Sadsbury

Check #: _____
Fee Paid: _____
Date Received: _____
Permit: _____
Date Issued: _____

Small Project Stormwater Application

Owner's Name: _____ Phone Number: _____

Property Address: _____

Parcel No: 555-_ _ _ _ _-0-0000 Email: _____

Small Project Checklist

___ Check for $150 payable to Sadsbury Township
___ Sign and Date Ownership Acknowledgement (listed below)
___ Fill out Small Project Calculations (Step 1, below)
___ Select a proposed BMP and attach it to this page (Step 2, Infiltration Bed BMP or Shed BMP)
*Either or both BMPs may be selected as necessary to manage impervious area
___ Infiltration Bed-BMP
___ Shed-BMP
___ Attach sketch of the property including proposed improvements (see Sample Sketch)
___ Has the 1,000 sq. foot exemption been used on this property since year 2008 when the Township adopted the stormwater ordinance? Yes ___ No___ Partial___(how many sq feet)
___ If the above answer was No, do you plan to use it now? ___Yes (how many sq feet? ___ No

Owner Acknowledgement – I declare that I am the property owner and that the information provided is accurate to the best of my knowledge. I understand that stormwater may not adversely affect adjacent properties or be directed onto another property without written permission. I also understand that false information may result in a stop work order or revocation of any associated permits. Township representatives are also granted reasonable access to the property for review and/or inspection of this project as necessary.

Signature: _____ Date: _____

Application filled out by: _____ Phone: _____

Application reviewed by: _____ Phone: _____

Signature: _____ Date: _____

Project inspected by: _____ Phone: _____

Signature: _____ Date: _____

Stone Infiltration Trench – General Notes

1. Use the worksheets and table to compute the required volume in the stone infiltration trench (in cubic feet) for all proposed impervious areas. The calculated total volume is the minimum requirement for on-site construction. The actual horizontal dimensions of the stone infiltration trench may vary to fit specific site configurations and constraints, but the vertical depth of the stone infiltration trench must be a minimum of twenty-four (24) inches and a maximum of forty (40) inches. The total volume of the stone infiltration trench must be equal to or greater than the required minimum.

2. Multiple stone infiltration trenches may also be utilized. If multiple stone infiltration trenches are desired, the volume for each stone infiltration trench should be a proportional amount of the calculated total storage volume (if utilizing two (2) trenches; if sixty (60) percent of the total roof area is piped to one (1) stone infiltration trench, then that stone infiltration trench should be sized for sixty (60) percent of the total required minimum volume. The second stone infiltration trench would be sized for the remaining forty (40) percent of the total required minimum volume).

3. Based on the calculations of the required stone infiltration trench dimensions computed using the worksheet and table, stake out the locations of the stone infiltration trench corners. Staking is critical and should outline the location of the stone infiltration trench. The stone infiltration trench shall be located as far as possible downslope from the proposed home. A minimum of ten (10) feet of undisturbed soil shall be provided between the stone infiltration trench and any adjoining building or structure. Maintain a minimum of ten (10) feet between the stone infiltration trench and any property lines and road rights-of-way. Stone infiltration trenches shall be located beside or downslope (not upslope of) and a minimum of ten (10) feet from of any component of any on-lot sewage disposal system or on-lot sewage disposal system replacement absorption area.

4. Excavation of the stone infiltration trench shall be conducted from outside of the stone infiltration trench perimeter, using equipment which has a bucket on a reaching arm (backhoe or track hoe). No equipment shall be permitted in or on the stone infiltration trench area. The bottom and sides of the stone infiltration trench shall be chiseled or ripped to break up any smearing or compaction that may have occurred during excavation.

5. After excavation of the stone infiltration trench is complete, ensure that the bottom is graded with a slope that is no greater than two (2) inches per one hundred (100) feet. Line the stone infiltration trench and sides with a Class 1 Geotextile filter fabric, leaving enough excess filter fabric to cover the top of the stone infiltration trench before it is backfilled with earthen fill. If multiple runs of filter fabric are required to completely enclose the stone infiltration trench, a minimum of twelve (12) inches overlapping must be provided.

6. Backfill the stone infiltration with clean aggregate (clean washed stone with no fines in the range of coarse aggregate sizes from AASHTO#1 to AASHTO#57). Backfilling of the stone infiltration trench shall be conducted from outside of the stone infiltration trench perimeter, using equipment which has a bucket on a reaching arm (backhoe or track hoe). No equipment shall be permitted in or on the stone infiltration trench area. The stone infiltration trench shall be to a

uniform depth a minimum of six (6) inches below the finished top of stone (a minimum of eighteen (18) inches below finished grade).

7. The perforated pipe (minimum four (4) inch PVC) with cleanout pipe extension should then be placed on the stone. Connect roof drain pipes from downspouts to the stone infiltration facility. Be sure to leave the pipes exposed for observation by the Township.

8. At this time, before more stone is placed in the infiltration trench to cover the pipe, or roof leaders trenches are backfilled, the Township should be notified for inspection of the facility to verify proper pipe installation.

9. Following the Township inspection, add more stone around and over the pipe to a uniform depth a minimum of two (2) inches over the top of the pipe. Carefully over the top of the stone bed with the remaining geotextile fabric, being careful to overlap a minimum of twelve (12) inches.

