STORMWATER MANAGEMENT

302 Attachment 1

Township of West Vincent

Appendix A
Simplified Approach to Stormwater Management for Small Projects

Appendix A.1 —
Applicability, Submittal and Approval Requirements

Appendix A.2 —
"Simplified Approach to Stormwater Management for Small Projects - Handbook" (Revised June 10, 2012)

Appendix A.3 —
"Simplified Approach - Stormwater Best Management Practices Operation, Maintenance and Inspection Plan and Agreement" — Sample Agreement (Revised October 12, 2012)

STORMWATER MANAGEMENT

Appendix A.1
Applicability, Submittal and Approval Requirements

West Vincent Township
Chester County, Pennsylvania

Applicability:

- Small projects with less than 2,000 square feet of Proposed Impervious Surfaces (as defined in the Municipality's Stormwater Management Ordinance) and with less than 10,000 square feet of proposed Earth Disturbance (as defined in the Municipality's Ordinance) may apply the "Simplified Approach to Stormwater Management for Small Projects" (Simplified Approach).
- Only projects that meet the above size thresholds as specified in the Municipality's Stormwater Management Ordinance may use this Simplified Approach and are then not required to submit a formal Stormwater Management Site plan to the Municipality, However, these projects are still required to address water quality and infiltration requirements as outlined in this Simplified Approach "Handbook".
- Any project with more than 2,000 square feet of Proposed Impervious Surface or more than 10,000 square feet of proposed Earth Disturbance can NOT apply this Simplified Approach.
- The Applicant should first review the planned project with the Municipal Engineer prior to initiating the Simplified Approach to confirm the following:
  - That the proposed project is not otherwise exempt from the stormwater management control and the engineered Stormwater Management Site Plan requirements of the Municipality's Stormwater Management Ordinance;
  - That the proposed project is eligible to use this Simplified Approach;
  - To determine which components of the proposed project must be included in the calculation of "impervious surfaces (areas)"; and,
  - Whether any local conditions are known to the Municipal Engineer that would preclude the use of any of the techniques included in this Simplified Approach.

Submittal and Approval Requirements:

Use of the Simplified Approach requires:

- The applicant to submit the following to the Municipality for review and approval prior to beginning construction:
  - A Simplified Stormwater Management Site Plan (i.e., sketch plan) and accompanying Worksheet; and
  - A completed signed and notarized "Simplified Operation, Maintenance and Inspection Plan and Agreement".
- The first one-inch of rainfall runoff from Proposed Impervious Surfaces (as defined by the Municipality's Ordinance) must be captured and removed on the applicant's property.
- The applicant to record the "Simplified Approach - Stormwater Best Management Practices Operation, Maintenance and Inspection Plan and Agreement" at the Chester County Office of the Recorder of Deeds after signature by the Municipality.
- A final inspection conducted by the Municipality after completion of construction.

Appendix A.2
Simplified Approach to Stormwater Management for Small Projects — Handbook”

Simplified Approach to Stormwater Management for Small Projects Handbook

STORMWATER MANAGEMENT PROCEDURES FOR MEETING THE SIMPLIFIED APPROACH REQUIREMENTS

Introduction

This Handbook has been developed to allow homeowners or applicants for small projects to comply with stormwater management requirements of the Stormwater Management Ordinance of the Municipality, including sizing, designing, locating and installing on-lot measures, referred to herein as "Best Management Practices" (BMPs). Only projects that meet the size thresholds specified in the Municipality's Stormwater Management Ordinance may use this Simplified Approach and are then not required to submit a formal Stormwater Management Site plan to the Municipality. However, these projects are still required to address certain requirements, such as stormwater quality, infiltration, rate and volume management goals as outlined in this Simplified Approach Handbook.

Pennsylvania Act 167 (PA Stormwater Management Act) was authorized on October 4, 1978 (32 P.S., P.L. 864) and gave Pennsylvania Municipalities the power to regulate activities that affect flooding, streambank erosion, stormwater runoff and surface and groundwater quantity and quality. The Municipality's Stormwater Management Ordinance was prepared to comply with the PA Act 167 requirements and includes provisions allowing this Simplified Approach to be used for small projects as specified in their Ordinance.

If the guidelines presented in this Handbook are followed, the applicant may not require professional engineering services to comply with these stormwater management goals. This Handbook is organized into five sections:

- Section 1 describes requirements and a simplified approach for designing a suitable BMP, and a description of what needs to be included on the simplified stormwater management (SWM) site plan (i.e., sketch plan).
- Section 2 presents definitions of key terms.
- Section 3 presents options of BMPs that can be considered for on-lot stormwater management.
- Section 4 illustrates an example of how to obtain the size and dimensions of a BMP(s) for a sample project.
- Section 5 describes the requirements to be met for a "Simplified Approach Operation, Maintenance and Inspection Plan and Agreement".

The Simplified Approach requires:

- The applicant to submit the following to the Municipality for review and approval prior to beginning construction:
  - A Simplified Stormwater Management (SWM) Site Plan (i.e., sketch plan), and accompanying Worksheet, and
  - A completed and signed "Simplified Approach Operation, Maintenance and Inspection Plan and Agreement".

- The first one-inch of rainfall runoff from proposed impervious surfaces (as defined by the Municipality's Ordinance) must be captured and removed from the stormwater runoff leaving the applicant's property.
- The applicant to record the "Simplified Approach Operation, Maintenance and Inspection Plan and Agreement" at the County's Recorder of Deeds after signature by the Municipality.

The purpose of requiring effective stormwater management from small projects is to help reduce stormwater runoff in the community, to maintain groundwater recharge, to prevent degradation of surface and groundwater quality, and to otherwise protect water resources and public safety.

What needs to be submitted to the Municipality?

- Simplified Approach Worksheet (Table 4)
- Simplified SWM site plan (i.e., sketch plan), containing the features described in Section 1, Step 1
- "Simplified Approach Operation, Maintenance and Inspection Plan and Agreement" must be signed, notarized and (after approval and signature by the Municipality) recorded at the County Recorder of Deeds.

If the applicant is using a contractor to construct the project, the worksheet and sketch plan must be shared with the contractor to ensure the BMP(s) are properly installed.

1. Determination of Simplified Approach Volume Requirements

All proposed impervious areas (as required by the Municipality's Ordinance) must be included in the determination of the amount of new impervious areas and the size of proposed BMPs needed to manage stormwater. Proposed impervious areas on an individual residential lot generally include, but are not limited to: roof area, pavement, sidewalks, driveways, patios, porches, permanent pools, or parking areas, etc. See the definitions provided in Section 2 and check with the Municipal Engineer to confirm what features of the proposed project must be included in the calculation of new impervious areas. Sidewalks, driveways, or patios that are constructed with gravel or pervious pavers and will not be disturbed or altered in the future may not need to be included in this calculation (check with the Municipal Engineer). In these cases, the amount of proposed impervious area may be reduced for proposed driveways, patios, and sidewalks through the use of gravel, pervious pavement, and turf pavers. All proposed impervious areas must be constructed so that runoff is conveyed to a BMP(s); no runoff may be directed to storm sewers, inlets or other impervious areas (i.e., street) without effective stormwater management from a site.

In addition, the use of low impact development is recommended to further minimize the effect of the new construction on water, land, and air. Low impact development is a method of development that incorporates design techniques that include: minimizing the amount of land disturbance, reducing the amount of impervious cover, disconnecting gutters and directing stormwater runoff to vegetated areas to infiltrate, and redirecting the flow of stormwater runoff from impervious surfaces to vegetated areas instead of the street or gutter.

Below are the steps that must be undertaken to meet the Ordinance requirements. The size and description of the proposed construction as well as important aspects related to the design of the BMP(s) must be documented in the Simplified Approach Worksheet found in Table 4. All individuals planning on using the Simplified Approach are encouraged to review the planned project with the Municipal Engineer prior to initiating the Simplified Approach to confirm the following:

- That the proposed project is not otherwise exempt from the stormwater management control and engineered Stormwater Management Site Plan requirements of the Municipality's Stormwater Management Ordinance;

- That the proposed project size is within the range eligible to use this Simplified Approach;

- To determine which components of the proposed project must be included in the calculation of "impervious areas"; and

- Whether any local conditions are known to the Municipal Engineer that would preclude the use of any of the techniques included in this Simplified Approach.

