



Stormwater Quality Worksheet

This worksheet is to be used in conjunction with the Connecticut Stormwater Quality Manual for any new land development. It is designed to help the regulated community and regulatory agencies work through the recommendations provided in the 2004 Connecticut Stormwater Quality Manual. It is not currently required to be submitted with any permit applications submitted to the Connecticut Department of Environmental Protection (DEP).

Part I: General Information

1. List applicant information.			
Name:			
Address:			
City/Town:	State:	Zip Code:	
Phone:	ext.	Fax:	
E-mail:			
Contact Person:	Title:		
2. List site information.			
Site Name:			
Address:			
City/Town:	State:	Zip Code:	
3. Proposed Stormwater Management Practices (STP) (check all that apply):			
<input type="checkbox"/> Site Planning and Design	<input type="checkbox"/> Stormwater Treatment Practices		
4. Critical Resources (check all that apply):			
On-site		Off-site	
<input type="checkbox"/> Wells, aquifers	<input type="checkbox"/> Neighboring land uses		
<input type="checkbox"/> Wetlands, streams, ponds	<input type="checkbox"/> Wells, aquifers		
<input type="checkbox"/> Public drinking water supplies	<input type="checkbox"/> Wetlands, streams, ponds		
<input type="checkbox"/> Other: (please describe)	<input type="checkbox"/> Public drinking water supplies		
	<input type="checkbox"/> Other: (please describe)		

Part I: General Information (continued)

5. List any plans and/or reports that may be referenced in this worksheet. In addition to the name of each plan or report, label each consecutively starting with the number 1 (e.g., Report 1: <i>name of report</i> , etc.) Use the plan or report identifier number where necessary in this worksheet.				
6a. Provide the location of the following information. Use the identifier numbers provided in Part I: item 5 of this worksheet for consistency.	Plan #	Plan sheet #	Report #	Report page #
	Site Description			
i. Natural and manmade features at the site				
ii. Site topography, drainage patterns, flow paths, and ground cover				
iii. Impervious area and runoff coefficient				
iv. Site soils as defined by USDA				
v. Stormwater discharge from site and known sources of pollutants and sediment loading				
vi. Critical areas, buffers, and setbacks established by authorities				
vii. Water quality classification of on-site and adjacent water bodies				
viii. Identity of any on-site or adjacent waterbodies included on CT 303(d) list of impaired waters				
6b. Potential Stormwater Impacts				
i. Potential pollutant sources				
ii. Type of anticipated stormwater pollutants and relative/calculated load of each pollutant				
iii. Summary of calculated pre- and post-development peak flows				
iv. Summary of calculated pre- and post-development groundwater recharge				

Part II: Site Planning and Design

See Chapter 4 of the Stormwater Quality Manual for complete descriptions of concepts listed in this Part.

A. Site Planning and Design Concepts	
<i>Indicate Yes or No for each item listed below and provide a brief explanation in the space provided.</i>	
1. Has the development been designed to fit the terrain?	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Has the development been designed to limit land disturbance?	<input type="checkbox"/> Yes <input type="checkbox"/> No

Part III: Stormwater Treatment Practices

Complete Sections A through E for all developments. Complete and include appropriate sheets from Part IV for each practice checked in this Part.

