



# WinSLAMM v 10.2 User's Guide

Stormwater Control Devices

# Control Devices Summary

☁ Biofiltration (BF)

☁ Catch Basins (CB)

☁ Cisterns (CI)

☁ Filter Strips (FS)

☁ Grass Swales (GS)

☁ Green Roof (GR)

☁ Hydrodynamic Devices (HD)

☁ Media Filters (MF)

☁ Other Control Device (OD)

☁ Porous Pavement (PP)

☁ Street Cleaning (SC)

☁ Wet Detention Pond (WP)

# Control Devices

After the Parameter File and Source Area data are entered, Control Devices can be added to analyze their ability to reduce stormwater runoff volume and/or pollutants.

There are two types of control devices in the model:

1. Source Area Control Devices
2. Drainage System Control Devices

Depending upon the location in the program, not all Control Devices are available. For example, Street Cleaning is not available for the Roof Source Area.

All Control Devices have a “Copy/Paste” function. Data entered for one Control Device may be pasted into a new Control Device within the same model file.

# Source Area Control Device

WinSLAMM v 10 Data File: [C:\Caroline\PVA\Reference Guide.mdb] - [Land Use Model]

File Current File Data Pollutants Tools Run Utilities Help

RES INS COM IND OJ 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
<b>Roofs</b>		0.680			
1	Roofs 1	0.680	Entered	-	-
2	Roofs 2			WP	
3	Roofs 3			HD	
4	Roofs 4			OD	
5	Roofs 5			BF	
6	Roofs 6			CI	
7	Roofs 7			GR	
8	Roofs 8			GS	
9	Roofs 9			MF	
10	Roofs 10				
11	Roofs 11				
12	Roofs 12				
<b>Parking</b>		2.850			
13	Paved Parking 1	2.850	Entered	-	-
14	Paved Parking 2				
15	Paved Parking 3				

Commercial 1

Junction 1

Biofilters 1

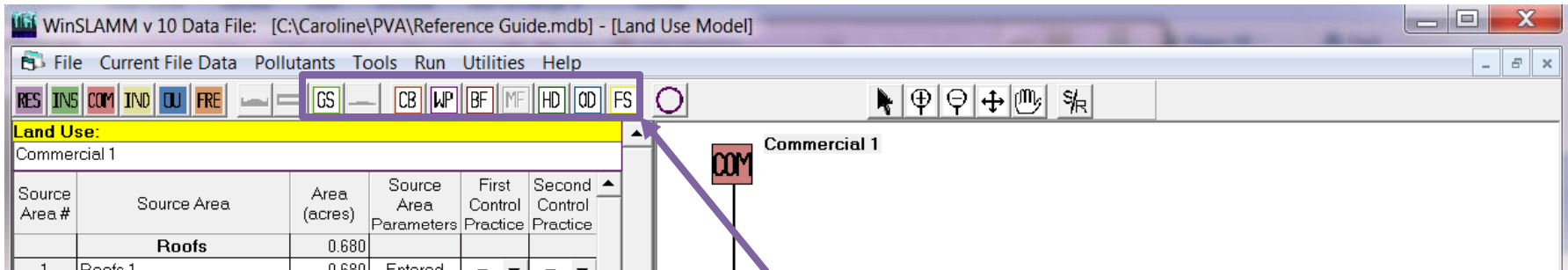
Outfall

Source Area Control Devices are accessed from the Source Area Grid. To access a Source Area Control Device, select the pull-down menu under “First Control Practice” or “Second Control Practice” and then select the desired Control Device. A Source Area Control Device will only treat one source area.

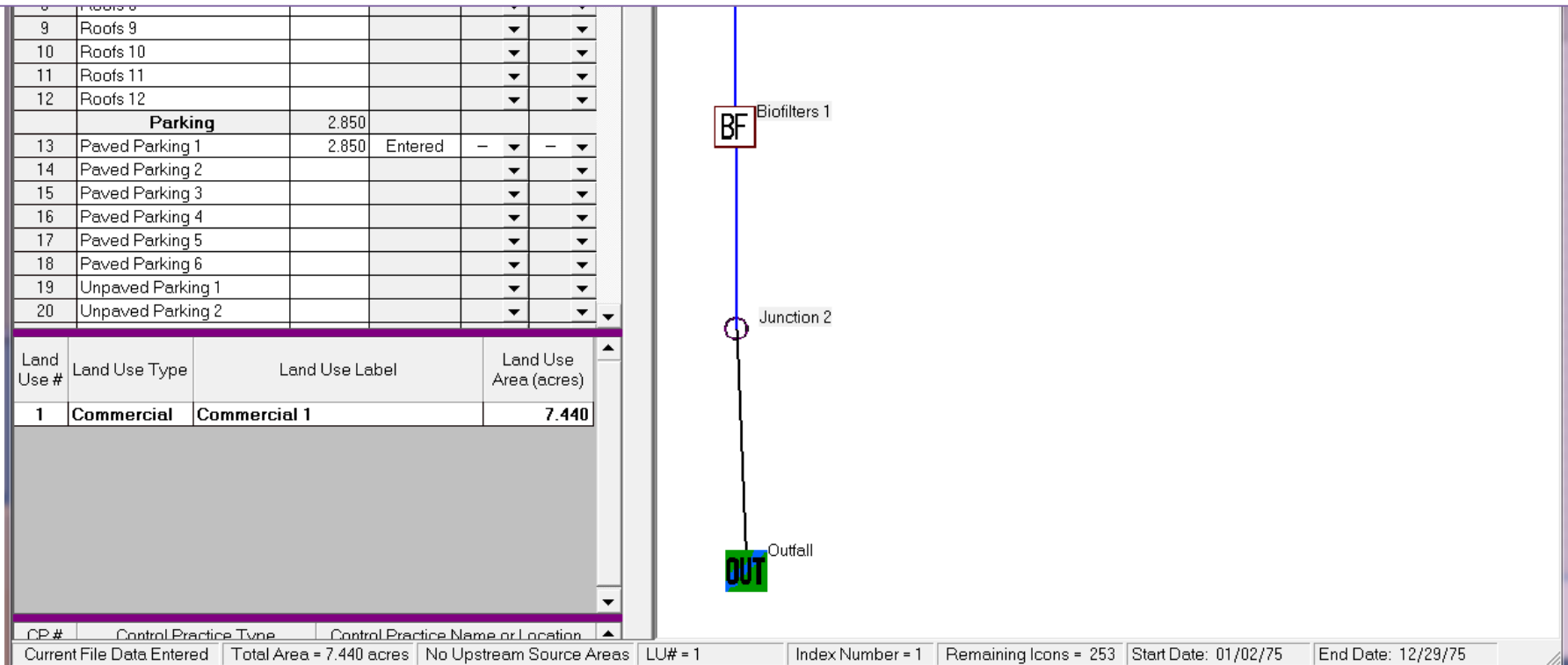
CP # Control Practice Type Control Practice Name or Location

Current File Data Entered Total Area = 7.440 acres No Upstream Source Areas LU# = 1 Index Number = 1 Remaining Icons = 253 Start Date: 01/02/75 End Date: 12/29/75

# Drainage System Control Device



Drainage System Control Devices are accessed from the main toolbar. To access a Drainage System Control Device, click on the desired Control Device, then click on the white map space. The Control Device Icon will appear.



# Control Devices – Biofiltration

# Biofiltration Control Device

**Biofiltration Control Device**

**Drainage System Control Practice**

**Device Properties**

**Biofilter Number 1**

Top Area (sf) 1363

Bottom Area (sf) 1363

Total Depth (ft) 3.50

Typical Width (ft)

Native Soil Infil.

Native Soil Infil.

Infil. Rate Fract.

Infil. Rate Fract.

Rock Filled De

Rock Fill Poros

Engineered Me

Engineered Me

Engineered Me

Engineered Me

Engineered Me

Percent solids

Engineered Me

Inflow Hydrogr

Flow Ratio

Number of Dev

Upstream Drain

☐ Activate Pi

Diameter (ft)

Length (ft)

Within Biofilter

Perforated (che

Bottom Elevati

Discharge Orifi

**Select Nati**

☐ Sand - 8 in

☐ Loamy sa

☐ Sandy loa

☐ Loam - 0.5

☐ Silt loam - 0.3 in/hr

☐ Clay - 0.02 in/hr

☐ Sandy silt loam - 0.2 in/hr

☐ Rain Barrel/Cistern - 0.00 in/hr

Paste Biofilter Data

Select Particle Size File

Not needed - calculated by program

Control Practice #: 1

CP Index #: 1

**Add** **Sharp Crested Weir**

Weir Length (ft)

Height from datum to bottom of weir opening (ft)

**Remove** **Broad Crested Weir**

**Add** **Other Outlet**

Stage Number	Stage (ft)	Other Outflow Rate (cfs)
1		
2		

**Evaporation**

Month	Evapotranspiration (in/day)	Evaporation (in/day)
Jan	0.00	
Feb	0.00	
Mar		
Apr		
May		
Jun		
Jul		
Aug		
Sep		
Oct		
Nov		
Dec		

**4**

0.00

0.0

0.00

in Schematic

1.00'

0.50'

**Delete** **Cancel** **Continue**

The Biofiltration Control Device allows the user to model many different types of stormwater control measures including:

- Infiltration Basins (without engineered soil)
- Biofilters (with engineering soil)
- Infiltration Trenches
- Rain Gardens

The stormwater control measures can be modeled with:

- Evaporation
- Evapotranspiration
- Impermeable Liners
- Drain Tiles
- Stone Storage Layers

# Biofiltration Control Device

**Biofiltration Control Device**

**Drainage System Control Practice**

**Device Properties Biofilter Number 1**

Top Area (sf)	43560
Bottom Area (sf)	43560
Total Depth (ft)	2.00
Typical Width (ft) (Cost est. only)	10.00
Native Soil Infiltration Rate (in/hr)	0.500
Native Soil Infiltration Rate COV	N/A
Infil. Rate Fraction-Bottom (0.001-1)	1.000
Infil. Rate Fraction-Sides (0.001-1)	1.000
Rock Filled Depth (ft)	0.00
Rock Fill Porosity (0-1)	0.00
Engineered Media Type	Media Data
Engineered Media Infiltration Rate	0.00
Engineered Media Infiltration Rate COV	N/A
Engineered Media Depth (ft)	0.00
Engineered Media Porosity (0-1)	0.00
Percent solids reduction due to Engineered Media (0-100)	N/A
Inflow Hydrograph Peak to Average Flow Ratio	3.80
Number of Devices in Source Area or Instream Drainage System	1

☐ Activate Pipe or Box Storage ☐ Pipe ☐ Box

Diameter (ft)	
Length (ft)	
Within Biofilter (check if Yes)	<input type="checkbox"/>
Perforated (check if Yes)	<input type="checkbox"/>
Bottom Elevation (ft above datum)	
Discharge Orifice Diameter (ft)	

**Select Native Soil Infiltration 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	<input type="radio"/> Rain Barrel/Cistern - 0.00 in/hr

Not needed - calculated by program

Control Practice #: 1 CP Index #: 1

**Add** **Sharp Crested Weir** **Add** **Other Outlet** **Add**

Weir Length (ft) \_\_\_\_\_  
Height from bottom of weir (ft) \_\_\_\_\_

**Weir crest level** \_\_\_\_\_  
**Weir crest width** \_\_\_\_\_  
Height from bottom of weir (ft) \_\_\_\_\_

**Add** **Vertical Stand Pipe**

Pipe diameter (ft)	
Height above datum (ft)	

**Surface Discharge Pipe**

Pipe Diameter (ft)	1.00
Invert elevation above datum (ft)	1.00
Number of pipes at invert elev.	2

**Add** **Drain Tile/Underdrain**

Pipe Diameter (ft)	
Invert elevation above datum (ft)	
Number of pipes at invert elev.	

**ET Crop Adjustment Factor**

Jul	
Aug	
Sep	

**ET Crop Adjustment Factor**

1	
2	
3	
4	

**Enter data regarding the Biofiltration Device(s) physical characteristics. To enter data describing the Engineered Media, select "Media Data".**

**As data is entered, the values will appear in the diagram below.**

**Biofilter Geometry Schematic**



# Biofiltration Control Device

**Biofiltration Control Device**

**Drainage System Control Practice**

**Device Properties**

**Biofilter Number 1**

Top Area (sf) 1363

Bottom Area (sf)

Total Depth (ft)

Typical Width (ft) (Cost est. only)

Native Soil Infiltration Rate (in/hr)

Native Soil Infiltration Rate COV

Infil. Rate Fraction-Bottom (0-1)

Infil. Rate Fraction-Sides (0-1)

Rock Filled Depth (ft)

Rock Fill Porosity (0-1)

Engineered Media Type

Engineered Media Infiltration Rate

Engineered Media Infiltration Rate

Engineered Media Depth (ft)

Engineered Media Porosity (0-1)

Percent solids reduction due to Engineered Media (0 -100)

Inflow Hydrograph Peak to Average Flow Ratio

Number of Devices in Source Area Upstream Drainage System

☐ Activate Pipe or Box Storage

Diameter (ft)

Length (ft)

Within Biofilter (check if Yes)

Perforated (check if Yes)

Bottom Elevation (ft above datum)

Discharge Orifice Diameter (ft)

**Select Native Soil Infiltration**

☐ Sand - 8 in/hr

**Detailed Media Characteristics**

Soil Type Texture	Saturation Water Content % (Porosity)	Field Capacity (Percent)	Permanent Wilting Point (Percent)	Infiltration Rate (in/hr)	Fraction of Soil Type Texture in Engineered Soil (0-1)
<input type="checkbox"/> User-Defined Soil Type	0.0	0.0	0.0	0.000	0.000
Gravel	32	4	0	40	0.000
Sands	38	8	2.5	13	0.800
Loamy Sands	39	13.5	4.5	2.5	0.000
Sandy Loams	40	19.5	6.5	1	0.000
Fine Sandy Loams	42	26.5	10.5	0.5	0.000
Loams & Silt Loams	43	34	14	0.15	0.000
Clay Loams/Silty Clay Loams	50	34.5	17	0.1	0.000
Silty Clays & Clays	55	33.5	18	0.015	0.000
Peat as Amendment	78	59	5	3	0.100
Compost as Amendment	61	55	5	3	0.100
<b>Composite Soil Mixture Properties</b>	<b>44.3</b>	<b>17.8</b>	<b>3.0</b>	<b>13.000</b>	<b>1.000</b>

☐ Apply Soil Mixture Values as a User Defined Soil Mixture

☒ Apply Porosity ☒ Apply Field Capacity ☒ Apply Wilting Point ☒ Apply Infiltration Rate ☒ Apply All Values

**Cancel** **Continue**

**Evaporation**

Month

Evapotranspiration (in/day)

Evaporation (in/day)

**Plant Types**

2 3 4

0.25 0.25 0.00

hrubs Other G1

2.0 1.0 0.0

0.50 0.55 0.00

**Refresh Schematic**

**Continue**

Enter the fraction of each Soil Type in the column on the right. The total should equal 1 when finished. To apply the various soil properties to the Control Devices, check the applicable boxes on the bottom of the form. Then select "Continue".