Step 1 - Prepare the Simplified SWM Site Plan (i.e., sketch plan) that includes:

- Name and address of the owner of the property, and name and address of individual preparing the plan (if different than the property owner), along with the date of submission.

- Location of all existing structures including buildings, driveways, and roads within 50 feet of the project site.

- Location of proposed structures, driveways, or other paved areas with approximate size in square feet.

- Location, and distance, of any existing surface water features, such as streams, lakes, ponds, wetlands or other natural waterbodies, within 50 feet of the project site and/or BMPs. Depending upon the Municipality's requirements, the following may also be required (check with the Municipal Engineer):

  - The project and/or BMPs cannot cause earth disturbance within 50 feet from a perennial or intermittent stream, wetland or waterbody. Protecting this area from non-disturbance along the aforementioned features helps protect the applicant's land from erosion, the flood carrying capacity of streams, and the water quality of the waterbody. Where the applicant cannot meet the fifty-foot non-disturbance width, the applicant should work with the Municipal Engineer to determine if a reduced width is acceptable; however, a minimum of at least a ten-foot non-disturbance area width should be maintained.

  - If an existing buffer is legally prescribed (i.e., deed, covenant, easement, etc.) and it exceeds this requirement, the existing buffer must be maintained.

- Location, orientation, and dimensions of all proposed BMPs. For all rain gardens/bioretention, infiltration trenches, and dry wells the length, width, and depth must be included on the plan. For rain barrels or cisterns, the volume must be included.

- Location of any existing or proposed on-lot septic system and potable water wells showing rough proximity to infiltration facilities. See Section 3. Description of BMPs, for the appropriate setbacks for on-lot septic systems and potable water wells.

Step 2 - Determine the Impervious Area to be Managed

- Determine the total area of all proposed impervious surfaces that will need to drain to one or more BMP(s).

- Also determine the total area for proposed earth disturbance to complete the project and install the BMP(s). The total earth disturbance to complete a project is often greater than the project area to allow for access from construction vehicles, stock piling of materials and excavation. The total area of earth disturbance must account for all of the construction activities necessary to construct the project.

- Determine locations where BMP(s) need to be placed so that the appropriate amount of stormwater runoff from the proposed impervious surfaces can be captured and managed.

Step 3 - Select the BMP(s) to be Used and Determine Appropriate Sizing Criteria

- Select the BMP(s) to be used and determine the requirements of each from Section 3, Description of BMPs.
  - For instance, the back half of a garage may drain to a rain barrel and the front half of the garage and a driveway may drain to a bioretention area. Each BMP will be sized differently, manage stormwater runoff and will need to be designed to be consistent with Section 3.

- Then obtain the required storage volume and surface area needed for each of the proposed BMP(s) from the appropriate heading below.

- Complete Table 4 Simplified Approach Worksheet.

For Rain Barrels/Cisterns:

Step 3A - Select the proposed impervious area value in Column 1 of Table 1 that is closest to, but not less than the determined value.

Step 3B - Determine the volume that needs to be provided in cubic feet and gallons to satisfy the volume requirements using Columns 2 and 3 in Table 1.

For Rain Gardens/Bioretention or Dry Well #1:

Step 3A - Select the proposed impervious area value in Column 1 of Table 2 that is closest to, but not less than the determined value.

Step 3B - Determine the volume that needs to be provided in cubic feet to satisfy the volume requirements using Column 2 in Table 2.

Step 3C - Using the value from Column 2 determined above, and the depth (D) of the proposed BMP, simply determine the surface area needed from Column 3 of Table 2.

Note: The arrows under Column 3 in Table 2 indicate which range of depths is appropriate for each BMP. To determine the depth based on the area, select an area that corresponds to the required volume, and is closest to, but not more than the area to be used. To determine the area based on the depth, select a depth that is closest to, but not less than the depth that is to be used.

For Infiltration Trench or Dry Well #2:

Step 3A - Select the proposed impervious area value in Column 1 of Table 3 that is closest to, but not less than the determined value.

Step 3B - Determine the volume that needs to be provided in cubic feet to satisfy the volume requirements using Column 2 in Table 3.

Step 3C - Using the value from Column 2 determined above, and the depth (D) of the proposed BMP, simply determine the surface area needed from Column 3 of Table 3.

Note: The arrows under Column 3 in Table 3 indicate which range of depths is appropriate for each BMP. To determine the depth based on the area, select an area that corresponds to the required volume, and is closest to, but not less than the area to be used. To determine the area based on the depth, select a depth that is closest to, but not less than the depth that is to be used.

Step 4 - Submit the final SWM Site Plan, Simplified Approach Worksheet, and signed and notarized "Simplified Approach Operation, Maintenance and Inspection Plan and Agreement" (a sample document is provided in the accompanying appendix) to the Municipality for review and approval prior to beginning construction. After the Municipality has signed the "Simplified Approach Operation, Maintenance and Inspection Plan and Agreement", record the Agreement at the County's Office of Recorder of Deeds. Construction can begin only after the Municipality has issued its approval of the proposed project to the applicant.

Table 1: Simplified Approach - Calculating Rain Barrel/Cistern Storage Volume for 1" Rainfall[1]

Column 1	Column 2	Column 3	
Proposed Impervious Area (square feet)	**Volume of Rain Barrel/Cistern[2] (cubic feet)**	**Volume of Rain Barrel/Cistern (gallons)**	
I	**V_{RBcf}**	**V_{RBgal}**	
Sum of all Proposed Impervious Areas	**$(1*(1/12)*I)/0.75=V_{RBcf}$**	**$V_{RBcf} * 7.48=V_{RBgal}$**	
50	6	42	
100	11	83	
150	17	125	**Rain Barrel**
200	22	166	
250	28	208	
300	33	249	
350	39	291	
400	44	332	
450	50	374	
500	56	416	
550	61	457	**Cistern**
600	67	499	
650	72	540	
700	78	582	
750	83	623	
800	89	665	
850	94	706	
900	100	748	
950	106	790	
1,000	111	831	
1,050	117	873	
1,100	122	914	
1,150	128	956	
1,200	133	997	
1,250	139	1,039	
1,300	144	1,080	
1,350	150	1,122	
1,400	156	1,164	
1,450	161	1,205	
1,500	167	1,247	
1,550	172	1,288	
1,600	178	1,330	
1,650	183	1,371	
1,700	189	1,413	
1,750	194	1,454	
1,800	200	1,496	
1,850	206	1,538	
1,900	211	1,579	
1,950	217	1,621	
2,000	222	1,662	

NOTES:

[1] The typical volume of a rain barrel is between 50 to 200 gallons, so more than one rain barrel may be needed. Larger volumes may require a cistern.

[2] It is assumed that the rain barrel/cistern is 25% full prior to receiving runoff.

Table 2: Simplified Approach - Calculating Rain Garden/Bioretention and Dry Well #1 Storage Volume and Surface Area for 1 Inch Rainfall

Column 1	Column 2	Column 3							
		Surface Area of Rain Garden/Bioretention or Dry Well #1 Acceptable Depths for Each BMP are indicated by the arrows below **(square feet)**							
Proposed Impervious Area (square feet)	**Volume of Rain Garden/Bioretention or Dry Well #11 (cubic feet)**	**Area Required for a BMP with a Depth(D) of 0.5'**	**Area Required for a BMP with a Depth(D) of 1.0'**	**Area Required for a BMP with a Depth(D) of 1.5'**	**Area Required for a BMP with a Depth(D) of 2.0'**	**Area Required for a BMP with a Depth(D) of 2.5'**	**Area Required for a BMP with a Depth(D) of 3.0'**	**Area Required for a BMP with a Depth(D) of 3.5'**	**Area Required for a BMP with a Depth(D) of 4.0'**
		Rain Garden Depth of 0.5							
I **Sum of all Proposed Impervious Areas**	**V** **1*(1/12)*I= V**	***A(sf)*** **V/I =A**							
50	4	8	4	3	2	2	1	1	1
100	8	17	8	6	4	3	3	2	2
150	13	25	13	8	6	5	4	4	3
200	17	33	17	11	8	7	6	5	4
250	21	42	21	14	10	8	7	6	5
300	25	50	25	17	13	10	8	7	6
350	29	58	29	19	15	12	10	8	7
400	33	67	33	22	17	13	11	10	8
450	38	75	38	25	19	15	13	11	9
500	42	83	42	28	21	17	14	12	10
550	46	92	46	31	23	18	15	13	11
600	50	100	50	33	25	20	17	14	13
650	54	108	54	36	27	22	18	15	14
700	58	117	58	39	29	23	19	17	15
750	63	125	63	42	31	25	21	18	16
800	67	133	67	44	33	27	22	19	17
850	71	142	71	47	35	28	24	20	18
900	75	150	75	50	38	30	25	21	19
950	79	158	79	53	40	32	26	23	20
999	83	167	83	56	42	33	28	24	21
1,000	83	167	83	56	42	33	28	24	21
1,050	88	175	88	58	44	35	29	25	22
1,100	92	183	92	61	46	37	31	26	23