A. Practices Used	
<i>Check all practices used in development.</i>	
Primary Treatment Practices	Secondary Treatment Practices
<input type="checkbox"/> Stormwater Pond (P1)	<i>Conventional</i>
<input type="checkbox"/> micropool extended detention pond	<input type="checkbox"/> Dry detention pond (S1)
<input type="checkbox"/> wet pond	<input type="checkbox"/> Underground detention facilities (S2)
<input type="checkbox"/> wet extended detention pond	<input type="checkbox"/> Deep sump catch basins (S3)
<input type="checkbox"/> multiple pond system	<input type="checkbox"/> Oil/particle separators (S4)
<input type="checkbox"/> pocket pond	<input type="checkbox"/> Dry wells (S5)
<input type="checkbox"/> Stormwater Wetlands (P2)	<input type="checkbox"/> Permeable pavement (S6)
<input type="checkbox"/> shallow wetland	<input type="checkbox"/> Vegetated filter strips (S7)
<input type="checkbox"/> extended detention wetland	<input type="checkbox"/> Grass drainage channels (S8)
<input type="checkbox"/> pond/wetland system	<i>Innovative/ Emerging Technologies</i>
<input type="checkbox"/> Infiltration Practices (P3)	<input type="checkbox"/> Catch basin inserts (S9)
<input type="checkbox"/> infiltration Trench	<input type="checkbox"/> Hydrodynamic separators (S10)
<input type="checkbox"/> infiltration Basin	<input type="checkbox"/> Media filters (S11)
<input type="checkbox"/> Filtering Practices (P4)	<input type="checkbox"/> Underground infiltration systems (S12)
<input type="checkbox"/> surface sand filter	<input type="checkbox"/> Alum injections (S13)
<input type="checkbox"/> underground sand filter	
<input type="checkbox"/> perimeter sand filter	
<input type="checkbox"/> organic filter	
<input type="checkbox"/> bioretention	
<input type="checkbox"/> Water Quality Swales (P5)	
<input type="checkbox"/> dry swales	
<input type="checkbox"/> wet swales	
<p>1. If there is no primary treatment practice used, explain why.</p>	
<p>2. Are other innovative emerging technologies proposed that are not listed? <input type="checkbox"/> Yes <input type="checkbox"/> No If yes, please describe technologies.</p>	
<p>3. Provide a diagram of the treatment train showing the practices used, their locations, and how they are connected. <i>Attach and label a separate sheet to this sheet.</i></p>	

Part III: Stormwater Treatment Practices (continued)

B. Stormwater Quality Management Objectives	
<i>Check all that apply</i>	
<input type="checkbox"/> Groundwater Recharge	Pollutants expected from development
<input type="checkbox"/> Runoff Volume Reduction	<input type="checkbox"/> Sediment
<input type="checkbox"/> Stream Channel Protection	<input type="checkbox"/> Phosphorus
<input type="checkbox"/> Peak Flow Control	<input type="checkbox"/> Nitrogen
	<input type="checkbox"/> Metals
	<input type="checkbox"/> Hydro-Carbons
	<input type="checkbox"/> Bacteria

C. Downstream Resources: <i>List each stormwater treatment practice (STP) which may affect a downstream resource. Check each downstream resource affected for each STP listed. In the space below each listed practice describe how the STP is designed to reduce impacts to the affected downstream resources.</i>					
<i>See Section 8.4 of the Stormwater Quality Manual for additional guidance</i>					
Stormwater Treatment Practice	Sensitive Watercourses	Water Supply Aquifers	Lakes and Ponds	Surface Water Drinking Supplies	Estuary/ Coastal
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Description:					
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Description:					
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Description:					
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Description:					

Part III: Stormwater Treatment Practices (continued)

D. Has the STP been designed to minimize the potential for nuisance insects and vectors?

See Section 8.7 of the Stormwater Quality Manual for guidance

Yes No

Provide brief explanation:

E. Has the STP been designed to reduce the impact on natural wetlands and vernal pools?

See Section 8.8 of the Stormwater Quality Manual for guidance

Yes No

Provide brief explanation:

Part IV: Stormwater Treatment Practice (STP) Design Worksheets

A. Stormwater Ponds (P1) (See Chapter 11-P1 of the Stormwater Quality Manual for guidance)

<p>1. Type: (check one) (Reproduce this sheet for each type used.)</p> <p> <input type="checkbox"/> Wet Pond <input type="checkbox"/> Wet Extended Detention Pond <input type="checkbox"/> Micropool Extended Detention Pond <input type="checkbox"/> Multiple Pond System </p>		
<p>2. Provide the location of the following information. Use the report and/or plan identifier numbers provided in Part I: item 5 of this worksheet for consistency.</p>		
Parameter	Design Criteria	Provide report and/or plan page or sheet number showing aspect or calculation
Setback	50 feet from on-site sewage disposal systems	
	50 feet from private wells	
	10 feet from any property line	
	20 feet from any structure	
	50 feet from any steep slope	
	750 feet from any vernal pool	
Preferred Shape	Curvilinear	
Side Slopes	3:1 or maximum	
	Terminate at safety benches	
Length to Width Ratio	3:1 minimum along the flow path between the inlet and outlet at mid-depth	
Pretreatment Volume	10% of WQV	
	100% of WQV for higher pollutant loading (see Chapter 7)	
Pond Volume	Equal or exceeding WQV	
Drainage Area		
Wet ponds	Minimum contributing drainage area 25 acres	
Extended Detention	Minimum contributing drainage area 10 acres	
Pocket Ponds	Minimum contributing drainage area 1-5 acres	
Underlying Soils	Low permeability unless groundwater intercepted	
Capacity	Minimum ratio of pool volume to WQV between 2:1 and 4:1	
Depth		
Pool	3-6 feet, not greater than 8 feet	
Aquatic bench	12-18 inches	
Low Flow Orifice	Protected from clogging	
Pond Drain	Present	
Principle Spillway	Inaccessible to children	
Warning Signs	Posted against swimming/skating	
Maintenance Access	Extending to public road	
Cross Sections		
Describe Cold Climate Design Features:		
Other Design Features:		