# Biofiltration Control Device

**Biofiltration Control Device**

**Drainage System Control Practice**

**Device Properties Biofilter Number 1**

Top Area (sf)	43560
Bottom Area (sf)	43560
Total Depth (ft)	2.00
Typical Width (ft) (Cost est. only)	10.00
Native Soil Infiltration Rate (in/hr)	0.500
Native Soil Infiltration Rate COV	N/A
Infil. Rate Fraction-Bottom (0.001-1)	1.000
Infil. Rate Fraction-Sides (0.001-1)	1.000
Rock Filled Depth (ft)	0.00
Rock Fill Porosity (0-1)	0.00
Engineered Media Type	Media Data
Engineered Media Infiltration Rate	0.00
Engineered Media Infiltration Rate COV	N/A
Engineered Media Depth (ft)	0.00
Engineered Media Porosity (0-1)	0.00
Percent solids reduction due to Engineered Media (0 -100)	N/A
Inflow Hydrograph Peak to Average Flow Ratio	3.80
Number of Devices in Source Area or Upstream Drainage System	1

☐ Activate Pipe or Box Storage ☐ Pipe ☐ Box

Diameter (ft)

Length (ft)

Within Biofilter (check if Yes) ☐

Perforated (check if Yes) ☐

Bottom Elevation (ft above datum)

Discharge Orifice Diameter (ft)

**Select Native Soil Infiltration 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  
☐ Rain Barrel/Cistern - 0.00 in/hr

Copy Biofilter Data

Paste Biofilter Data

Select Particle Size File

Not needed - calculated by program

Control Practice #: 1 CP Index #: 1

**Add Sharp Crested Weir**

Weir Length (ft)

Height from datum to bottom of weir opening (ft)

**Remove Broad Crested Weir-Reqd**

Weir crest length (ft) 10.00

Weir crest width (ft) 10.00

Height from datum to bottom of weir opening (ft) 1.75

**Add Vertical Stand Pipe**

Pipe diameter (ft)

Height above datum (ft)

**Add Other Outlet**

Stage Number	Stage (ft)	Other Outflow Rate (cfs)
1		
2		
3		
4		
5		

**Add Evapotranspiration**

Soil porosity (saturation moisture content, 0-1)

Soil field moisture capacity (0-1)

Permanent wilting point (0-1)

**Evaporation**

Month	Evapotranspiration (in/day)	Evaporation (in/day)
Jan		
Feb		
Mar		
Apr		
May		
Jun		
Jul		
Aug		
Sep		

**Biofilter Geometry Schematic**

Refresh Schematic

2.00'

1.75'

1.00'

1.000'

Delete Cancel Continue

# Biofiltration Control Device

**Biofiltration Control Device**

**Drainage System Control Practice**

**Device Properties Biofilter Number 1**

Top Area (sf)	43560
Bottom Area (sf)	43560
Total Depth (ft)	2.00
Typical Width (ft) (Cost est. only)	10.00
Native Soil Infiltration Rate (in/hr)	0.500
Native Soil Infiltration Rate COV	N/A
Infil. Rate Fraction-Bottom (0.001-1)	1.000
Infil. Rate Fraction-Sides (0.001-1)	1.000
Rock Filled Depth (ft)	0.00
Rock Fill Porosity (0-1)	0.00
Engineered Media Type	Media Data
Engineered Media Infiltration Rate	0.00
Engineered Media Infiltration Rate COV	N/A
Engineered Media Depth (ft)	0.00
Engineered Media Porosity (0-1)	0.00
Percent solids reduction due to Engineered Media (0 -100)	N/A
Inflow Hydrograph Peak to Average Flow Ratio	3.80
Number of Devices in Source Area or Upstream Drainage System	1

☐ Activate Pipe or Box Storage ☐ Pipe ☐ Box

Diameter (ft)	
Length (ft)	
Within Biofilter (check if Yes)	<input type="checkbox"/>
Perforated (check if Yes)	<input type="checkbox"/>
Bottom Elevation (ft above datum)	
Discharge Orifice Diameter (ft)	

**Select Native Soil Infiltration 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	<input type="radio"/> Rain Barrel/Cistern - 0.00 in/hr

Select Particle Size File: Not needed - calculated by program

Control Practice #: 1 CP Index #: 1

**Add Sharp Crested Weir**

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

**Remove Broad Crested Weir-Reqd**

Weir crest length (ft)	10.00
Weir crest width (ft)	10.00
Height from datum to bottom of weir opening (ft)	1.75

**Add Vertical Stand Pipe**

Pipe diameter (ft)	
Height above datum (ft)	

**Remove Surface Discharge Pipe**

Pipe Diameter (ft)	1.00
Invert elevation above datum (ft)	1.00
Number of pipes at invert elev.	2

**Add Drain Tile/Underdrain**

Pipe Diameter (ft)	
Invert elevation above datum (ft)	
Number of pipes at invert elev.	

☐ Use Random Number Generation to Account for Infiltration Rate Uncertainty

Initial Water Surface Elevation (ft): 0.00

Est. Surface Drain Time (hrs):

**Add Other Outlet**

Stage Number	Stage (ft)	Other Outflow Rate (cfs)
1		
2		
3		
4		
5		

**Add Evapotranspiration**

Soil porosity (saturation moisture content, 0-1)	
Soil field moisture capacity (0-1)	
Permanent wilting point (0-1)	
Supplemental irrigation used?	<input type="checkbox"/>
Fraction of available capacity when irrigation starts (0-1)	
Fraction of available capacity when irrigation stops (0-1)	

**Evaporation**

Month	Evapotranspiration (in/day)	Evaporation (in/day)
Jan		
Feb		
Mar		
Apr		
May		
Jun		
Jul		
Aug		
Sep		
Oct		
Nov		
Dec		

**Plant Types**

1	2	3	4
Fraction of biofilter that is vegetated			
Plant type			
Root depth (ft)			
ET Crop Adjustment Factor			

**Biofilter Geometry Schematic**

If unknown, select the Native Soil Seepage Rate from the list of default values

# Biofiltration Control Device

**Biofiltration Control Device**

**Drainage System Control Practice**

**Device Properties Biofilter Number 1**

Top Area (sf)	43560
Bottom Area (sf)	43560
Total Depth (ft)	2.00
Typical Width (ft) (Cost est. only)	10.00
Native Soil Infiltration Rate (in/hr)	0.500
Native Soil Infiltration Rate COV	N/A
Infil. Rate Fraction-Bottom (0.001-1)	1.000
Infil. Rate Fraction-Sides (0.001-1)	1.000
Rock Filled Depth (ft)	0.00
Rock Fill Porosity (0-1)	0.00
Engineered Media Type	Media Data
Engineered Media Infiltration Rate	0.00
Engineered Media Infiltration Rate COV	N/A
Engineered Media Depth (ft)	0.00
Engineered Media Porosity (0-1)	0.00
Percent solids reduction due to Engineered Media (0 -100)	N/A
Inflow Hydrograph Peak to Average Flow Ratio	3.80
Number of Devices in Source Area or Upstream Drainage System	1

☐ Activate Pipe or Box Storage ☐ Pipe ☐ Box

Diameter (ft)	
Length (ft)	
Within Biofilter (check if Yes)	<input type="checkbox"/>
Perforated (check if Yes)	<input type="checkbox"/>
Bottom Elevation (ft above datum)	
Discharge Orifice Diameter (ft)	

**Select Native Soil Infiltration 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	<input type="radio"/> Rain Barrel/Cistern - 0.00 in/hr

Select Particle Size File: Not needed - calculated by program

Control Practice #: 1 CP Index #: 1

**Add Sharp Crested Weir**

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

**Remove Broad Crested Weir-Reqd**

Weir crest length (ft)	10.00
Weir crest width (ft)	10.00
Height from datum to bottom of weir opening (ft)	

**Add Weir**

Pipe diameter (ft)	
Height above datum (ft)	

**Remove Submerged Weir**

Pipe Diameter (ft)	
Invert elevation	
Number of pipes at invert elev.	2

**Add Drain Tile/Underdrain**

Pipe Diameter (ft)	
Invert elevation above datum (ft)	
Number of pipes at invert elev.	

☐ Use Random Number Generation to Account for Infiltration Rate Uncertainty

Initial Water Surface Elevation (ft): 0.00

Est. Surface Drain Time (hrs):

**Add Other Outlet**

Stage Number	Stage (ft)	Other Outflow Rate (cfs)
1		
2		
3		
4		

**Evaporation**

Month	Evapotranspiration (in/day)	Evaporation (in/day)
Jan		
Feb		
Mar		

**Biofilter Geometry Schematic**

Refresh Schematic

2.00' 1.75' 10.00' 1.00'

Delete Cancel Continue

# Biofiltration Control Device

**Biofiltration Control Device**

**Drainage System Control Practice**

**Device Properties Biofilter Number 1**

Top Area (sf)	43560
Bottom Area (sf)	43560
Total Depth (ft)	2.00
Typical Width (ft) (Cost est. only)	10.00
Native Soil Infiltration Rate (in/hr)	0.500
Native Soil Infiltration Rate COV	N/A
Infil. Rate Fraction-Bottom (0.001-1)	1.000
Infil. Rate Fraction-Sides (0.001-1)	1.000
Rock Filled Depth (ft)	0.00
Rock Fill Porosity (0-1)	0.00
Engineered Media Type	Media Data
Engineered Media Infiltration Rate	0.00
Engineered Media Infiltration Rate COV	N/A
Engineered Media Depth (ft)	0.00
Engineered Media Porosity (0-1)	0.00
Percent solids reduction due to Engineered Media (0 -100)	N/A
Inflow Hydrograph Peak to Average Flow Ratio	3.80
Number of Devices in Source Area or Upstre	

**Add Sharp Crested Weir**

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

**Remove Broad Crested Weir-Reqd**

Weir crest length (ft)	10.00
Weir crest width (ft)	10.00
Height from datum to bottom of weir opening (ft)	1.75

**Add Vertical Stand Pipe**

Pipe diameter (ft)	
Height above datum (ft)	

**Remove Surface Discharge Pipe**

Pipe Diameter (ft)	1.00
Invert elevation above datum (ft)	1.00
Number of pipes at invert elev.	2

**Add Drain Tile/Underdrain**

Pipe Diameter (ft)	
Invert elevation above datum (ft)	
Number of pipes at invert elev.	

**Add Other Outlet**

Stage Number	Stage (ft)	Other Outflow Rate (cfs)
1		
2		
3		
4		
5		

**Add Evapotranspiration**

Soil porosity (saturation moisture content, 0-1)	
Soil field moisture capacity (0-1)	
Permanent wilting point (0-1)	
Supplemental irrigation used?	<input type="checkbox"/>
Fraction of available capacity when irrigation starts (0-1)	
Fraction of available capacity when irrigation stops (0-1)	

**Evaporation**

Month	Evapotranspiration (in/day)	Evaporation (in/day)
Jan		
Feb		
Mar		
Apr		
May		
Jun		
Jul		
Aug		
Sep		
Oct		
Nov		
Dec		

**Plant Types**

1	2	3	4
Fraction of biofilter that is vegetated			
Plant type			
Root depth (ft)			
ET Crop Adjustment Factor			

**Biofilter Geometry Schematic**

**Select Particle Size File**

Not needed - calculated by program

Control Practice #: 1 | CP Index #: 1

The particle size distribution will be calculated automatically using the particle size distributions from the source areas.

# Biofiltration Control Device

Enter the outlet structure information. To add an outlet structure, select "Add", then enter the required data.

To delete an outlet structure, select "Remove"

Data describing the inputs for each Outlet can be found in the Help File.

Data describing the outlet structures will also be reflected in the schematic. You must have a Broad Crested Weir as an emergency overflow.

The software interface includes several data entry sections:

- Sharp Crested Weir:**
  - Add
  - Weir Length (ft)
  - Height from datum to bottom of weir opening (ft)
  - Remove
  - Broad Crested Weir-Reqd
  - Weir crest length (ft): 10.00
  - Weir crest width (ft): 10.00
  - Height from datum to bottom of weir opening (ft): 1.75
- Other Outlet:**
  - Add
  - Table with columns: Stage Number, Stage (ft), Other Outflow Rate (cfs)
  - Rows 1 through 5
- Evaporation:**
  - Add
  - Table with columns: Month, Evapotranspiration (in/day), Evaporation (in/day)
  - Rows for Jan through Dec
- Vertical Stand Pipe:**
  - Add
  - Pipe diameter (ft)
  - Height above datum (ft)
- Surface Discharge Pipe:**
  - Remove
  - Pipe Diameter (ft): 1.00
  - Invert elevation above datum (ft): 1.00
  - Number of pipes at invert elev.: 2
- Drain Tile/Underdrain:**
  - Add
  - Pipe Diameter (ft)
  - Invert elevation above datum (ft)
  - Number of pipes at invert elev.
- Evapotranspiration:**
  - Add
  - Soil porosity (saturation moisture content, 0-1)
  - Soil field moisture capacity (0-1)
  - Permanent wilting point (0-1)
  - Supplemental irrigation used? ☐
  - Fraction of available capacity when irrigation starts (0-1)
  - Fraction of available capacity when irrigation stops (0-1)
- Plant Types:**
  - Table with 4 columns (1, 2, 3, 4) and rows for various plant types
- ET Crop Adjustment Factor:**
  - Input field
- Use Random Number Generation to Account for Infiltration Rate Uncertainty:**
  - ☐
- Biofilter Geometry Schematic:**
  - Refresh Schematic
  - Diagram showing a cross-section of a biofilter with dimensions: 2.00', 1.75', 1.00', and 10.00'
  - Buttons: Delete, Cancel, Continue

# Biofiltration Control Device

**Biofiltration Control Device**

**Drainage System Control Practice**

**Device Properties** **Biofilter Number 1**

Top Area (sf)	1363
Bottom Area (sf)	1363
Total Depth (ft)	3.50
Typical Width (ft) (Cost est. only)	10.00
Native Soil Infiltration Rate (in/hr)	0.020
Native Soil Infiltration Rate COV	N/A
Infil. Rate Fraction-Bottom (0-1)	1.00
Infil. Rate Fraction-Sides (0-1)	1.00
Rock Filled Depth (ft)	1.00
Rock Fill Porosity (0-1)	0.33
Engineered Media Type	Media Data
Engineered Media Infiltration Rate	13.00
Engineered Media Infiltration Rate COV	N/A
Engineered Media Depth (ft)	2.00
Engineered Media Porosity (0-1)	0.43
Percent solids reduction due to Engineered Media (0-100)	N/A
Inflow Hydrograph Peak to Average Flow Ratio	3.80
Number of Devices in Source Area or Upstream Drainage System	31

☐ Activate Pipe or Box Storage ☐ Pipe ☐ Box

Diameter (ft) \_\_\_\_\_ Length (ft) \_\_\_\_\_

Within Biofilter (check if) \_\_\_\_\_  
 Perforated (check if Yes) \_\_\_\_\_  
 Bottom Elevation (ft above datum) \_\_\_\_\_  
 Discharge Orifice Diameter (ft) \_\_\_\_\_

**Select Native Soil**

☐ 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

☐ Silty clay - 0.03 in/hr  
☐ Silty clay - 0.04 in/hr  
☐ Clay - 0.02 in/hr  
☐ Rain Barrel/Cistern - 0.00 in/hr

Not needed - calculated by program

**Add Sharp Crested Weir**

Weir Length (ft) \_\_\_\_\_  
 Height from datum to bottom of weir opening (ft) \_\_\_\_\_

**Remove Broad Crested Weir**

Weir crest length (ft) 10.00  
 Weir crest width (ft) 2.00  
 Height from datum to bottom of weir opening (ft) 3.40

**Add Vertical Stand Pipe**

Pipe diameter (ft) \_\_\_\_\_  
 Height above datum (ft) \_\_\_\_\_

**Add Surface Discharge Pipe**

Pipe Diameter (ft) \_\_\_\_\_  
 Invert elevation above datum (ft) \_\_\_\_\_  
 Number of pipes at invert elev. \_\_\_\_\_

**Remove Drain Tile/Underdrain**

Pipe Diameter (ft) 0.50  
 Invert elevation above datum (ft) 0.50  
 Number of pipes at invert elev. 1

☐ Use Random Number ☐ Generation to Account for Infiltration Rate Uncertainty

**Add Other Outlet**

Stage Number	Stage (ft)	Other Outflow Rate (cfs)
1		
2		
3		
4		
5		

**Remove Evapotranspiration**

Soil porosity (saturation moisture content, 0-1) 0.427  
 Soil field moisture capacity (0-1) 0.154  
 Permanent wilting point (0-1) 0.029  
 Supplemental irrigation used? ☐  
 Fraction of available capacity when irrigation starts (0-1) 0.000  
 Fraction of available capacity when irrigation stops (0-1) 0.000

**Evaporation**

Month	Evapotranspiration (in/day)	Evaporation (in/day)
Jan	0.00	
Feb	0.00	
Mar	0.00	
Apr	0.12	
May	0.14	
Jun	0.14	
Jul	0.13	
Aug	0.11	
Sep	0.10	
Oct	0.00	
Nov	0.00	
Dec	0.00	

**Plant Types**

	1	2	3	4
Fraction of biofilter that is vegetated	0.50	0.25	0.25	0.00
Plant type	Prairie P	Shrubs	Other G1	
Root depth (ft)	6.0	2.0	1.0	0.0
ET Crop Adjustment Factor	0.50	0.50	0.55	0.00

**Biofilter Geometry Schematic**

Initial Water Surface

10.00'

0.50'

Top of Rock Fill

0.50'

1.00'

Control Practice #: 1 CP Index #: 1

Detailed output from the Biofiltration Control Device can be generated by selecting the option in the Program Options screen.



# Biofiltration Control Device

Program Options

**Detailed Output File Options**

**Biofilters**

- ☐ Detailed Biofilter Output
- ☐ Irreducible Concentration Detailed Output
- ☐ Particulate Reduction Output
- ☐ Stage-Outflow
- ☐ Stochastic Seepage Rate Detail
- ☒ Water Balance
- ☐ Evapotranspiration Detail

**Catchbasins**

- ☐ Performance by Event Output
- ☐ Performance By Step Output
- ☐ Stage-Inflow Data
- ☐ Stage-Outflow

**Cisterns**

- ☐ Detailed Output
- ☐ Outfall Discharge Hydrograph
- ☐ Water Balance

**Filter Strips**

- ☐ Hydraulics and Concentration by Event
- ☐ Hydraulics Detailed Output
- ☐ Incremental Performance Output
- ☐ Irreducible Concentration Detailed
- ☐ Particulate Reduction Output

**Flow Duration Curve Data**

- ☐ Detailed Data
- ☐ Plotting Calculations
- ☐ Critical Particle Size Calculation Detailed Output File

**Freeway Data**

- ☐ Freeway Washoff Detail

**Grass Swales**

- ☐ Hydraulics and Concentration by Event
- ☐ Hydraulics Detailed Output

**Wet Detention Ponds**

- ☐ Detailed Output
- ☐ Pond Stage-Area-Volume Data
- ☐ Stage-Outflow
- ☐ Stone Weeper Detailed Output
- ☐ Water Balance Summary of All Ponds

**Summary Statistics**

	Rain Depth (in)	Rain Duration (hrs)		Maximum BioF Stage (ft)	Minimum BioF Stage (ft)	Event Peak Flow (cfs)	Surface Ponding Duration (hrs)	Total Ponding Duration (hrs)	Event Inflow Volume (ac-ft)	Event Hydraulic Outflow (ac-ft)
Number of Events	112	112	-	112	112	112	112	112	112	1
Total	27.87	28.71	-	-	-	-	0.7	887.401	5.295	2.7
Equivalent Annual Total	28.25	29.1	-	-	-	-	0.709	899.413	5.366	2.8
Minimum	0.01	0.04	0	0.003	0	0.003	0	0.8	0	
Maximum	2.34	1.08	0	3.599	0	2.429	0.7	29.3	0.49	0.4
Average of All Events	0.2	0.2		0.4	0	0.2	0	7	0	
Median	0.1	0.2		0.1	0	0	0	6	0	
Stnd. Deviation	0.3	0.2		0.5	0	0.3	0	6	0	
COV	1	0.9		1	7	2	10	0.8	1	
First Rain Date: 01/02/69										
Last Rain Date: 12/28/69										
Total Time Period (yrs): 0.9866439										

**File Update Options**

This shows an example of the Biofilter Water Balance detailed output that can be generated for a Biofiltration Control Device. Notice data on the Surface Ponding Duration and the Total Ponding Duration.



## Control Devices – Catchbasins

# Catchbasin Control Device

Catchbasin Control Device

First Source Area Control Practice  
Land Use: Commercial 1  
Source Area: Paved Parking 2

1. Fraction of drainage area served by catchbasins (0 - 1):

☐ 2a. Catchbasin density (cb/ac):

☒ 2b. Number of Catchbasins:

3. Average sump depth below catchbasin outlet invert (ft):

4. Depth of sediment in catchbasin sump at beginning of study period (ft):

5. Typical outlet pipe diameter (ft):

6. Typical outlet pipe Manning's n:

7.

8.

9.

10.

11.

12.

Typical Catchbasin Densities

☐ Low density residential (0.25 inlets/acre)

☐ Medium density residential (0.5 inlets/acre)

☐ High density residential (1 inlet/acre)

☐ Strip commercial (1.2 inlets/acre)

☐ Shopping center (1.2 inlets/acre)

☐ Industry (0.8 inlets/acre)

☐ Freeways (1 inlet/acre)

Catchbasin Cleaning Dates

Catchbasin Cleaning No.	Catchbasin Cleaning Date (mm/dd/yy)
1	
2	
3	
4	
5	

Select

OR

☒ Catchbasin Cleaning Frequency

☐ Monthly

☐ Three Times per Year

☐ Semi-Annually

☒ Annually

☐ Every Two Years

☐ Every Three Years

☐ Every Four Years

☐ Every Five Years

Control Practice #: 1 Land Use #: 1 Source Area #: 14

C:\WinSLAMM Files\NURP.CPZ

Enter either the Catchbasin Density (catchbasins per acre) or the total number of Catchbasins in the drainage system or watershed you are modeling.

# Catchbasin Control Device

Catchbasin Control Device

First Source Area Control Practice

Land Use: Commercial 1

Source Area: Paved Parking 2

1. Fraction of drainage area served by catchbasins (0 - 1):

2a. Catchbasin density (cb/ac):

2b. Number of Catchbasins:

3. Average sump depth below catchbasin outlet invert (ft):

4. Depth of sediment in catchbasin sump at beginning of study period (ft):

5. Typical outlet pipe diameter (ft):

6. Typical outlet pipe Manning's n:

7. Typical outlet pipe slope (ft/ft):

8. Typical catchbasin sump surface area (sf):

9. Catchbasin Depth from Sump Bottom to street level (ft):

10. Inflow Hydrograph Peak to Average Flow Ratio:

11. Leakage rate through sump bottom (in/hr):

12.  Critical Particle Size file name:

Typical Catchbasin Densities

☐ Low density residential (0.25 inlets/acre)

☐ Medium density residential (0.5 inlets/acre)

☐ High density residential (1 inlet/acre)

☐ Strip commercial (1.2 inlets/acre)

☐ Shopping center (1.2 inlets/acre)

☐ Industry (0.8 inlets/acre)

☐ Freeways (1 inlet/acre)

Catchbasin Cleaning Dates

OR ☒ Catchbasin Cleaning Frequency

1  
2  
3  
4  
5

ars  
ears  
ars  
ars

☐ Monthly

☐ Three Times per Year

Control Practice #: 1 Land Use #: 1 Source Area #: 14

You can select a typical catchbasin density or enter your own value

# Catchbasin Control Device

Catchbasin Control Device

First Source Area Control Practice  
Land Use: Commercial 1  
Source Area: Paved Parking 2

1. Fraction of drainage area served by catchbasins (0 - 1):

☐ 2a. Catchbasin density (cb/ac):

☒ 2b. Number of Catchbasins:

3. Average sump depth below catchbasin outlet invert (ft):

4. Depth of sediment in catchbasin sump at beginning of study period (ft):

5. Typical outlet pipe diameter (ft):

6. Typical outlet pipe Manning's n:

10. Inflow Hydrograph Peak to Average Flow Ratio:

11. Leakage rate through sump bottom (in/hr):

12.  Critical Particle Size file name:

Typical Catchbasin Densities

☐ Low density residential (0.25 inlets/acre)  
☐ Medium density residential (0.5 inlets/acre)  
☐ High density residential (1 inlet/acre)  
☐ Strip commercial (1.2 inlets/acre)

☐ Shopping center (1.2 inlets/acre)  
☐ Industry (0.8 inlets/acre)  
☐ Freeways (1 inlet/acre)

Catchbasin Cleaning Dates

Catchbasin Cleaning No.	Catchbasin Cleaning Date (mm/dd/yy)
1	
2	
3	
4	
5	

OR

☒ Catchbasin Cleaning Frequency

☐ Monthly  
☐ Three Times per Year  
☐ Semi-Annually  
☒ Annually  
☐ Every Two Years  
☐ Every Three Years  
☐ Every Four Years  
☐ Every Five Years

Control Practice #: 1 Land Use #: 1 Source Area #: 14

Enter a leakage rate only if the sump bottom is not sealed. This rate will not change over time.

# Catchbasin Control Device

**Catchbasin Control Device**

**First Source Area Control Practice**  
 Land Use: Commercial 1  
 Source Area: Paved Parking 2

1. Fraction of drainage area served by catchbasins (0 - 1):

☐ 2a. Catchbasin density (cb/ac):

☒ 2b. Number of Catchbasins:

7. Typical outlet pipe slope (ft/ft):

8. Typical catchbasin sump surface area (sf):

9. Catchbasin Depth from Sump Bottom to street level (ft):

10. Inflow Hydrograph Peak to Average Flow Ratio:

11. Leakage rate through sump bottom (in/hr):

12.  Critical Particle Size file name:

**Typical Catchbasin Densities**

☐ Medium density residential (0.5 inlets/acre)

☐ High density residential (1 inlet/acre)

☐ Strip commercial (1.2 inlets/acre)

☐ Shopping center (1.2 inlets/acre)

☐ Industry (0.8 inlets/acre)

☐ Freeways (1 inlet/acre)

**Catchbasin Cleaning Dates**

Catchbasin Cleaning No.	Catchbasin Cleaning Date (mm/dd/yy)
1	
2	
3	
4	
5	

**Select**

OR

☒ **Catchbasin Cleaning Frequency**

☐ Monthly

☐ Three Times per Year

☐ Semi-Annually

☒ Annually

☐ Every Two Years

☐ Every Three Years

☐ Every Four Years

☐ Every Five Years

Control Practice #: 1 Land Use #: 1 Source Area #: 14

You can enter specific catchbasin cleaning dates or select a catchbasin cleaning frequency.

# Catchbasin Control Device

Catchbasin Control Device

First Source Area Control Practice

Land Use: Commercial 1

Source Area: Paved Parking 2

1. Fraction of drainage area served by catchbasins (0 - 1):

☐ 2a. Catchbasin density (cb/ac):

☒ 2b. Number of Catchbasins:

3. Average sump depth below catchbasin outlet invert (ft):

4. Depth of sediment in catchbasin sump at beginning of study period (ft):

5. Typical outlet pipe diameter (ft):

6. Typical outlet pipe Manning's n:

7. Typical outlet pipe slope (ft/ft):

8. Typical catchbasin sump surface area (sf):

9. Catchbasin Depth from Sump Bottom to street level (ft):

10. Inflow Hydrograph Peak to Average Flow Ratio:

11. Leakage rate through sump bottom (in/hr):

12.  Critical Particle Size file name:

☒ Typical

☐ Low density residential (0.25 inlets/acre)

☐ Medium density residential (0.5 inlets/acre)

☐ Shopping center (1.2 inlets/acre)

☐ Industry (0.8 inlets/acre)

☐ Freeways (1 inlet/acre)

☒ Catchbasin Cleaning Frequency

☐ Monthly

☐ Three Times per Year

☐ Semi-Annually

☒ Annually

☐ Every Two Years

☐ Every Three Years

☐ Every Four Years

☐ Every Five Years

Control Practice #: 1 Land Use #: 1 Source Area #: 14

If modeling a catch basin with an overflow structure, a hydrodynamic device at the drainage level system, or a system with Lamella Plates, select the “Inflow Bypass and Lamella Plate Data” button.

# Catchbasin Control Device

The data required for this control device when using the bypass is the same data required for the hydrodynamic device.

Enter the Maximum Flow to the In-Line Sump if known.  
Or enter the characteristics of the diversion and the program will calculate the maximum flow.

**Catchbasin Flow Bypass Data**

☒ **Maximum Flow to In-Line Sump**  
9999.00 Maximum Flow to In-Line Sump (cfs)

☐ **Flow Inlet Diversion Elevation**  
Diameter of Orifice that Controls Flow to In-Line Sump (ft)  
Inflow Orifice Invert Elevation (ft)  
Length (ft) of Overflow Structure Acting as a Sharp-Crested Weir  
Elevation of Overflow Structure to Bypass Inline Sump (ft above sump base)

☐ **Lamella Plates or Tube Settlers**  
Fraction of device area with plates or tubes  
Average tube diameter or distance between plates (ft):  
Number of plates or tubes that a vertical line will intercept

Clear and Exit Continue

Enter the data for the Lamella Plates if relevant.

# Catchbasin Control Device

Program Options

**Detailed Output File Options**

**Biofilters**

- ☐ Detailed Biofilter Output
- ☐ Irreducible Concentration Detailed Output
- ☐ Particulate Reduction Output
- ☐ Stage-Outflow
- ☐ Stochastic Seepage Rate Detail
- ☒ Water Balance
- ☐ Evapotranspiration Detail

**Catchbasins**

- ☐ Performance by Event Output
- ☐ Performance By Step Output
- ☐ Stage-Inflow Data
- ☐ Stage-Outflow

**Cisterns**

- ☐ Detailed Output
- ☐ Outfall Discharge Hydrograph
- ☐ Water Balance

**Filter Strips**

- ☐ Hydraulics and Concentration by Event
- ☐ Hydraulics Detailed Output
- ☐ Incremental Performance Output
- ☐ Irreducible Concentration Detailed Output
- ☐ Particulate Reduction Output

**Flow Duration Curve Data**

- ☐ Detailed Data
- ☐ Plotting Calculations

☐ Critical Particle Size Calculation Detailed Output File

**Freeway Data**

- ☐ Freeway Washoff Detail

**Grass Swales**

- ☐ Hydraulics and Concentration by Event
- ☐ Hydraulics Detailed Output
- ☐ Incremental Performance Output
- ☐ Irreducible Concentration Detailed Output
- ☐ Particulate Reduction Output

**Hydrodynamic Devices**

- ☐ Detailed Output
- ☐ Performance By Event
- ☐ Stage-Inflow
- ☐ Stage-Outflow

**Porous Pavement**

- ☐ Detailed
- ☐ Stage-Outflow
- ☐ Stochastic
- ☐ Surface
- ☐ Water Balance

**Street Cleaning**

- ☐ Street Dirt Removal
- ☐ Street Dirt Removal
- ☐ Washoff or Street Cleaning Detail

**Wet Detention Ponds**

- ☐ Detailed Output
- ☐ Pond Stage-Area-Volume Data
- ☐ Stage-Outflow
- ☐ Stone Weeper Detailed Output
- ☐ Water Balance Summary of All Ponds

**Media Filters (all types)**

- ☐ Detailed Time Step Output
- ☐ Stage-Outflow Data
- ☐ Stage-Area-Storage
- ☐ Device Effluent Concentrations
- ☐ Performance By Event
- ☐ Puls Routing Detail
- ☐ Iteration Information

☐ Uncheck All Detailed Output File Options

☐ Check All Detailed Output File Options

**File Update Options**

**Cancel Changes** **Save .INI File**

Detailed output for each catchbasin can be obtained using the Detailed Output Files through Program Options.



# Control Devices – Cisterns

# Cistern Control Device

Cistern Control Device

First Source Area Control Practice  
Land Use: Residential 1  
Source Area: Roof 1

Total Area: 4.770 acres  
Cistern No. 1

Source Area Water Use Rate Multiplier =

Apply Rate Multiplier

**Device Properties**

Top Surface Area (sf)	0.0
Bottom Surface Area (sf)	0.0
Height to Overflow (ft)	0.00
Rock Filled Depth (ft)	0.00
Rock Fill Porosity (0-1)	0.00
Inflow Hydrograph Peak to Average Flow Ratio	3.80
Number of Devices in Source Area or Land Use	0
Runoff Fraction Entering Devices (0-1)	1.00

Drainage Area (sf) per Cistern

Copy Cistern Data

Paste Cistern Data

**Water Use Rate**

Month	Water Use Rate	Source Area
January		
February		
March		
April		
May		
June		
July		
August	0.00	0.00
September	0.00	0.00
October	0.00	0.00
November	0.00	0.00
December	0.00	0.00

Delete Cancel Continue

Control Practice #: 3 Land Use #: 1 Source Area #: 1

Enter data describing each Cistern or Rain Barrel

# Cistern Control Device

**Cistern Control Device**

**First Source Area Control Practice**  
**Land Use:** Residential 1  
**Source Area:** Roof 1

**Total Area:** 4.770 acres  
**Cistern No. 1**

Source Area Water Use Rate Multiplier =

**Device Properties**

Top Surface Area (sf)	0.0
Bottom Surface Area (sf)	0.0
Height to Overflow (ft)	0.00
Rock Filled Depth (ft)	0.00
Rock Fill Porosity (0-1)	0.00
Inflow Hydrograph Peak to Average Flow Ratio	3.80
Number of Devices in Source Area or Land Use	0
	1.00

**Water Use Rate**

Month	Water Use Rate per Cistern (gal/day)	Source Area Water Use Rate (gal/day)
January	0.00	0.00
February	0.00	0.00
March	0.00	0.00
April	0.00	0.00
May	0.00	0.00
June	0.00	0.00
July	0.00	0.00
August	0.00	0.00
September	0.00	0.00
October	0.00	0.00
November	0.00	0.00
December	0.00	0.00

# : 1 Source Area # : 1

Enter the information regarding the water use rates for each month. If water will not be used during a certain month, enter "0" for that month.

# Cistern Control Device

Cistern Control Device

First Source Area Control Practice

Land Use: Residential 1

Source Area: Roof 1

Total Area: 4.770 acres

Cistern No. 1

Device Properties

Top Surface Area (sf)	0.0
Bottom Surface Area (sf)	0.0
Height to Overflow (ft)	0.00
Rock Filled Depth (ft)	0.00
Rock Fill Porosity (0-1)	0.00

Source Area Water Use Rate Multiplier =

Apply Rate Multiplier

Water Use Rate

Month	Water Use Rate per Cistern (gal/day)	Source Area Water Use Rate (gal/day)
January	0.00	0.00
February	0.00	0.00
March	0.00	0.00
April	0.00	0.00
May	0.00	0.00
June	0.00	0.00
July	0.00	0.00
August	0.00	0.00
September	0.00	0.00
October	0.00	0.00
November	0.00	0.00
December	0.00	0.00

Copy Cistern Data

Paste Cistern Data

Delete Cancel Continue

Control Practice #: 3 Land Use #: 1 Source Area #: 1

The Rate Multiplier can be used to quickly adjust the water use rates for sensitivity analyses.

# Cistern Control Device

Program Options

**Detailed Output File Options**

**Biofilters**

- ☐ Detailed Biofilter Output
- ☐ Irreducible Concentration Detailed Output
- ☐ Particulate Reduction Output
- ☐ Stage-Outflow
- ☐ Stochastic Seepage Rate Detail
- ☒ Water Balance
- ☐ Evapotranspiration Detail

**Catchbasins**

- ☐ Performance by Event Output
- ☐ Performance By Step Output
- ☐ Stage-Inflow Data
- ☐ Stage-Outflow

**Cisterns**

- ☐ Detailed Output
- ☐ Outfall Discharge Hydrograph
- ☐ Water Balance

**Filter Strips**

- ☐ Hydraulics and Concentration by Event
- ☐ Hydraulics Detailed Output
- ☐ Incremental Performance Output
- ☐ Irreducible Concentration Detailed Output
- ☐ Particulate Reduction Output

**Flow Duration Curve Data**

- ☐ Detailed Data
- ☐ Plotting Calculations

☐ Critical Particle Size Calculation Detailed Output File

**Freeway Data**

- ☐ Freeway Washoff Detail

**Grass Swales**

- ☐ Hydraulics and Concentration by Event
- ☐ Hydraulics Detailed Output
- ☐ Incremental Performance Output
- ☐ Irreducible Concentration Detailed Output
- ☐ Particulate Reduction Output

**Hydrodynamic Devices**

- ☐ Detailed Output
- ☐ Performance By Event
- ☐ Stage-Inflow
- ☐ Stage-Outflow

**Media Filters (all types)**

- ☐ Detailed Time Step Output
- ☐ Stage-Outflow Data
- ☐ Stage-Area-Storage
- ☐ Device Effluent Concentrations
- ☐ Performance By Event
- ☐ Puls Routing Detail
- ☐ Iteration Information

**Wet Detention Ponds**

- ☐ Detailed Output
- ☐ Pond Stage-Area-Volume Data
- ☐ Stage-Outflow
- ☐ Stone Weeper Detailed Output
- ☐ Water Balance Summary of All Ponds

**Default Model Options**

**Default Current File Data**

**Uncheck All Detailed Output File Options**

**Check All Detailed Output File Options**

**File Update Options**

**Cancel Changes**

**Save .INI File**

Detailed output for each cistern can be obtained using the Detailed Output Files through Program Options.

## Control Devices – Filter Strips

# Filter Strip Control Device

Filter Strip Control Device

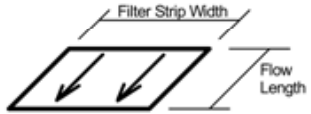
Land Use: Commercial 1      Total Area:  
Source Area: Paved Parking 1      Filter Strip No. 1

First Source Area Control Practice

**Device Properties**

Total Area in Source Area (ac)	2.850
Area Fraction Served by Filter Strips (0-1)	0.41
Total Filter Strip Width (ft)	664
Flow Length (ft)	50
Dynamic Infiltration Rate (in/hr)	0.025
Typical Longitudinal Slope (Fraction)	0.010
Typical Grass Height (in)	4.0
Grass Retardance Factor	D
Use Stochastic Analysis to account for Infiltration Rate Uncertainty	<input type="checkbox"/>
Native Soil Infiltration Rate COV	
Surface Clogging Load (lbs/sf)	3.50

Filter Strip Area to Drainage Area Ratio = 0.652.  
This ratio must be greater than 0.05 to activate the filter strip.



View Retardance Table

Select Particle Size File  
Not needed - calculated by program

**Select Native Soil Dynamic Infiltration Rate**

<input type="radio"/> Sand - 4 in/hr	<input type="radio"/> Clay loam - 0.05 in/hr
<input type="radio"/> Loamy sand - 1.25 in/hr	<input type="radio"/> Silty clay loam - 0.025 in/hr
<input type="radio"/> Sandy loam - 0.5 in/hr	<input type="radio"/> Sandy clay - 0.025 in/hr
<input type="radio"/> Loam - 0.25 in/hr	<input type="radio"/> Silty clay - 0.02 in/hr
<input type="radio"/> Silt loam - 0.15 in/hr	<input type="radio"/> Clay - 0.01 in/hr
<input type="radio"/> Sandy silt loam - 0.1 in/hr	

Copy Filter Strip Data      Paste Filter Strip Data

Delete      Cancel      Continue

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

Enter data describing each Filter Strip

The particle size distribution will be calculated automatically using the particle size distributions from the source areas.

If unknown, select a default Dynamic Infiltration Rate based on the project site's soil data description.

# Filter Strip Control Device

Program Options

**Detailed Output File Options**

**Biofilters**

- ☐ Detailed Biofilter Output
- ☐ Irreducible Concentration Detailed Output
- ☐ Particulate Reduction Output
- ☐ Stage-Outflow
- ☐ Stochastic Seepage Rate Detail
- ☒ Water Balance
- ☐ Evapotranspiration Detail

**Catchbasins**

- ☐ Performance by Event Output
- ☐ Performance By Step Output
- ☐ Stage-Inflow Data
- ☐ Stage-Outflow

**Cisterns**

- ☐ Detailed Output
- ☐ Outfall Discharge Hydrograph
- ☐ Water Balance

**Filter Strips**

- ☐ Hydraulics and Concentration by Event
- ☐ Hydraulics Detailed Output
- ☐ Incremental Performance Output
- ☐ Irreducible Concentration Detailed Output
- ☐ Particulate Reduction Output

**Flow Duration Curve Data**

- ☐ Detailed Data
- ☐ Plotting Calculations

☐ Critical Particle Size Calculation Detailed Output File

**Freeway Data**

- ☐ Freeway Washoff Detail

**Grass Swales**

- ☐ Hydraulics and Concentration by Event
- ☐ Hydraulics Detailed Output
- ☐ Incremental Performance Output
- ☐ Irreducible Concentration Detailed Output
- ☐ Particulate Reduction Output

**Hydrodynamic Devices**

- ☐ Detailed Output
- ☐ Performance By Event
- ☐ Stage-Inflow
- ☐ Stage-Outflow

**Porous Pavement**

- ☐ Detailed
- ☐ Stage-Outflow
- ☐ Stochastic
- ☐ Surface
- ☐ Water Balance

**Street Cleaning**

- ☐ Street Dirt/Accumulation Plots
- ☐ Street Dirt Removal
- ☐ Washoff or Street Cleaning Detail

**Wet Detention Ponds**

- ☐ Detailed Output
- ☐ Pond Stage-Area-Volume Data
- ☐ Stage-Outflow
- ☐ Stone Weeper Detailed Output
- ☐ Water Balance Summary of All Ponds

**Media Filters (all types)**

- ☐ Detailed Time Step Output
- ☐ Stage-Outflow Data
- ☐ Stage-Area-Storage
- ☐ Device Effluent Concentrations
- ☐ Performance By Event
- ☐ Puls Routing Detail
- ☐ Iteration Information

☐ Uncheck All Detailed Output File Options

☐ Check All Detailed Output File Options

**File Update Options**

Cancel Changes

Save .INI File

Detailed output for each filter strip can be obtained using the Detailed Output Files through Program Options.



## Control Devices – Grass Swales

# Grass Swales

**Grass Swales**

**Drainage System Control Practice      Grass Swale Number 1**

Grass Swale Data	
Total Drainage Area (ac)	7.290
Fraction of Drainage Area Served by Swales (0-1)	1.00
Swale Density (ft/ac)	230.86
Total Swale Length (ft)	1683
Average Swale Length to Outlet (ft)	313
Typical Bottom Width (ft)	3.0
Typical Swale Side Slope ( __ ft H : 1 ft V)	4.0
Typical Longitudinal Slope (ft/ft, V/H)	0.010
Swale Retardance Factor	D ▾
Typical Grass Height (in)	4.0
Swale Dynamic Infiltration Rate (in/hr)	0.010
Typical Swale Depth (ft) for Cost Analysis (Optional)	0.0

☒ Use Total Swale Length Instead of Swale Density for Infiltration Calculations

**Select infiltration rate by soil type**

- ☐ Sand - 4 in/hr
- ☐ Loamy sand - 1.25 in/hr
- ☐ Sandy loam - 0.5 in/hr
- ☐ Loam - 0.25 in/hr
- ☐ Silt loam - 0.15 in/hr
- ☐ Sandy clay loam - 0.1 in/hr
- ☐ Clay loam - 0.05 in/hr
- ☐ Silty clay loam - 0.025 in/hr
- ☐ Sandy clay - 0.025 in/hr
- ☐ Silty clay - 0.02 in/hr
- ☐ Clay - 0.01 in/hr

Total area served by swales (acres): 7.290

**Select Swale Density by Land Use**

- ☐ Low density residential - 240 ft/ac
- ☐ Medium density residential - 350 ft/ac
- ☐ High density residential - 375 ft/ac
- ☐ Strip commercial - 410 ft/ac
- ☐ Shopping center - 90 ft/ac
- ☐ Industrial - 260 ft/ac
- ☐ Freeways (shoulder only) - 480 ft/ac
- ☐ Freeways (center and shoulder) - 540 ft/ac

Copy Swale Data    Paste Swale Data    Delete    Cancel    Continue

Control Practice #: 1    CP Index #: 1

Enter the data for each grass swale. The “Average Swale Length to Outlet” will automatically populate after other swale data is entered.