Column 1	Column 2	Column 3							
Proposed Impervious Area (square feet)	Volume of Rain Garden/Bioretention or Dry Well #11 (cubic feet)	Surface Area of Rain Garden/Bioretention or Dry Well #1 Acceptable Depths for Each BMP are indicated by the arrows below (square feet)							
		Area Required for a BMP with a Depth(D) of 0.5'	Area Required for a BMP with a Depth(D) of 1.0'	Area Required for a BMP with a Depth(D) of 1.5'	Area Required for a BMP with a Depth(D) of 2.0'	Area Required for a BMP with a Depth(D) of 2.5'	Area Required for a BMP with a Depth(D) of 3.0'	Area Required for a BMP with a Depth(D) of 3.5'	Area Required for a BMP with a Depth(D) of 4.0'
		Rain Garden /Bioretention (0.5-1.0')				Dry Well #1 (1.5-4.0')			
I	V	*A(sf)*							
Sum of all Proposed Impervious Areas	1*(1/12)**I*= V	V/I =A							
1,150	96	192	96	64	48	38	32	27	24
1,200	100	200	100	67	50	40	33	29	25
1,250	104	208	104	69	52	42	35	30	26
1,300	108	217	108	72	54	43	36	31	27
1,350	113	225	113	75	56	45	38	32	28
1,400	117	233	117	78	58	47	39	33	29
1,450	121	242	121	81	60	48	40	35	30
1,500	125	250	125	83	63	50	42	36	31
1,550	129	258	129	86	65	52	43	37	32
1,600	133	267	133	89	67	53	44	38	33
1,650	138	275	138	92	69	55	46	39	34
1,700	142	283	142	94	71	57	47	40	35
1,750	146	292	146	97	73	58	49	42	36
1,800	150	300	150	100	75	60	50	43	38
1,850	154	308	154	103	77	62	51	44	39
1,900	158	317	158	106	79	63	53	45	40
1,950	163	325	163	108	81	65	54	46	41
2,000	167	333	167	111	83	67	56	48	42

NOTE:

[1] It is assumed that the rain garden/bioretention or the dry well #1 are empty prior to receiving runoff (i.e., 0% full)

Table 3: Simplified Approach - Calculating Infiltration Trench and Dry Well #2 Storage Volume and Surface Area for 1" Rainfall

Column 1	Column 2	Column 3							
Total Proposed Impervious Area (square feet)	Volume of Infiltration Trench or Dry Well #2[1] (cubic feet)	Surface Area of Infiltration Trench or Dry Well #2 Acceptable Depths for Each BMP are indicated by the arrows below (square feet)							
		Area Required for a BMP with a Depth(D) of 1.5'	Area Required for a BMP with a Depth(D) of 2.0'	Area Required for a BMP with a Depth(D) of 2.5 Dry Well #2 (1.5 -4.0)	Area Required for a BMP with a Depth(D) of 3.0	Area Required for a BMP with a Depth(D) of 3.5	Area Required for a BMP with a Depth(D) of 4.0	Area Required for a BMP with a Depth(D) of 4.5'	Area Required for a BMP with a Depth(D) of 5.0'
I	V	*A(sf)*							
Sum of all Proposed Impervious Areas	(1*(1/12)**I*)/ (0.4)*=V	V/D=A							
50	10	7	5	4	3	3	3	2	2
100	21	14	10	8	7	6	5	5	4
150	31	21	16	13	10	9	8	7	6
200	42	28	21	17	14	12	10	9	8
250	52	35	26	21	17	15	13	12	10
300	63	42	31	25	21	18	16	14	13
350	73	49	36	29	24	21	18	16	15
400	83	56	42	33	28	24	21	19	17
450	94	63	47	38	31	27	23	21	19
500	104	69	52	42	35	30	26	23	21
550	115	76	57	46	38	33	29	25	23
600	125	83	63	50	42	36	31	28	25
650	135	90	68	54	45	39	34	30	27
700	146	97	73	58	49	42	36	32	29
750	156	104	78	63	52	45	39	35	31
800	167	111	83	67	56	48	42	37	33
850	177	118	89	71	59	51	44	39	35
900	188	125	94	75	63	54	47	42	38
950	198	132	99	79	66	57	49	44	40
1,000	208	139	104	83	69	60	52	46	42
1,050	219	146	109	88	73	63	55	49	44
1,100	229	153	115	92	76	65	57	51	46
1,150	240	160	120	96	80	68	60	53	48
1,200	250	167	125	100	83	71	63	56	50
1,250	260	174	130	104	87	74	65	58	52
1,300	271	181	135	108	90	77	68	60	54
1,350	281	188	141	113	94	80	70	63	56
1,400	292	194	146	117	97	83	73	65	58
1,450	302	201	151	121	101	86	76	67	60

Column 1	Column 2	Column 3							
		Surface Area of Infiltration Trench or Dry Well #2 Acceptable Depths for Each BMP are indicated by the arrows below **(square feet)**							
Total Proposed Impervious Area (square feet)	**Volume of Infiltration Trench or Dry Well #2[1] (cubic feet)**	**Area Required for a BMP with a Depth(D) of 1.5'**	**Area Required for a BMP with a Depth(D) of 2.0'**	**Area Required for a BMP with a Depth(D) of 2.5**	**Area Required for a BMP with a Depth(D) of 3.0**	**Area Required for 3.5**	**Area Required for 4.0**	**Area Required for a BMP with a Depth(D) of 4.5'**	**Area Required for a BMP with a Depth(D) of 5.0'**
				Dry Well #2 (1.5'-4.0')					
I	**V**								
		A(sf)							
Sum of all Proposed Impervious Areas	**(1*(1/12)*I)/ (0.4)*=V**	**V/D=A**							
1,500	313	208	156	125	104	89	78	69	63
1,550	323	215	161	129	108	92	81	72	65
1,600	333	222	167	133	111	95	83	74	67
1,650	344	229	172	138	115	98	86	76	69
1,700	354	236	177	142	118	101	89	79	71
1,750	365	243	182	146	122	104	91	81	73
1,800	375	250	188	150	125	107	94	83	75
1,850	385	257	193	154	128	110	96	86	77
1,900	396	264	198	158	132	113	99	88	79
1,950	406	271	203	163	135	116	102	90	81
2,000	417	278	208	167	139	119	104	93	83

NOTE:
[1]Assume a percent void volume of 40%.

Table-4: Simplified Approach Worksheet

Name of Property Owner(s):					Date:
Name of Applicant(s) [if different than Owner(s)]:					
Contact Phone #: Email Address:					
Address of Project:					
Description of Project:					
□ Met with Municipal Engineer to discuss proposed project. [insert date of meeting]					
Distance from earth disturbance to nearest surface water feature (stream, pond, wetland, etc.) (if required by the Municipality, circle one): 50 feet or less More than 50 feet					
□ **Step 1**: Attach Simplified SWM Site Plan (i.e., sketch plan), per Section 1, Step 1					
Step 2: Determine the Impervious Area to be Managed					
	Total Proposed Impervious Area (square feet):				
	Total Earth Disturbance (square feet):				
Step 3: Select the BMP(s) to be Used and Appropriate Sizing Criteria					
	Rain Barrel or Cistern				
	Proposed Impervious Surface from Column 1 in Table 1	Volume from Column 3 in Table 1			
	Rain Garden/Bioretention or Dry Well #1				
	Proposed Impervious Surface from Column 1 in Table 2	Volume of BMP from Column 2 in Table 2	Area Dimensions of BMP - Column 3 in Table 2	Depth of BMP from Column 3 in Table 2	Types of Materials to be Used
	Infiltration Trench or Dry Well # 2				
	Proposed Impervious Surface from Column 1 in Table 3	Volume of BMP from Column 2 in Table 3	Area Dimensions of BMP - Column 3 in Table 3	Depth of BMP from Column 3 in Table 3	Types of Materials to be Used
□ **Step 4**: Complete, Sign and have Operation, Maintenance and Inspection Plan and Agreement Notarized and Recorded at the County Recorder of Deeds (when signed by Municipality)					

NOTE: For additional BMPs, use additional sheet(s).

