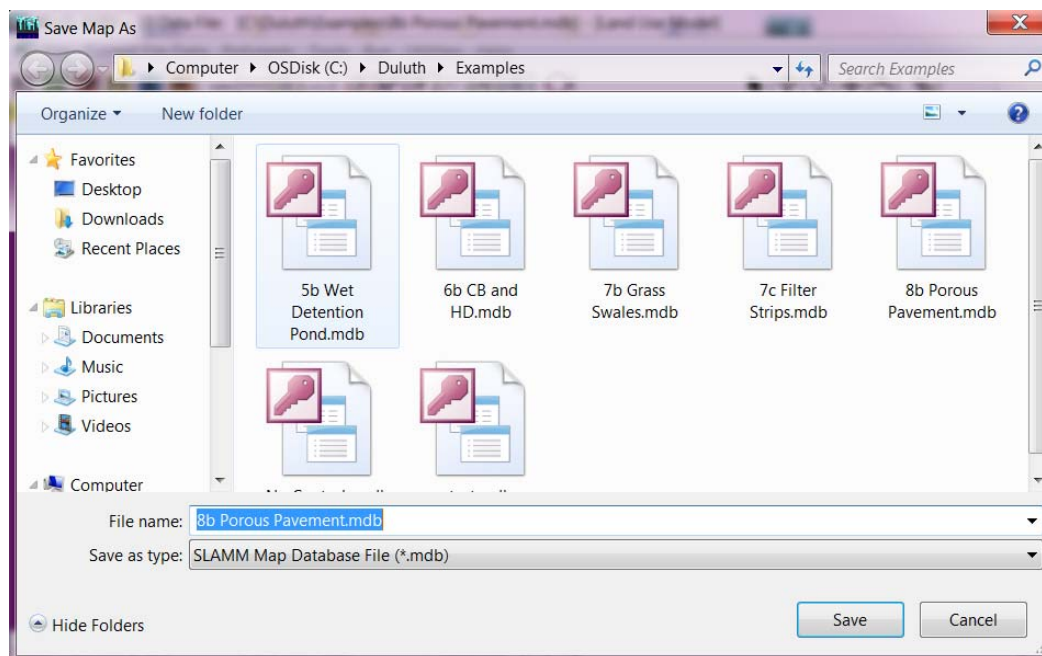


Porous Pavement Example

Porous Pavement Example

For this example, we will start with the model file we created for No Controls and add Porous Pavement. Only the parking stalls in the Parking Lot Source Area will be treated by the Porous Pavement. A schematic showing the location of the Porous Pavement 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 Porous Pavement.

Porous Pavement Example

Porous Pavement is only being applied to 1.46 acres of the parking lot. Therefore, the parking lot source area needs to be split into two source areas – one with porous pavement and one without.

WinSLAMM v 10 Data File: [L:\group\WaterResources\Ppresentations and Papers\WinSLAMM\2012 November Madison\Examples\1e Porous Pavement.mdb] - [Land Use ...]

File Current File Data Pollutants Tools Run Utilities Help

RES INS COM INO DU FRE GS CB WP BF MF HD OD FS

Land Use:

Commercial 1

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	1.460	Entered	-	-
14	Paved Parking 2	1.390	Entered	-	-
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	0.490			

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

CP #	Control Practice Type	Control Practice Name or Location
------	-----------------------	-----------------------------------

Outfall

Junction 1

Commercial 1

Outfall

Copyright 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 = 2160

Porous Pavement Example

Use the Pull Down menu next to the Parking Lot Source Area to select the Porous Pavement control measure.

The screenshot displays the WinSLAMM v 10 software interface. The 'Land Use' table is visible on the left, with the 'Paved Parking 1' row highlighted in red. The 'First Control Practice' dropdown menu is open, showing a list of control practices including Wp, HD, OD, BF, CI, PP, FS, and CB. The 'Porous Pavement' (PP) option is selected. The network diagram on the right shows a flow from 'Commercial 1' (a red box) through 'Junction 1' (a circle) to an 'Outfall' (a green box labeled 'OUT').

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				
13	Paved Parking 1	1.460	Entered	PP	
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		0.190			

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

CP #	Control Practice Type	Control Practice Name or Location
------	-----------------------	-----------------------------------

Current File Data Entered | Total Area = 7.290 acres | No Upstream Source Areas | LUP = 1 | Index Number = 1 | Remaining Icons = 253 | Start Date: 01/01/81 | End Date: 12/31/81 | X = 84

Porous Pavement Example

Enter the data shown below. Only the parking stalls will have Porous Pavement (1.46 acres).

Note: when moving through the Porous Pavement form, press the "Enter" key to move to the next cell, not the "Tab" key.