10. The infiltration trench should be then backfilled to the top of the infiltration trench with at lease twelve (12) inches of clean earth fill.

11. To ease maintenance of the underground pipes, and prevent clogging of the infiltration trench, consideration should be given to providing screens for all roof gutters. The screens prevent foreign materials from clogging the pipes and stone infiltration trench.

12. During and after construction, care must be taken to keep all dirty stormwater and silt out of the system.

Sample Sketch

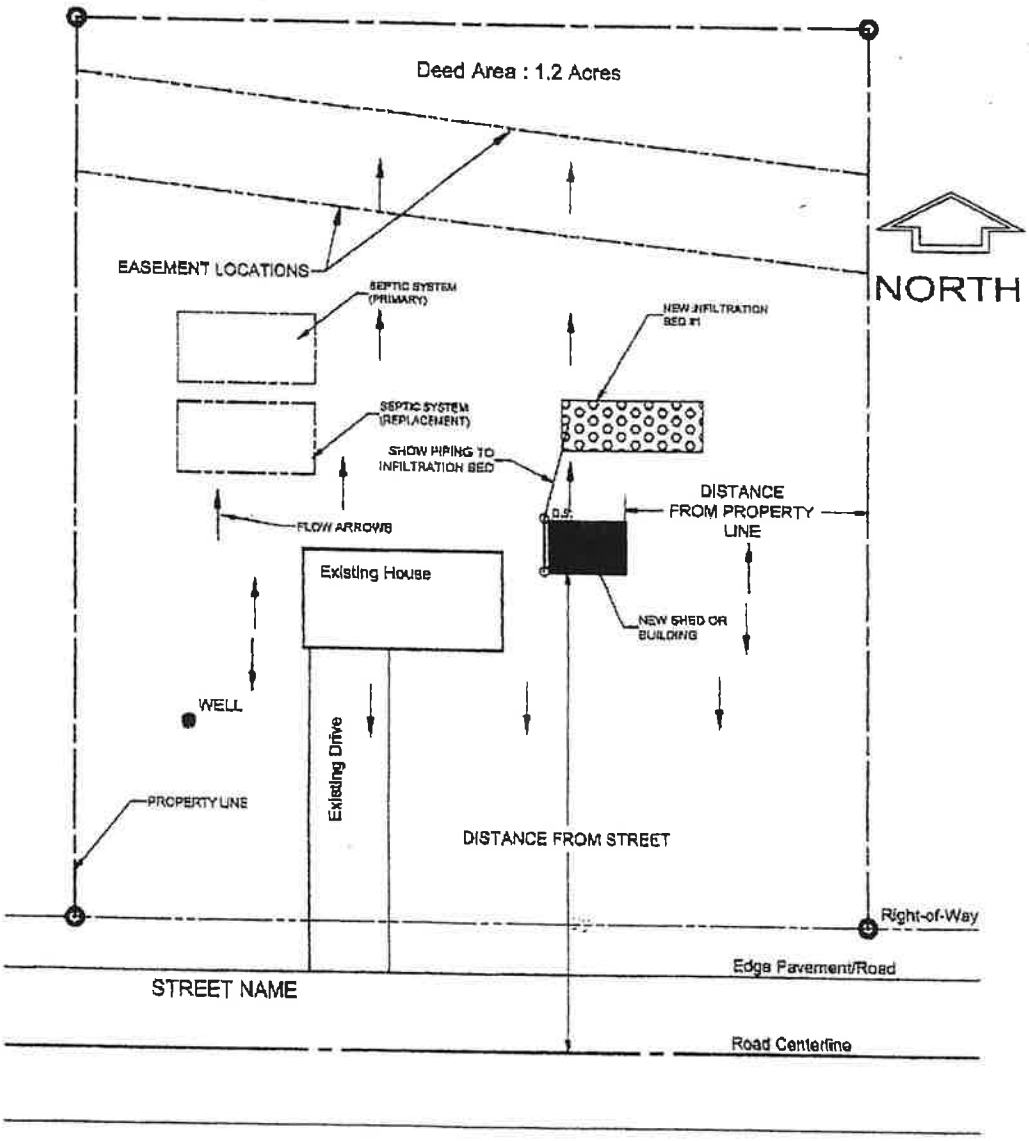
Property Sketch Checklist

The following items should be included on the sketch if applicable:

___ Location and square footage of proposed impervious area
___ Approximate location of all property lines, driveways and buildings on the property
___ Approximate location of all structures, trees, fences or other items located within 50 feet of the proposed impervious area or land disturbance
___ Approximate distance from proposed buildings or structures to the nearest property line and street
___ Direction of proposed stormwater discharge (e.g., with flow arrows)
___ Location of existing wells and septic system
___ North arrow

Applicant is encouraged to use Google Earth or similar mapping software for the property sketch.

Sample Sketch



Infiltration Bed - BMP

Step 2: Determine size of infiltration bed. Select required bed area from the sizing chart below. If the area to be managed (from Step 1) is between two values, round up to the higher value. Then enter length, width and resulting bed area(s) into the infiltration bed size table below.