2. Definitions

These definitions apply only to this Simplified Approach to Stormwater Management for Small Projects Handbook. The definitions included in the Municipality's Stormwater Management Ordinance also apply.

Best Management Practice (BMP) - As defined in the Municipality's Stormwater Management Ordinance, but generally including activities, facilities, designs, measures or procedures used to manage stormwater impacts from land development and earth disturbance activities to meet stormwater quality, runoff control and groundwater recharge protection requirements, BMPs include, but are not limited to, a wide variety of practices and devices such as: infiltration facilities (dry wells and infiltration trenches), filter strips, low impact design, bioretention (rain gardens), permeable paving, grassed swales, and manufactured devices (cisterns and rain barrels). Structural stormwater BMPs are permanent appurtenances to the project site.

Geotextile - A fabric manufactured from synthetic fibers which provides a separation between different types of media (i.e., soil and stone), and is used to achieve specific objectives, including infiltration or filtration.

Hotspot - Areas where land use or activities generate highly contaminated runoff, with concentrations of pollutants that are higher than those that are typically found in stormwater (e.g., vehicle salvage yards, recycling facilities, vehicle fueling stations, fleet storage areas, vehicle equipment and cleaning facilities, and vehicle service and maintenance facilities).

Impervious Surface - As defined in the Municipality's Stormwater Management Ordinance, but generally including any surface that prevents the infiltration of water into the ground. Impervious surfaces generally include, but are not limited to, streets, sidewalks, pavements, driveway areas, or roofs. The applicant should review the Municipality's Stormwater Management Ordinance or consult with the Municipal Engineer to confirm what components of the proposed project are considered "impervious surfaces". Decks, swimming pools, compacted soils or stone surfaces (such as for vehicle movement or parking), among other features, may be included in the Municipality's definition of "impervious surfaces".

Infiltration - Movement of surface water into the soil, where it is absorbed by plant roots, transpired or evaporated into the atmosphere, or percolated downward to recharge groundwater.

Low Impact Development - A land development and construction approach that uses various land planning, design practices, and technologies to simultaneously conserve and protect natural resource systems, and reduce infrastructure costs.

Percent Void Volume - The volume of void space, expressed as a percentage, of the total volume of the storage facility (void volume + volume of solid materials providing structural support for the storage facility).

Pervious Surface - Any area not defined as impervious surface.

Potable - A water supply that is either absent of contaminants or contains contaminant levels that are below a given threshold level that makes the water as suitable for drinking.

Runoff - Any part of precipitation that flows over the land surface.

Stormwater - Drainage runoff from the surface of the land resulting from precipitation, or snow or ice melt.

3. Description of BMPs

The following is a description of several types of BMPs that could be implemented. The requirements of each BMP as described below are taken directly from the PA Stormwater BMP Manual (December, 2006). Refer to the PA BMP Manual (latest version) which can be found on the PA Department of Environmental Protection's website.

Rain Barrels/Cisterns

Rain Barrels are large containers that collect drainage from roof leaders and temporarily store water to be released to lawns, gardens, and other landscaped areas after the rainfall has ended. Rain Barrels are typically between 50 to 200 gallons in size. The stored water can also be used as a nonpotable water supply. Cisterns are larger than rain barrels having volumes of 200 gallons or more, and can be placed either on the surface or underground. Figures 1 and 2 show examples of rain barrels and cisterns, respectively that could be used to manage stormwater from a project. Rain barrels and cisterns are manufactured in a variety of shapes and sizes. All of these facilities must make provisions for the following items:

- There must be a means to release the water stored in the container between storm events in order for the necessary storage volume to be available for the next storm.

- Stormwater must be kept from entering other potable systems, and pipes and storage units must be clearly marked "Do Not Drink".

- An overflow outlet should be placed a few inches below the top of the storage container with an overflow pipe to divert flow away from structures once the storage containers are filled.

- Use screens to filter debris, and covers (lids) placed over the containers to prevent insects and debris from entering the storage chamber.

- Make sure cisterns are watertight and do not leak.

- Rain barrels are typically assumed to be 25% full to calculate volume since they are not always emptied before each storm. The tables contained in this Handbook were developed to account for the 25% increase in the required storage of a rain barrel or a cistern.

Source (picture on left): http://www.rfcity.org/Eng/Stormwater/YourProperty/YourProperty.him
Source (picture on right): http://www.floridata.com/tracks/transplantedgardener/Rainbarrels.cfm

Figure 1: Rain Barrels

Source (for both pictures): Pennsylvania Stormwater BMP Manual (PADEP, 2006)

Figure 2: Cisterns

Infiltration Trench

An infiltration trench is a long, narrow, rock-filled trench, with or without a perforated pipe placed within the rock to distribute water evenly along the trench that receives stormwater runoff, and has no outlet. Runoff is stored in the void space between the stones and in the pipe, and infiltrates through the bottom of the trench into the underlying soil matrix. Figure 3 shows a typical cross section of an infiltration trench configuration. Infiltration trenches shall incorporate or make provisions for the following elements:

- These facilities should be located a minimum of 10 feet (or as otherwise required by the Municipality) from the building foundation to avoid foundation seepage problems, and are not recommended if their installation would create a risk of flooding other structures constructed at or below grade.

- Perforated pipe placed within the rock is to be set level.

- The width is limited to between **three to eight feet,** and the depth ranges from **two to five feet.**

- Trench should be wrapped in nonwoven geotextile (top, sides, and bottom).

- There should be a positive overflow that allows stormwater that cannot be stored or infiltrated to be discharged into a nearby vegetated area.

- Roof downspouts may be connected to infiltration trenches, but should contain a cleanout to collect sediment and debris before entering the infiltration area.

- Infiltration testing is recommended to ensure soil is capable of infiltrating stormwater.

- It is recommended that there be a two-foot clearance above the regularly occurring seasonal high-water table, and have a minimum depth to bedrock of two feet.

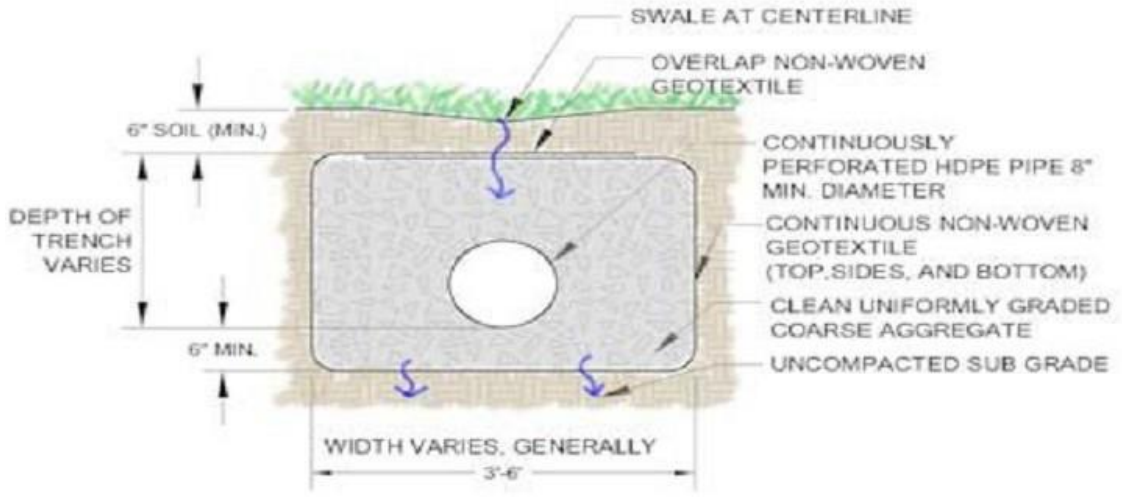
- The infiltration trench should be at least 50 feet from individual water supply wells, 100 feet from community or municipal water supply wells, and 50 feet from any septic system component. It should not be located near stormwater Hotspots (refer to B.2 Definitions).

- The infiltration trench should be located so that it presents no threat to sub-surface structures such as building foundations and basements.

- Protect infiltration areas from compaction by heavy equipment during and after construction.

