke this permit application if any of the above statements are found to be false.

The Applicant assumes all risk and responsibilities for the design submitted. The manual is provided as a guide. However, it provides no specific design for any project.

The undersigned hereby represents that, to the best of his knowledge and belief, all information listed above and on the storm water management plan herewith submitted is true, correct and complete.

5/12/14
Date

Mr. Smith
Applicant

OFFICE USE

Date Received _____ Township File # _____

Property Account # _____

Submission Fee _____

Date of Application Approval _____

IX. Practice Exercise B

Applicant wants to put in a 15x20 shed.

Type of regulated ground work activity (check all that apply):

[ ] Ground Cover Change [X] Grading [ ] Filling [X] Excavation
[ ] Other Earth Disturbance Activity (please describe) _____

_____

5. Provide a copy of the Zoning or Building Permit Sketch.

By my signature below, I certify to the Township that, to the best of my knowledge, the following statements are true:

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- The proposed activity will not adversely impact any existing known problem areas or downstream property owners or the quality of runoff entering any storm sewer.
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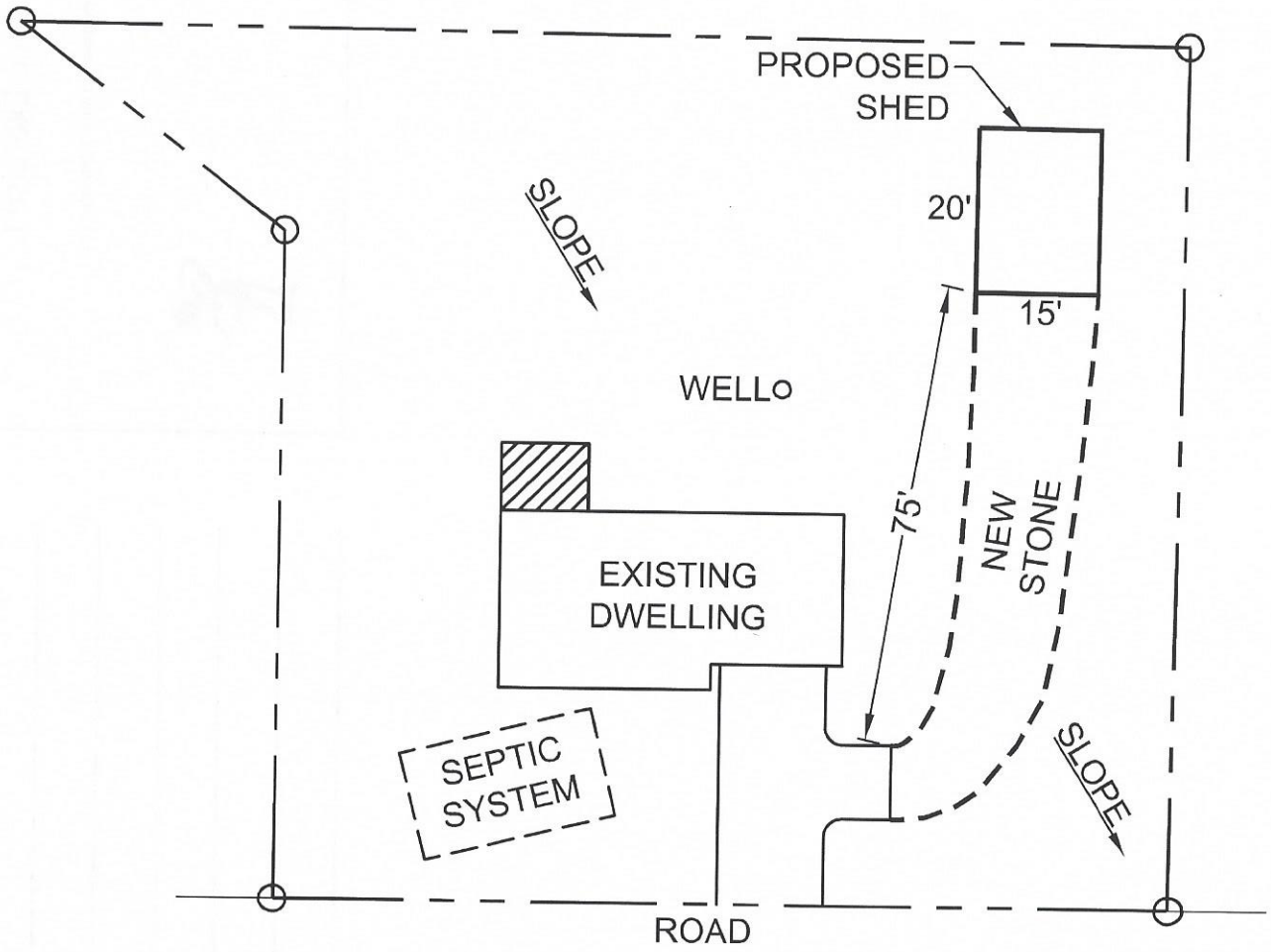
- I acknowledge the Township's right to review the provided information, at my expense, and to deny this application or to revoke this permit application if any of the above statements are found to be false.