Porous Pavement Control Device

First Source Area Control Practice Porous Pavement Number 1

Land Use: Commercial 1

Source Area: Paved Parking 1

Total Area: 1.460

Porous pavement area (acres):

Inflow Hydrograph Peak to Average Flow Ratio

Pavement Geometry and Properties

1 - Pavement Thickness (in)	4.0
Pavement Porosity (>0 and <1)	0.20
2 - Aggregate Bedding Thickness (in)	12.0
Aggregate Bedding Porosity (>0 and <1)	0.25
3 - Aggregate Base Reservoir Thickness (in)	12.0
Aggregate Base Reservoir Porosity (>0 and <1)	0.30

Outlet/Discharge Options

Perforated Pipe Underdrain Diameter, if used (inches)	4.00
4 - Perforated Pipe Underdrain Outlet Invert Elevation (inches above Datum)	6.0
Number of Perforated Pipe Underdrains (<250)	4
Subgrade Seepage Rate (in/hr) - select below or enter	0.020
Use Random Number Generation to Account for Uncertainty in Seepage Rate	<input type="checkbox"/>
Subgrade Seepage Rate COV	

Select Subgrade Seepage Rate

<input type="radio"/> Sand - 8 in/hr	<input type="radio"/> Clay loam - 0.1 in/hr
<input type="radio"/> Loamy sand - 2.5 in/hr	<input type="radio"/> Silty clay loam - 0.05 in/hr
<input type="radio"/> Sandy loam - 1.0 in/hr	<input type="radio"/> Sandy clay - 0.05 in/hr
<input type="radio"/> Loam - 0.5 in/hr	<input type="radio"/> Silty clay - 0.04 in/hr
<input type="radio"/> Silt loam - 0.3 in/hr	<input type="radio"/> Clay - 0.02 in/hr
<input type="radio"/> Sandy silt loam - 0.2 in/hr	

Surface Pavement Layer Infiltration Rate Data

Initial Infiltration Rate (in/hr)	8.750
Percent of Infiltration Rate After 3 Years (0-100)	
Percent of Infiltration Rate After 5 Years (0-100)	
Time Period Until Complete Clogging Occurs (yrs)	
Percent of Original Infiltration Rate Upon Cleaning (0-100)	85.0
Surface Clogging Load (lb/sf)	10.0

Enter values in either rows 2-4 or row 6. You cannot enter values in both sets of rows.

Restorative Cleaning Frequency

☐ Never Cleaned

☐ Three Times per Year

☐ Semi-Annually

☒ Annually

☐ Every Two Years

☐ Every Three Years

☐ Every Four Years

☐ Every Five Years

☐ Every Seven Years

☐ Every Ten Years

Diagram Labels: Porous Concrete, Porous Asphalt, Concrete Grid with Aggregate Bedding, Porous Pavement Layer, Aggregate Bedding, Geotextile, Perforated Pipe, Aggregate Base Reservoir, Datum 0 Feet Elev, Subgrade

Diagram Dimensions: 1- 4.0", 2- 12.0", 3- 12.0", 4- 6.0"

Control Practice #: 1 Land Use #: 1 Source Area #: 13

Copy Porous Pavement Data Paste Porous Pavement Data Delete Control Cancel Continue

Porous Pavement Example

Run the model.

Results

Runoff Volume: 225,404 cu ft
Runoff Volume Percent Reduction: 32.32 %
Particulate Solids Concentration: 113.9 mg/L
Particulate Solids Yield: 1,602 lbs
Particulate Solids Percent Reduction: 35.30 %
Rv (with controls): 0.27
Approx. Urban Stream Classification: Poor
Total Phosphorus: 5.67 lbs
Total Phosphorus Percent Reduction: 20.3 %

Land Uses	Junctions	Control Practices	Outfall	Output Summary			
File Name: C:\Caroline\PVA\Demo Files\1e Porous Pavement.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	333043		0.39	119.1	2476		
Outfall Total with Controls	225404	32.32 %	0.27	113.9	1602	35.30 %	
Current File Output: Annualized Total After Outfall Controls		226023	Years in Model Run:	1.00	1607		
Pollutant	Concen- tration - No Controls	Concen- tration - With Controls	Concen- tration Units	Pollutant Yield - No Controls	Pollutant Yield - With Controls	Pollutant Yield Units	Percent Yield Reduction
Total Phosphorus	0.3423	0.4031	mg/L	7.117	5.673	lbs	20.30 %
<div><div>Print Output Summary to Text File</div><div>Print Output Summary to .csv File</div><div>Total Area Modeled (ac) 7.290</div></div>							
Total Control Practice Costs							
Capital Cost	N/A						
Land Cost	N/A						
Annual Maintenance Cost	N/A						
Present Value of All Costs	N/A						
Annualized Value of All Costs	N/A						
<div>Perform Outfall Flow Duration Curve Calculations</div>				Receiving Water Impacts Due To Stormwater Runoff (CWP Impervious Cover Model)			
				Calculated Rv	Approximate Urban Stream Classification		
Without Controls				0.39	Poor		
With Controls				0.27	Poor		

The pollution reduction reported at the outfall is the overall pollution reduction for the entire site.

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

Porous Pavement 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:\Caroline\PVA\Dem										
Rain File: WisReg - Madison WI 1										
Date: 11-13-12 Time: 10:38:53 AM										
Site Description: No Management										
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
1	Porous Pavement	110822	3186	97.13	899.4	25.85	97.13	130.0	130.0	0.000

The Porous Pavement is reducing the runoff volume by 97.1% and the TSS load by 97.1% from the portion of the Parking Lot source area they are treating.

Legend

-  Porous Pavement
-  Drainage Area

**WinSLAMM Model Example
Project Area**

