Permeable Pavement for Stormwater Management Porous Pavement

Advanced Permeable Pavement for Stormwater Management

Water Quality Design Using WinSLAMM

Presented by John Voorhees

Water Resources Engineer

AECOM

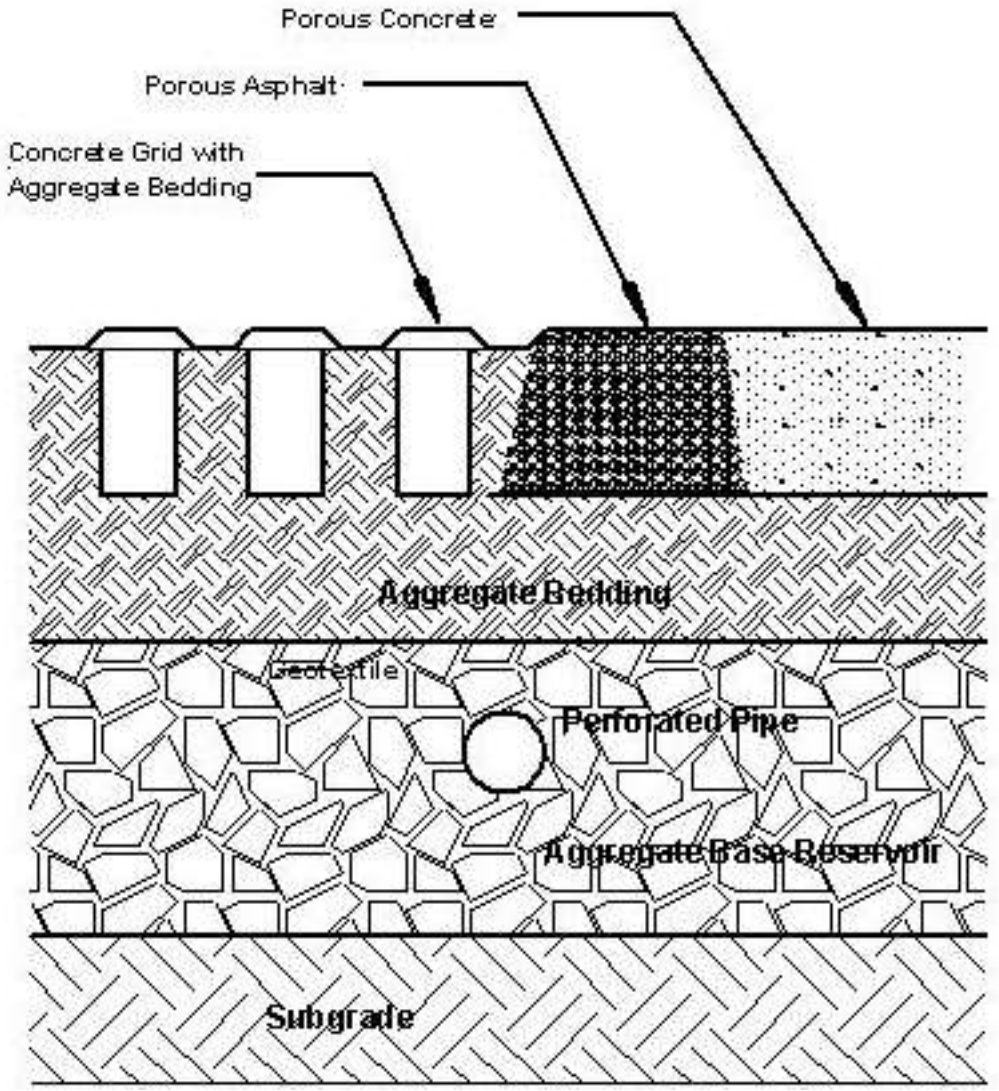
UW Extension Webinar

February 17, 2015

We will cover . . .

- Porous Pavement Options in WinSLAMM
- Porous Pavement Performance Algorithm
- Entering Porous Pavement Data into the Program
- Modeling Notes
- Example Input and Output

Porous Pavement Cross Section



File Current File Data Pollutants Tools Run Utilities Help

RES INS COM IND OU FRE GS CB WP BF PP HD QD FS SF UF

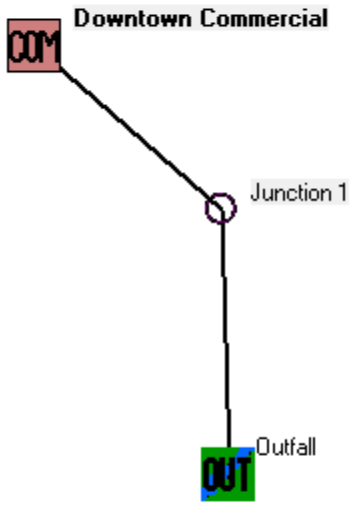
Land Use:

Downtown Commercial

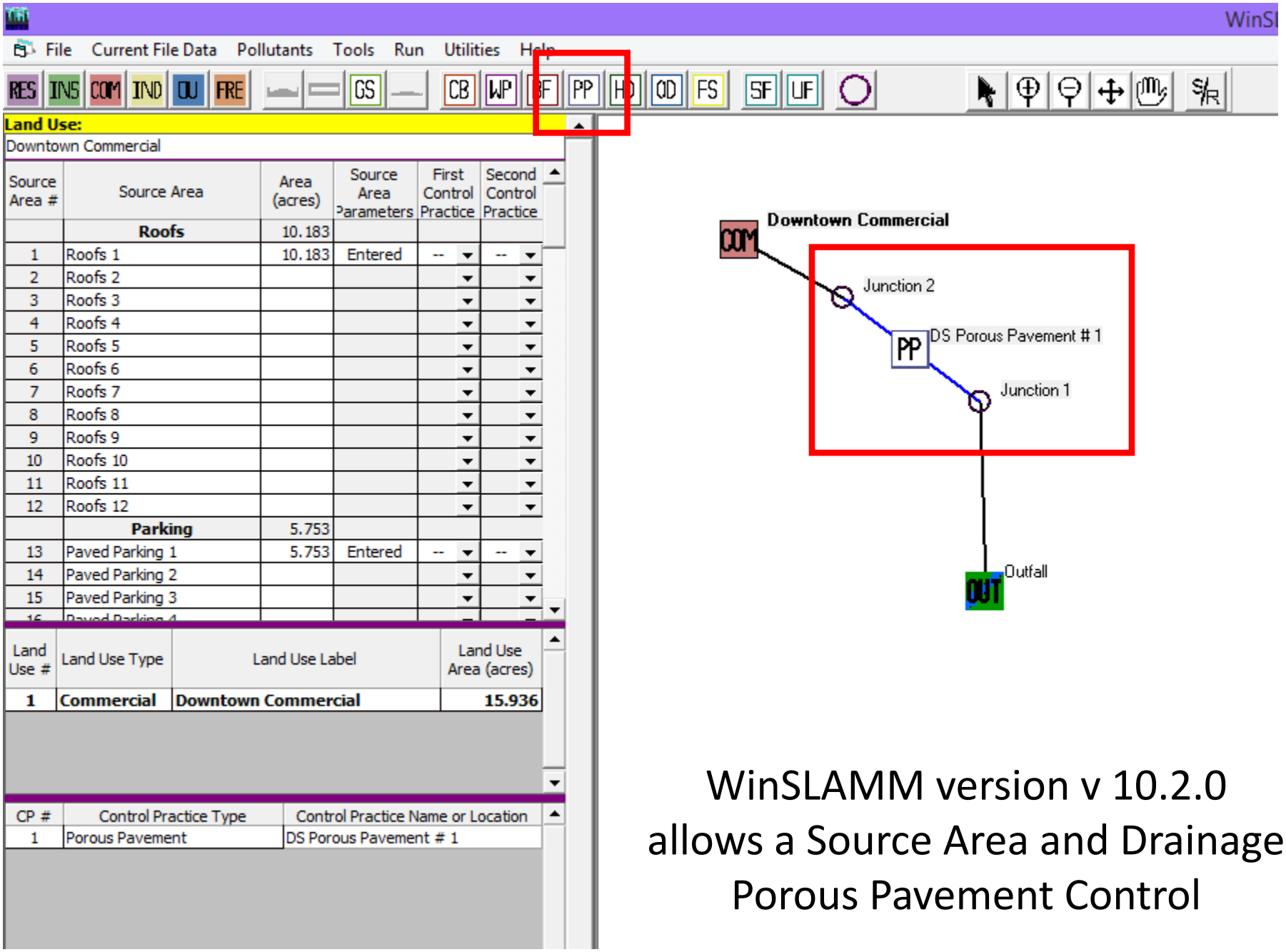
Source Area #	Source Area	Area (acres)	Source Area Parameters	First Control Practice	Second Control Practice
	Roofs	10.183			
1	Roofs 1	10.183	Entered	--	--
2	Roofs 2				
3	Roofs 3				
4	Roofs 4				
5	Roofs 5				
6	Roofs 6				
7	Roofs 7				
8	Roofs 8				
9	Roofs 9				
10	Roofs 10				
11	Roofs 11				
12	Roofs 12				
	Parking	5.753			
13	Paved Parking 1	5.753	Entered	PP	--
14	Paved Parking 2				
15	Paved Parking 3				
16	Paved Parking 4				
17	Paved Parking 5				
18	Paved Parking 6				