The undersigned hereby represents that, to the best of their knowledge and belief, all information listed above is true, correct and complete.

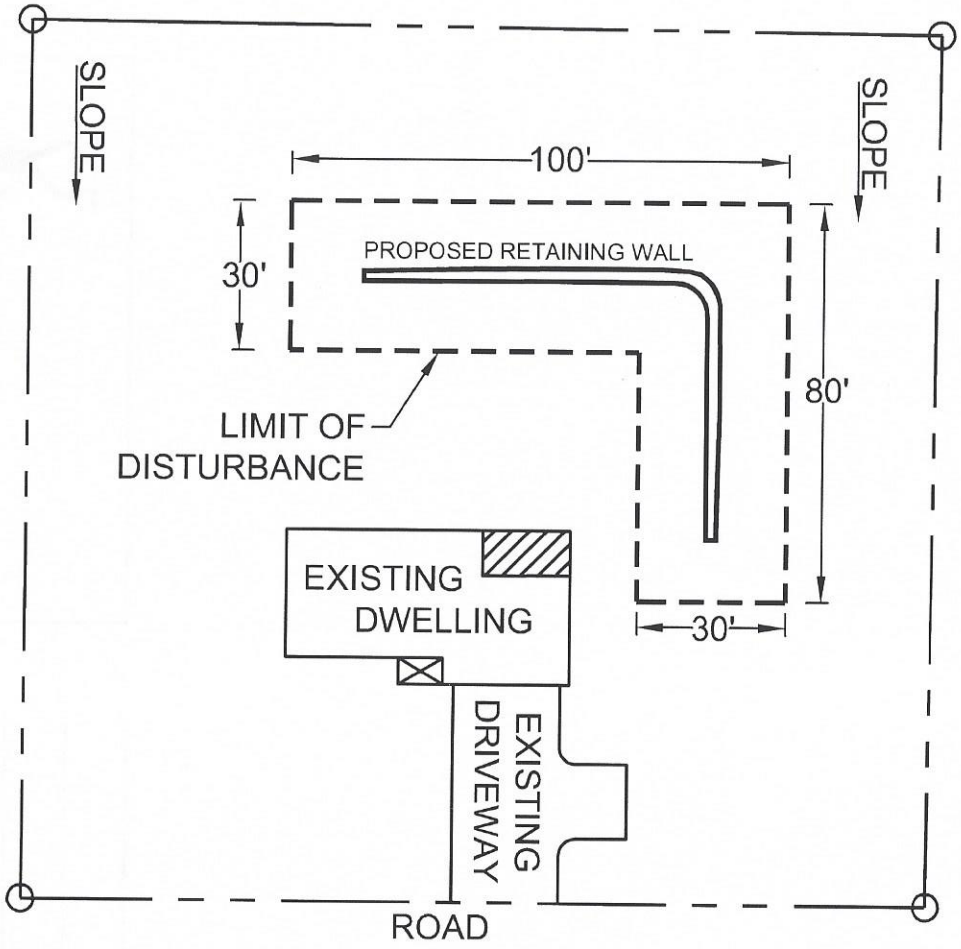
_____ Joe Smith
Date Signature of Owner / Applicant

- Municipal Use Only –

Date Received: _____ File #: _____ Submitted Fee: _____
Property Account #: _____
Approval Date of Application: _____
Comments: _____