- Infiltration trenches should be constructed after all earth disturbance associated with a given project or site is stabilized to avoid clogging.

- The ratio of the drainage area which stormwater runoff is collected from to the area of the footprint (bottom area) of the infiltration portion of the facility should be as small as possible with a ratio of less than 5:1 preferred.



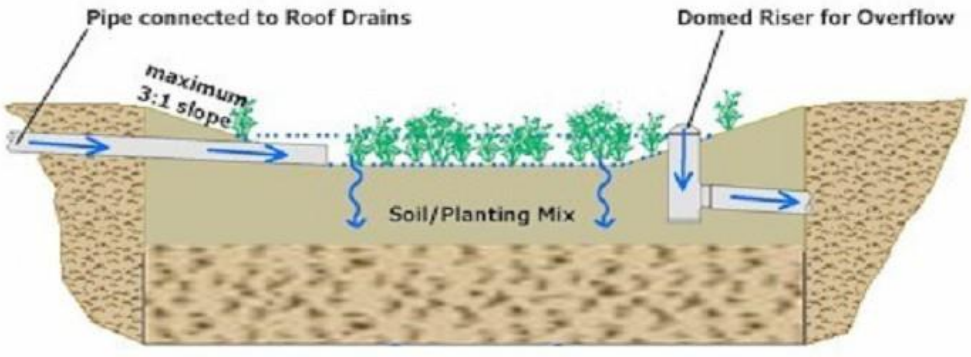
Source: Pennsylvania Stormwater BMP Manual (PADEP, 2006)

Figure 3: Cross Section of Typical Infiltration Trench

Rain Garden/Bioretention Area

A Rain Garden (Bioretention Area) is an excavated depression area on the surface of the land in which native vegetation is planted to filter and use stormwater runoff. Runoff ponds on top of the surface of the rain garden and then infiltrates into an enhanced soil/planting mix below the surface where plants can use the water to grow. Bioretention improves water quality, with the vegetation planted in the facility filtering the water, and the root systems encouraging or promoting infiltration. Figure 4 shows a cross section of a typical rain garden. Key elements of a rain garden include:

- Recommended ponding depths not exceeding one foot.
- Native vegetation that can tolerate dry and wet weather.
- An overflow area where, if the bioretention area were to overflow, the overflow would flow over pervious surfaces (i.e., grass, meadow), and would not cause harm to property, or;
- An overflow, such as a domed riser, to allow excess flow from large storms to travel to other infiltration areas, pervious areas, or connected storm systems designed to receive the excess runoff.
- For most areas, slopes should be limited to 3:1, maximum; however, where space is limited, 2:1 side slopes may be acceptable with approval from the municipal engineer.
- The soil/planting mix depth should not be less than 1.5 feet deep and typically consist of a mixture of topsoil, sand and compost (i.e., mulch). The topsoil, sand and compost should be uniformly mixed by volume in a 50%, 30%, 20% mixture, respectively.



Source: Pennsylvania Stormwater BMP Manual (PADEP, 2006)

Figure 4: Cross Section of Typical Rain Garden/Bioretention Area

Dry Wells

A dry well, also referred to as a seepage pit, is a subsurface storage facility that temporarily stores and infiltrates runoff from the roofs of buildings or other impervious surfaces. A dry well can be either a structural prefabricated chamber (Dry Well #1) or an excavated pit filled with stone fill (Dry Well #2). Dry Wells discharge the stored runoff via infiltration into the surrounding or underlying soils. Figure 5 shows a typical prefabricated dry well and a typical dry well configuration with stone fill. The following elements shall be incorporated into all dry well designs:

- These facilities should be located a minimum of 10 feet (or as otherwise required by the Municipality) from the building foundation to avoid foundation seepage problems, and are not recommended if their installation would create a risk of flooding other structures constructed at or below grade.

- Dry well should be constructed after all earth disturbance associated with a given project or site is stabilized to avoid clogging.

- During construction, compaction of the subgrade soil in the bottom of the dry well should be avoided, and construction should be performed only with light machinery.

- For Dry Well # 2 designs, the depth of dry well should be between **1.5 feet to four feet.** Gravel fill should consist of uniformly graded stone with an average diameter of between 1 1/2 and two inches with the gravel fill wrapped in a nonwoven geotextile to separate the stone fill from the surrounding soil.

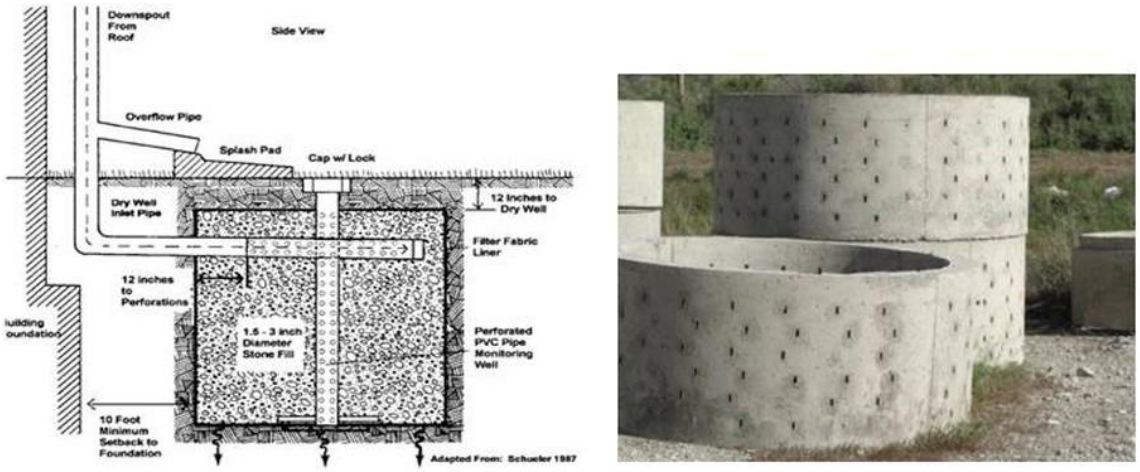
- At least one foot of soil must be placed over the top of the dry well.

- Dry wells should be inspected at least four times annually as well as after large storm events.

- Dry wells should have overflow pipes to allow high volumes of runoff to overflow the facility and flow into a connected infiltration area, pervious area, or other connected storm sewer designed to receive the excess runoff.

- Every dry well must have at least one monitoring well to assist in the inspection of the dry well to determine how much water is retained within the well during dry weather periods.

- Infiltration testing is recommended to ensure the underlying soil is capable of infiltrating the needed volume of stormwater.



Source (for picture on left): http://www.seagrant.sunysb.edu/pages/BMPsForMarinas.htm
Source (for picture on right): http://www.conelandconcreteine.net/1800652.html

Figure 5: Typical Dry Well Configuration filled with Stone Fill (DRY WELL #2) (Left) and Structural Prefabricated Chamber (DRY WELL #1) (Right)

4. Example

Simplified Approach to Stormwater Management for a Residential Garage and Driveway addition

Joe Homeowner wants to build a 400 square foot two car garage, and a 540 square foot (30 feet long x 18 feet wide) impervious driveway that is graded so that the stormwater runoff drains to the grassy area along one edge of the driveway. (An annotated copy of Table 1 is provided below as Table 5 and an annotated copy of Table 3 is provided below as Table 6, and outlines the steps of this example) and a completed Table 4 is provided as Table 7.

STEP 1 - Make a sketch of the site plan as shown in Figure 6.

STEP 2 - Determine the total area of all proposed impervious surfaces to drain to each BMP:

Garage Roof (Front)	10 feet x 20 feet =		200 square feet
Garage Roof (Rear)	10 feet x 20 feet =		200 square feet
Driveway	30 feet x 18 feet =		540 square feet
Total Proposed Impervious Surface			**940 square feet**
Total Proposed Earth Disturbance Area			**2,500 square feet (estimated)**

Note: If the driveway used pervious pavement (i.e., paving blocks), then the total impervious area would only be 400 square feet, and no stormwater management practices would need to control runoff from the project.

STEP 3 - Select the BMP(s) to be Used and Appropriate Sizing Criteria

Select a BMP or combination of BMPs from Section 3 to be used to satisfy the volume requirement. Determine the length, width, depth and other requirements for the BMPs in Section 3. A BMP needs to be placed to catch runoff from the back of the garage, and a BMP needs to be placed to capture runoff from the front of the garage and the driveway. Figure 6 shows the direction the runoff flows and the locations where the BMPs are to be placed.