Sizing Chart										
Total Area to be managed	250	500	750	1000	1250	1500	1750	2000	2250	2500
Bed Area (ft2)	30	55	80	105	130	160	185	210	235	260

Sizing Chart										
Total Area to be managed	2750	3000	3250	3500	3750	4000	4250	4500	4750	5000
Bed Area (ft2)	290	315	340	365	395	420	445	470	495	525

Infiltration Bed Size			
Bed #	Length (L)	Width (W)	Proposed Bed Area (L x W)
		Total	

Notes

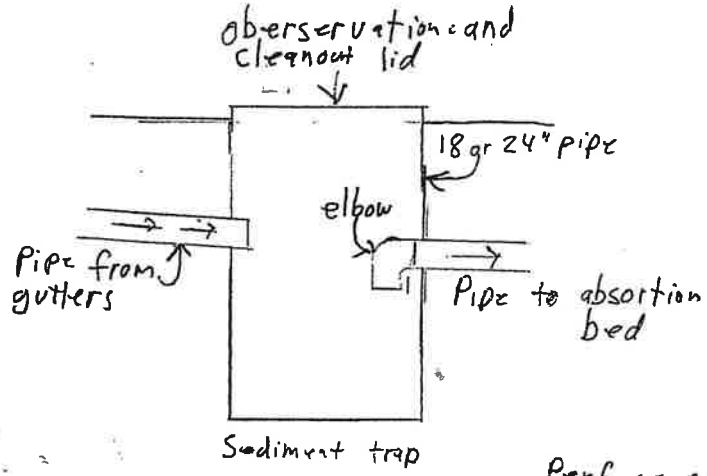
1. The above charts assume a trench or bed of 2' in depth. If alternate bed or trench depths are being designed then the length and width calculations need to be adjusted to maintain the cubic feet.
2. All PVC pipe to be schedule 35 pipe or greater.
3. For infiltration beds to handle projects larger than 3,000 sq. ft. the PVC pipe needs to be 6" or larger.
4. The sump/inlet box can be outside or inside the perimeter of the bed.
5. The above charts and tables are only for small stormwater projects.

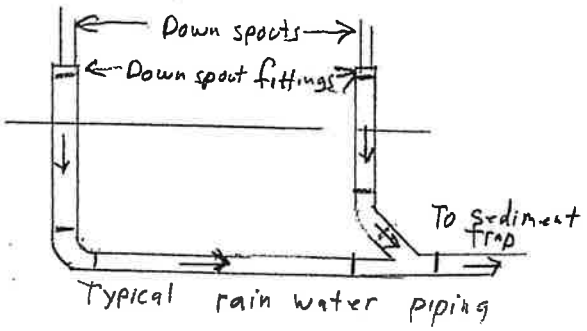
Small Project Calculations

Step 1: Determine the total area to be managed (ft2) including roof, driveway, walk, patio and/or other impervious area. Once this table is complete proceed to Step 2.

Surface	Length(ft)	x	Width(ft)	=	Impervious Area(ft2)
Building/Structures		x		=	
Driveway		x		=	
Parking Areas		x		=	
Patios/Walkways		x		=	
Other		x		=	
			(a) Sum of all impervious area		
			(b) Subtract any impervious area being removed		
			***Total area to be managed (a) – (b)**		

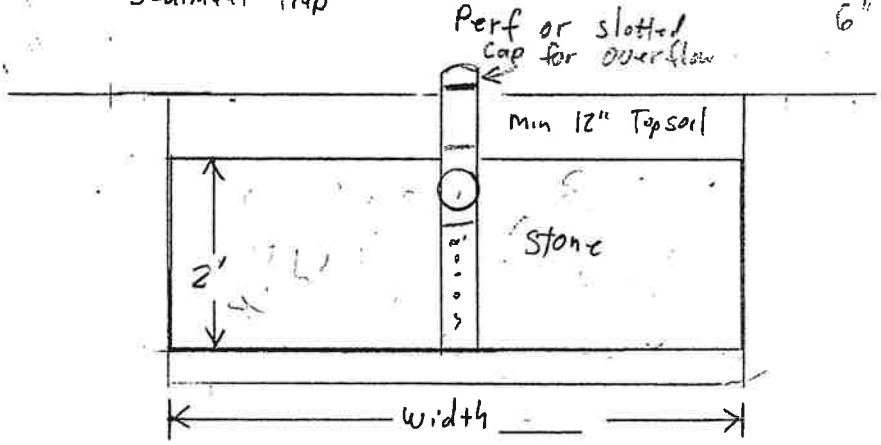
*Total must be under 5,000 sq ft to qualify for a small project