EXEMPT: YES___ NO___



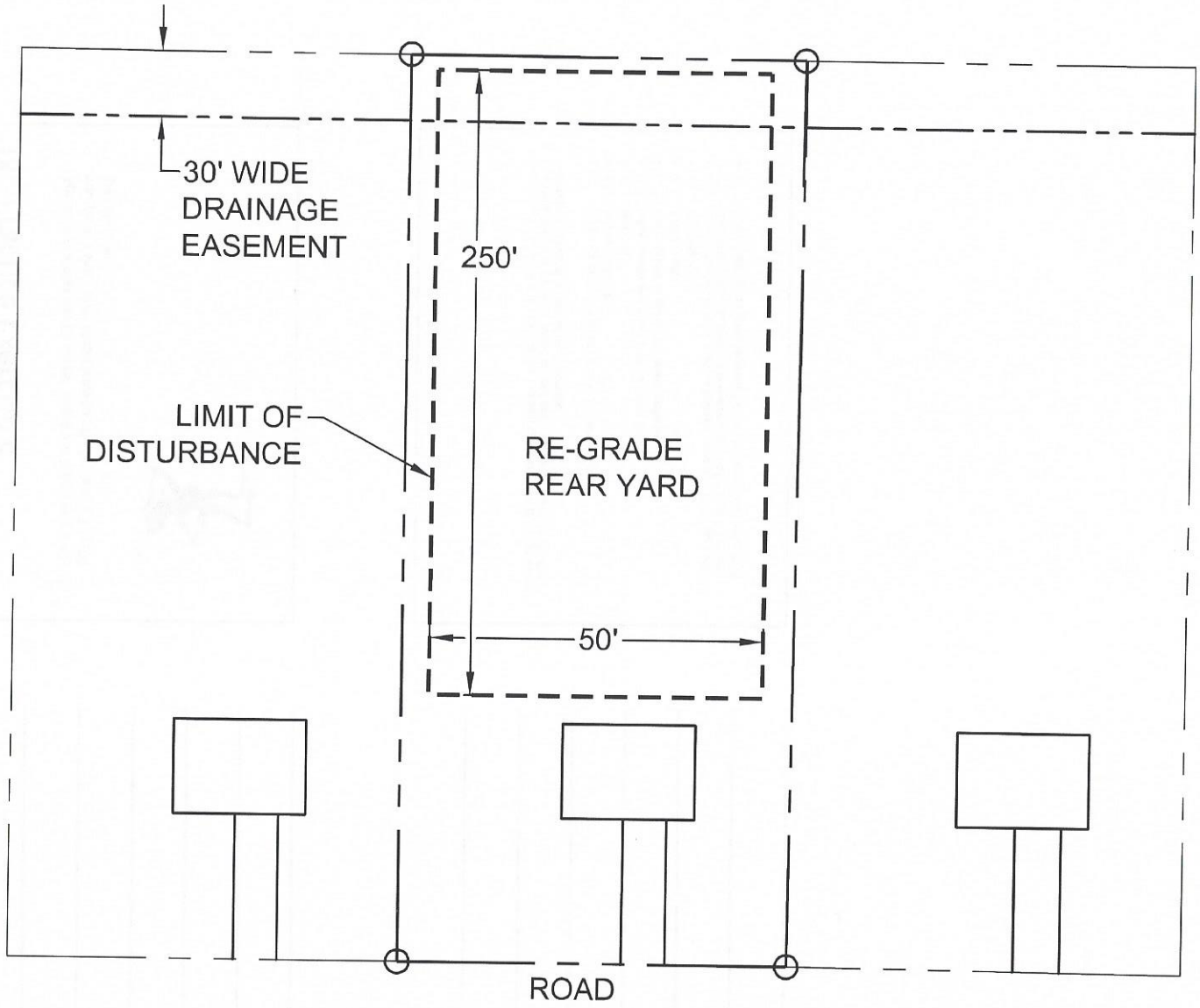
EXEMPT: YES___ NO___

LIMIT OF DISTURBED AREA

LESS THAN 5,000 SQ. FT.? YES___ NO___

MORE THAN 5,000 SQ. FT.? YES___ NO___

E&S PLAN NEEDED: YES___ NO___



EXEMPT: YES___ NO___

E&S PLAN NEEDED: YES___ NO___

NPDES PLAN NEEDED: YES___ NO___

OTHER ISSUES: YES___ NO___

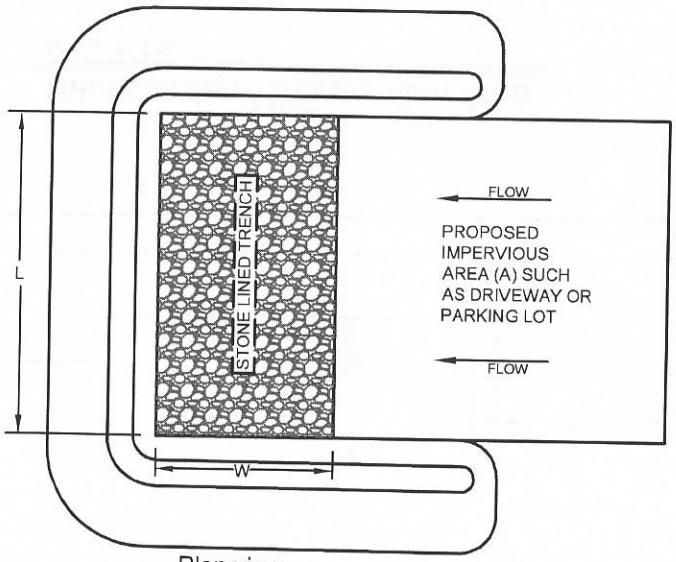
Table 1 – Minimum Separation Distances

New Impervious Area in Square Feet	Minimum Separation Distance	
	NO ROOF DRAIN	ROOF DRAIN
0-250	25	40
251-500	50	75
501-1,000	75	110
1,001-1,500	100	150
1,501-2,000	125	190
2,001-2,500	150	225
2,501-3,000	175	260
3,001-4,000	200	300
4,001-5,000	225	340
5,001 to 10,000	350	525

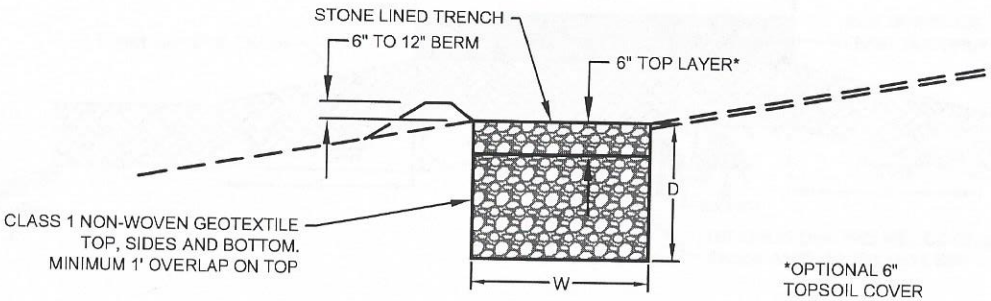
Where Jefferson Township believes that conditions present in the receiving area (slope, soil type, existing problems, etc.) warrant additional separation distance, Jefferson Township may request additional separation distance or require Stormwater management controls.

IX. Practice Exercise F

Applicant is adding a 30x40 addition onto the back of the house with a 24x10 breezeway, and 24x30 attached garage.



Plan view



Section view (Scale: N.T.S)

Stone Lined Infiltration Trench at Grade Detail

Scale: N.T.S.

STONE LINED INFILTRATION TRENCH SIZING CALCULATIONS

EXAMPLE:

STORMWATER RUNOFF VOLUME (B)* = 125 cu ft

ADJUSTED STORMWATER VOLUME (C)*

= (B) X 2.5 = 125 cu ft X 2.5 = 312.5 cu ft

W X L X D ≥ B

USER COULD PROVIDE W = 10', L = 20', D = 2'