Land Use #	Land Use Type	Land Use Label	Land Use Area (acres)
1	**Commercial**	**Downtown Commercial**	**25.002**

CP #	Control Practice Type	Control Practice Name or Location
1	Porous Pavement	SA Device, LU# 1 ,SA# 13

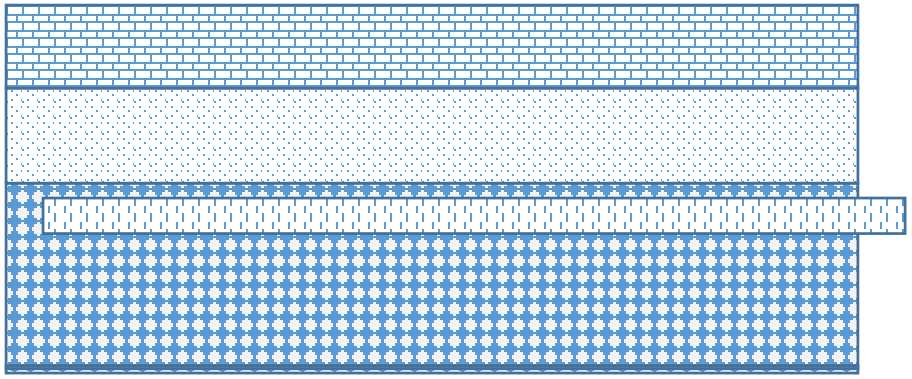


For WinSLAMM versions up to v 10.1.6 – Source Area Pavement Control only



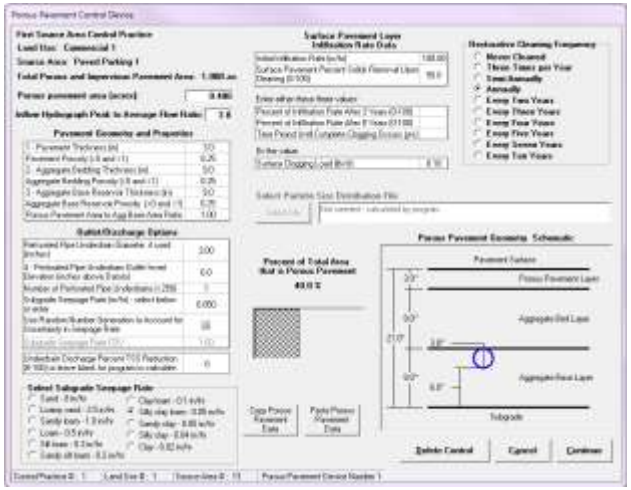
WinSLAMM version v 10.2.0 allows a Source Area and Drainage Porous Pavement Control

Porous Pavement Performance Algorithm



TSS Treatment Processes included in the Porous Pavement algorithms

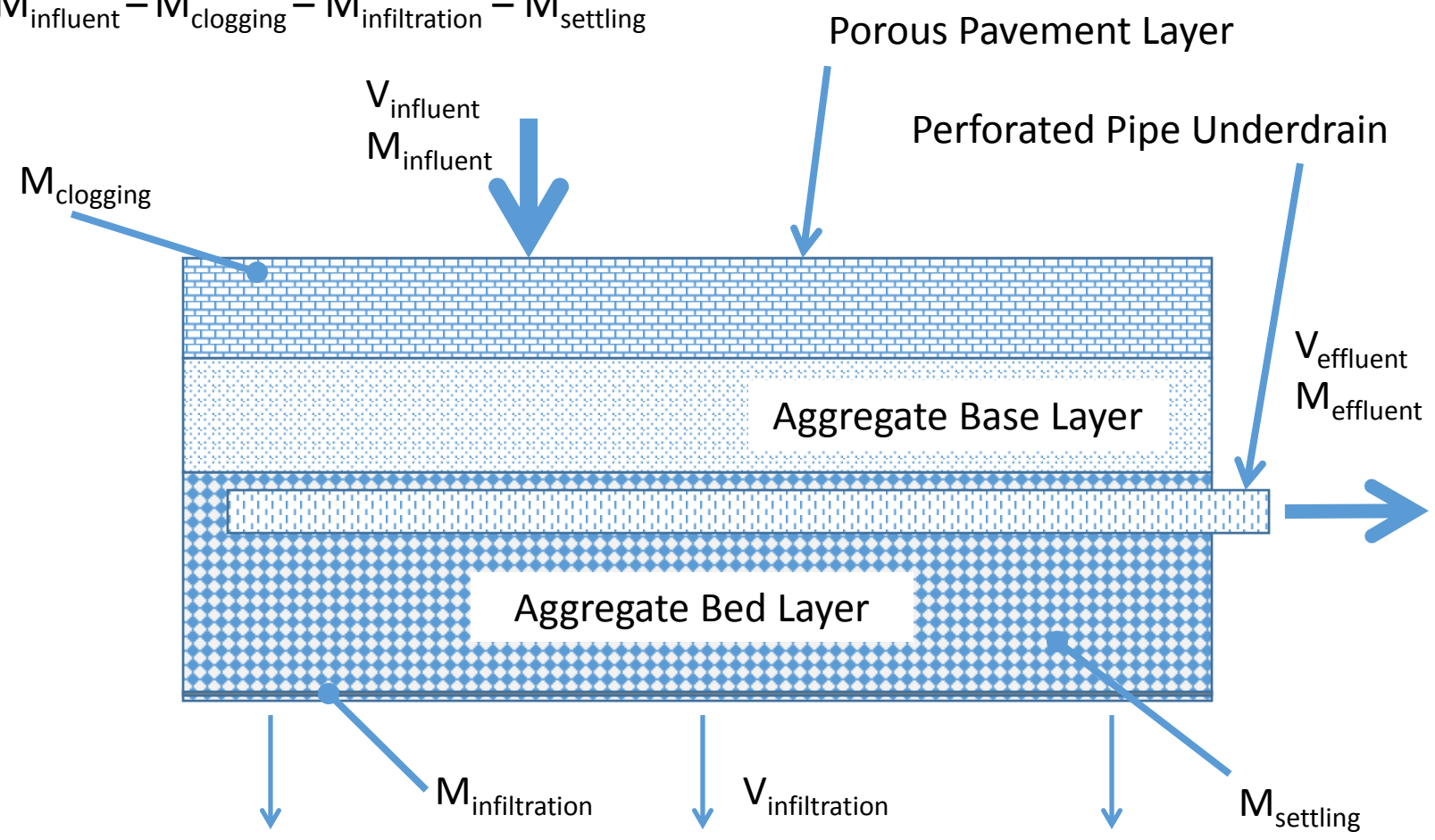
- Surface Sediment Trapping
- Subsurface Settling
- Mass Loss through Infiltration into Native Soils