Joe Homeowner would like to use a rain barrel (BMP #1) to capture the runoff from the rear of the garage and an infiltration trench (BMP #2) to capture runoff from the front of the garage and the driveway.

BMP #1 (Rain Barrel/Cistern) - Steps 3A and 3B

STEP 3A - Select the proposed impervious area value for BMP # 1, the rain barrel or cistern, in Column 1 that is closest to, but not less than 200 in Table 1:

The value in Column 1 that is closest to but is not less than 200 is 200.

STEP 3B - Determine the volume that BMP # 1 must be to satisfy the volume requirements using Columns 2 and 3 in Table 1:

The volume in gallons of the rain barrel/cistern to be used as BMP # 1, assuming the rain barrel/cistern is 25% full, is determined by finding the value in Column 3 for the same row that corresponds to the impervious area value determined in Step 1. Therefore, the volume of BMP # 1, the rain barrel/cistern must be $\geq$ 166 gallons. Depending on the size of the rain barrel(s), a combination of rain barrels could be used in succession as shown in Figure 1, or a cistern could be used.

BMP #2 (Infiltration Trench) - Steps 3A through 3C

STEP 3A - Select the proposed impervious area value for BMP # 2, the infiltration trench, using Column 1 in Table 6:

Find the row in Column 1 that is closest to but not less than 740 (200 from the front of the garage + 540 from the driveway). Therefore, the value selected is 750.

STEP 3B - Determine the volume that BMP #2, the infiltration trench must be to satisfy the volume requirements using Column 2 in Table 6:

The volume of the infiltration trench to be used as BMP #2, assuming a percent void volume of 40%, is determined by finding the value Column 2 that is in the same row as 750 square feet from Column 1 as described in Step 2. Therefore, the volume of BMP #2 must be 156 cubic feet.

STEP 3C - Utilizing the value from Column 2 determined above, and the surface area that the proposed BMP will occupy, determine the depth needed using Column 3 in Table 6:

Joe Homeowner would like to place the infiltration trench along the edge of the driveway so it would have a length of 20 feet. The smallest width that can be used, as stated in the infiltration trench requirements in Section 3, is three feet. Therefore, the area of the infiltration trench is:

20 feet * 3 feet = 60 square feet

To find the minimum depth of the trench move toward the right side of the table from 156 cubic feet in Column 2 to Column 3, and find the column with a value of as close to but not more than 60 square feet, which is 52 square feet. Then obtain the minimum depth of the facility by reading the depth from the column heading at the top of the table. Therefore, the depth of the trench would need to be three feet.

Selected BMPs:

BMP #1: Rain barrel(s) that provides for at least 166 gallons, and
BMP #2: A 20' long x 3' wide x 3' deep infiltration trench

Table 5: Example – Calculating Storage Volume for Rain Barrel/Cistern

Column 1	Column 2	Column 3	
Proposed Impervious Area (square feet)	**Volume of Rain Barrel/Cistern[1] (cubic feet)**	**Volume of Rain Barrel/Cistern (gallons)**	
I	**V_{RBcf}**	**V_{RBgal}**	
Sum of all Proposed Impervious Areas	**$(1*(1/12)*I)/0.75=V_{RBcf}$**	**$V_{RBcf} * 7.48=V_{RBgal}$**	
50	6	42	
100	11	83	**Rain Barrel**
150	17	125	
200	22	166	
250	28	208	
300	33	249	
350	39	291	
400	44	332	
450	50	374	
500	56	416	
550	61	457	
600	67	499	**Cistern**
650	72	540	
700	78	582	
750	83	623	
800	89	665	
850	94	706	
900	100	748	
950	106	790	
999	111	830	

NOTE:
[1]Assume that the rain barrel/cistern is 25% full.

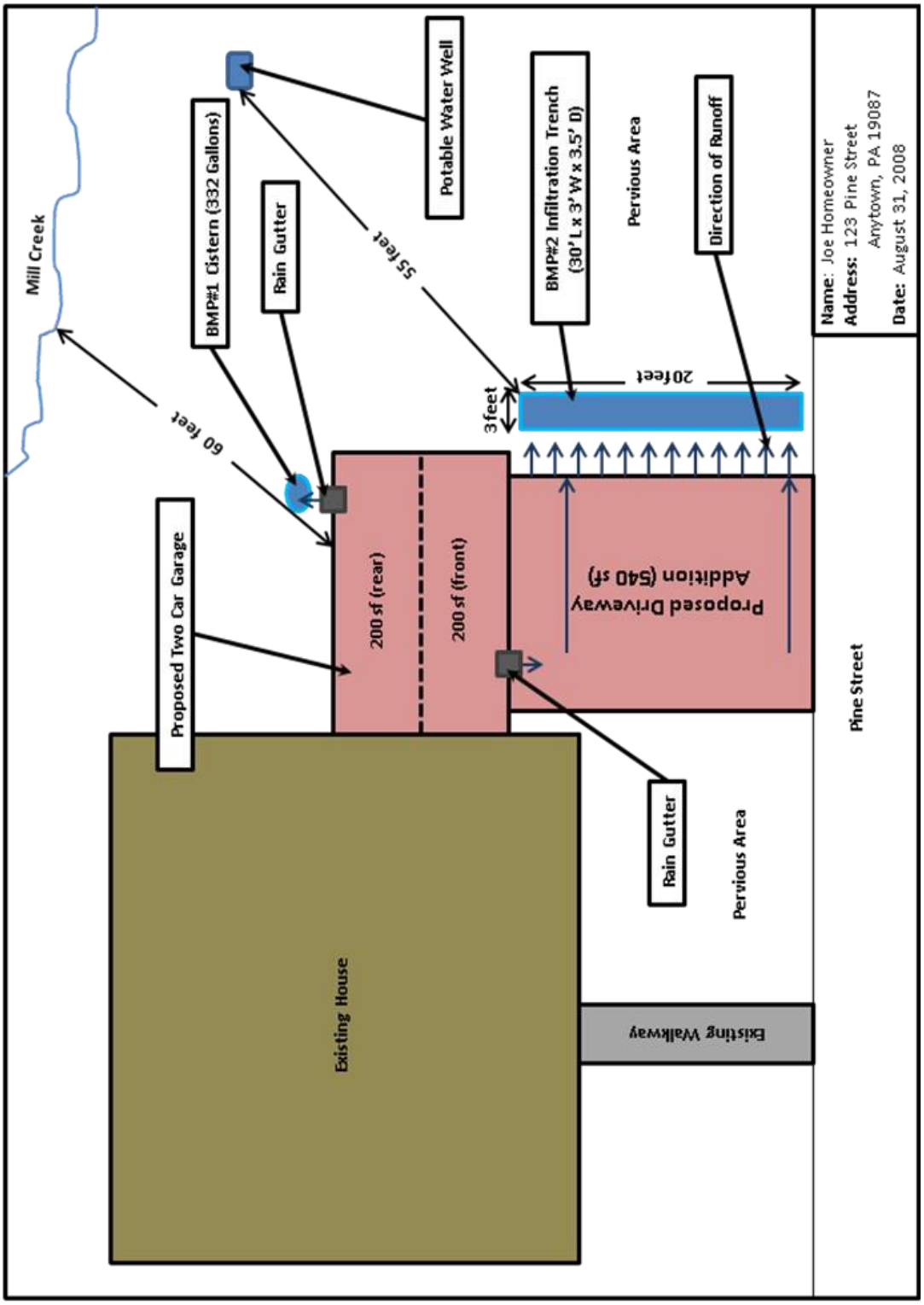


Figure 6: Example of Simplified Stormwater Management Site Plan for Joe Homeowner

Table 6: Example – Calculating Storage Volume Surface Area and Depth for Infiltration Trench