W X L X D = 10' X 20' X 2' = 400 cu ft ≥ 312.5 cu ft

STORMWATER RUNOFF VOLUME (B)* = _____ cu ft

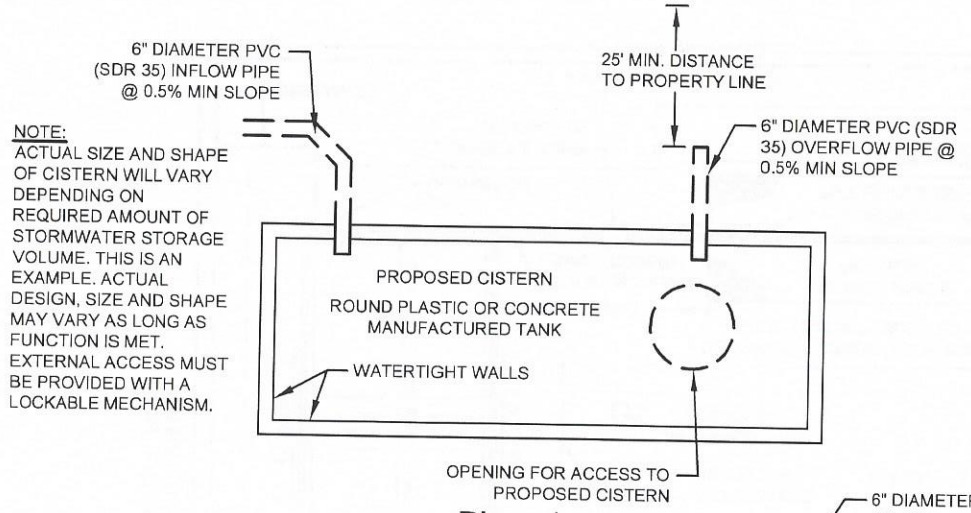
ADJUSTED STORMWATER VOLUME (C)* = (B) X 2.5 =

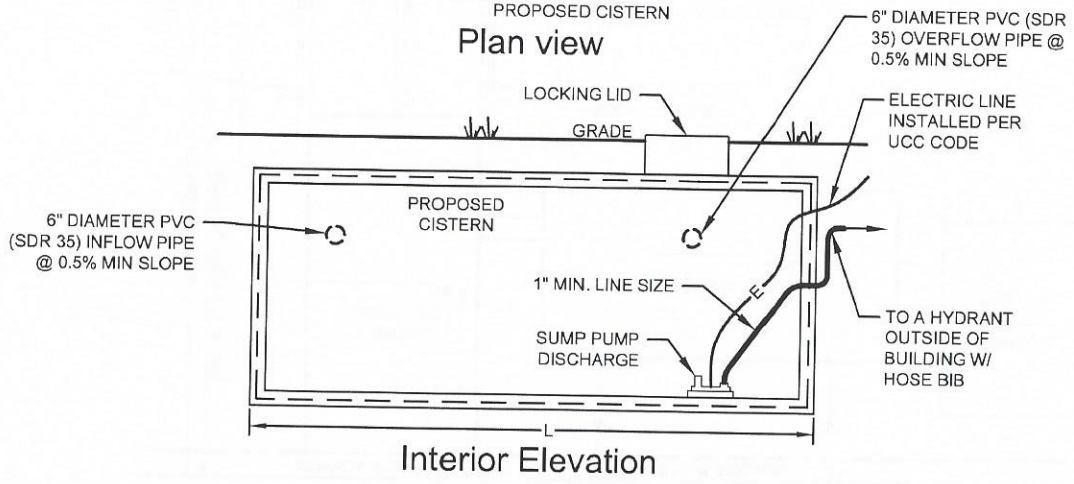
= _____ cu ft

W = _____ ft L = _____ ft D = _____ ft

W X L X D = _____ cu ft ≥ _____ (B)

*** From page 6 of the Small Project Application**





CISTERN SIZING CALCULATIONS

EXAMPLE:

STORMWATER RUNOFF VOLUME (B) = 125 cu ft

ADJUSTED STORMWATER VOLUME (C)

= (B) X 1.25 = 125 cu ft X 1.25 = 156.25 cu ft

= 156.25 cu ft X 7.5 GAL/cu ft = 1,172 GAL.

W X L X D ≥ B

USER COULD PROVIDE W = 10', L = 6', D = 3'

W X L X D = 10' X 6' X 3' = 180 cu ft ≥ 156.25 cu ft (1,172 GAL.)

STORMWATER RUNOFF VOLUME (B)* = _____ cu ft

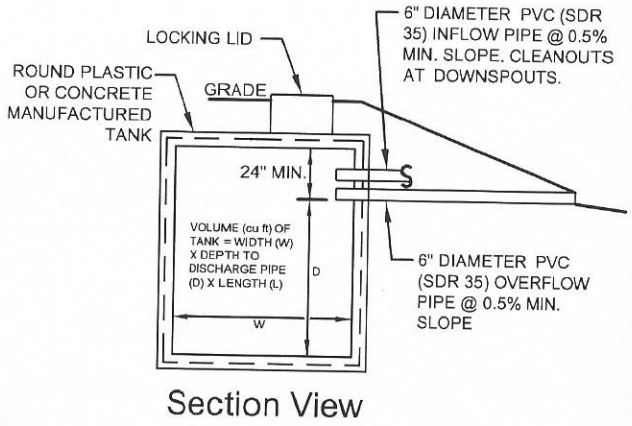
ADJUSTED STORMWATER VOLUME (C)* = (B) X 2.5 =

= _____ cu ft X 7.5 GAL/cu ft = _____ GAL.