# Grass Swales

**Grass Swales**

Drainage System Control Practice      Grass Swale Number 1

Grass Swale Data	
Total Drainage Area (ac)	7.290
Fraction of Drainage Area Served by Swales (0-1)	1.00
Swale Density (ft/ac)	230.86
Total Swale Length (ft)	1683
Average Swale Length to Outlet (ft)	313
Typical Bottom Width (ft)	3.0
Typical Swale Side Slope ( __ ft H : 1 ft V)	4.0
Typical Longitudinal Slope (ft/ft, V/H)	0.010
Swale Retardance Factor	D ▼
Typical Grass Height (in)	4.0
Swale Dynamic Infiltration Rate (in/hr)	0.010
Typical Swale Depth (ft) for Cost Analysis (Optional)	0.0

☒ Use Total Swale Length Instead of Swale Density for Infiltration Calculations

Select infiltration rate by soil type

- ☐ Sand - 4 in/hr
- ☐ Loamy sand - 1.25 in/hr
- ☐ Sandy loam - 0.5 in/hr
- ☐ Loam - 0.25 in/hr
- ☐ Silt loam - 0.15 in/hr
- ☐ Sandy clay loam - 0.1 in/hr
- ☐ Clay loam - 0.05 in/hr
- ☐ Silty clay loam - 0.025 in/hr
- ☐ Sandy clay - 0.025 in/hr
- ☐ Silty clay - 0.02 in/hr
- ☐ Clay - 0.01 in/hr

Total area served by swales (acres): 7.290  
Total area (acres): 7.290

Select Particle Size Distribution File      Particle Size Distribution File Name      View Retardance

Not needed - calculated by program

Copy Swale Data      Paste Swale Data      Delete      Cancel      Continue

Control Practice #: 1      CP Index #: 1

If the swale length is known instead of the swale density, check the box next to “Use Total Swale Length...” and the swale length can then be entered.

# Grass Swales

**Grass Swales**

**Drainage System Control Practice**      **Grass Swale Number 1**

Grass Swale Data	
Total Drainage Area (ac)	7.290
Fraction of Drainage Area Served by Swales (0-1)	1.00
Swale Density (ft/ac)	230.86
Total Swale Length (ft)	1683
Average Swale Length to Outlet (ft)	313
Typical Bottom Width (ft)	3.0
Typical Swale Side Slope ( __ ft H : 1 ft V)	4.0
Typical Longitudinal Slope (ft/ft, V/H)	0.010

**Select infiltration rate by soil type**

- ☐ Sand - 4 in/hr
- ☐ Loamy sand - 1.25 in/hr
- ☐ Sandy loam - 0.5 in/hr
- ☐ Loam - 0.25 in/hr
- ☐ Silt loam - 0.15 in/hr
- ☐ Sandy clay loam - 0.1 in/hr
- ☐ Clay loam - 0.05 in/hr
- ☐ Silty clay loam - 0.025 in/hr

☒ Use Total Swale Length instead of Swale Density for Infiltration Calculations

Total area served by swales (acres): 7.290  
Total area (acres): 7.290

Select Particle Size Distribution File      **Particle Size Distribution File Name**      View Retardance Table

Not needed - calculated by program

**Select Swale Density by Land Use**

- ☐ Low density residential - 240 ft/ac
- ☐ Medium density residential - 350 ft/ac
- ☐ High density residential - 375 ft/ac
- ☐ Strip commercial - 410 ft/ac
- ☐ Shopping center - 90 ft/ac
- ☐ Industrial - 260 ft/ac
- ☐ Freeways (shoulder only) - 480 ft/ac
- ☐ Freeways (center and shoulder) - 540 ft/ac

Copy Swale Data      Paste Swale Data      Delete      Cancel      Continue

Control Practice #: 1      CP Index #: 1

If the swale density and swale length are unknown, select a value based on land use.

# Grass Swales

**Grass Swales**

**Drainage System Control Practice**      **Grass Swale Number 1**

Grass Swale Data	
Total Drainage Area (ac)	7.290
Fraction of Drainage Area Served by Swales (0-1)	1.00
Swale Density (ft/ac)	230.86
Total	
Average	
Typical	
Typical	
Typical	
Swale	
Typical	
Swale	
Typical	

**Select infiltration rate by soil type**

☐ Sand - 4 in/hr  
☐ Loamy sand - 1.25 in/hr  
☐ Sandy loam - 0.5 in/hr

The particle size distribution will be calculated automatically using the particle size distributions from the source areas.

☒ Use Total Swale Length Instead of Swale Density for Infiltration Calculations

Total area served by swales (acres): 7.290  
Total area (acres): 7.290

Select Particle Size Distribution File      **Particle Size Distribution File Name**

Not needed - calculated by program

**Select Swale Density by Land Use**

☐ Low density residential - 240 ft/ac      ☐ Shopping center - 90 ft/ac  
☐ Medium density residential - 350 ft/ac      ☐ Industrial - 260 ft/ac  
☐ High density residential - 375 ft/ac      ☐ Freeways (shoulder only) - 480 ft/ac  
☐ Strip commercial - 410 ft/ac      ☐ Freeways (center and shoulder) - 540 ft/ac

Copy Swale Data      Paste Swale Data      Delete      Cancel      Continue

Control Practice #: 1      CP Index #: 1

# Grass Swales

**Grass Swales**

**Drainage System Control Practice      Grass Swale Number 1**

Grass Swale Data	
Total Drainage Area (ac)	7.290
Fraction of Drainage Area Served by Swales (0-1)	1.00
Swale Density (ft/ac)	230.86
Total Swale Length (ft)	1683
Average Swale Length to Outlet (ft)	313
Typical Bottom Width (ft)	3.0
Typical Swale Side Slope ( __ ft H : 1 ft V)	4.0
Typical Longitudinal Slope (ft/ft, V/H)	0.010
Swale Retardance Factor	D
Typical Grass Height (in)	4.0
Swale Dynamic Infiltration Rate (in/hr)	0.010
Typical Swale Depth (ft) for Cost Analysis (Optional)	0.0

☒ Use Total Swale Length Instead of Swale Density for Infiltration Calculations

Total area served by swales (acres): 7.290  
Total area (acres): 7.290

Select Particle Size Distribution File      **Particle Size Distribution**

Not needed - calculated by program

**Select Swale Density by Land Use**

☐ Low density residential - 240 ft/ac  
☐ Medium density residential - 350 ft/ac  
☐ High density residential - 375 ft/ac  
☐ Strip commercial - 410 ft/ac  
☐ Freeways (center and shoulder) - 540 ft/ac

**Select infiltration rate by soil type**

☐ Sand - 4 in/hr  
☐ Loamy sand - 1.25 in/hr  
☐ Sandy loam - 0.5 in/hr  
☐ Loam - 0.25 in/hr  
☐ Silt loam - 0.15 in/hr  
☐ Sandy clay loam - 0.1 in/hr  
☐ Clay loam - 0.05 in/hr  
☐ Silty clay loam - 0.025 in/hr  
☐ Sandy clay - 0.025 in/hr  
☐ Silty clay - 0.02 in/hr  
☐ Clay - 0.01 in/hr

Copy Swale Data      Paste Swale Data      Delete      Cancel      Continue

Control Practice #: 1      CP Index #: 1

If the dynamic infiltration rate is unknown, select a dynamic infiltration rate based on soil type from the default values.

# Grass Swale Control Device

Program Options

**Detailed Output File Options**

**Biofilters**

- ☐ Detailed Biofilter Output
- ☐ Irreducible Concentration Detailed Output
- ☐ Particulate Reduction Output
- ☐ Stage-Outflow
- ☐ Stochastic Seepage Rate Detail
- ☒ Water Balance
- ☐ Evapotranspiration Detail

**Catchbasins**

- ☐ Performance by Event Output
- ☐ Performance By Step Output
- ☐ Stage-Inflow Data
- ☐ Stage-Outflow

**Freeway Data**

- ☐ Freeway Washoff Detail

**Grass Swales**

- ☐ Hydraulics and Concentration by Event
- ☐ Hydraulics Detailed Output
- ☐ Incremental Performance Output
- ☐ Irreducible Concentration Detailed Output
- ☐ Particulate Reduction Output

**Hydrodynamic Devices**

- ☐ Detailed Output
- ☐ Performance By Event
- ☐ Stage-Inflow

**Wet Detention Ponds**

- ☐ Detailed Output
- ☐ Pond Stage-Area-Volume Data
- ☐ Stage-Outflow
- ☐ Stone Weeper Detailed Output
- ☐ Water Balance Summary of All Ponds

**Media Filters (all types)**

- ☐ Detailed Time Step Output
- ☐ Stage-Outflow Data
- ☐ Stage-Area-Storage
- ☐ Device Effluent Concentrations
- ☐ Performance By Event
- ☐ Puls Routing Detail
- ☐ Iteration Information

**Green Roofs**

- ☐ Time Step Output
- ☐ Irreducible Concentration Calculations
- ☐ Particulate Reduction Output
- ☐ Stage-Area-Outflow
- ☐ Water Balance
- ☐ Evapotranspiration Detail

**Flow Duration Curve Data**

- ☐ Detailed Data
- ☐ Plotting Calculations

**Street Cleaning**

- ☐ Street Dirt/Accumulation Plots
- ☐ Street Dirt Removal
- ☐ Washoff or Street Cleaning Detail

☐ Irreducible Concentration Detailed Output

☐ Particulate Reduction Output

☐ Critical Particle Size Calculation Detailed Output File

☐ Uncheck All Detailed Output File Options

☐ Check All Detailed Output File Options

**File Update Options**

**Cancel Changes**

**Save .INI File**

Detailed output for each grass swale can be obtained using the Detailed Output Files through Program Options.

## Control Devices – Green Roofs

Green Roofs will be available in version 10.3



# Control Devices – Hydrodynamic Device

# Hydrodynamic Device

**Hydrodynamic Device**

First Source Area Control Practice  
 Hydrodynamic Device Number 1  
 Land Use: Commercial 1  
 Source Area: Paved Parking 1

**Hydrodynamic Control Device General Information - Enter for Both Single Chamber and Proprietary Devices**

Total Source Area (ac)	N/A
Area Served by Device (ac)	0.00
Number of Devices	1
Device Density (units/ac)	0.000

Select Particle Size Distribution file name:  
 Not needed - calculated by program

☐ Model Hydrodynamic Device with Lamella Plates or Settling Tubes

Fraction of device area with plates or tubes	
Average tube diameter or distance between plates (ft)	
Number of plates or tubes a vertical line will intersect	

**For Device Cleaning, Select Either**

Device Cleaning Dates

Device Cleaning No.	Device Cleaning Date (mm/dd/yy)
1	
2	
3	
4	
5	

OR

☒ Device Cleaning Frequency

☐ Monthly  
☐ Three Times per Year  
☐ Semi-Annually  
☒ Annually  
☐ Every Two Years  
☐ Every Three Years  
☐ Every Four Years  
☐ Every Five Years  
☐ Never

**Single Chamber Device Characteristics**

1 - Average Sumo Depth below Device

2 - Typical

3 - Typical

4 - D Street

Inflow Ratio

5 - M Below

Maxi

6 - D to In

7 - In

8 - L Activ

9 - E Bypa base

Control

**Or Use Proprietary Hydrodynamic Control**

dynamic ata

Continue

The Hydrodynamic Device allows the user to enter data for a 'generic' single chambered hydrodynamic device or select a proprietary device model.

Proprietary device data is currently not available for the model. It will become available as manufacturers test their devices and provide the peer- or regulatory agency-reviewed data to us to incorporate into the model.

# Hydrodynamic Device

**Hydrodynamic Device**

First Source Area Control Practice  
**Hydrodynamic Device Number 1**  
**Land Use: Commercial 1**  
**Source Area: Paved Parking 1**

**Hydrodynamic Control Device General Information - Enter for Both Single Chamber and Proprietary Devices**

Total Source Area (ac)	N/A
Area Served by Device (ac)	0.00
Number of Devices	1
Device Density (units/ac)	0.000

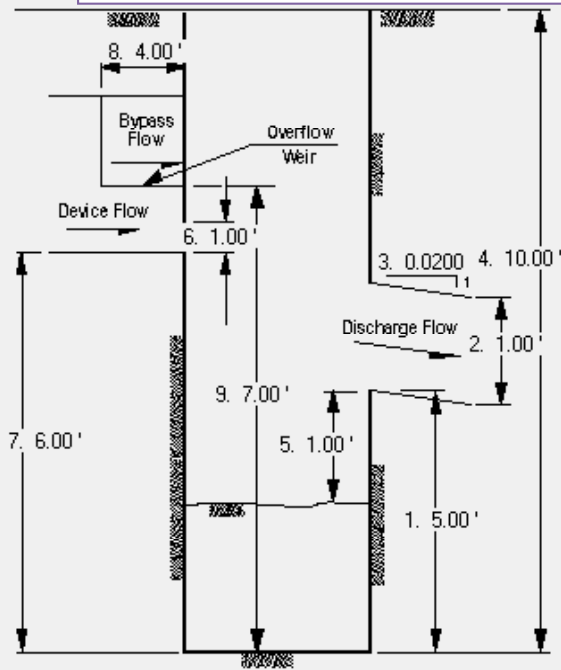
Select Particle Size Distribution file name:  
 Not needed - calculated by program

First enter data regarding the drainage area to the device and the number of devices or device density.

The particle size distribution will be calculated automatically using the particle size distributions from the source areas.

**Single Chamber Device Characteristics**

1 - Average Sump Depth below Device Outlet Invert (ft)	5.00
Depth of Sediment in Device at Beginning of Study Period (ft)	0.00
2 - Typical Outlet Pipe Diameter (ft)	1.00
Typical Outlet Pipe Manning's n	0.013
3 - Typical Outlet Pipe Slope (ft/ft)	0.0200
Typical Device Sump Surface Area (sf)	19.3
4 - Device Depth from Sump Bottom to Street Level (ft)	10.00
Inflow Hydrograph Peak to Average Flow Ratio	3.8
5 - Minimum Allowable Scour Depth Below Outlet Invert (ft)	1.0
Maximum Flow to In-Line Sump (cfs)	N/A - Click to Activate
6 - Diameter of Orifice that Controls Flow to In-Line Sump (ft)	1.00
7 - Inflow Orifice Invert Elevation (ft)	6.00
8 - Length (ft) of Overflow Structure Acting as a Sharp-Crested Weir	4.00
9 - Elevation of Overflow Structure to Bypass In-Line Sump (ft above sump base)	7.00



**Or Use Proprietary**  
☐ **Hydrodynamic Control Device Information**

Manufacturer - Model

1 - Average Sump Depth below Device Outlet Invert (ft)	
Depth of Sediment in Device at Beginning of Study Period (ft)	
2 - Typical Outlet Pipe Diameter (ft)	
Typical Outlet Pipe Manning's n	
3 - Typical Outlet Pipe Slope (ft/ft)	
Inflow Hydrograph Peak to Average Flow Ratio	
5 - Minimum Allowable Scour Depth Below Outlet Invert (ft)	
Device Sump Surface Area (sf)	

Copy Hydrodynamic Device Data    Paste Hydrodynamic Device Data

Delete Control    Cancel    Continue

Control Practice #: 2    Land Use #: 1    Source Area #: 13

# Hydrodynamic Device

**Hydrodynamic Device**

**First Source Area Control Practice**  
**Hydrodynamic Device Number 1**  
**Land Use: Commercial 1**  
**Source Area: Paved Parking 1**

**Hydrodynamic Control Device General Information - Enter for Both Single Chamber and Proprietary Devices**

Total Source Area (ac)	N/A
Area Served by Device (ac)	0.00
Number of Devices	1
Device Density (units/ac)	0.000

Select **Particle Size Distribution file name:**  
 Not needed - calculated by program

**Model Hydrodynamic Device with Plates or Settling Tubes**

☐ **For Device Cleaning, Select Either**

Fraction of device area with plates or tubes

Average tube diameter or distance between plates (ft)

Number of plates or tubes a vertical line will intersect

**Single Chamber Device Characteristics**

1 - Average Sump Depth below Device Outlet Invert (ft)	5.00
Depth of Sediment in Device at Beginning of Study Period (ft)	0.00
2 - Typical Outlet Pipe Diameter (ft)	1.00
Typical Outlet Pipe Manning's n	0.013
3 - Typical Outlet Pipe Slope (ft/ft)	0.0200
Typical Device Sump Surface Area (sf)	19.3
4 - Device Depth from Sump Bottom to Street Level (ft)	10.00
Inflow Hydrograph Peak to Average Flow Ratio	3.8
5 - Minimum Allowable Scour Depth Below Outlet Invert (ft)	1.0
Maximum Flow to In-Line Sump (cfs)	N/A - Click to Activate
6 - Diameter of Orifice that Controls Flow to In-Line Sump (ft)	1.00
7 - Inflow Orifice Invert Elevation (ft)	6.00
8 - Length (ft) of Overflow Structure Acting as a Sharp-Crested Weir	4.00
9 - Elevation of Overflow Structure to Bypass In-Line Sump (ft above sump base)	7.00

Control Practice #: 2    Land Use #: 1    Source Area #: 13

**Schematic Diagram:**

If using a single chambered hydrodynamic device, enter the data describing the device in the form to the left of the schematic.

As data is entered in the form, it will appear in the schematic.

Value 1 through 5 describe the geometry of the device.

The remainder of the table describes when flow will bypass.

Either enter a maximum flow, or enter the geometry of the bypass system.

# Hydrodynamic Device

**First Source Area Control Practice**  
**Hydrodynamic Device Number 1**  
**Land Use: Commercial 1**  
**Source Area: Paved Parking 1**

**Hydrodynamic Control Device General Information - Enter for Both Single Chamber and Proprietary Devices**

Total Source Area (ac)	N/A
Area Served by Device (ac)	0.00
Number of Devices	1
Device Density (units/ac)	0.000

Select Particle Size Distribution file name:  
 Not needed - calculated by program

☐ **Model Hydrodynamic Device with Lamella Plates or Settling Tubes**

Fraction of device area with plates or tubes	
Average tube diameter or distance between plates (ft)	
Number of plates or tubes a vertical line will intersect	

**For Device Cleaning, Select Either**

**Device Cleaning Dates**

Device Cleaning No.	Device Cleaning Date (mm/dd/yy)
1	
2	
3	
4	
5	

**OR**

☒ **Device Cleaning Frequency**

☐ Monthly  
☐ Three Times per Year  
☐ Semi-Annually  
☒ Annually  
☐ Every Two Years  
☐ Every Three Years  
☐ Every Four Years  
☐ Every Five Years  
☐ Never

**Single Chamber Device Characteristics**

1 - Average Sump Depth below Device Outlet Invert (ft)	5.00
Depth of Sediment in Device at Beginning of Study Period (ft)	0.00
2 - Typical Outlet Pipe Diameter (ft)	1.00
Typical Outlet Pipe Manning's n	0.013
3 - Typical Outlet Pipe Slope (ft/ft)	0.0200
Typical Device Sump Surface Area (sf)	19.3
4 - Device Depth from Sump Bottom to Street Level (ft)	10.00
Inflow Hydrograph Peak to Average Flow Ratio	3.8
5 - Minimum Allowable Scour Depth Below Outlet Invert (ft)	1.0
Maximum Flow to In-Line Sump (cfs)	N/A - Click to Activate
6 - Diameter of Orifice that Controls Flow to In-Line Sump (ft)	1.00
7 - Inflow Orifice Invert Elevation (ft)	6.00
8 - Length (ft) of Overflow Structure Acting as a Sharp-Crested Weir	4.00
9 - Elevation of Overflow Structure to Bypass In-Line Sump (ft above sump base)	7.00

☐ **Or Use Proprietary Hydrodynamic Control Device Information**

Manufacturer - Model

1 - Average Sump Depth below Device Outlet Invert (ft)	
Depth of Sediment in Device at	

Control Practice #: 2    Land Use #: 1    Source Area #: 13

The remainder of the table describes when flow will bypass.

Either enter a maximum flow, or enter the geometry of the bypass system.

# Hydrodynamic Device

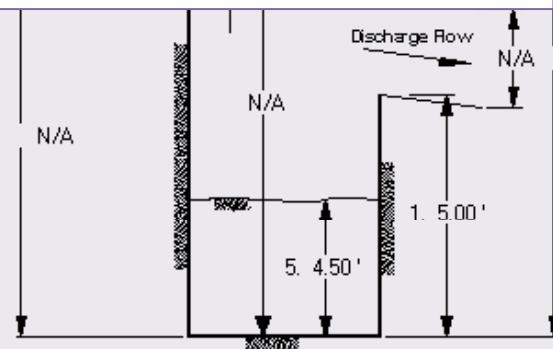
Proprietary Device data is not yet available.

Once it is, you may check the box next to “Or Use Proprietary Hydrodynamic Control Device Information”. You may then select the device from the drop down menu.

As you enter data in the form, it will appear in the schematic.

Note: Less data is required for a proprietary hydrodynamic device with research data available to the model, so “N/A” will appear in the schematic for data that is not required.

Inflow Hydrograph Peak to Average Flow Ratio	
5 - Max. Allowable Depth of Sediment Accumulation Below Outlet Invert (ft)	
Maximum Flow to In-Line Sump (cfs)	
6 - Diameter of Orifice that Controls Flow to In-Line Sump (ft)	
7 - Inflow Orifice Invert Elevation (ft)	
8 - Length (ft) of Overflow Structure Acting as a Sharp-Crested Weir	
9 - Elevation of Overflow Structure to Bypass In-Line Sump (ft above sump base)	



g, Select Either

☐ Device Cleaning Frequency

- ☐ Monthly
- ☐ Three Times per Year
- ☐ Semi-Annually
- ☐ Annually
- ☐ Every Two Years
- ☐ Every Three Years
- ☐ Every Four Years
- ☐ Every Five Years
- ☐ Never

☒ Or Use Proprietary Hydrodynamic Control Device Information

Manufacturer - Model

Acme - Model 1A

1 - Average Sump Depth below Device Outlet Invert (ft)	5.00
Depth of Sediment in Device at Beginning of Study Period (ft)	0.00
2 - Typical Outlet Pipe Diameter (ft)	N/A
Typical Outlet Pipe Manning's n	N/A
3 - Typical Outlet Pipe Slope (ft/ft)	N/A
Inflow Hydrograph Peak to Average Flow Ratio	3.8
5 - Maximum Allowable Depth of Sediment Accumulation Below Outlet Invert (ft)	4.5
Device Sump Surface Area (sf)	20.0

Delete Control Cancel Continue

# Hydrodynamic Device

**Hydrodynamic Device**

**First Source Area Control Practice**  
**Hydrodynamic Device Number 1**  
**Land Use: Commercial 1**  
**Source Area: Paved Parking 1**

**Hydrodynamic Control Device General Information - Enter for Both Single Chamber and Proprietary Devices**

Total Source Area (ac)	N/A
Area Served by Device (ac)	0.00
Number of Devices	1
Device Density (units/ac)	0.000

Select Particle Size Distribution file name:  
 Not needed - calculated by program

☐ **Model Hydrodynamic Device with Lamella Plates or Settling Tubes**

Fraction of device area with plates or tubes	
Average tube diameter or distance between plates (ft)	
Number of plates or tubes a vertical line will intersect	

**For Device Cleaning, Select Either**

**Device Cleaning Dates**

Device Cleaning No.	Device Cleaning Date (mm/dd/yy)
1	
2	
3	
4	
5	

OR

☒ **Device Cleaning Frequency**

☐ Monthly  
☐ Three Times per Year  
☐ Semi-Annually  
☒ Annually  
☐ Every Two Years  
☐ Every Three Years  
☐ Every Four Years  
☐ Every Five Years  
☐ Never

**Single Chamber**

1 - Average Sump Depth (ft)

Depth of Sediment in of Study Period (ft)

2 - Typical Outlet Pipe

Typical Outlet Pipe Material

3 - Typical Outlet Pipe

Typical Device Sump

4 - Device Depth from Street Level (ft)

Inflow Hydrograph Peak Ratio

5 - Minimum Allowable Below Outlet Invert (ft)

Maximum Flow to In-Line Sump (sf)

6 - Diameter of Orifice that Controls Flow to In-Line Sump (ft) 1.00

7 - Inflow Orifice Invert Elevation (ft) 6.00

8 - Length (ft) of Overflow Structure Acting as a Sharp-Crested Weir 4.00

9 - Elevation of Overflow Structure to Bypass In-Line Sump (ft above sump base) 7.00

10 - Minimum Allowable Sump Depth Below Outlet Invert (ft)

Device Sump Surface Area (sf)

Copy Hydrodynamic Device Data Paste Hydrodynamic Device Data

Delete Control Cancel Continue

Control Practice #: 2 Land Use #: 1 Source Area #: 13

Finally, enter the cleaning frequency.

If using specific dates, enter the dates in the box on the left.

If using a frequency, check the box next to “Device Cleaning Frequency” and then select the frequency from the options on the right.

# Hydrodynamic Device

Hydrodynamic Device

First Source Area Control Practice

Hydrodynamic Device Number 1

Land Use: Commercial 1

Source Area: Paved Parking 1

Hydrodynamic Control Device General Information - Enter for Both Single Chamber and Proprietary Devices

Total Source Area (ac)	N/A
Area Served by Device (ac)	0.00
Number of Devices	1
Device Density (units/ac)	0.000

Select

Particle Size Distribution file name:

Not needed - calculated by program

☐

Model Hydrodynamic Device with Lamella Plates or Settling Tubes

Fraction of device area with plates or tubes	
Average tube diameter or distance between plates (ft)	
Number of plates or tubes a vertical line will intersect	

For Device Cleaning, Select Either

Device Cleaning Dates

Device Cleaning No.	Device Cleaning Date (mm/dd/yy)
1	
2	
3	
4	
5	

OR

Device Cleaning Frequency

☒ Monthly
 ☐ Three Times per Year
 ☐ Semi-Annually
 ☒ Annually
 ☐ Every Two Years
 ☐ Every Three Years
 ☐ Every Four Years
 ☐ Every Five Years
 ☐ Never

Inflow Hydrograph Peak to Average Flow Ratio

3.8

5 - Minimum Allowable Scour Depth Below Outlet Invert (ft)

1.0

Maximum Flow to In-Line Sump (cfs)

N/A - Click to Activate

6 - Diameter of Orifice that Controls Flow to In-Line Sump (ft)

1.00

7 - Inflow Orifice Invert Elevation (ft)

6.00

8 - Length (ft) of Overflow Structure Acting as a Sharp-Crested Weir

4.00

9 - Elevation of Overflow Structure to Bypass In-Line Sump (ft above sump base)

7.00

2 - Typical Outlet Pipe Diameter (ft)

Typical Outlet Pipe Manning's n

3 - Typical Outlet Pipe Slope (ft/ft)

Inflow Hydrograph Peak to Average Flow Ratio

5 - Minimum Allowable Scour Depth Below Outlet Invert (ft)

Device Sump Surface Area (sf)

Copy Hydrodynamic Device Data

Paste Hydrodynamic Device Data

Delete Control

Cancel

Continue

Control Practice # : 2

Land Use # : 1

Source Area # : 13

If using Lamella Plates, enter the data describing the plates.

A schematic is available in the Help File to illustrate each data value.



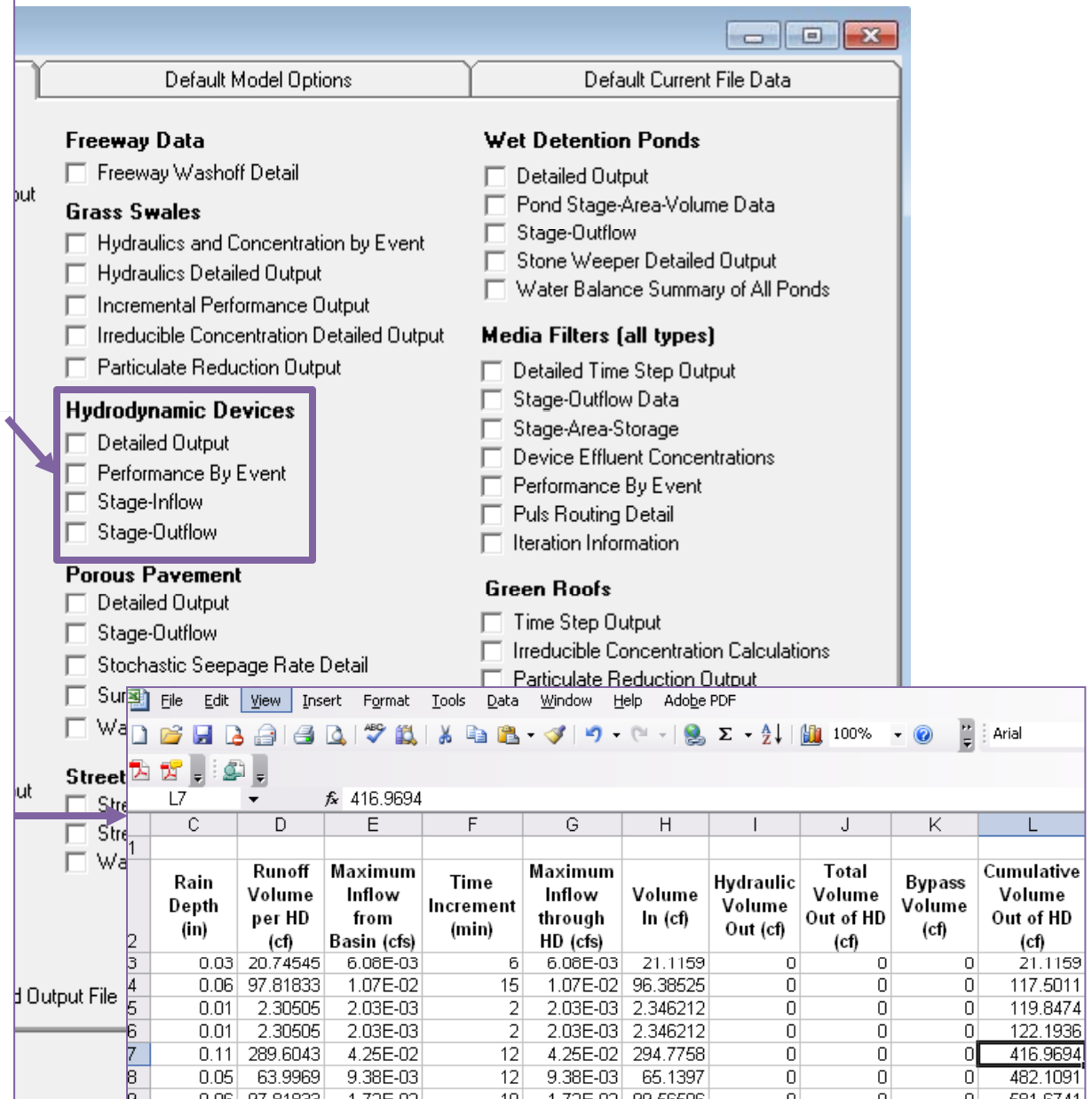
# Hydrodynamic Device

Several detailed output files are available for the Hydrodynamic Device through the Program Options form.

Access the form through the Main Menu of the program. Select the desired file(s). Then select "Save .INI File".

\*.csv file(s) will be created in the same directory that your .MDB file is stored in for the detailed output options selected.

For example, this \*.csv output file illustrates the Hydrodynamic Device Performance By Event. The file was opened in Microsoft Excel.



**Default Model Options**

**Freeway Data**

- ☐ Freeway Washoff Detail

**Grass Swales**

- ☐ Hydraulics and Concentration by Event
- ☐ Hydraulics Detailed Output
- ☐ Incremental Performance Output
- ☐ Irreducible Concentration Detailed Output
- ☐ Particulate Reduction Output

**Hydrodynamic Devices**

- ☐ Detailed Output
- ☒ Performance By Event
- ☐ Stage-Inflow
- ☐ Stage-Outflow

**Porous Pavement**

- ☐ Detailed Output
- ☐ Stage-Outflow
- ☐ Stochastic Seepage Rate Detail

**Wet Detention Ponds**

- ☐ Detailed Output
- ☐ Pond Stage-Area-Volume Data
- ☐ Stage-Outflow
- ☐ Stone Weeper Detailed Output
- ☐ Water Balance Summary of All Ponds

**Media Filters (all types)**

- ☐ Detailed Time Step Output
- ☐ Stage-Outflow Data
- ☐ Stage-Area-Storage
- ☐ Device Effluent Concentrations
- ☐ Performance By Event
- ☐ Puls Routing Detail
- ☐ Iteration Information

**Green Roofs**

- ☐ Time Step Output
- ☐ Irreducible Concentration Calculations
- ☐ Particulate Reduction Output

**Street**

- ☐ Street
- ☐ Street
- ☐ Water

**Default Current File Data**

File Edit View Insert Format Tools Data Window Help Adobe PDF

416.9694

	C	D	E	F	G	H	I	J	K	L
	Rain Depth (in)	Runoff Volume per HD (cf)	Maximum Inflow from Basin (cfs)	Time Increment (min)	Maximum Inflow through HD (cfs)	Volume In (cf)	Hydraulic Volume Out (cf)	Total Volume Out of HD (cf)	Bypass Volume (cf)	Cumulative Volume Out of HD (cf)
1	0.03	20.74545	6.08E-03	6	6.08E-03	21.1159	0	0	0	21.1159
2	0.06	97.81833	1.07E-02	15	1.07E-02	96.38525	0	0	0	117.5011
3	0.01	2.30505	2.03E-03	2	2.03E-03	2.346212	0	0	0	119.8474
4	0.01	2.30505	2.03E-03	2	2.03E-03	2.346212	0	0	0	122.1936
5	0.11	289.6043	4.25E-02	12	4.25E-02	294.7758	0	0	0	416.9694
6	0.05	63.9969	9.38E-03	12	9.38E-03	65.1397	0	0	0	482.1091
7	0.06	97.81833	1.07E-02	15	1.07E-02	96.38525	0	0	0	591.6741

## Control Devices – Media Filters

Media Filters will be available in version 10.3

Control Devices - Other

# Other Control Device

Other Control Device

Drainage System Control Practice

Land Use: Residential 1

Source Area: Streets 1

1. Pollutant Concentration Reduction (fraction):

**This pollutant concentration reduction will be credited towards the overall drainage system reduction in the Outfall Summary calculation if the value is set to 1.0. To remove this credit, uncheck the 'If Other control device concentration reduction value is set to 1, remove off-site pollutant loads from pollutant load percent reduction calculation' checkbox in the Default Model Options tab of the Tool/Program Options menu.**

2. Water Volume (flow) Reduction (fraction):

3. Drainage Area Fraction served by Other Control (0-1):

Total Area: 4.200 acres

Press 'F1' for Additional Help

Control Practice #: 6 CP Index #: 3

Enter the Percent Reduction in Pollutant Concentration and Runoff, and the Fraction of the Area served by the Control Device. The percent reduction will be applied uniformly to the Pollutant Load and Runoff Volume generated.

Note: The Other Control Device should only be used for runoff and pollutant reduction if review agency approved monitored data is available and applicable.

# Other Control Device

Other Control Device

Drainage System Control Practice

Land Use: Residential 1

Source Area: Streets 1

1. Pollutant Concentration Reduction (fraction): 0.0000

**This pollutant concentration reduction will be credited towards the overall drainage system reduction in the Outfall Summary calculation if the value is set to 1.0. To remove this credit, uncheck the 'If Other control device concentration reduction value is set to 1, remove off-site pollutant loads from pollutant load percent reduction calculation' checkbox in the Default Model Options tab of the Tool/Program Options menu.**

2. Water Volume (flow) Reduction (fraction): 0.0000

3. Drainage Area Fraction served by Other Control (0-1): 1.0000

Total Area: 4.200 acres

Press 'F1' for Additional Help

Copy Other Device Data Paste Other Device Data

Clear Cancel Delete Control Continue

Control Practice #: 6 CP Index #: 3

Until the storm sewer and overland flow options are available in the model, the Other Control Device can also be used as links to connect subbasins together in a larger watershed model. To use this, set the Pollutant Concentration reduction to 0.01, the Water Volume reduction to zero, and the Drainage Area Fraction served by Other Control to 0.001.

Additionally, new for v10.2, offsite run-on can be modeled more efficiently. The user can enter a “1” as the Pollutant Concentration Reduction (fraction). Then check the box in the Program Options tab (shown on the next slide). The program will route all the runoff volume to the stormwater control device, but not the pollutant loading. This allows the effectiveness of the device to be appropriately accounted for and the offsite load to be ignored.

# Other Control Device

Program Options

Detailed Output File Options      **Default Model Options**      Default Current File Data

☐ Turn 'Save File Upon Exit' Message Off  
☐ Suppress the 'Wet Detention Pond Overflow' Warning Message  
☒ Save Backup File  
☐ Save Outfall Runoff and Particulate Loading for WinDETPOND Analysis  
Maximum allowable biofilter surface ponding duration (hrs)   
☒ If Other control device concentration reduction value is set to 1, remove off-site pollutant loads from pollutant load percent reduction calculations.  
Default Peak Flow to Average Flow Ratio

Default Monthly Stormwater Temperature (degrees F)

January	40
February	45
March	50
April	55
May	60
June	65
July	65
August	60
September	50
October	40
November	35
December	35

Time (1.2" Rainfall Duration)

Standard Land Use File

☒ Route Hydrographs and Particle Sizes Between Control Practices  
☐ Create Hydrograph and Particle Size Distribution .csv Files  
☒ Use Default Time Increment for all Hydrograph Analyses (required for hydrograph routing between control practices)  
Default Time Increment (min):

**Soil Compaction Infiltration Factors**

	Sandy	Silty	Clayey
Moderately Compacted	<input type="text" value="0.50"/>	<input type="text" value="0.20"/>	<input type="text" value="0.10"/>
Severely Compacted	<input type="text" value="0.20"/>	<input type="text" value="0.10"/>	<input type="text" value="0.00"/>

File Update Options      Cancel Changes      Save .INI File

Go to "Tools" then "Default Model Options" to check the box that accounts for the offsite run-on.

## Control Devices – Porous Pavement

# Porous Pavement Control Device

Porous Pavement Control Device

**First Source Area Control Practice**  
**Land Use:** Commercial 1  
**Source Area:** Paved Parking 1  
**Total Porous and Impervious Pavement Area:** 1.460 ac.  
**Porous pavement area (acres):** 1.460  
**Inflow Hydrograph Peak to Average Flow Ratio:** 3.8

**Surface Pavement Layer Infiltration Rate Data**  

Initial Infiltration Rate (in/hr)	8.75
Surface Pavement Percent Solids Removal Upon Cleaning (0-100)	85.0

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)	10.00
-------------------------------	-------

Select Particle Size Distribution File

Select File Not needed - calculated by program

**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

**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
Porous Pavement Area to Agg Base Area Ratio	1.00

**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	

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

**Percent of Total Area that is Porous Pavement**  
100.0 %

**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

Porous Pavement Control Device

**First Source Area Control Practice**  
**Land Use:** Commercial 1  
**Source Area:** Paved Parking 1  
**Total Porous and Impervious Pavement Area:** 1.460 ac.

**Porous pavement area (acres):**

**Inflow Hydrograph Peak to Average Flow Ratio** 3.8

**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
Porous Pavement Area to Agg Base Area Ratio	1.00

**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	

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

**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	

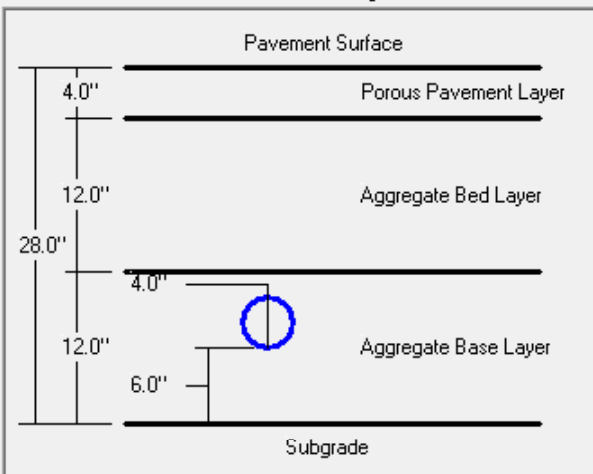
**Surface Infiltration**

Initial Infiltration Rate (in/hr)  
Surface Pavement Percent Cleaning (0-100)  
Enter either these three values:  
Percent of Infiltration Rate  
Percent of Infiltration Rate  
Time Period Until Complete  
Or this value:  
Surface Clogging Load (lb)

**Select Particle Size Distribution File**

Select File

**Percent of Total Area that is Porous Pavement**  
100.0 %



**Porous Pavement Geometry Schematic**

4.0"  
12.0"  
28.0"  
4.0"  
12.0"  
6.0"

Pavement Surface  
Porous Pavement Layer  
Aggregate Bed Layer  
Aggregate Base Layer  
Subgrade

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

Enter the area of the Porous Pavement.

Note: New for v10.2 - the Porous Pavement Control Device now accepts run-on from other source areas.

# Porous Pavement Control Device

Porous Pavement Control Device

**First Source Area Control Practice**  
**Land Use:** Commercial 1  
**Source Area:** Paved Parking 1  
**Total Porous and Impervious Pavement Area:** 1.460 ac.  
**Porous pavement area (acres):** 1.460  
**Inflow Hydrograph Peak to Average Flow Ratio:** 3.8

**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
Porous Pavement Area to Agg Base Area Ratio	1.00

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

**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)	8.75
Surface Pavement Percent Solids Removal Upon Cleaning (0-100)	85.0

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 Clog

**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

**Enter data for the Geometry and Properties of the Pavement.**  
Each layer requires a depth and porosity. The Help File contains some default information, however the porous pavement manufacturer should also be able to provide the information.

**Diagram:**

**Buttons:** Copy Porous Pavement Data, Paste Porous Pavement Data, Delete Control, Cancel, Continue

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

# Porous Pavement Control Device

**Porous Pavement Control Device**

**First Source Area Control Practice**  
**Land Use:** Commercial 1  
**Source Area:** Paved Parking 1  
**Total Porous and Impervious Pavement Area:** 1.460 ac.  
**Porous pavement area (acres):** 1.460  
**Inflow Hydrograph Peak to Average Flow Ratio:** 3.8

**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
Porous Pavement Area to Agg Base Area Ratio	1.00

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

**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)	8.75
Surface Pavement Percent Solids Removal Upon Cleaning (0-100)	85.0

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)	10.00
-------------------------------	-------

**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

**Porous Pavement Geometry Schematic**

Percent of Total Area that is Porous Pavement: 10

Enter the Outlet data for the Pavement.

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

**Porous Pavement Control Device**

**First Source Area Control Practice**  
**Land Use:** Commercial 1  
**Source Area:** Paved Parking 1  
**Total Porous and Impervious Pavement Area:** 1.460 ac.  
**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
Porous Pavement Area to Agg Base Area Ratio	1.00

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

**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)	8.75
Surface Pavement Percent Solids Removal Upon Cleaning (0-100)	85.0

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)

**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

**Porous Pavement Geometry Schematic**

Percent of Total Area that is Porous Pavement

Pavement Surface

Copy Porous Pavement Data

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

If the Percent TSS Reduction is known, or dictated by a regulatory program, enter the % reduction here. Otherwise leave it blank and the program will calculate it based on the properties of the Base Reservoir.

# Porous Pavement Control Device

**Porous Pavement Control Device**

**First Source Area Control Practice**  
Land Use: **Commercial 1**  
Source Area: **Paved Parking 1**  
Total Porous and Impervious Pavement Area: **1.460 ac.**

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

**Surface Pavement Layer Infiltration Rate Data**

Initial Infiltration Rate (in/hr)	8.75
Surface Pavement Percent Solids Removal Upon Cleaning (0-100)	85.0

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)	10.00
-------------------------------	-------

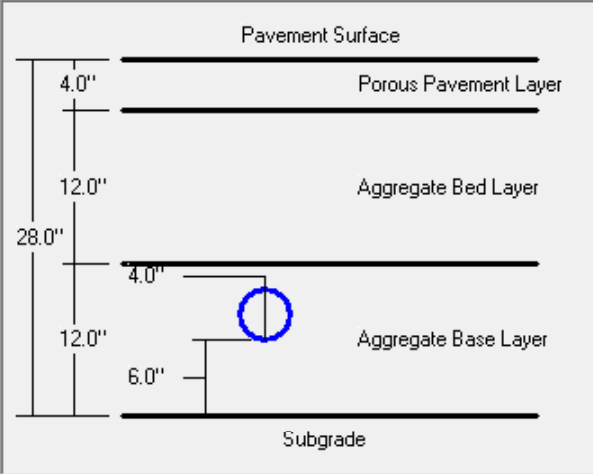
**Restorative Cleaning Frequency**

- ☐ 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

**Percent of Total Area that is Porous Pavement**  
**100.0 %**



**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

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

Subgrade Seepage Rate CO

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

**Porous Pavement Geometry Schematic**

4.0"  
12.0"  
12.0"  
6.0"  
28.0"

Pavement Surface  
Porous Pavement Layer  
Aggregate Bed Layer  
Aggregate Base Layer  
Subgrade

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

Select the Seepage Rate of the Subgrade from the list of default values or enter the value if known.

# Porous Pavement Control Device

**Porous Pavement Control Device**

**First Source Area Control Practice**  
**Land Use:** Commercial 1  
**Source Area:** Paved Parking 1  
**Total Porous and Impervious Pavement Area:** 1.460 ac.  
**Porous pavement area (acres):** 1.460  
**Inflow Hydrograph Peak to Average Flow Ratio:** 3.8

**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
Porous Pavement Area to Agg Base Area Ratio	1.00

**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	
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):** 8.75  
**Restorative Cleaning Frequency:** ☐ Never Cleaned ☐ Every Seven Years ☐ Every Ten Years  
**Or this value:** **Surface Clogging Load (lb/sf):** 10.00

**Select Particle Size Distribution File**  
 Not needed - calculated by program

**Porous Pavement Geometry Schematic**

**Percent of Total Area that is Porous Pavement**  
100.0 %

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

# Porous Pavement Control Device

Enter the remaining data for the Surface Pavement Layer.