Column 1	Column 2	Column 3							
		Surface Area of Infiltration Trench or Dry Well #2 Acceptable Depths for Each BMP are indicated by the arrows below **(square feet)**							
Total Proposed Impervious Area (square feet)	**Volume of Infiltration Trench or Dry Well #2* (cubic feet)**	**Area Required for a BMP with a Depth(D) of 1.5'**	**Area Required for a BMP with a Depth(D) of 2.0'**	**Area Required for a BMP with a Depth(D) of 2.5'**	**Area Required for a BMP with a Depth(D) of 3.0'**	**Area Required for a BMP with a Depth(D) of 3.5'**	**Area Required for a BMP with a Depth(D) of 4.0'**	**Area Required for a BMP with a Depth(D) of 4.5'**	**Area Required for a BMP with a Depth(D) of 5.0'**
				Dry Well #2 (1.5'-4.0')			Infiltration Trench (2.0'-5.0')		
I	**V**	***A(sf)***							
Sum of all Proposed Impervious Areas	**(1*(1/12)*I)/ (0.4)[1]=V**	**V/D=A**							
50	10	7	5	4	3	3	3	2	2
100	21	14	10	8	7	6	5	5	4
150	31	21	16	1	10	9	8	7	6
200	42	28	21	1	14	12	10	9	8
250	52	35	26	2	17	15	13	12	10
300	63	42	31	2	21	18	16	14	13
350	73	49	36	2	24	21	18	16	15
400	83	56	42	3	28	24	21	19	17
450	94	63	47	3	31	27	23	21	19
500	104	69	52	4	35	30	26	23	21
550	115	76	57	4	38	33	29	25	23
600	125	83	63	5	42	36	31	28	25
650	135	90	68	5	45	39	34	30	27
700	146	97	73	5	49	42	36	32	29
Step 3A 750	**Step 3B** 156	104	78	6	**Step 3C** 52	45	39	35	31
800	167	111	83	6	56	48	42	37	33
850	177	118	89	7	59	51	44	39	35
900	188	125	94	7	63	54	47	42	38
950	198	132	99	7	66	57	49	44	40
999	208	139	104	8	69	59	52	46	42

NOTE:
[1] Assumes a percent void volume of 40%.

Table 7: Simplified Approach Worksheet — Example for *Joe Homeowner*

Name of Property Owner(s): **Joe Homeowner**					Date: **8/26/12**
Name of Applicant(s) [if different than Owner(s)]: **N/A**					
Contact Phone #: **610-555-1234** Email Address: **joe@homeowner.com**					
Address of Project: **123 Pine St., Anytown, PA 19355**					
Description of Project: **Add a 2-car garage and driveway**					
☐ Met with Municipal Engineer to discuss proposed project. **[date of meeting 6/1/12]**					
Distance from earth disturbance to nearest surface water feature (stream, pond, wetland, etc.) (if required by the Municipality, circle one): 50 feet or less (More than 50 feet)					
☐ **Step 1**: Attach Simplified SWM Site Plan (i.e. sketch plan), per Section 1, Step 1					
Step 2: Determine the Impervious Area to be Managed					
	Total Proposed Impervious Area (square feet): **940 sq. feet**				
	Total Earth Disturbance (square feet): **~ 2,500 square feet**				
Step 3: Select the BMP(s) to be Used and Appropriate Sizing Criteria					
	Rain Barrel or Cistern				
	Proposed Impervious Surface from Column 1 in Table 1	Volume from Column 3 in Table 1			
	200 sq. feet	**166 gallons**			
	Rain Garden/Bioretention or Dry Well #1				
	Proposed Impervious Surface from Column 1 in Table 2	Volume of BMP from Column 2 in Table 2	Area Dimensions of BMP - Column 3 in Table 2	Depth of BMP from Column 3 in Table 2	Types of Materials to be Used
	N/A				
	Infiltration Trench or Dry Well # 2				
	Proposed Impervious Surface from Column 1 in Table 3	Volume of BMP from Column 2 in Table 3	Area Dimensions of BMP - Column 3 in Table 3	Depth of BMP from Column 3 in Table 3	Types of Materials to be Used
	740 square feet	**156 cubic feet**	**20 feet by 3 feet**	**3 feet**	**Infiltration trench, uniformly graded aggregate, 8″ HDPE pipe, geotextile, grass planted on top.**
☐ **Step 4**: Complete, Sign & have Operation, Maintenance and Inspection Plan and Agreement Notarized and Recorded at the County Recorder of Deeds (when signed by Municipality)					

NOTE: For additional BMPs, use additional sheet(s).

5. Simplified Approach Operation, Maintenance and Inspection Plan and Agreement.

It is the property owner's responsibility to properly maintain BMPs. It is also the property owner's responsibility to inform any future buyers of the function, operation, and maintenance needed for any BMPs on the property prior to the purchase of the property. The accompanying sample "Simplified Approach Operation, Maintenance and Inspection Plan and Agreement" (see accompanying appendix) outlines the maintenance required for each type of BMP, the responsibilities of the property owner, and the rights of the Municipality in regards to inspection and enforcement of the maintenance requirements.

The "Simplified Approach Operation, Maintenance and Inspection Plan and Agreement" must be signed, notarized and submitted to the Municipality. Following the signature by the Municipality, the property owner must have the Agreement recorded at the County Recorder of Deeds, so that the Agreement will be applicable to future property owners.

Appendix A.3
Simplified Approach - Stormwater Best Management Practices
Operation, Maintenance, and Inspection Plan and Agreement

SAMPLE AGREEMENT

It is the Landowner's responsibility to properly maintain BMPs, It is also the Landowner's responsibility to inform any future buyers of the function, operation, and maintenance needed for any BMPs on the property prior to the purchase of the property. The following maintenance agreement outlines the inspection and maintenance required for each type of BMP, the responsibilities of the Landowner, and the rights of the Municipality in regards to inspection and enforcement of the maintenance requirements.

The Operation, Maintenance and Inspection Plan and Agreement must be signed, notarized and submitted to the Municipality. Following approval and signature by the Municipality, the Landowner must have the Agreement recorded at the Chester County Office of the Recorder of Deeds, so that the Agreement will be applicable to future landowners.

Prepared By: *Insert Preparer's Name* *Insert Preparer's Address Line 1* *Insert Preparer's Address Line 2* *Insert Preparer's Phone Number* Return To: *Insert Municipality's Name* *Insert Municipality's Address Line 1* *Insert Municipality's Address Line 2* *Insert Municipality's Phone Number* **UPI#:** *Insert UPI(s) of properties with BMPs and/or Conveyances for the O & M Agreement* Property Street Address: *Insert the street address of the property*	LEAVE BLANK For Recorder's Use Only

STORMWATER BEST MANAGEMENT PRACTICES (BMPs) AND CONVEYANCES
OPERATION AND MAINTENANCE AGREEMENT

THIS AGREEMENT, made and entered into this _____ day of _____ 20__, by and between _____, (hereinafter the "Landowner"), and _____ (Chester County, Pennsylvania, (hereinafter "Municipality");

WITNESSETH

WHEREAS, the Landowner is the owner of certain real property by virtue of a deed of conveyance recorded in the land records of Chester County, Pennsylvania, at Deed Book ____ and Page ____, (hereinafter "Property"); and

WHEREAS, _____(title of approved plans) approved by the Municipality_____(date) (hereinafter referred to as the "Plan") for the Property, which is attached hereto as Appendix A and made part hereof, provides for management of stormwater within the confines of the Property through the use of BMP(s) and Conveyances; and

WHEREAS, for the Municipality and the Landowner, for itself and its administrators, executors, successors heirs, and assigns, agree that the health, safety, and welfare of the residents of the Municipality and the protection and maintenance of water quality require that stormwater BMP(s) and Conveyances be constructed and maintained on the Property; and

WHEREAS, for the purposes of this Agreement, the following definitions shall apply:

BMP - "Best Management Practice" – Activities, facilities, designs, measures or procedures as specifically identified in the Plan, used to manage stormwater impacts from Regulated Activities to provide water quality treatment, infiltration, volume reduction, and/or peak rate control, to promote ground water recharge, and to otherwise meet the purposes of the Municipality's Stormwater Management Ordinance. Stormwater BMPs are commonly grouped

into one (1) of two (2) broad categories or measures: "structural" or "nonstructural." Nonstructural BMPs or measures refer to low impact development and conservation design practices used to minimize the contact of pollutants with stormwater runoff. These practices aim to limit the total volume of stormwater runoff and manage stormwater at its source by techniques such as protecting natural systems and incorporating landscape features. Nonstructural BMPs include, but are not limited to, the protection of sensitive and special value features such as wetlands and riparian areas, the preservation of open space while clustering and concentrating development, the reduction of impervious cover, and the disconnection of downspouts from storm sewers. Structural BMPs are those that consist of a constructed system that is designed and engineered to capture and treat stormwater runoff. Structural BMPs are those that consist of a physical system that is designed and engineered to capture and treat stormwater runoff. Structural BMPs include, but are not limited to, a wide variety of practices and devices from large-scale retention ponds and constructed wetlands to small-scale underground treatment systems, infiltration facilities, filter strips, bioretention, wet ponds, permeable paving, grassed swales, riparian buffers sand filters, detention basins, and other manufactured devices designed to mitigate stormwater impacts. The BMPs identified in the Plan are permanent appurtenances to the Property; and

Conveyance – As specifically identified in the Plan, a man-made, existing or proposed facility, feature or channel used for the transportation or transmission of stormwater from one place to another, including pipes, drainage ditches, channels and swales (vegetated and other), gutters, stream channels, and like facilities or features. The Conveyances identified in the Plan are permanent appurtenances to the Property; and

WHEREAS, the Municipality requires through the implementation of the Plan, that Stormwater Management BMPs and conveyances, as required by the Plan and the Municipality's Stormwater Management Ordinance, be constructed and adequately inspected, operated and maintained by the Landowner or their designee.