W = _____ ft L = _____ ft D = _____ ft

W X L X D = _____ cu ft ≥ _____ (B) (OR _____ GAL.)

*** From page 6 of the Small Project Application**



Cistern Details

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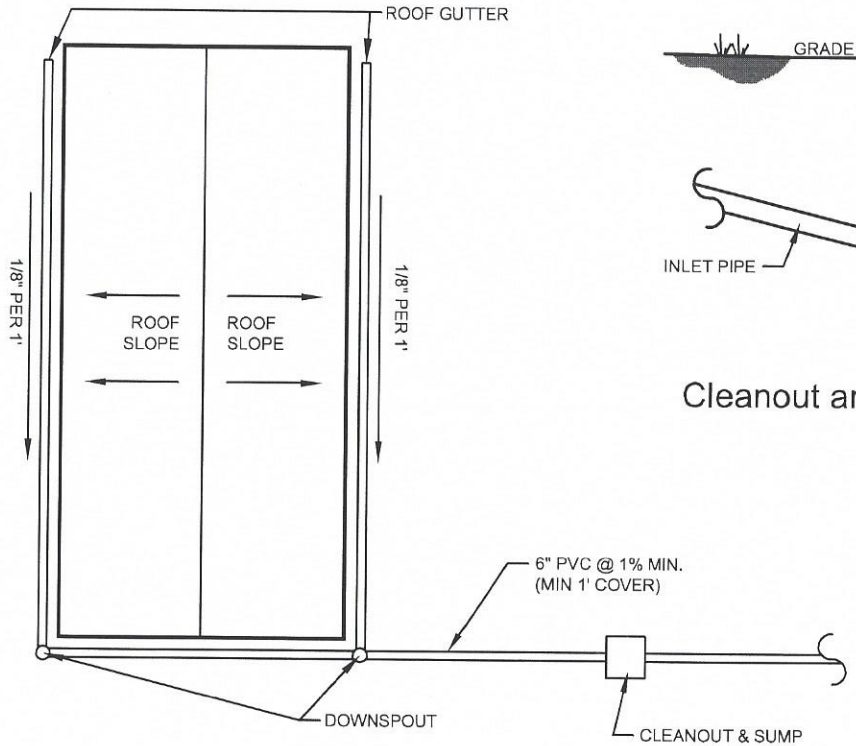
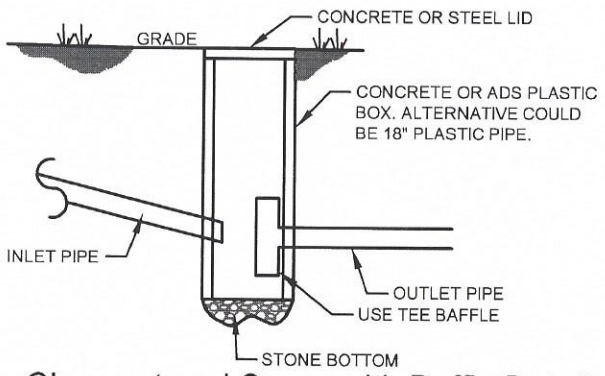


Plan view



Cleanout and Sump with Baffle Detail

EXAMPLE:

STORMWATER RUNOFF VOLUME (B)* = 125 cu ft

ADJUSTED STORMWATER VOLUME (C)*

= (B) X 2.5 = 125 cu ft X 2.5 = 312.5 cu ft

W X L X D ≥ B

USER COULD PROVIDE W = 10', L = 20', D = 2'