TSS Removal Processes - Initial

$V_{effluent} = V_{influent} - V_{infiltration}$

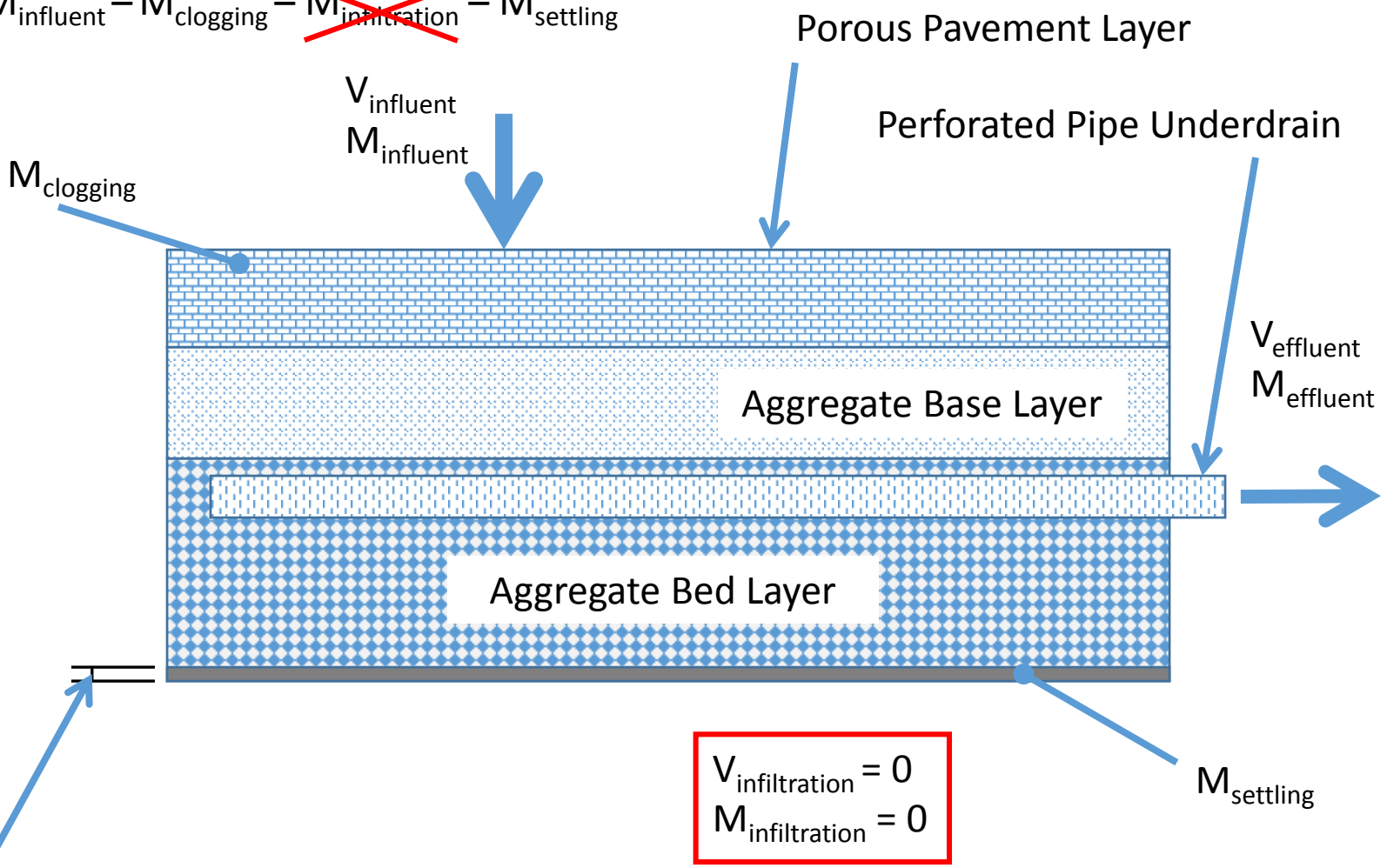
$M_{effluent} = M_{influent} - M_{clogging} - M_{infiltration} - M_{settling}$



TSS Removal Processes – Subsurface Clogged

$V_{effluent} = V_{influent} - V_{infiltration}$

$M_{effluent} = M_{influent} - M_{clogging} - M_{infiltration} - M_{settling}$

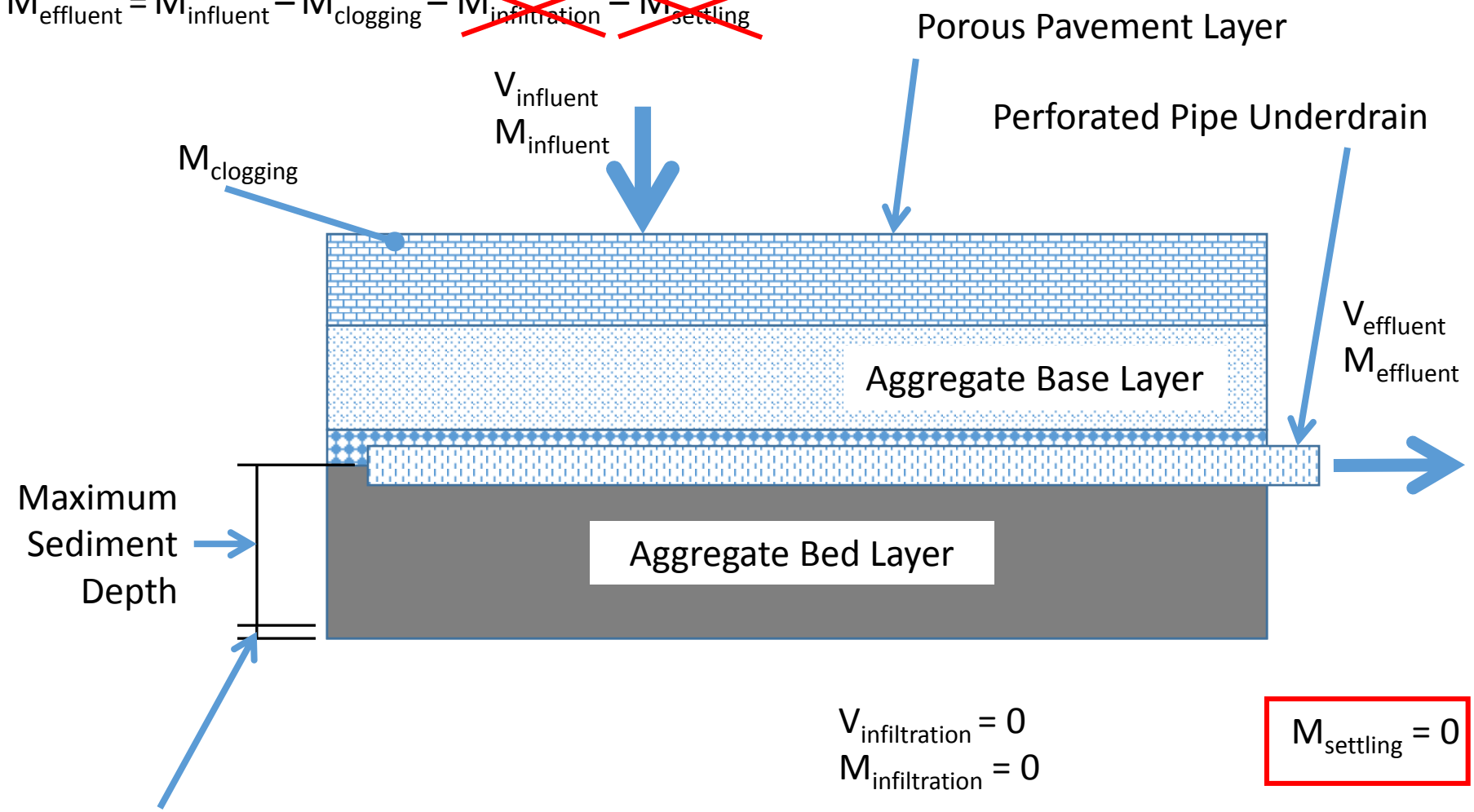


Clogging Sediment Depth for Zero Subsurface Infiltration = 0.25 in.

TSS Removal Processes – Settling Volume = 0

$V_{effluent} = V_{influent} - V_{infiltration}$

$M_{effluent} = M_{influent} - M_{clogging} - M_{infiltration} - M_{settling}$

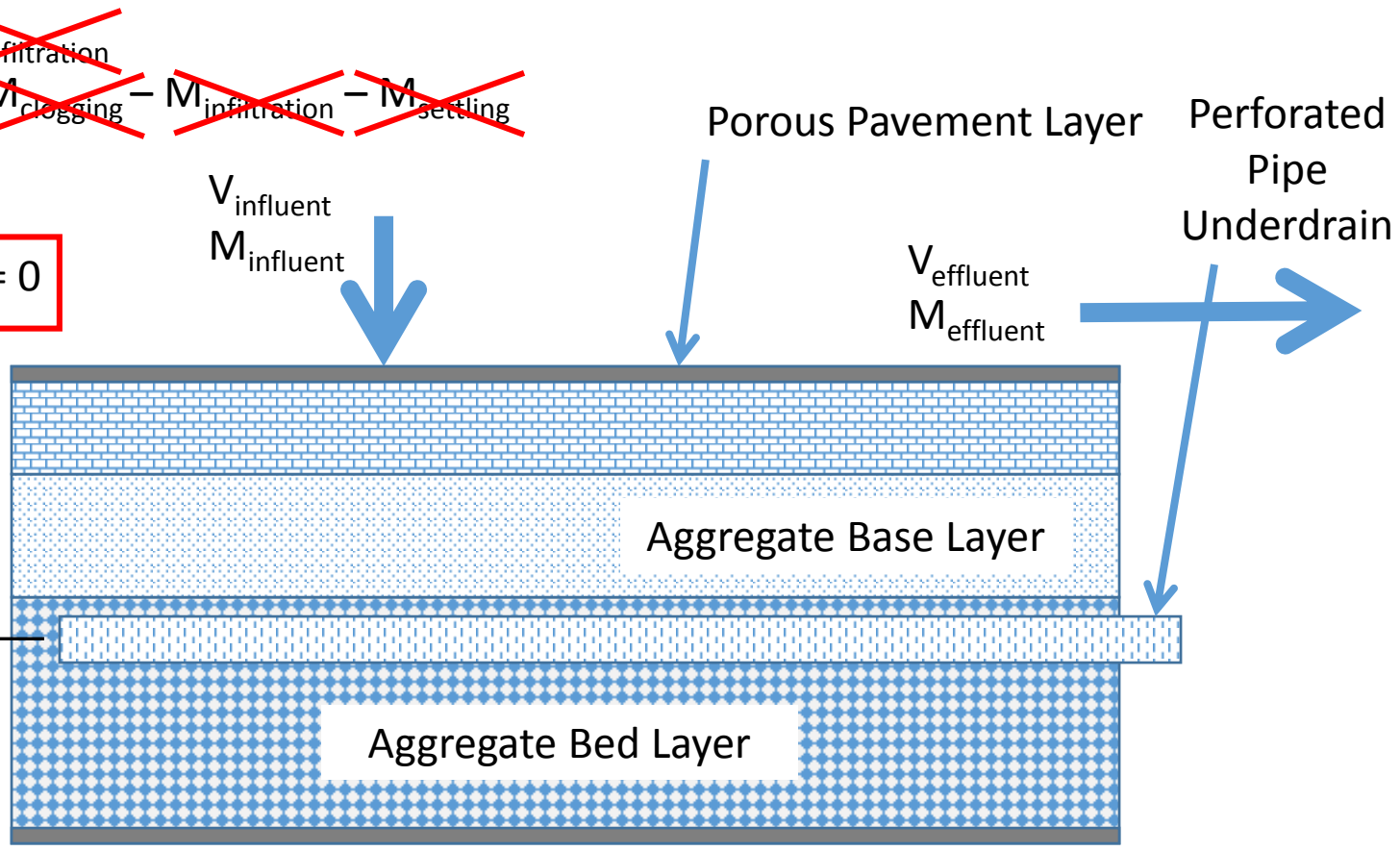


TSS Removal Processes – Surface Clogged

$V_{effluent} = V_{influent} - V_{infiltration}$

$M_{effluent} = M_{influent} - M_{clogging} - M_{infiltration} - M_{settling}$

$M_{clogging} = 0$



$V_{infiltration} = 0$

$M_{infiltration} = 0$

$M_{settling} = 0$

Clogging Sediment Depth for Zero Subsurface Infiltration = 0.25 in.

Entering Porous Pavement Data into the Program

- **Pavement Geometry and Properties**
- **Outlet/Discharge Options**
- **Surface Pavement Layer and Cleaning Data**
- **Native Soil Infiltration Data**

Porous Pavement Control Device

First Source Area Control Practice

Land Use: Commercial 1

Source Area: Paved Parking 1

Total Porous and Impervious Pavement Area: 1.000 ac.

Porous pavement area (acres): 0.170

Inflow Hydrograph Peak to Average Flow Ratio 3.8

Area – runoff from the Total Area drains to the Porous pavement area

Pavement Geometry and Properties

1 - Pavement Thickness (in)	3.0
Pavement Porosity (>0 and <1)	0.25
2 - Aggregate Bedding Thickness (in)	9.0
Aggregate Bedding Porosity (>0 and <1)	0.30
3 - Aggregate Base Reservoir Thickness (in)	12.0
Aggregate Base Reservoir Porosity (>0 and <1)	0.30
Porous Pavement Area to Agg Base Area Ratio	1.00

Outlet/Discharge Options

Perforated Pipe Underdrain Diameter, if used (inches)	3.00
4 - Perforated Pipe Underdrain Outlet Invert Elevation (inches above Datum)	6.0
Number of Perforated Pipe Underdrains (<250)	5
Subgrade Seepage Rate (in/hr) - select below or enter	0.100
Use Random Number Generation to Account for Uncertainty in Seepage Rate	☐
Subgrade Seepage Rate COV	

Underdrain Discharge Percent TSS Reduction (0-100) or leave blank for program to calculate	0

Select Subgrade Seepage Rate

- ○ Sand - 8 in/hr
- ○ Loamy sand - 2.5 in/hr
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- ○ Sandy clay - 0.05 in/hr
- ○ Silty clay - 0.04 in/hr
- ○ Clay - 0.02 in/hr

Surface Pavement Layer Infiltration Rate Data

Initial Infiltration Rate (in/hr)	100.00
Surface Pavement Percen Cleaning (0-100)	
Enter either these three	
Percent of Infiltration Rate	
Percent of Infiltration Rate	
Time Period Until Complete	

Or this value:

Surface Clogging Load (lb/sf)	0.06

Restorative Cleaning Frequency

- ○ Never Cleaned
- ○ Every Seven Years
- ○ Every Ten Years

Pavement Area Graphic

Select F

Select File

Percent of Total Area that is Porous Pavement

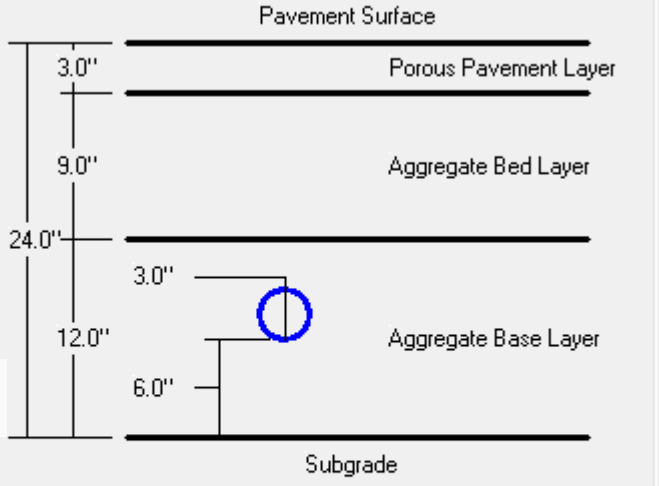
17.0 %

Run-on Allowed

Copy Porous Pavement Data

Paste Porous Pavement Data

Porous Pavement Geometry Schematic



Delete Control | Cancel | Continue

Control Practice # : 1 | Land Use # : 1 | Source Area # : 13 | Porous Pavement Device Number 1

Porous Pavement Control Device

First Source Area Control Practice

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Porous pavement area (acres): 0.170

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Porous Pavement Area to Agg Base Area Ratio	1.00

Outlet/Discharge Options

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Number of Perforated Pipe Underdrains (<250)	5
Subgrade Seepage Rate (in/hr) - select below or enter	0.100
Use Random Number Generation to Account for Uncertainty in Seepage Rate	☐
Subgrade Seepage Rate COV	

Underdrain Discharge Percent TSS Reduction (0-100) or leave blank for program to calculate	0

Select Subgrade Seepage Rate

- ○ Sand - 8 in/hr
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- ○ Silty clay - 0.04 in/hr
- ○ Clay - 0.02 in/hr

Surface Pavement Layer Infiltration Rate Data

Initial Infiltration Rate (in/hr)	100.00
Surface Pavement Percent Solids Removal Upon Cleaning (0-100)	50.0

Enter either these three values:

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)	

Or this value:

Surface Clogging Load (lb/sf)	0.06

Restorative Cleaning Frequency

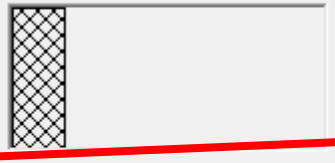
- ○ Never Cleaned
- ○ Three Times per Year
- ○ Semi-Annually
- ◉ Annually
- ○ Every Two Years
- ○ Every Three Years
- ○ Every Four Years
- ○ Every Five Years
- ○ Every Seven Years
- ○ Every Ten Years

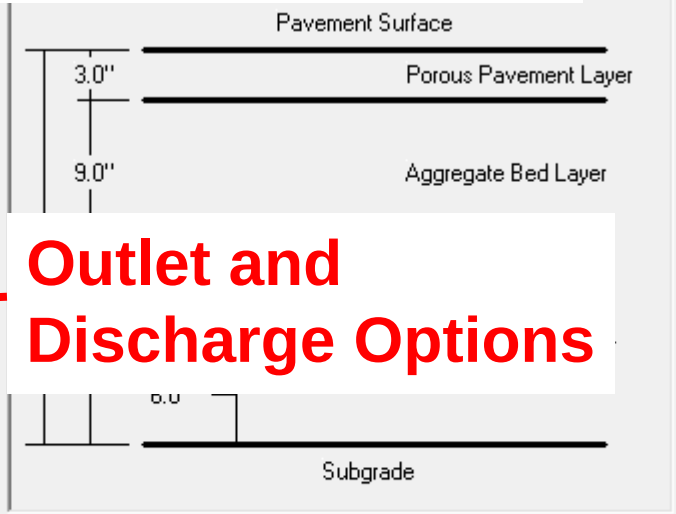
Select Particle S

Select File

Percent of Total Area that is Porous Pavement

17.0 %





Copy Porous Pavement Data

Paste Porous Pavement Data

Delete Control

Cancel

Continue

Control Practice # : 1 | Land Use # : 1 | Source Area # : 13 | Porous Pavement Device Number 1

Pavement Geometry and Properties

Outlet and Discharge Options

Porous Pavement Control Device

First Source Area Control Practice

Land Use: Commercial 1

Source Area: Paved Parking 1

Total Porous and Impervious Pavement Area: 1.000 ac.

Porous pavement area (ac

Inflow Hydrograph Peak to

Cleaning Frequencies

Surface Pavement Layer Infiltration Rate Data

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hree values:

on Rate After 3 Years (0-100)	
on Rate After 5 Years (0-100)	
Complete Clogging Occurs (yrs)	

Of this value:

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Pavement Geome

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Aggregate Base Reservoir Porosity (>0 and <1)	0.30
Porous Pavement Area to Agg Base Area Ratio	1.00

Select Particle Size Distribution File

Select File | Not needed - calculated by program

Outlet/Discharge Options

Perforated Pipe Underdrain Diameter, if used (inches)	3.00
4 - Perforated Pipe Underdrain Outlet Invert Elevation (inches above Datum)	
Number of Perforated Pipe Underc	
Subgrade Seepage Rate (in/hr) - s or enter	
Use Random Number Generation (Uncertainty in Seepage Rate	
Subgrade Seepage Rate COV	

Underdrain Discharge Percent TSS Reduction (0-100) or leave blank for program to calculate	0

Percent of Total Area orous Pavement

17.0 %

Graphic with entered data

Select Subgrade Seepage Rate

- ○ Sand - 8 in/hr
- ○ Loamy sand - 2.5 in/hr
- ○ Sandy loam - 1.0 in/hr
- ○ Loam - 0.5 in/hr
- ○ Silt loam - 0.3 in/hr
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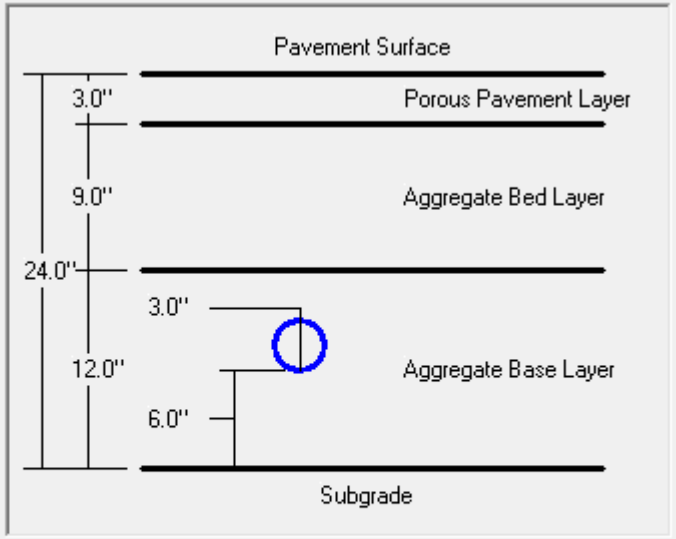
Copy Porous Pavement Data | Paste Porous Pavement Data

Porous Pavement Geometry Schematic



Delete Control | Cancel | Continue

Control Practice # : 1 | Land Use # : 1 | Source Area # : 13 | Porous Pavement Device Number 1

Porous Pavement Control Device

First Source Area Control Practice

Land Use: Commercial 1

Source Area: Paved Parking 1

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Porous pavement area (acres): 0.170

Inflow Hydrograph Peak to Average Flow Ratio 3.8

Pavement Geometry and Properties

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Porous Pavement Area to Agg Base Area Ratio	1.00

Outlet/Discharge Options

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Use Random Number Generation to Account for Uncertainty in Seepage Rate	☐
Subgrade Seepage Rate COV	

Underdrain Discharge Percent TSS Reduction (0-100) or leave blank for program to calculate	0

Select Subgrade Seepage Rate

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Surface Pavement Layer Infiltration Rate Data

Initial Infiltration Rate (in/hr)	100.00
Surface Pavement Percent Solids Removal Upon Cleaning (0-100)	50.0

Enter either these three values:

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)	

Or this value:

Surface Clogging Load (lb/sf)	0.06

Surface Clogging Option 1

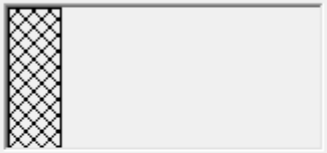
Restorative Cleaning Frequency

- ○ 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

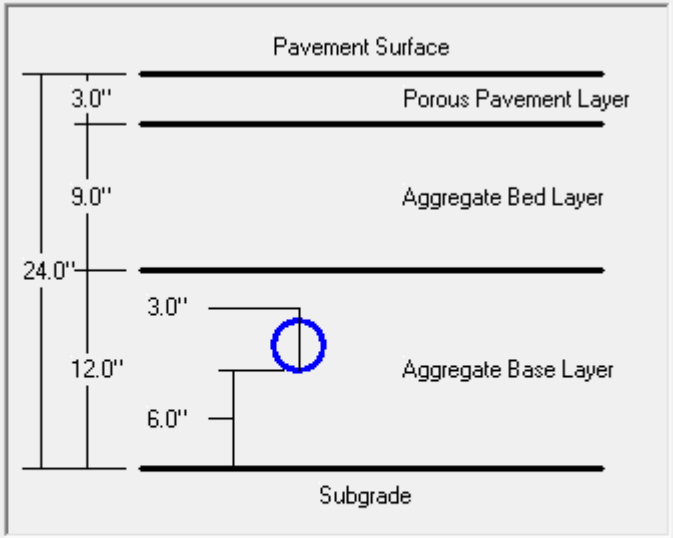
Select File — Not needed - calculated by program

Percent of Total Area that is Porous Pavement

17.0 %



Porous Pavement Geometry Schematic



Copy Porous Pavement Data | Paste Porous Pavement Data

Delete Control | **Cancel** | **Continue**

Control Practice # : 1 | Land Use # : 1 | Source Area # : 13 | Porous Pavement Device Number 1

Porous Pavement Control Device

First Source Area Control Practice

Land Use: Commercial 1

Source Area: Paved Parking 1

Total Porous and Impervious Pavement Area: 1.000 ac.

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Inflow Hydrograph Peak to Average Flow Ratio	3.8

Pavement Geometry and Properties

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Aggregate Base Reservoir Porosity (>0 and <1)	0.30
Porous Pavement Area to Agg Base Area Ratio	1.00

Outlet/Discharge Options

Perforated Pipe Underdrain Diameter, if used (inches)	3.00
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Number of Perforated Pipe Underdrains (<250)	5
Subgrade Seepage Rate (in/hr) - select below or enter	0.100
Use Random Number Generation to Account for Uncertainty in Seepage Rate	☐
Subgrade Seepage Rate COV	

Underdrain Discharge Percent TSS Reduction (0-100) or leave blank for program to calculate	0

Select Subgrade Seepage Rate

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Surface Pavement Layer Infiltration Rate Data

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Surface Pavement Percent Solids Removal Upon Cleaning (0-100)	50.0

Enter either these three values:

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)	

Or this value:

Surface Clogging Load (lb/sf)	0.06

Surface Clogging Option 2

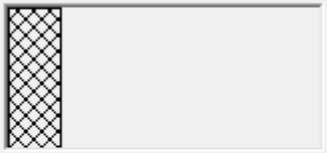
Restorative Cleaning Frequency

- ○ 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

Select File

Percent of Total Area that is Porous Pavement

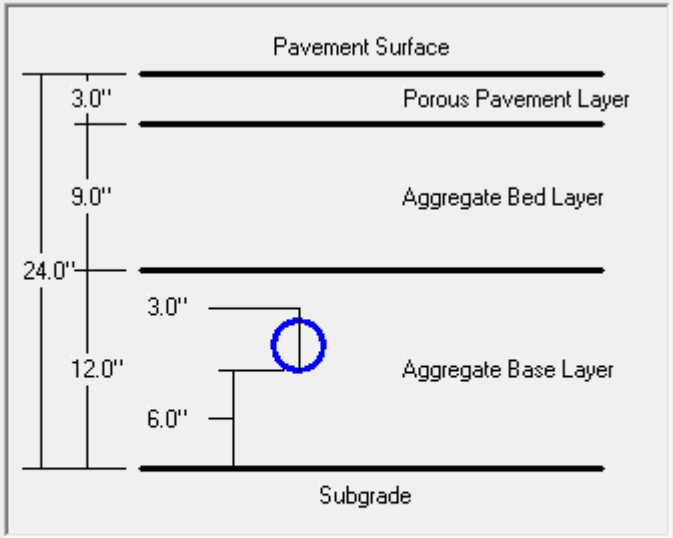
17.0 %



Copy Porous Pavement Data

Paste Porous Pavement Data

Porous Pavement Geometry Schematic



Delete Control | **Cancel** | **Continue**

Control Practice # : 1 | Land Use # : 1 | Source Area # : 13 | Porous Pavement Device Number 1

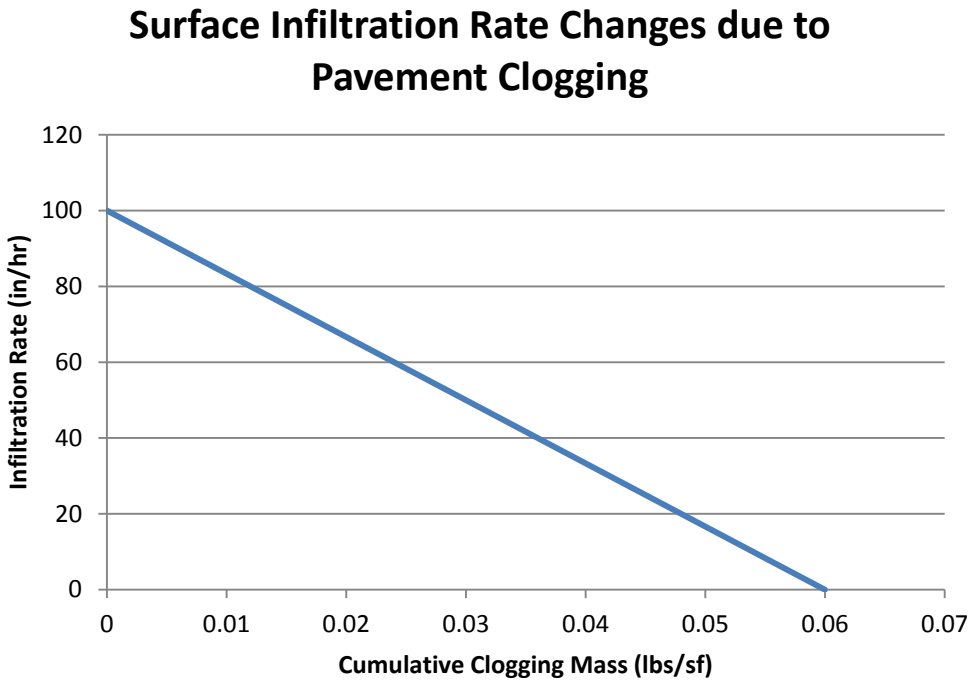
Modeling Notes

- **Porous Pavement routing is performed using the Modified Puls Storage – Indication Method.**
- **Time increments are established by the user and vary by event.**
- **Yield reductions are due to**
  - **surface pavement filtering**
  - **subsurface settling**
  - **runoff volume reduction through infiltration**
- **The pavement surface can be any material – paver blocks, porous asphalt or porous concrete**
- **The porous pavement structure is assumed to be flat**

Surface Seepage Rate Changes due to Surface Clogging

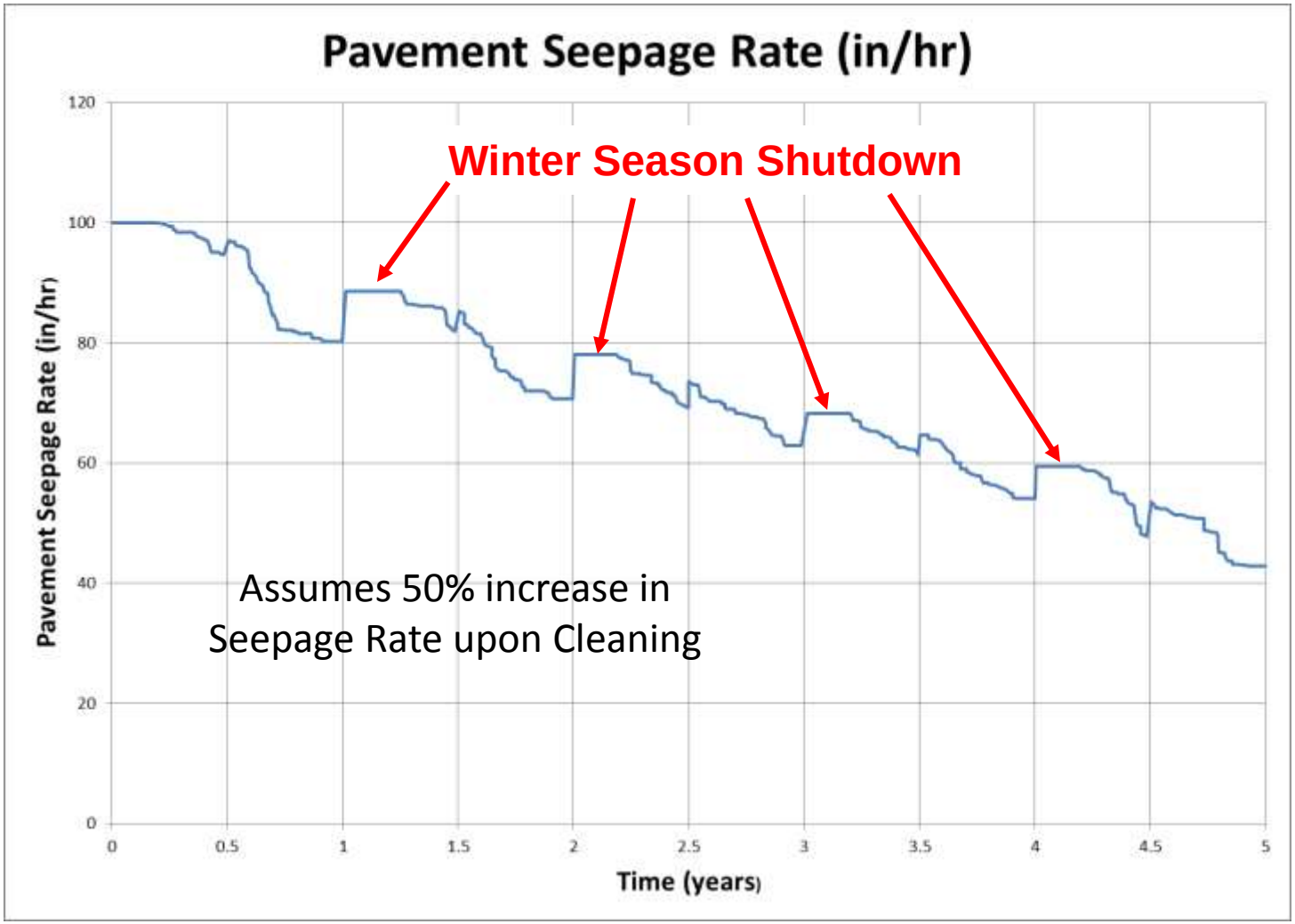
Table 1 - Particulate Treatment in Porous Pavement Devices
Fractional Removal of Stormwater Particulates

Media	0.45 to 3µm	3 to 12µm	12 to 30µm	30 to 60µm	60 to 120µm	120 to 250µm	>250µm
Porous pavement surface (asphalt or concrete)	0.00	0.00	0.00	0.00	0.25	0.50	1.00