Part IV: Stormwater Treatment Practice (STP) Design Worksheets (continued)

B. Stormwater Wetlands (P2) (See Chapter 11-P2 of the Stormwater Quality Manual for guidance)

1. Type: (check one) (Reproduce and complete this sheet for each type used.)		
<input type="checkbox"/> Shallow Wetland <input type="checkbox"/> Pond/Wetland System <input type="checkbox"/> Extended Detention Wetland		
2. Provide the location of the following information. Use the report and/or plan identifier numbers provided in Part I: item 5 of this worksheet for consistency.		
Parameter	Design Criteria	Provide report and/or plan page or sheet number showing aspect or calculation
Setback	50 feet from on-site sewage disposal systems	
	50 feet from private wells	
	10 feet from any property line	
	20 feet from any structure	
	50 feet from any steep slope	
	750 feet from any vernal pool	
Preferred Shape	Curvilinear	
Side Slopes	3:1 or maximum	
	Terminate at safety benches	
Length to Width Ratio	3:1 minimum along the flow path between the inlet and outlet at mid-depth	
Pretreatment Volume	10% of WQV	
	100% of WQV for higher pollutant loading (see Chapter 7)	
Drainage Area	Minimum contributing drainage area 25 acres	
	Surface area of wetland 1 to 1.5% of contributing drainage area	
Underlying Soils	Low permeability unless groundwater intercepted	
Size	Based on calculations on page 11-P2-7 and 8. Approximate guidelines: ratio of wetland to drainage area 0.2 for shallow marshes and 0.1 for extended detention shallow wetland systems	
Depth	Marsh/Wetland	0.5 to 1.5 feet
	Forebays/Micropools	4-6 feet
Low Flow Orifice	Protected from clogging	
Wetland Drain	Present	
Principle Spillway	Inaccessible to children	
Warning Signs	Posted against swimming/skating	
Maintenance Access	Extending to public road	
Cross Sections		
Describe Cold Climate Design Features:		
Other Design Features:		

Part IV: Stormwater Treatment Practice (STP) Design Worksheets (continued)

C. Infiltration Practices (P3) (See Chapter 11-P3 of the Stormwater Quality Manual for guidance)

1. Type: (check one) (Reproduce and complete this sheet for each type used.) <input type="checkbox"/> Trench <input type="checkbox"/> Basin		
2. Provide the location of the following information. Use the report and/or plan identifier numbers provided in Part I: item 5 of this worksheet for consistency.		
Parameter	Design Criteria	Provide report and/or plan page or sheet number showing aspect or calculation
Design Volume	<i>Entire water quality volume (WQV)</i>	
Pretreatment Volume	<i>25% of WQV</i>	
Maximum Draining Time	<i>48 to 72 hours after storm event (entire WQV)</i>	
Minimum Draining Time	<i>12 hours (for adequate pollutant removal)</i>	
Maximum Contributing Drainage		
Trench	<i>5 acres</i>	
Basin	<i>25 acres</i>	
Minimum Infiltration Rate	<i>0.3 in/hr (as measured in field)</i>	
Maximum Infiltration Rate	<i>5.0 in/hr (as measured in field)</i>	
Depth		
Trench	<i>2 to 10 feet (trench depth)</i>	
Basin	<i>3 feet (pondering depth) recommended</i>	
Vegetated Buffers	<i>Around Trench</i>	
Cross Sections		
Describe Cold Climate Design Features:		
Other Design Features:		

Part IV: Stormwater Treatment Practice (STP) Design Worksheets (continued)