W X L X D = 10' X 20' X 2' = 400 cu ft ≥ 312.5 cu ft

STORMWATER RUNOFF VOLUME (B)* = _____ cu ft

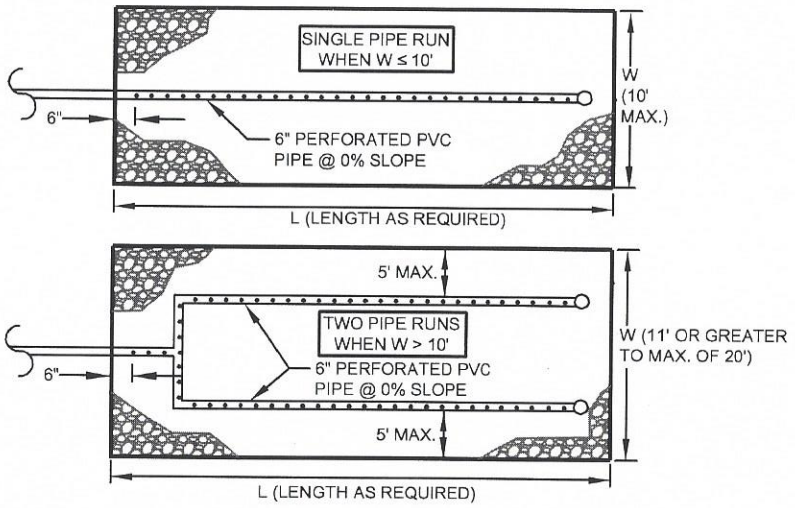
ADJUSTED STORMWATER VOLUME (C)* = (B) X 2.5 =

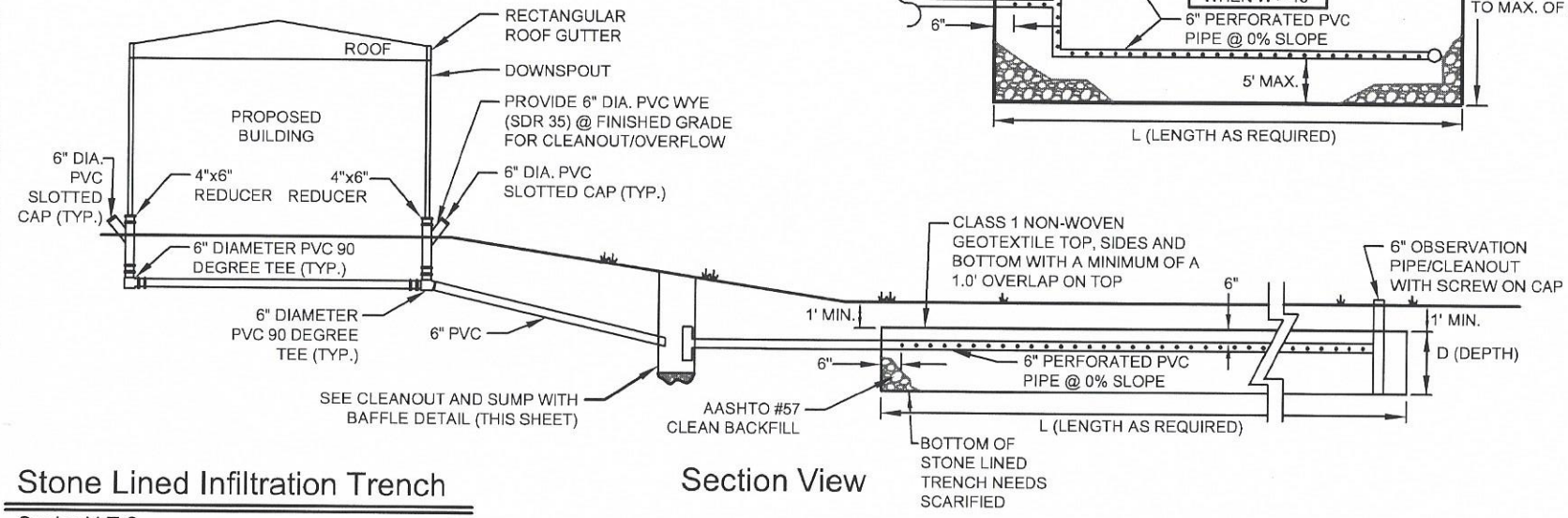
= _____ cu ft

W = _____ ft L = _____ ft D = _____ ft

W X L X D = _____ cu ft ≥ _____ (B)

*** From page 6 of the Small Project Application**





Section View

Stone Lined Infiltration Trench

Scale: N.T.S.