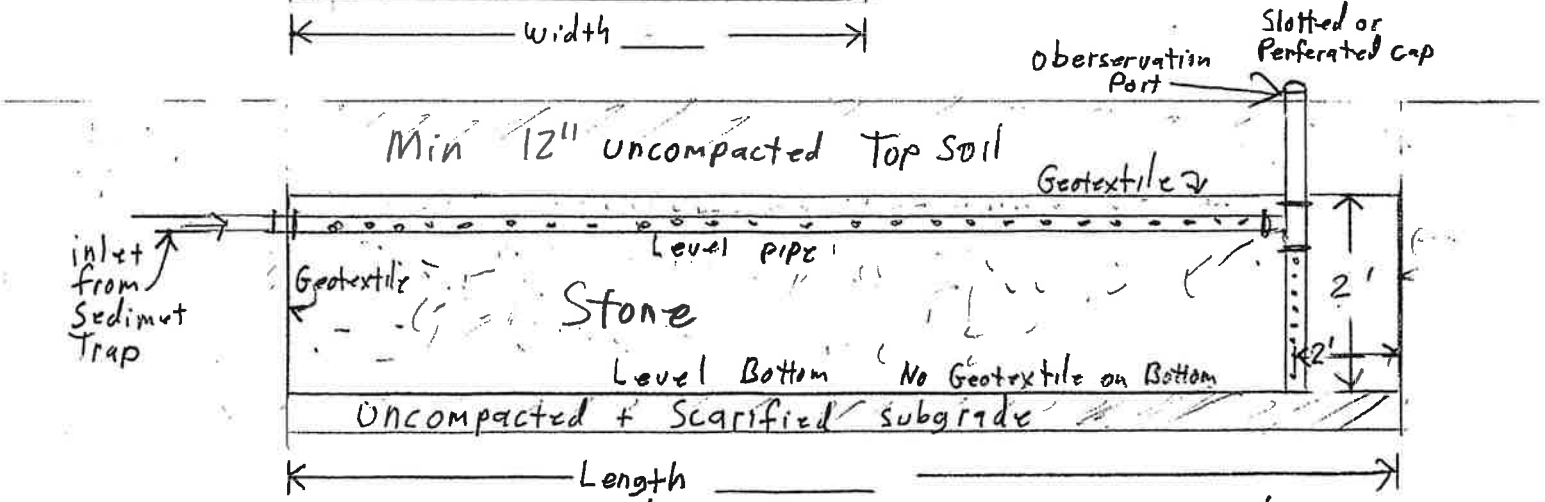




Typical rain water piping

recommended pipe size:
4" up to 2500 sq ft roof area
6" 2500 to 5000 sq ft roof area





Stone to be Astro #57, #1, or #3 clean stone

Infilteration Bed
not to scale

Infiltration Bed - BMP

Step 2: Determine size of infiltration bed. Select required bed area from the sizing chart below. If the area to be managed (from Step 1) is between two values, round up to the higher value. Then enter length, width and resulting bed area(s) into the infiltration bed size table below.

Sizing Chart										
Total Area to be managed	250	500	750	1000	1250	1500	1750	2000	2250	2500
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Bed Area (ft2)	290	315	340	365	395	420	445	470	495	525

Infiltration Bed Size			
Bed #	Length (L)	Width (W)	Proposed Bed Area (L x W)
		Total	

Notes

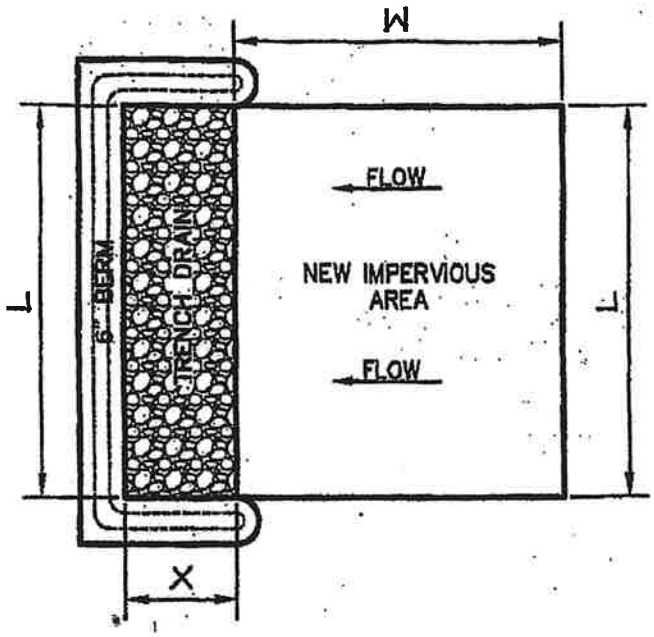
1. The above table is only applicable to projects with disturbed areas of less than one (1) acre. Any projects that propose more than one (1) acre of disturbed area are subject to E&S and NPDES Permit requirements and will require a formal Stormwater Management Plan.
2. All PVC pipe to be schedule 40 or approved equal.
3. Perforated pipe to contain a minimum of 3 holes per row. The maximum spacing between rows is 12".