D. Filtering Practices (P4) (See Chapter 11-P4 of the Stormwater Quality Manual for guidance)

1. Type: (check one) (Reproduce and complete this sheet for each type used.) <input type="checkbox"/> Surface Filters <input type="checkbox"/> Underground Filters		
2. Provide the location of the following information. Use the report and/or plan identifier numbers provided in Part I: item 5 of this worksheet for consistency.		
Parameter	Design Criteria	Provide report and/or plan page or sheet number showing aspect or calculation
Maximum Drainage Area	<i>5 to 10 acres</i>	
Bio-retention	<i>Less than 5 acres</i>	
Slope	<i>6% or less</i>	
Head Difference	<i>5 to 7 feet</i>	
Underlying Soils	<i>Highly impervious</i>	
Distance to Water Table	<i>At least 3 feet separation</i>	
Pretreatment Volume	<i>at least 25% WQV</i>	
Length to Width Ratio	<i>1.5:1 to 3:1</i>	
Design Volume	<i>At least 75% WQV</i>	
Draining Time	<i>Designed to Drain within 24 hours</i>	
Cross Sections		
Describe Cold Climate Design Features:		
Other Design Features:		

Part IV: Stormwater Treatment Practice (STP) Design Worksheets (continued)

E. Water Quality Swales (P5) (See Chapter 11-P5 of the Stormwater Quality Manual for guidance)

<p>1. Type: (check one) (Reproduce and complete this sheet for each type used.)</p> <p><input type="checkbox"/> Dry Swale <input type="checkbox"/> Wet Swale</p>		
<p>2. Provide the location of the following information. Use the report and/or plan identifier numbers provided in Part I: item 5 of this worksheet for consistency.</p>		
Parameter	Design Criteria	Provide report and/or plan page or sheet number showing aspect or calculation
Pretreatment Volume	<i>25% of the water quality volume (WQV)</i>	
Preferred Shape	<i>Trapezoidal and parabolic</i>	
Bottom Width	<i>4 feet minimum recommended for maintenance, 8 feet maximum, widths up to 16 feet are allowable if a dividing berm or structure is used</i>	
Side Slopes	<i>3(h): 1(v) maximum, 4:1 or flatter recommended for maintenance (where space permits)</i>	
Longitudinal Slope	<i>1% to 2% without check dams, up to 5% with check dams</i>	
Drainage Area	<i>No more than 5 acres</i>	
Sizing Criteria	<i>Length, width, depth and slope needed to provide surface storage for the WQV.</i>	
Dry Swale	<i>Maximum ponding time of 24 hours</i>	
Wet Swale	<i>retains the WQV for 24 hours; ponding may continue longer (5 days recommended maximum duration to avoid potential for mosquito breeding)</i>	
Underlying Soil Bed	<i>Equal to Swale width</i>	
Dry Swale	<i>Moderately permeable soils (USCS ML, SM, or SC), 30 inches deep with gravel/pipe underdrain system</i>	
Wet Swale	<i>Undisturbed soils, no underdrain system</i>	
Depth and Capacity	<i>Surface storage of WQV with maximum ponding depth of 18 inches for water quality treatment</i>	
	<i>Safely convey 2-year storm with non-erosive velocity</i>	
	<i>Adequate capacity for 10-year storm with 6 inches of freeboard</i>	
Cross Sections		
Describe Cold Climate Design Features:		
Other Design Features:		

Part IV: Stormwater Treatment Practice (STP) Design Worksheets (continued)

F. Secondary Treatment Practices (S1-S13)

<p>Provide location of explanatory narrative, computations and plan/detail for each numbered item consistent with "Design Consideration" for each measure. Use the report and/or plan identifier numbers provided in Part I: item 5 of this worksheet for consistency.</p>	
<p>S1: Dry Detention Ponds</p>	
<p>Explain why this practice is suitable for this site (see pp 11-S1-1 to 2):</p>	
<p>Item:</p>	<p>Provide report and/or plan page or sheet #:</p>
1. Sediment Forebay with Deep Permanent Pool	
2. Extended Detention Storage Design (no longer than 5 days)	
3. Outlet Wet Pool	
4. Pond Configuration	
5. Low Flow Channels	
6. Dam Safety Section of CTDEP IWRD consulted regarding State jurisdiction?	
<p>S2: Underground Detention Facilities</p>	
<p>Explain why this practice is suitable for this site (see pp 11-S2-1 to 3):</p>	
<p>Item:</p>	<p>Provide report and/or plan page or sheet #:</p>
1. Siting	
2. Pretreatment	
3. Inlets, Outlets, and Overflows	
<p>S3: Deep Sump Catch Basins</p>	
<p>Explain why this practice is suitable for this site (see pp 11-S3-1 to 3):</p>	
<p>Item:</p>	<p>Provide report and/or plan page or sheet #:</p>
1. Drainage Area	
2. Design	
3. Maintenance	
4. Sediment Disposal	
<p>S4: Oil/Particle Separators</p>	
<p>Explain why this practice is suitable for this site (see pp 11-S4-1 to 6):</p>	
<p>Item:</p>	<p>Provide report and/or plan page or sheet #:</p>
1. Drainage Area	
2. Sizing/Design	
3. Maintenance	

Part IV: Stormwater Treatment Practice (STP) Design Worksheets (continued)

F. Secondary Treatment Practices (S1-S13)

S5: Dry Wells	
Explain why this practice is suitable for this site (see pp 11-S5-1 to 4):	
Item:	Provide report and/or plan page or sheet #:
1. Soils	
2. Land Use	
3. Drainage Area	
4. Water Table/ Bedrock	
5. Size/Depth	
6. Miscellaneous	
7. Construction	
8. Operation and Maintenance	
S6: Permeable Pavement	
Explain why this practice is suitable for this site (see pp 11-S6-1 to 4):	
Item:	Provide report and/or plan page or sheet #:
1. Soils	
2. Land Use	
3. Slope	
4. Water Table/ Bedrock	
5. Construction (Site Preparation and Planting)	
6. Operation and Maintenance	
S7: Vegetated Filter Strips and Level Spreaders	
Explain why this practice is suitable for this site (see pp 11-S7-1 to 6):	
Item:	Provide report and/or plan page or sheet #:
1. Slope	
2. Soils	
3. Drainage Area	
4. Water Table/ Bedrock	
5. Size	
6. Vegetation	
7. Level Spreader	
8. Construction	
9. Operation and Maintenance	

Part IV: Stormwater Treatment Practice (STP) Design Worksheets (continued)

F. Secondary Treatment Practices (S1-S13)

S8: Grass Drainage Channels	
Explain why this practice is suitable for this site (see pp 11-S8-1 to 3):	
Item:	Provide report and/or plan page or sheet #:
1. Provides sufficient channel length	
2. Provides non-erosive velocities	
3. Sufficient capacity and conveyance for 10-year frequency storm event.	
S9: Catch Basin Inserts	
Explain why this practice is suitable for this site (see pp 11-S9-1 to 3):	
Item:	Provide report and/or plan page or sheet #:
1. High Flow Bypass	
2. Maintenance	
S10: Hydrodynamic Separators	
Explain why this practice is suitable for this site (see pp 11-S10-1 to 3):	
Item:	Provide report and/or plan page or sheet #:
1. Drainage Area	
2. Sizing/Design	
3. Performance	
4. Maintenance	
5. Sediment Disposal	
S11: Media Filter	
Explain why this practice is suitable for this site (see pp 11-S11-1 to 3):	
Item:	Provide report and/or plan page or sheet #:
1. Sizing/ Design	
2. Maintenance	
3. Sediment Disposal	

Part IV: Stormwater Treatment Practice (STP) Design Worksheets (continued)

F. Secondary Treatment Practices (S1-S13)

S12: Underground Infiltration Systems	
Explain why this practice is suitable for this site (see pp 11-S12-1 to 3):	
Item:	Provide report and/or plan page or sheet #:
1. Siting	
2. Pretreatment	
3. Design Volume	
4. Draining Time	
5. Infiltration Rate	
S13: Alum Injection	
Explain why this practice is suitable for this site (see pp 11-S13-1 to 2):	
Item:	Provide report and/or plan page or sheet #:
1. Design	
2. Operation and Maintenance	

Part V: Calculations Worksheet

For each STP used, provide calculations for each item listed. Use separate sheet for each STP.

Name of STP for which the following calculations are provided:			
1. Compute Water Quality Volume (WQV):			
WQV = _____ (ac-ft)			
2. Compute Water Quality Flow (WQF):			
WQF = _____ (cfs)			
3. Compute Groundwater Recharge Volume (GRV):			
GRV = _____ (ac-ft)			
4. Compute Runoff Capture Volume (RCV):			
RCV = _____ (ac-ft)			
5. Provide Peak Discharge Rates for the following storm events:			
Storm Event	Pre-Development (cfs)	Post-Development (cfs)	Change (+/- cfs)
24 hr			
2-year			
10-year			
25-year			
100-year			
500-year			