NOW, THEREFORE, in consideration of the foregoing promises, the mutual covenants contained herein, and the following terms and conditions, the parties hereto, intending to be legally bound hereby, agree as follows:

1. The foregoing recitals to this Agreement are incorporated as terms of this Agreement and obligations of the Landowner as if fully set forth in the body of this Agreement.

2. The Landowner shall construct the BMP(s) and Conveyance(s) in accordance with the Simplified Approach Stormwater Management Site Plan.

3. Upon completion of construction, the Landowner shall be responsible for completing final As-Built Plans of all BMPs, Conveyances, or other stormwater management facilities included in the approved stormwater management site plan as per the requirements of Section 302-31 of the Stormwater Management Ordinance. As-Built Plans are not required for Simplified Approach Projects.

4. The Landowner shall inspect, operate and maintain the BMP(s) and Conveyances as shown on the Plan in good working order acceptable to the Municipality and in accordance with the specific inspection and maintenance requirements in the approved Plan and the current version of the Pennsylvania Stormwater BMP Manual, as amended.

5. The Landowner hereby grants permission to the Municipality, its authorized agents and employees, to enter upon the Property from the public right-of-way or roadway, at reasonable times and upon presentation of proper identification, to inspect the BMP(s) and

Conveyance(s) whenever it deems necessary for compliance with this Agreement and the Municipality's Stormwater Ordinance. Whenever possible, the Municipality shall notify the Landowner prior to entering the Property.

6. The Landowner shall inspect the BMP(s) and Conveyance(s) to determine if they continue to function as intended.

7. The BMP(s) and Conveyance(s) shall be inspected according to the following frequencies, at a minimum:

   a. Annually for the first 5 years.

   b. Once every 3 years thereafter.

   c. During or immediately after the cessation of a 10-year or greater storm, as determined by the Municipal Engineer. Inspection reports for inspections during or after the cessation of a 10-year or greater storm event are only required to be submitted to the Municipality if requested by the Municipality or Municipal Engineer.

   Written inspection reports shall be created to document each inspection. The inspection report shall contain the date and time of the inspection, the individual(s) who completed the inspection, the location of the BMP, facility or structure inspected, observations on performance, and recommendations for improving performance, if applicable. Inspection reports shall be submitted to the Municipality within 30 days following completion for the inspection.

   Landowners must notify the Municipality of BMP(s) and Conveyance(s) that are no longer functioning as designed and must coordinate with the Municipality to determine a schedule to repair or retrofit these systems to restore designed functionality.

8. The Landowner acknowledges that, per the Municipality's Stormwater Ordinance, it is unlawful, without written approval of the Municipality, to:

   a. Modify, remove, fill, landscape, alter or impair the effectiveness of any BMP or Conveyance that is constructed as part of the approved Plan;

   b. Place any structure, fill, landscaping, additional vegetation, yard waste, brush cuttings, or other waste or debris into a BMP or Conveyance that would limit or alter the functioning of the BMP or Conveyance;

   c. Allow the BMP or Conveyance to exist in a condition which does not conform to the Plan or this Agreement; and

   d. Dispose of, discharge, place or otherwise allow pollutants including, but not limited to, deicers, pool additives, household chemicals and automotive fluids to directly or indirectly enter any BMP or Conveyance.

9. In the event the Landowner fails to operate and maintain the BMP(s) and Conveyance(s) as shown on the Plan in good working order acceptable to the Municipality, the Landowner shall be in violation of this Agreement and the Landowner agrees that the Municipality or its representatives may, in addition to and not in derogation or diminution of any remedies available to it under the Stormwater Ordinance or other statutes, codes, rules or

regulations, or this Agreement, enter upon the Property and take whatever action is deemed necessary to maintain said BMP(s) and Conveyance(s). It is expressly understood and agreed that the Municipality is under no obligation to maintain or repair said facilities, and in no event shall this Agreement be construed to impose any such obligation on the Municipality.

10. In the event the Municipality, pursuant to this Agreement, performs work of any nature, or expends any funds in performance of said work for labor, use of equipment, supplies, materials, and the like, the Landowner shall reimburse the Municipality for all expenses (direct and indirect) incurred within thirty (30) days of delivery of an invoice from the Municipality. Failure of the Landowner to make prompt payment to the Municipality may result in enforcement proceedings, which may include the filing of a lien against the Property, which filing is expressly authorized by the Landowner.

11. The intent and purpose of this Agreement is to ensure the proper maintenance of the on-site BMP(s) and Conveyance(s) by the Landowner; provided, however, that this Agreement shall not be deemed to create or effect any additional liability of any party for damage alleged to result from or be caused by stormwater runoff.

12. The Landowner, its executors, administrators, assigns, heirs, and other successors in interests, hereby release and shall release the Municipality, its employees, agents and designated representatives from all damages, accidents, casualties, occurrences or claims which might arise or be asserted against the Municipality and/or its said employees, agents or representatives, arising out of the construction, presence, existence, or maintenance of the BMP(s) and Conveyance(s) either by the Landowner or Municipality. In the event that a claim is asserted or threatened against the Municipality, its employees, agents or designated representatives, the Municipality shall notify the Landowner and the Landowner shall defend, at his own expense, any claim, suit, action or proceeding, or threatened claim, suit, action or proceeding against the Municipality or, at the request of the Municipality, pay the cost, including attorneys' fees, of defense of the same undertaken on behalf of the Municipality. If any judgment or claims against the Municipality, its employees, agents or designated representatives shall be allowed, the Landowner shall pay all damages, judgments or claims and any costs and expenses incurred by the Municipality, including attorney's fees, regarding said damages, judgment or claims.

13. The Municipality may enforce this Agreement in accordance with its Stormwater Ordinance, at law or in equity, against the Landowner for breach of this Agreement. Remedies may include fines, penalties, damages or such equitable relief as the parties may agree upon or as may be determined by a Court of competent jurisdiction. Recovery by the Municipality shall include its reasonable attorney's fees and costs incurred in seeking relief under this Agreement.

14. Failure or delay in enforcing any provision of this Agreement shall not constitute a waiver by the Municipality of its rights of enforcement hereunder.

15. The Landowner shall inform future buyers of the Property about the function of, operation, inspection and maintenance requirements of the BMP(s) prior to the purchase of the Property by said future buyer, and upon purchase of the Property the future buyer assumes all responsibilities as Landowner and must comply with all components of this Agreement.

16. This Agreement shall inure to the benefit of and be binding upon, the Municipality and the Landowner, as well as their heirs, administrators, executors, assigns and successors in interest.

This Agreement shall be recorded at the Office of the Recorder of Deeds of the County of Chester, Pennsylvania, and shall constitute a covenant running with the Property and/or equitable servitude, in perpetuity.

ATTEST:

WITNESS the following signatures and seals:

(SEAL) For the Municipality:

_____

(SEAL) For the Landowner:

_____

ATTEST:

_____(Township)

By Individual:

State of: _____

County of: _____

On this _____ day of _____, 20____. Before me, the undersigned officer, personally appeared _____, known to me (or satisfactorily proven) to be person whose name(s) is/are subscribed to the within instrument and acknowledged that _____ executed the same for the purpose therein contains.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

_____

Notary Public

My commission expires:

By the Company:

State of _____

County of _____

On this _____ day of _____, 20____, before me, the undersigned officer, personally appeared _____, who acknowledged himself/herself to be executed the foregoing instrument for the purpose therein contained by signing the name of the Company by herself/himself as _____.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

_____

Notary Public

My commission expires: