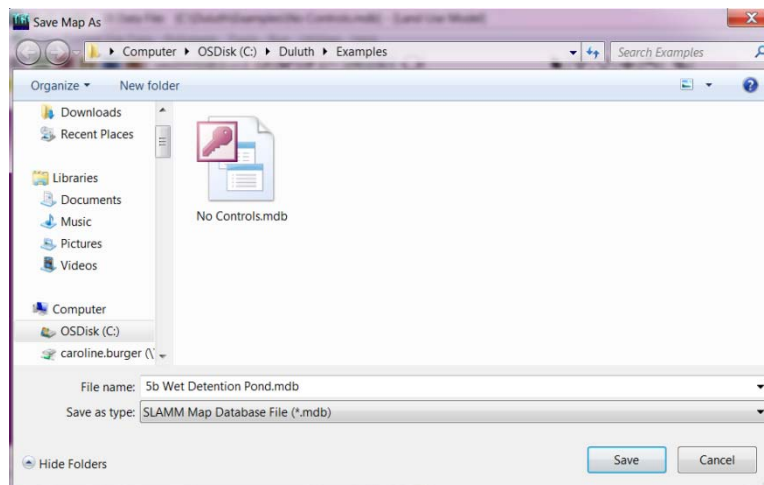


Wet Detention Pond Example

Wet Detention Pond Example

For this example, we will start with the model file we created for No Controls and add a wet detention pond. All of the source areas in the Commercial 1 Land Use will be routed to the pond. A schematic showing the location of the Wet Detention Pond can be found at the end of this document.

Open the No Controls model file and Save the File with a new name.



Change the Site Description in the Current File Data to reflect the pond.

Current File Data	
SLAMM Data File Name:	
<input type="text" value="C:\WinSLAMM\Training Courses\Madison 2012\Model Files\1f Wet Detention Pond.mdb"/>	
Site Descript.: <input type="text" value="Wet Detention Pond, Commercial Development"/>	
Edit	Seed: <input type="text" value="-42"/>
Edit	Rain File: <input type="text" value="C:\Program Files\WinSLAMM v10\Rain Files\WisReg - Madison WI 1981.RAN"/>
Edit	Start Date: <input type="text" value="01/01/81"/>
Edit	End Date: <input type="text" value="12/31/81"/>
<input checked="" type="checkbox"/> Winter Season Range	
Start of Winter (mm/dd) <input type="text" value="12/02"/> End of Winter (mm/dd) <input type="text" value="03/12"/>	
Edit	Pollutant Probability Distribution File: <input type="text" value="C:\Program Files\WinSLAMM v10\WI_GEO01.ppd"/>

Wet Detention Pond Example

Disconnect the map network and add the Wet Detention Pond control measure. Reconnect the network.

The screenshot displays the WinSLAMM v.10 software interface. The left pane shows data tables for Land Use and Control Practices. The right pane shows a map network diagram.

Land Use Table:

Source Area #	Source Area	Area (acres)	Source Area Parameters	First Control Practice	Second Control Practice
6	Roofs 6				
7	Roofs 7				
8	Roofs 8				
9	Roofs 9				
10	Roofs 10				
11	Roofs 11				
12	Roofs 12				
Parking		2.850			
13	Paved Parking 1	2.850	Entered		
14	Paved Parking 2				
15	Paved Parking 3				
16	Paved Parking 4				
17	Paved Parking 5				
18	Paved Parking 6				
19	Unpaved Parking 1				
20	Unpaved Parking 2				
21	Unpaved Parking 3				
22	Unpaved Parking 4				
23	Unpaved Parking 5				
24	Unpaved Parking 6				
Driveways/Sidewalks		0.340			

Land Use Table:

Land Use #	Land Use Type	Land Use Label	Land Use Area (acres)
1	Commercial	Commercial 1	7.290

Control Practices Table:

CP #	Control Practice Type	Control Practice Name or Location
1	Wet Detention Pond	US Wet Pond # 1

Map Network Diagram:

The map network diagram shows a flow from 'Commercial 1' (represented by a red square icon) through 'Junction 2' (a circle icon) to 'US Wet Pond # 1' (a purple square icon labeled 'WP'). From the wet pond, the flow continues through 'Junction 1' (a circle icon) to an 'Outfall' (a green square icon labeled 'OUT').

Status Bar:

Current File: Data Entered | Total Area = 7.290 acres | No Upstream Source Areas | LU# = 1 | Index Number = 1 | Remaining Icons = 253 | Start Date: 01/01/81 | End Date: 12/31/81 | X = 2124

Wet Detention Pond Example

Because the pond will have a permanent wet pool, the surface area of the permanent pool needs to be removed from a Landscaped Source Area and replaced with a Water Body Area Source Area.

The permanent pool surface area is 0.11 acres. Remove 0.11 acres from the Large Landscaped Source Area in the Commercial 1 Land Use and add it as a Water Body Source Area.

The screenshot displays the WinSLAMM v 10 software interface. The main window is divided into two panes. The left pane shows the 'Land Use' data table, and the right pane shows a hydrologic diagram.

Land Use Data Table:

Source Area #	Source Area	Area (acres)	Source Area Parameters	First Control Practice	Second Control Practice
58	Undeveloped Areas 2				
59	Undeveloped Areas 3				
60	Undeveloped Areas 4				
61	Undeveloped Areas 5				
62	Undeveloped Areas 6				
Other Areas		0.110			
63	Playground 1				
64	Playground 2				
65	Playground 3				
66	Playground 4				
67	Playground 5				
68	Playground 6				
69	Isolated Areas				
70	Winter Windy Areas	0.110	Entered		
71	Other Previous Areas 1				
72	Other Previous Areas 2				
73	Other Previous Areas 3				
74	Other Previous Areas 4				
75	Other Previous Areas 5				
76	Other Previous Areas 6				
77	Other Direct Outflow Areas				

Land Use Summary Table:

Land Use #	Land Use Type	Land Use Label	Land Use Area (acres)
1	Commercial	Commercial 1	7.290

Control Practice Table:

CP #	Control Practice Type	Control Practice Name or Location
1	Wet Detention Pond	DS Wet Pond #1

Hydrologic Diagram:

The diagram shows a flow path starting from 'Commercial 1' (represented by a red square icon), passing through 'Junction 2', then through 'DS Wet Pond #1' (represented by a purple square icon with 'WP' inside), then through 'Junction 1', and finally reaching 'Outfall' (represented by a green square icon with 'OUT' inside).

Status Bar:

Current File Data Entered | Total Area - 7.290 acres | No Upstream Source Areas | LU# - 1 | Index Number - 1 | Remaining Icons - 25/2 | Start Date: 01/01/01 | End Date: 12/31/01 | X - 1000

Check that the total area on the Status Bar still matches the total project area.

Wet Detention Pond Example

Double click on the Wet Detention Pond label to open the form. Enter the data shown below.

Note: when moving through the Wet Detention Pond form, press the “Enter” key to move to the next cell, not the “Tab” key.

Check that the file name and path for the particle size distribution are correct.

The Initial Stage is 5 feet. The Initial Stage indicates how full the pond is at the beginning of the model run. It is usually equivalent to the permanent pool depth, but does not have to be.

Wet Detention Control Device

Pond Number 1
Drainage System Control Practice
Land Use: Commercial 1
Source Area: Paved Parking 1
Total Area: 1.460 acres

Select Particle Size Distribution File
C:\WinSLAMM Files\NURP.CPZ

Initial Stage Elevation (ft): 5
Peak to Average Flow Ratio: 3.8

Enter fraction (greater than 0) that you want to modify all pond areas by and then select 'Modify Pond Areas' button

Modify Pond Areas

Recalculate Cumulative Volume

Copy Pond Data
Paste Pond Data

Save this Pond as a WinDETPOND File

Delete Pond Cancel Continue

Control Practice #: 1 CP Index #: 1

Stage (ft)	Area (acres)	Cumulative Volume (ac-ft)
0	0.00	0.000
1	0.01	0.0300
2	2.50	0.0700
3	5.00	0.1100
4	7.00	0.1600
5	9.00	0.2300
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		

Add Sharp Crested Weir
Weir Length (ft)
Height from datum to bottom of weir opening (ft)

Add V-Notch Weir
Weir Angle (<180 degrees)
Height from datum to bottom of weir opening (ft)
Number of V-Notch weirs

Remove Orifice Set 1
Orifice Diameter (ft) 0.33
Invert elevation above datum (ft) 5.00
Number of orifices in set 1

Add Orifice Set 2
Orifice Diameter (ft)
Invert elevation above datum (ft)
Number of orifices in set

Add Orifice Set 3
Orifice Diameter (ft)
Invert elevation above datum (ft)
Number of orifices in set

Add Stone Weeper
Width at bottom of weeper (ft)
Weeper side slope (H:1V)
Upstream side slope (H:1V)
Downstream side slope (H:1V)
Horizontal flow path length at top of weeper (ft)
Average rock diameter (ft)
Distance from bottom to top of weeper (ft)
Height from datum to bottom of weeper (ft)

Add Vertical Stand Pipe
Pipe diameter (ft)
Height above datum (ft)

Month	Evaporation (in/day)	Water Withdraw Rate (ac-ft/day)
Jan	0.00	0.000
Feb	0.00	0.000
Mar	0.00	0.000
Apr	0.00	0.000
May	0.00	0.000
Jun	0.00	0.000
Jul	0.00	0.000
Aug	0.00	0.000
Sep	0.00	0.000
Oct	0.00	0.000
Nov	0.00	0.000
Dec	0.00	0.000

Stage (ft)	Natural Seepage Rate (in/hr)	Other Outflow Rate (cfs)
0.00		
0.01		
2.50		
5.00		
7.00		
9.00		

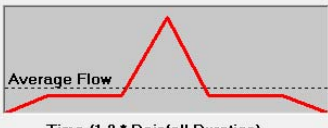
Remove Broad Crested Weir
Weir crest length (ft) 10.00
Weir crest width (ft) 10.00
Height of weir opening (ft) 0.50
Height from datum to bottom of weir opening (ft) 8.50

Add Seepage Basin
Infiltration rate (in/hr)
Width of device (ft)
Length of device (ft)
Invert elevation of seepage basin inlet above datum (ft)

Flow

Average Flow

Time (1.2 * Rainfall Duration)



The pond has a five foot deep permanent pool with four feet of open air storage above it.

In the model, all stages are relative. The first stage and area of the pond must be 0 feet and 0 acres. Therefore, start your lowest pond elevation at 0.01 feet. The pond must be defined by a minimum of 5 increments (not including the first increment of 0 feet, 0 acres).

The Cumulative Volume is for informational purposes only. Select the “Recalculate Cumulative Volume” button whenever areas or stages are changes, or after you’ve entered the data for the first time.

The water quality outlet structure is a 4-inch orifice set at the top of the permanent pool. The emergency outlet is a 10-foot wide broad crested weir that is 6-inches below the top of the pond.

Wet Detention Pond Example

Run the model.

Results

Runoff Volume: 343,684 cu ft
Runoff Volume Percent Reduction: 0 %
Particulate Solids Concentration: 34.53 mg/L
Particulate Solids Yield: 740.9 lbs
Particulate Solids Percent Reduction: 69.92 %
Rv (with controls): 0.40
Approx. Urban Stream Classification: Poor
Total Phosphorus: 3.79 lbs
Total Phosphorus Percent Reduction: 49.2 %

Land Uses	Junctions	Control Practices	Outfall	Output Summary			
File Name: C:\2012 November Madison\Examples\1f Wet Detention Ponds.mdb							
Outfall Output Summary							
	Runoff Volume (cu. ft.)	Percent Runoff Reduction	Runoff Coefficient (Rv)	Particulate Solids Conc. (mg/L)	Particulate Solids Yield (lbs)	Percent Particulate Solids Reduction	
Total of All Land Uses without Controls	343683		0.40	114.8	2463		
Outfall Total with Controls	343684	0.00 %	0.40	34.53	740.9	69.92 %	
Current File Output: Annualized Total After Outfall Controls		Years in Model Run:		1.00	743.0		
Pollutant	Concentration - No Controls	Concentration - With Controls	Concentration Units	Pollutant Yield - No Controls	Pollutant Yield - With Controls	Pollutant Yield Units	Percent Yield Reduction
Total Phosphorus	0.3480	0.1768	mg/L	7.467	3.794	lbs	49.19 %
<div>Print Output Summary to Text File Print Output Summary to .csv File Total Area Modeled: 7.290</div>							
Total Control Practice Costs				Receiving Water Impacts Due To Stormwater Runoff (CWP Impervious Cover Model)			
Capital Cost	N/A	Perform Outfall Flow Duration Curve Calculations		Calculated Rv	Approximate Urban Stream Classification		
Land Cost	N/A			Without Controls	0.40	Poor	
Annual Maintenance Cost	N/A			With Controls	0.40	Poor	
Present Value of All Costs	N/A						
Annualized Value of All	N/A						

The pollution reduction reported at the outfall is the overall pollution reduction for the entire site. Because a portion of the project area is not being routed to the wet detention pond, the pollution reduction from the pond is greater than the overall pollution reduction for the entire site.

To see the pollution reduction from just the pond, select the "Control Practices" tab.



Wet Detention Pond Example

Land Uses		Junctions		Control Practices		Outfall		Output Summary			
Runoff Volume		Part. Solids Yield (lbs)		Part. Solids Conc. (mg/L)		Summary Table					
Data File: C:\2012 November Maps.mdb											
Rain File: WisReg - Madison WI 1											
Date: 11-12-12 Time: 9:20:21 AM											
Site Description: Wet Detention Pond											
Control Practice No.	Control Practice Type	Total Inflow Volume (cf)	Total Outflow Volume (cf)	Percent Volume Reduction	Total Influent Load (lbs)	Total Effluent Load (lbs)	Percent Load Reduction	Flow Weighted Influent Conc (mg/L)	Flow Weighted Effluent Conc (mg/L)	Percent Conc. Reduction	IMP (n
1	Wet Detention Pond	343683	343683	0	2463	740.9	69.92	114.8	34.53	69.924	

The pond is reducing the TSS load by 69.6%.

This tab also shows other summary information such as the maximum water depth in the pond during the model run and if the pond is being overtopped.

Legend

-  Wet Detention Pond
-  Drainage Area

**WinSLAMM Model Example
Project Area**