Small Project Calculations

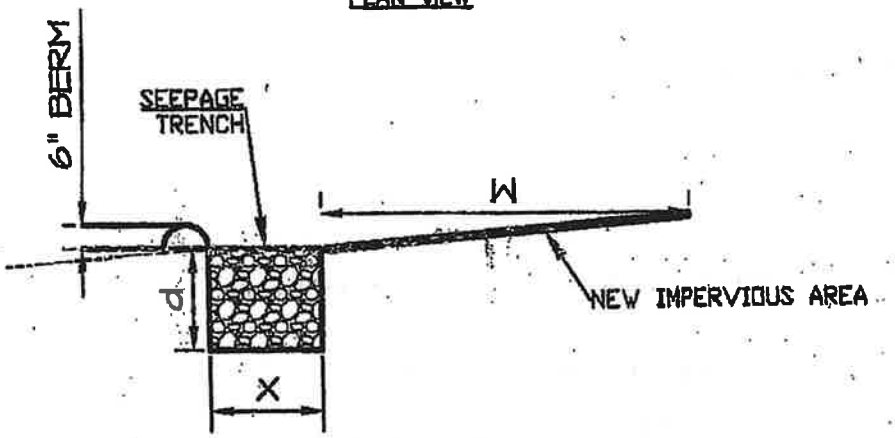
Step 1: Determine the total area to be managed (ft2) including roof, driveway, walk, patio and/or other impervious area. Once this table is complete proceed to Step 2.

Surface	Length(ft)	x	Width(ft)	=	Impervious Area(ft2)
Building/Structures		x		=	
Driveway		x		=	
Parking Areas		x		=	
Patios/Walkways		x		=	
Other		x		=	
(a) Sum of all impervious area					
(b) Subtract any impervious area being removed					
***Total area to be managed (a) – (b)**					

*Total must be under 5,000 sq ft to qualify for a small project



PLAN VIEW



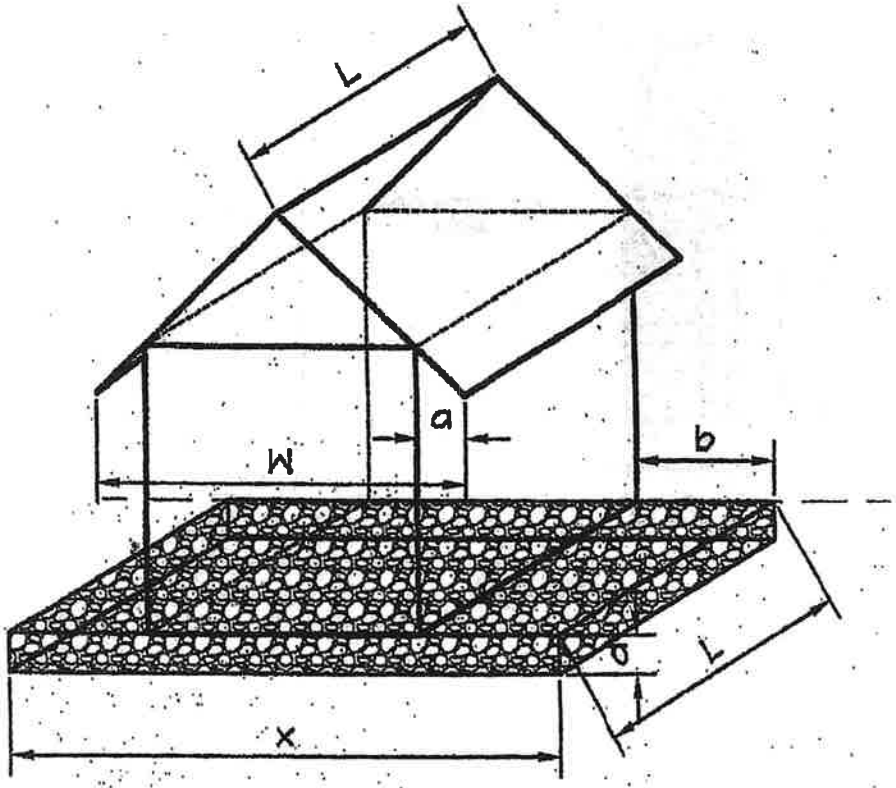
SECTION VIEW

KEY
L = LENGTH OF NEW IMPERVIOUS SURFACE (FT) =LENGTH OF SEEPAGE TRENCH
W = WIDTH OF NEW IMPERVIOUS SURFACE –MAY NOT EXCEED 75'
X = WIDTH OF SEEPAGE TRENCH (FT)
d = DEPTH OF SEEPAGE TRENCH (FT)

REQUIRED VOLUME OF TRENCH => L*W*1/12=X*L*d*0.4 => X=0.14W FOR d=1.5'

NOTES
1.) SIDE OF TRENCH TO BE WRAPPED IN CLASS 1 GEOTEXTILE
2.) TRENCH TO BE FILLED WITH CLEAN STONE (3/4"MIN. SIZE).
3.) TRENCH TO BE CONSTRUCTED AT 0% SLOPE ON UNDISTURBED SOIL.
4.) TRENCH TO BE CHECKED REGULARLY TO MAINTAIN PROPER OPERATION.

OPTION FOR DRIVEWAYS AND PARKING AREAS



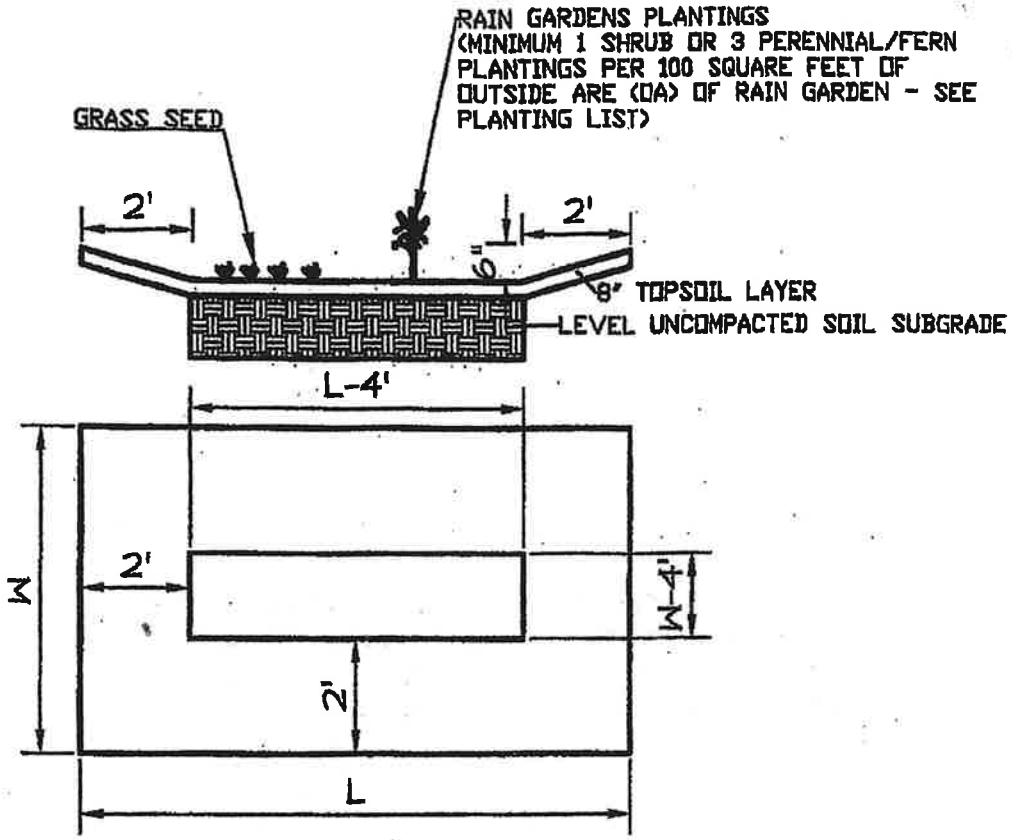
KEY

L = LENGTH OF STRUCTURE ROOF = LENGTH OF SEEPAGE TRENCH (FT.)
W = WIDTH OF ONE SIDE OF THE ROOF (FT)
a = EAVE/OVERHANG (FT)
b = DISTANCE FROM STRUCTURE WALL TO SEEPAGE TRENCH (FT)
= a + 1 FT => PLACE FROM EDGE OF TRENCH ONE FOOT PAST EAVES
x = WIDTH OF SEEPAGE TRENCH (FT)
x = W + 2FT
d = DEPTH OF SEEPAGE TRENCH (FT)
D = 6" TO 8" (AVERAGE)

NOTES

1.) TRENCH MUST BE PROVIDED ON EACH SIDE OF STRUCTURE.
2.) SIDE AND BOTTOM OF TRENCH TO BE WRAPPED IN CLASS 1 GEOTEXTILE.
3.) TRENCH TO BE FILLED WITH CLEAN STONE (3/4" MIN. SIZE).
4.) TRENCH TO BE CONSTRUCTED AT 0% SLOPE ON UNDISTURBED SOIL.
5.) TRENCH TO BE CHECKED REGULARLY TO MAINTAIN PROPER OPERATION

STORAGE SHED



1.) CALCULATE REQUIRED RAIN GARDEN VOLUME (V)
(RV) = SQUARE FEET OF NEW IMPERVIOUS AREA X (0.085') RV=____FT3

2.) CALCULATE OUTSIDE AREA OF RAIN GARDEN (OA)
(OA) = LENGTH (L) X WIDTH (W) OA=____FT2

3.) CALCULATE INSIDE AREA OF RAIN GARDEN (IA)
(IA) = [(L)-4'] X [(W)-4'] IA=____FT2

4.) CALCULATE AVERAGE AREA OF RAIN GARDEN (AA)
(AA) = (OA)/2 + (IA)/2 AA=____FT2

5.) CALCULATE STORAGE VOLUME (SV)
(SV) = (AA) X 0.5' SV=____FT3

6.) CHECK FOR ADEQUATE STORAGE
STORAGE VOLUME (SV) MUST BE GREATER THAN REQUIRED VOLUME (RV)
RV= ____FT3 > SV=____FT3

7.) ADJUST RAIN GARDEN SIZE
IF STORAGE VOLUME (SV) IS NOT GREATER THAN REQUIRED VOLUME (RV), INCREASE THE SIZE OF THE RAIN GARDEN AND REPEAT STEPS 2-6.

RAIN GARDEN OPTION

Rain Garden Native Planting List

Perennials and Ferns

Blue false indigo (Baptista Australis)
Blue flag iris (Iris Versicolor)
Blue star (Amsonia tabernaemontana)
Blue vervain (Verbena hastata)
Boltonia (Boltonia asteroids)
Boneset (Eupatorium perfoliatum)
Bottlebrush grass (Hystrix patula)
Broomsedge (Andropogon virginicus)
Cardinal flower (Lobelia cardinalis)
Cinnamon fern (Osmunda cinnamomea)
Culvers root (Veronicastrum virginicum)
Golden ragwort (Senecio aureus)
Goldenrod (Solidago patula, S. rugosa)
Great blue lobelia (Lobelia siphlitica)
Green bullrush (Scirpus atrovirens)
Horsetail (Equisetum species)
Marsh marigold (Caltha palustris)
Mistflower (Eupatorium colestinum)
Monkey flower (Mimulus ringens)
New England aster (Aster novae-anglia)
New York aster (aster novi-belgii)
Obedient plant (Physotegia virginiana)
Royal fern (Osmunda regalis)
Seedbox (Ludwigia alternifolia)
Sensitive fern (Onoclea sensibilis)
Sneezeweed (Helenium autumnale)
Soft rush (Juncus effusus)
Swamp milkweed (Asclepias incarnata)
Swamp rose mallow (Hibiscus moscheutos)
Swamp sunflower (Helianthus angustifolius)
Switchgrass (Panicum virgatum)
Threadleaf coreopsis (Coreopsis Verticillata)
Tussock sedge (Carex stricta)
White turtlehead (Chelone glabra)
Woolgrass (Scirpus cyperinus)

Shrubs

American beautyberry (Calicarpa americana)
Arrowwood (Viburnum dentatum)
Black chokeberry (Aronia melanocarpa)
Broad-leaved meadowsweet (Spirea latifolia)
Buttonbush (Cephalanthus occidentalis)
Elderberry (Sambucus canadansis)
Inkberry (Ilex glabra)
Narrow-leaved meadowsweet (Spirea alba)
Ninebark (Physocarpus opulifolius)
Possumhaw (Viburnum nudum)
Red-osier dogwood (Cornus sericea)
St. Johnswort (Hypericum densiflorium)
Silky dogwood (Cornus amomum)
Smooth alder (Alnus serrulata)
Spicebush (Lindera benzoin)
Swamp azalea (Rhododendron viscosum)
Swamp rose (Rosa palustris)
Sweet pepperbush (Clethra alnifolia)
Wild raisin (Viburnum cassinoides)
Winterberry (Ilex verticillata)
Virginia sweetspire (Itea virginica)

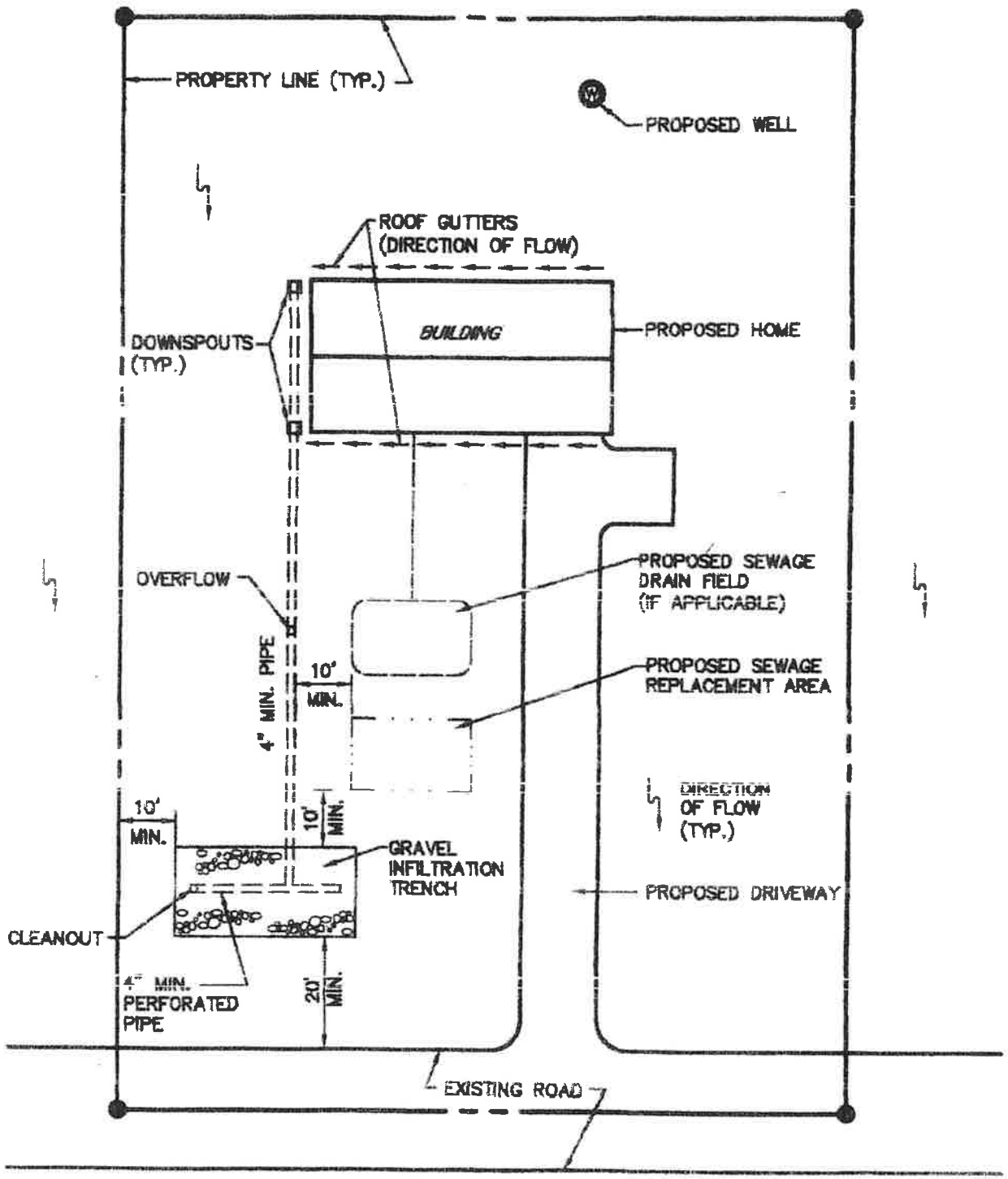
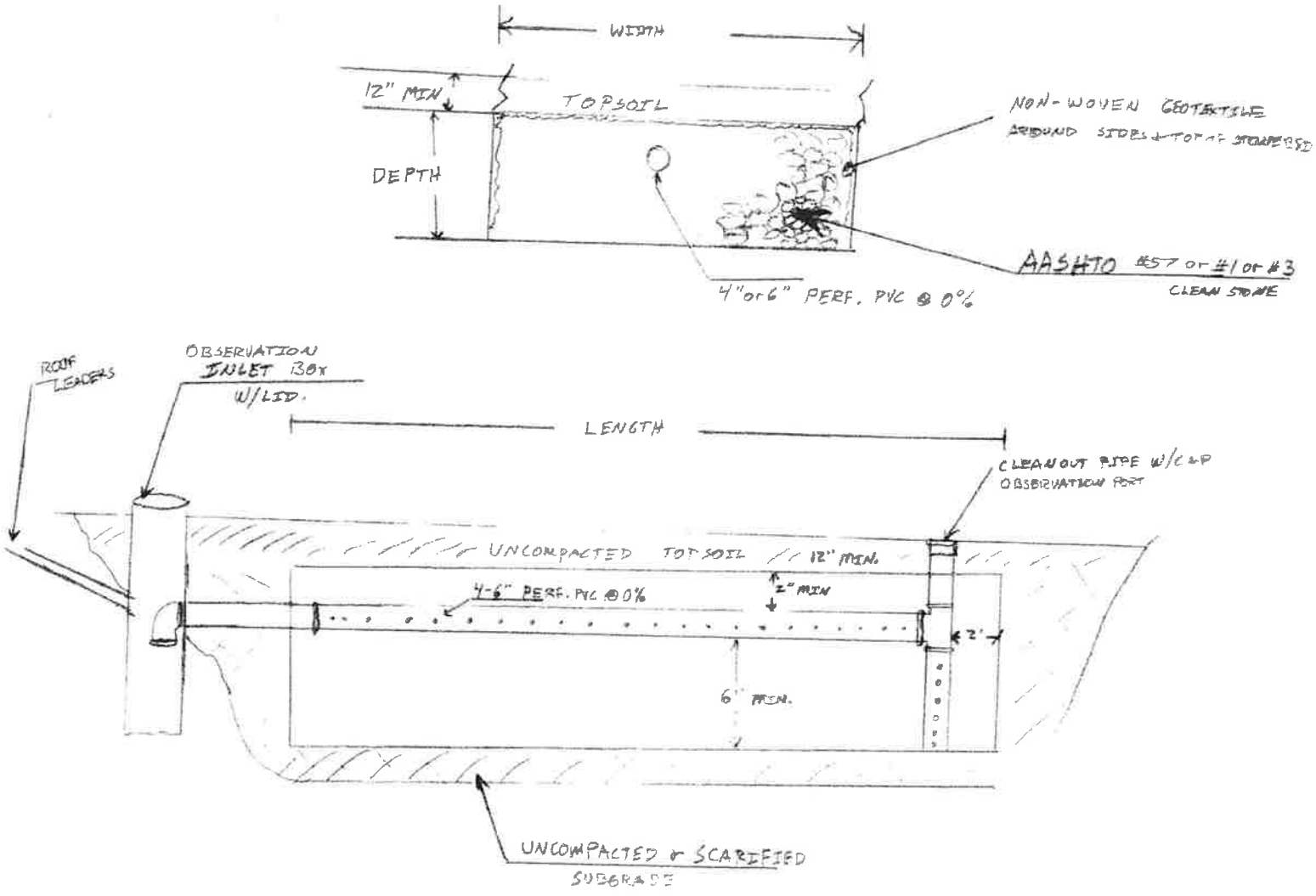


EXHIBIT A
TYPICAL INFILTRATION TRENCH PLAN

PARADISE TOWNSHIP LANCASTER COUNTY

REVIEW
REVIEW Associates, Inc.
3020 Columbia Ave., Lancaster, PA 17603
Phone (717) 394-3721 • Fax (717) 394-1063

DRAWN BY:
DATE: 6/12/14
SCALE: NOT TO SCALE
DWG. NO. 011132007



(BMP) INFILTRATION BED

NOT TO SCALE