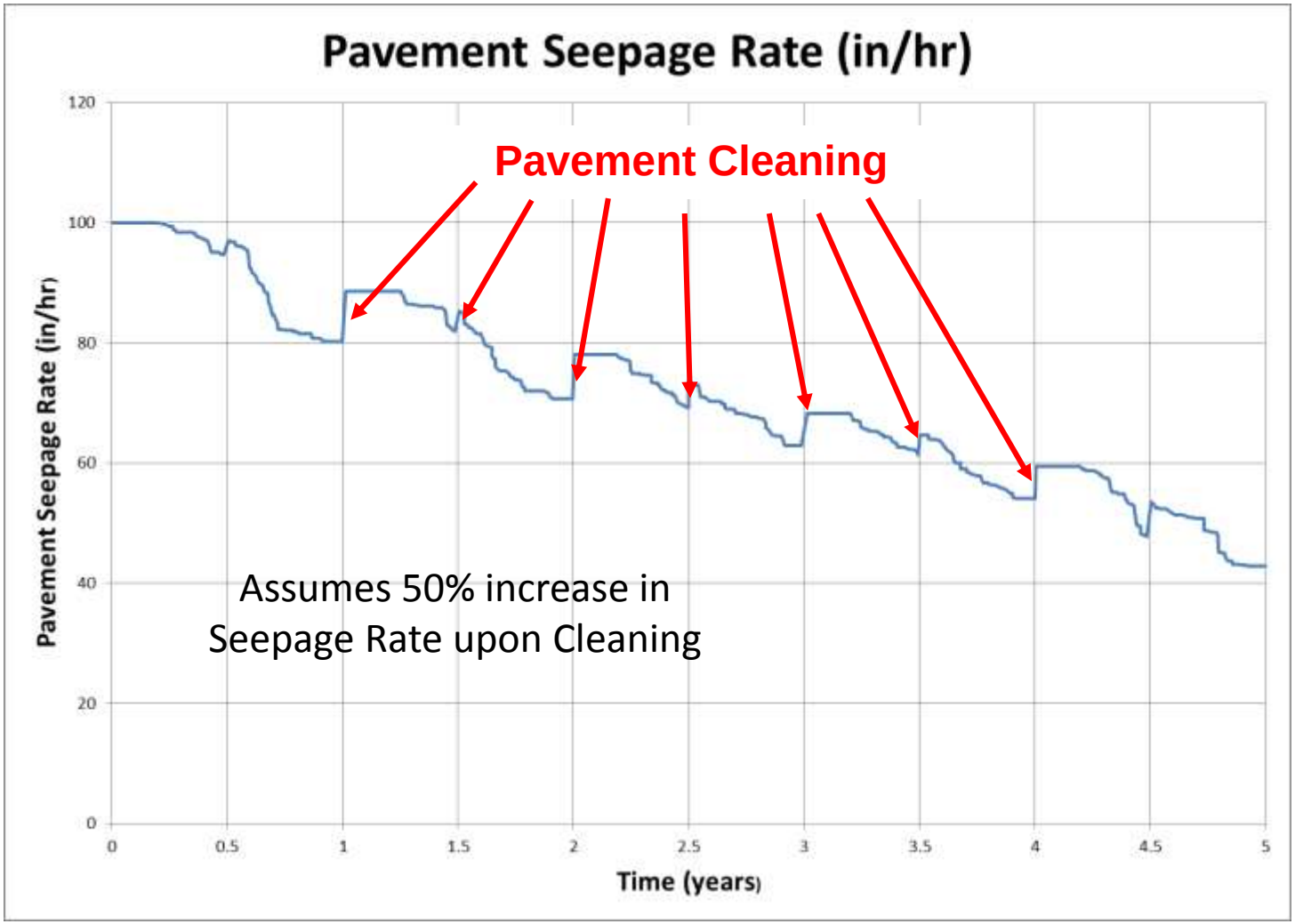


Infiltration rate decreases as sediment clogs the surface

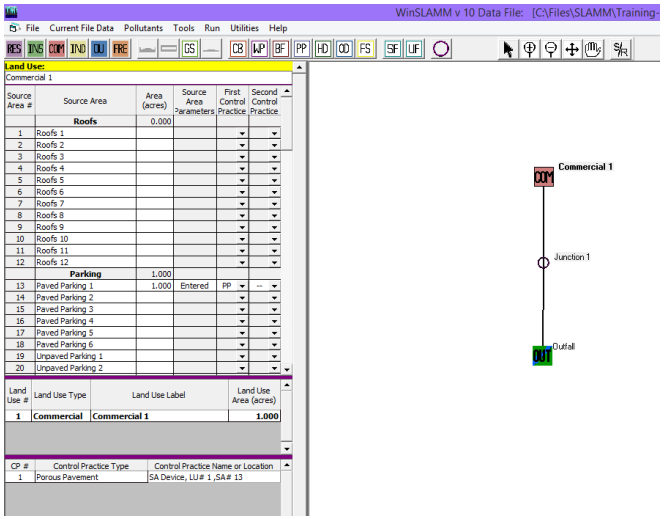
Surface Seepage Rate Changes to the Control Practice



Surface Seepage Rate Changes to the Control Practice



Example Input and Output



WinSLAMM v 10 Data File: [C:\Files\SLAMM\Training-

File Current File Data Pollutants Tools Run Utilities Help

RES INS COM IND OU FRE GS CB WP BF PP HD OD FS SF UF

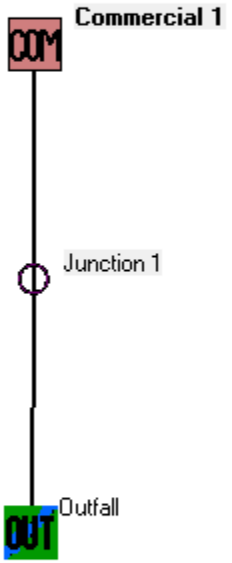
Land Use:

Commercial 1

Source Area #	Source Area	Area (acres)	Source Area Parameters	First Control Practice	Second Control Practice
	Roofs	0.000			
1	Roofs 1				
2	Roofs 2				
3	Roofs 3				
4	Roofs 4				
5	Roofs 5				
6	Roofs 6				
7	Roofs 7				
8	Roofs 8				
9	Roofs 9				
10	Roofs 10				
11	Roofs 11				
12	Roofs 12				
	Parking	1.000			
13	Paved Parking 1	1.000	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				

Land Use #	Land Use Type	Land Use Label	Land Use Area (acres)
1	**Commercial**	**Commercial 1**	**1.000**

CP #	Control Practice Type	Control Practice Name or Location
1	Porous Pavement	SA Device, LU# 1 ,SA# 13



Porous Pavement Control Device

First Source Area Control Practice

Land Use: Commercial 1

Source Area: Paved Parking 1

Total Porous and Impervious Pavement Area: 1.000 ac.

Porous pavement area (acres):	0.170
Inflow Hydrograph Peak to Average Flow Ratio	3.8

Pavement Geometry and Properties

1 - Pavement Thickness (in)	3.0
Pavement Porosity (>0 and <1)	0.25
2 - Aggregate Bedding Thickness (in)	9.0
Aggregate Bedding Porosity (>0 and <1)	0.30
3 - Aggregate Base Reservoir Thickness (in)	12.0
Aggregate Base Reservoir Porosity (>0 and <1)	0.30
Porous Pavement Area to Agg Base Area Ratio	1.00

Outlet/Discharge Options

Perforated Pipe Underdrain Diameter, if used (inches)	3.00
4 - Perforated Pipe Underdrain Outlet Invert Elevation (inches above Datum)	6.0
Number of Perforated Pipe Underdrains (<250)	5
Subgrade Seepage Rate (in/hr) - select below or enter	0.100
Use Random Number Generation to Account for Uncertainty in Seepage Rate	☐
Subgrade Seepage Rate COV	

Underdrain Discharge Percent TSS Reduction (0-100) or leave blank for program to calculate	0

Select Subgrade Seepage Rate

- ○ Sand - 8 in/hr
- ○ Loamy sand - 2.5 in/hr
- ○ Sandy loam - 1.0 in/hr
- ○ Loam - 0.5 in/hr
- ○ Silt loam - 0.3 in/hr
- ○ Sandy silt loam - 0.2 in/hr
- ○ Clay loam - 0.1 in/hr
- ○ Silty clay loam - 0.05 in/hr
- ○ Sandy clay - 0.05 in/hr
- ○ Silty clay - 0.04 in/hr
- ○ Clay - 0.02 in/hr

Surface Pavement Layer Infiltration Rate Data

Initial Infiltration Rate (in/hr)	100.00
Surface Pavement Percent Solids Removal Upon Cleaning (0-100)	50.0

Enter either these three values:

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)	

Or this value:

Surface Clogging Load (lb/sf)	0.06

Restorative Cleaning Frequency

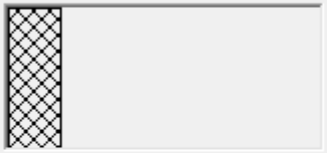
- ○ Never Cleaned
- ○ Three Times per Year
- ○ Semi-Annually
- ◉ Annually
- ○ Every Two Years
- ○ Every Three Years
- ○ Every Four Years
- ○ Every Five Years
- ○ Every Seven Years
- ○ Every Ten Years

Select Particle Size Distribution File

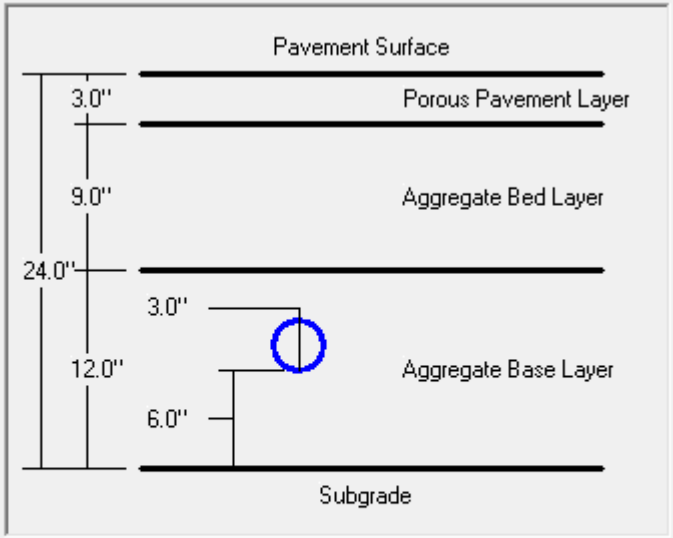
Select File — Not needed - calculated by program

Percent of Total Area that is Porous Pavement

17.0 %



Porous Pavement Geometry Schematic



Copy Porous Pavement Data | Paste Porous Pavement Data

Delete Control | **Cancel** | **Continue**

Control Practice # : 1 | Land Use # : 1 | Source Area # : 13 | Porous Pavement Device Number 1

Land Uses | Junctions | Control Practices | Outfall | **Ouput Summary**

File Name:

C:\Files\SLAMM\Training-Presentations\DNR PP Feb 2015 Webinar\PPTest.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	75538		0.71	130.0	613.0	
Outfall Total with Controls	38001	49.69 %	0.36	39.67	94.11	84.65 %

Current File Output: Annualized Total After Outfall Controls: 50994

Years in Model Run: 0.75

126.3

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
Particulate Solids	130.0	39.67	mg/L	613.0	94.11	lbs	84.65 %
Total Phosphorus	0.2150	0.08646	mg/L	1.014	0.2051	lbs	79.77 %

Print Output Summary to Text File

Print Output Summary to .csv File

Total Area Modeled (ac): 1.000

Total Control Practice Costs

Capital Cost	$ 14730
Land Cost	$ 0
Annual Maintenance Cost	$ 49
Present Value of All Costs	$ 15463
Annualized Value of All Costs	$ 1039

Perform Outfall Flow Duration Curve Calculations

Receiving Water Impacts Due To Stormwater Runoff

(CWP Impervious Cover Model)

	Calculated Rv	Approximate Urban Stream Classification
Without Controls	0.71	Poor
With Controls	0.36	Poor

Land Uses | Junctions | Control Practices | Outfall | **Ouput Summary**

File Name:

C:\Files\SLAMM\Training-Presentations\DNR PP Feb 2015 Webinar\PPTest.mdb

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Land Uses | Junctions | **Control Practices** | Outfall | Ouput Summary

Runoff Volume | Part. Solids Yield (lbs) | Part. Solids Conc. (mg/L) | **Summary Table**

Data File: C:\Files\SLAMM\Training-Presentations\DNR PP Feb 2015 Webinar\PPTest.mdb

Rain File: WisReg - Madison WI 1981.RAN

Date: 01-26-15 Time: 12:50:06 PM

Site Description:

Col. #:	2	3	4	5	6	7	8	9	10
Control Practice No.	Control Practice Type	Control Practice Name or Location	Total Inflow Volume (cf)	Total Outflow Volume (cf)	Percent Volume Reduction	Total Influent Load (lbs)	Total Effluent Load (lbs)	Percent Load Reduction	Flow Weight Influe Conc (m
1	Porous Pavement	SA Device, LU# 1 ,SA# 13	75538	38001	49.69	613.0	94.12	84.65	1

Control Practice Summary Table

Data File: C:\Files\SLAMM\Training-Presentations\DNR PP Feb 2015 Webinar\PPTest.mdb
Rain File: WisReg - Madison WI 1981.RAN
Date: 01-25-15 Time: 12:38:41 PM
Site Description:

Col. #:	2	3	4	5	6	7	8	9
Control Practice No.	Control Practice Type	Control Practice Name or Location	Total Inflow Volume (cf)	Total Outflow Volume (cf)	Percent Volume Reduction	Total Influent Load (lbs)	Total Effluent Load (lbs)	Percent Load Reduction
1	Porous Pavement	SA Device, LU# 1 ,SA# 13	75538	37980	49.72	613.0	94.06	84.66

10	11	12	13	14	26	28	29	30	36	61
Flow Weighted Influent Conc (mg/L)	Flow Weighted Effluent Conc (mg/L)	Percent Conc. Reduction	Influent Median Part. Size (microns)	Effluent Median Part. Size (microns)	% of Clogging Factor	Maximum Subsurface Ponding Time (hrs)	Volume Infiltrated (cf)	Underdrain Discharge Vol. (cf)	Final Surface Infiltration Rate (in/hr)	Runoff Producing Events/ Ttl. Rains
130.0	39.67	69.483	7.80	2.33	0.12	68.50	37524.94	37979.71	87.93	21/86

Control Practice Detail Tables

Runoff Volume

Data File: C:\Files\SLAMM\Training-Presentations\DNR PP Feb 2015 Webinar\PPTe
Rain File: WisReg - Madison WI 1981.RAN
Date: 01-25-15 Time: 12:38:40 PM
Site Description:

Control Practice Type ==> CP# 1 - Porous Pavement
Control Practice Name/Location ==> SA Device, LU# 1 ,SA# 13

Rain Number	Start Date	Rain Total (in)	Influent Runoff Vol.(cf)	Effluent Runoff Vol.(cf)	Runoff Vol. Percent Reduction
36	05/13/81	0.01	3.227	0	100.00
37	05/23/81	0.02	12.91	0	100.00
38	05/24/81	0.10	169.5	0	100.00
39	05/29/81	0.34	763.0	0	100.00
40	06/02/81	0.01	3.227	0	100.00
41	06/03/81	0.01	3.227	0	100.00
42	06/08/81	0.01	3.227	0	100.00
43	06/08/81	0.33	735.6	0	100.00
44	06/09/81	0.07	106.7	0	100.00
45	06/12/81	0.43	1013	0	100.00
46	06/15/81	2.59	8610	7311	15.09
47	06/20/81	0.34	763.0	0	100.00
48	06/21/81	0.32	708.6	0	100.00
49	06/23/81	0.51	1240	0	100.00
50	06/25/81	0.13	236.2	0	100.00
51	06/28/81	0.24	503.1	0	100.00
52	07/04/81	0.05	67.94	0	100.00
53	07/11/81	0.50	1211	56.08	95.37
54	07/12/81	0.14	258.9	21.94	91.53
55	07/12/81	0.86	2325	2075	10.74
56	07/13/81	1.32	3966	3778	4.72
57	07/14/81	0.12	214.2	0	100.00

Part. Solids Yield (lbs)

Data File: C:\Files\SLAMM\Training-Presentations\DNR PP Feb 2015 Webinar\PPT
Rain File: WisReg - Madison WI 1981.RAN
Date: 01-25-15 Time: 12:38:41 PM
Site Description:

Control Practice Type ==> CP# 1 - Porous Pavement
Control Practice Name/Location ==> SA Device, LU# 1 ,SA# 13

Rain Number	Start Date	Rain Total (in)	Influent Part. Sol. Yield(lbs)	Effluent Part. Sol. Yield(lbs)	Part.Yield Percent Reduction
36	05/13/81	0.01	0.02619	0	100.00
37	05/23/81	0.02	0.1048	0	100.00
38	05/24/81	0.10	1.376	0	100.00
39	05/29/81	0.34	6.192	0	100.00
40	06/02/81	0.01	0.02619	0	100.00
41	06/03/81	0.01	0.02619	0	100.00
42	06/08/81	0.01	0.02619	0	100.00
43	06/08/81	0.33	5.970	0	100.00
44	06/09/81	0.07	0.8662	0	100.00
45	06/12/81	0.43	8.224	0	100.00
46	06/15/81	2.59	69.88	22.59	67.67
47	06/20/81	0.34	6.192	0	100.00
48	06/21/81	0.32	5.751	0	100.00
49	06/23/81	0.51	10.06	0	100.00
50	06/25/81	0.13	1.917	0	100.00
51	06/28/81	0.24	4.083	0	100.00
52	07/04/81	0.05	0.5513	0	100.00
53	07/11/81	0.50	9.825	0.02718	99.72
54	07/12/81	0.14	2.101	0.004246	99.80
55	07/12/81	0.86	18.87	7.473	60.40
56	07/13/81	1.32	32.18	12.83	60.13
57	07/14/81	0.12	1.738	0	100.00

Additional Output

Available through:
Tools/
Default Model Options

- **Water Balance File**
- **Mass Balance File**
- **Stage Outflow File**
- **Surface Seepage Rate File**
- **Detailed Output File**
- **Stochastic Seepage Rate Detail File**

PorPav Source Area Number	Rain Number	Rain Depth (in)	Time (Julian Date)	Maximum PorPav Stage (ft)	Minimum PorPav Stage (ft)	Total Source Area Runoff Before Porous Pavement (ac-ft)	Non-Porous Pavement Area Runoff Volume (ac-ft)	Event Inflow Volume onto Porous Pavement (ac-ft)	Event Bypass Volume Due to Surface Clogging (ac-ft)	Event Overflow Volume (ac-ft)	Event Infil Outflow (ac-ft)	Event Orifice Outflow (ac-ft)	Event Total Outflow (ac-ft)	Event Flow Balance (ac-ft)	Volume Reduction Fraction	Solids Reduction Fraction
46	1	0.46	0	0.01	0	0.01	0	0.01	0	0	0.01	0	0.01	0	1	0
46	2	0.58	5	0	0	0.012	0	0.012	0	0	0.012	0	0.012	0	1	0
46	3	0.25	9	0	0	0.005	0	0.005	0	0	0.005	0	0.005	0	1	0
46	4	0.03	11	0	0	0.001	0	0.001	0	0	0.001	0	0.001	0	1	0
46	5	0.39	11	0	0	0.008	0	0.008	0	0	0.008	0	0.008	0	1	0
46	7	0.05	18	0	0	0.001	0	0.001	0	0	0.001	0	0.001	0	1	0
46	8	0.03	22	0	0	0.001	0	0.001	0	0	0.001	0	0.001	0	1	0
46	9	2.33	23	0.01	0	0.049	0	0.049	0	0	0.049	0	0.049	0	1	0
46	12	0.51	34	0	0	0.011	0	0.011	0	0	0.011	0	0.011	0	1	0
46	15	0.67	47	0.01	0	0.014	0	0.014	0	0	0.014	0	0.014	0	1	0
46	16	0.61	50	0.01	0	0.013	0	0.013	0	0	0.013	0	0.013	0	1	0
46	18	0.85	63	0	0	0.018	0	0.018	0	0	0.018	0	0.018	0	1	0
46	20	1.02	66	0.01	0	0.021	0	0.021	0	0	0.021	0	0.021	0	1	0
46	22	1.48	70	0.01	0	0.031	0	0.031	0	0	0.031	0	0.031	0	1	0