**Porous Pavement Control Device**

**Surface Pavement Layer Infiltration Rate Data**

Initial Infiltration Rate (in/hr)	8.75
Surface Pavement Percent Solids Removal Upon Cleaning (0-100)	85.0

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)	10.00
-------------------------------	-------

**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

**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
Porous Pavement Area to Agg Base Area Ratio	1.00

**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	
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

**Select Particle Size Distribution File**

Select File: Not needed - calculated by program

**Percent of Total Area that is Porous Pavement**

100.0 %

**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

**Porous Pavement Control Device**

**First Source Area Control Practice**  
**Land Use:** Commercial 1  
**Source Area:** Paved Parking 1  
**Total Porous and Impervious Pavement Area:** 1.460 ac.  
**Porous pavement area (acres):** 1.460  
**Inflow Hydrograph Peak to Average Flow Ratio:** 3.8

**Surface Pavement Layer Infiltration Rate Data**  
Initial Infiltration Rate (in/hr) 8.75  
Surface Pavement Percent Solids Removal Upon Cleaning (0-100) 85.0  
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) 10.00

**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

**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) 0.10  
3 - Aggregate Base Reservoir Thickness (in) 12.0  
Aggregate Base Reservoir Porosity (>0 and <1) 0.10  
Porous Pavement Area to Agg Base Area Ratio 1.00

**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 ☐  
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

**Percent of Total Area that is Porous Pavement**  
100.0 %

**Porous Pavement Geometry Schematic**  
Pavement Surface  
Porous Pavement Layer 4.0"  
Aggregate Bed Layer 12.0"  
Aggregate Base Layer 12.0"  
Subgrade 6.0"

**Buttons:** Select File, Copy Porous Pavement Data, Paste Porous Pavement Data, Delete Control, Cancel, Continue

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

Finally, enter the Restorative Cleaning Frequency.



# Porous Pavement Control Device

Program Options

**Detailed Output File Options**

**Biofilters**

- ☐ Detailed Biofilter Output
- ☐ Irreducible Concentration Detailed Output
- ☐ Particulate Reduction Output
- ☐ Stage-Outflow
- ☐ Stochastic Seepage Rate Detail
- ☒ Water Balance
- ☐ Evapotranspiration Detail

**Catchbasins**

- ☐ Performance by Event Output
- ☐ Performance By Step Output
- ☐ Stage-Inflow Data
- ☐ Stage-Outflow

**Cisterns**

- ☐ Detailed Output
- ☐ Outfall Discharge Hydrograph
- ☐ Water Balance

**Filter Strips**

- ☐ Hydraulics and Concentration by Event
- ☐ Hydraulics Detailed Output
- ☐ Incremental Performance Output
- ☐ Irreducible Concentration Detailed Output
- ☐ Particulate Reduction Output

**Flow Duration Curve Data**

- ☐ Detailed Data
- ☐ Plotting Calculations

☐ Critical Particle Size Calculation Detailed Output File

**Freeway Data**

- ☐ Freeway Washoff Detail

**Grass**

- ☐ H
- ☐ H
- ☐ In
- ☐ In
- ☐ P

**Hydr**

- ☐ Detailed Output
- ☐ Performance By Event
- ☐ Stage-Inflow
- ☐ Stage-Outflow

**Porous Pavement**

- ☐ Detailed Output
- ☐ Stage-Outflow
- ☐ Stochastic Seepage Rate Detail
- ☐ Surface Seepage Rate
- ☐ Water Balance

**Street Cleaning**

- ☐ Street Dirt/Accumulation Plots
- ☐ Street Dirt Removal
- ☐ Washoff or Street Cleaning Detail

**Wet Detention Ponds**

- ☐ Detailed Output

**Green Roofs**

- ☐ Time Step Output
- ☐ Irreducible Concentration Calculations
- ☐ Particulate Reduction Output
- ☐ Stage-Area-Outflow
- ☐ Water Balance
- ☐ Evapotranspiration Detail

☐ Uncheck All Detailed Output File Options

☐ Check All Detailed Output File Options

**File Update Options**

**Cancel Changes**

**Save .INI File**

Detailed output for the porous pavement can be obtained using the Detailed Output Files through Program Options.

# Control Devices – Street Cleaning

# Street Cleaning Control Device

Street Cleaning Control Device

Land Use: Commercial 2      Total Area: 1.560 acres  
Source Area: Streets 1  
First Source Area Control Practice

Select ☐ Street Cleaning Dates    OR    ☒ Street Cleaning Frequency

Line Number	Street Cleaning Date	Street Cleaning Frequency
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

☐ 7 Passes per Week  
☐ 5 Passes per Week  
☐ 4 Passes per Week  
☐ 3 Passes per Week  
☐ 2 Passes per Week  
☒ One Pass per Week  
☐ One Pass Every Two Weeks  
☐ One Pass Every Four Weeks  
☐ One Pass Every Eight Weeks  
☐ One Pass Every Twelve Weeks  
☐ Two Passes per Year (Spring and Fall)  
☐ One Pass Each Spring

Model Run Start Date: 01/06/91      Model Run End Date: 12/30/91

Final cleaning period ending date (MM/DD/YY):

Select Particle Size Distribution file name:

Type of Street Cleaner  
☐ Mechanical Broom Cleaner  
☒ Vacuum Assisted Cleaner

Street Cleaner Productivity  
☒ 1. Coefficients based on street texture, parking density and parking controls  
☐ 2. Other (specify equation coefficients)  
Equation coefficient M (slope,  $M < 1$ )   
Equation coefficient B (intercept,  $B > 1$ )

Parking Densities  
☒ 1. None  
☐ 2. Light  
☐ 3. Medium  
☐ 4. Extensive (short term)  
☐ 5. Extensive (long term)

Are Parking Controls Imposed?  
☒ Yes    ☐ No

Copy Cleaning Data    Paste Cleaning Data    Delete Control    Cancel Edits    Clear    Continue

Control Practice #: 1    Land Use #: 2    Source Area #: 37

# Street Cleaning Control Device

Enter the Street Cleaning Start Date, Frequency, and Street Cleaning End Date if known.

Street Cleaning Control Device

Land Use: Commercial 2      Total Area:      Source Area: Streets 1

First Source Area Control Practice

Select ☐ Street Cleaning Dates OR ☒ Street Cleaning Frequency

Line Number	Street Cleaning Date	Street Cleaning Frequency
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Model Run Start Date: 01/06/91      Model Run End Date: 12/30/91

Final cleaning period ending date (MM/DD/YY):

Select Particle Size Distribution file name:  
Not needed - calculated by program

Copy Cleaning Data      Paste Cleaning Data

Control Practice #: 1      Land Use #: 2      Source Area #: 37

☒ Vacuum Assisted Cleaner

Street Cleaner Productivity

☒ 1. Coefficients based on street texture, parking density and parking controls

☐ 2. Other (specify equation coefficients)  
Equation coefficient M (slope,  $M < 1$ )      0.60  
Equation coefficient B (intercept,  $B > 1$ )      55

Parking Densities

☒ 1. None  
☐ 2. Light  
☐ 3. Medium  
☐ 4. Extensive (short term)  
☐ 5. Extensive (long term)

Are Parking Controls Imposed?  
☒ Yes      ☐ No

Or, Enter the Street Cleaning Frequency.

# Street Cleaning Control Device

Street Cleaning Control Device

Land Use:   
Source Area:   
First Source:   
Select

**Enter the Type of Street Cleaner**

Line Number	Street Cleaning Date	Street Cleaning Frequency
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

☐ 7 Passes per Week  
☐ 5 Passes per Week  
☐ 4 Passes per Week  
☐ 3 Passes per Week  
☐ 2 Passes per Week  
☒ One Pass per Week  
☐ One Pass Every Two Weeks  
☐ One Pass Every Four Weeks  
☐ One Pass Every Eight Weeks  
☐ One Pass Every Twelve Weeks  
☐ Two Passes per Year (Spring and Fall)  
☐ One Pass Each Spring

Type of Street Cleaner  
☐ Mechanical Broom Cleaner  
☒ Vacuum Assisted Cleaner

Street Cleaner Productivity  
☒ 1. Coefficients based on street texture, parking density and parking controls  
☐ 2. Other (specify equation coefficients)  
Equation coefficient M (slope,  $M < 1$ )   
Equation coefficient B (intercept,  $B > 1$ )

Parking Densities  
☒ 1. None  
☐ 2. Light  
☐ 3. Medium  
☐ 4. Extensive (short term)  
☐ 5. Extensive (long term)

Are Parking Controls Imposed?  
☒ Yes ☐ No

Model Run Start Date: 01/06/91 Model Run End Date: 12/30/91  
Final cleaning period ending date (MM/DD/YY):   
Select Particle Size Distribution file name:

Copy Cleaning Data Paste Cleaning Data Delete Control Cancel Edits Clear Continue

Control Practice #: 1 Land Use #: 2 Source Area #: 37

# Street Cleaning Control Device

Street Cleaning Control Device

Land Use: Commercial 2      Total Area: 1.560 acres  
Source Area: Streets 1  
First Source Area Control Practice

Select ☐ Street Cleaning Dates    OR    ☒ Street Cleaning Frequency

☐ 7 Passes per Week

☐ One Pass Every Four Weeks  
☐ One Pass Every Eight Weeks  
☐ One Pass Every Twelve Weeks  
☐ Two Passes per Year (Spring and Fall)  
☐ One Pass Each Spring

Model Run Start Date: 01/06/91      Model Run End Date: 12/30/91

Final cleaning period ending date (MM/DD/YY):

Select Particle Size Distribution file name:

Copy Cleaning Data    Paste Cleaning Data    Delete Control    Cancel Edits    Clear    Continue

Control Practice #: 1    Land Use #: 2    Source Area #: 37

Type of Street Cleaner  
☐ Mechanical Broom Cleaner  
☒ Vacuum Assisted Cleaner

Street Cleaner Productivity  
☒ 1. Coefficients based on street texture, parking density and parking controls  
☐ 2. Other (specify equation coefficients)  
Equation coefficient M (slope,  $M < 1$ )   
Equation coefficient B (intercept,  $B > 1$ )

Parking Densities  
☒ 1. None  
☐ 2. Light  
☐ 3. Medium  
☐ 4. Extensive (short term)  
☐ 5. Extensive (long term)

Are Parking Controls Imposed?  
☒ Yes    ☐ No

Enter the Street Cleaner Productivity coefficients if known,  
Or use the defaults based on research data.

# Street Cleaning Control Device

Street Cleaning Control Device

Land Use: Commercial 2      Total Area: 1.560 acres  
Source Area: Streets 1  
First Source Area Control Practice

Select ☐ Street Cleaning Dates    OR    ☒ Street Cleaning Frequency

Line Number	Street Cleaning Date	Street Cleaning Frequency
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Model  
Final  
Sele  
Not ne  
Control

Type of Street Cleaner  
☐ Mechanical Broom Cleaner  
☒ Vacuum Assisted Cleaner

Street Cleaner Productivity  
☒ 1. Coefficients based on street texture, parking density and parking controls  
☐ 2. Other (specify equation coefficients)  
Equation coefficient M (slope,  $M < 1$ )    0.60  
Equation coefficient B (intercept,  $B > 1$ )    55

Parking Densities  
☒ 1. None  
☐ 2. Light  
☐ 3. Medium  
☐ 4. Extensive (short term)  
☐ 5. Extensive (long term)

Are Parking Controls Imposed?  
☒ Yes    ☐ No

Cancel Edits    Clear    Continue

Finally, Enter the Parking Density and if Parking Controls are Imposed. Note: Parking Controls should be set to "Yes" if the street cleaner can always get to the curb when street cleaning operations are conducted.

Note, Parking Density and Parking Controls are not required for the Ultra Urban Source Area; the Ultra Urban Source Area assumes there is never parking on the street.

# Street Cleaning Control Device

Program Options

**Detailed Output File Options**

**Biofilters**

- ☐ Detailed Biofilter Output

**Freeway Data**

- ☐ Freeway Washoff Detail

**Wet Detention Ponds**

- ☐ Detailed Output
- ☐ Pond Stage-Area-Volume Data
- ☐ Stage-Outflow
- ☐ Stone Weeper Detailed Output
- ☐ Water Balance Summary of All Ponds

**Media Filters (all types)**

- ☐ Detailed Time Step Output
- ☐ Stage-Outflow Data
- ☐ Stage-Area-Storage
- ☐ Device Effluent Concentrations
- ☐ Performance By Event
- ☐ Puls Routing Detail
- ☐ Iteration Information

**Green Roofs**

- ☐ Time Step Output
- ☐ Irreducible Concentration Calculations
- ☐ Particulate Reduction Output
- ☐ Stage-Area-Outflow
- ☐ Water Balance
- ☐ Evapotranspiration Detail

**Performance By Step Output**

- ☐ Performance By Step Output
- ☐ Stage-Inflow Data
- ☐ Stage-Outflow

**Cisterns**

- ☐ Detailed Output
- ☐ Outfall Discharge Hydrograph
- ☐ Water Balance

**Filter Strips**

- ☐ Hydraulics and Concentration by Event
- ☐ Hydraulics Detailed Output
- ☐ Incremental Performance Output
- ☐ Irreducible Concentration Detailed Output
- ☐ Particulate Reduction Output

**Flow Duration Curve Data**

- ☐ Detailed Data
- ☐ Plotting Calculations

**Uncheck All Detailed Output File Options**

**Check All Detailed Output File Options**

**File Update Options**

**Cancel Changes**

**Save .INI File**

Detailed output for street cleaning can be obtained using the Detailed Output Files through Program Options.

**Street Cleaning**

- ☐ Street Dirt/Accumulation Plots
- ☐ Street Dirt Removal
- ☐ Washoff or Street Cleaning Detail



## Control Devices – Wet Detention

# Wet Detention Control Device

Wet Detention Control Device

Pond Number 1

Drainage System Control Practice

Select Particle Size Distribution File

Not needed - calculated by program

Initial Stage Elevation (ft): 5

Peak to Average Flow Ratio: 3.8

Maximum Inflow into Pond (cfs)

Enter 0 or leave blank for no limit:

Copy Pond Data

Paste Pond Data

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

0.00

Modify Pond Areas

Recalculate Cumulative Volume

	Stage (ft)	Area (acres)	Cumulative Volume (ac-ft)
0	0.00	0.000	0.000
1	0.01	0.0300	0.000
2	2.50	0.0700	0.125
3	5.00	0.1100	0.350
4	7.00	0.1600	0.620
5	9.00	0.2300	1.010
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			

Vertical Dimension Only to Relative Scale

Delete Pond

Cancel

Continue

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)

Invert elevation above datum (ft)

Number of orifices in set

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)

	Add	Add
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

	Add	Add
Stage (ft)	Natural Seepage Rate (in/hr)	Other Outflow Rate (cfs)
0.00	0.00	0.000
0.01	0.00	0.000
2.50		
5.00		
7.00		
9.00		
0.00		

Remove

Broad Crested Weir (Required)

Weir crest length (ft)

Weir crest width (ft)

Height from datum to bottom of weir opening (ft)

Add

Seepage Basin

Infiltration rate (in/hr)

Width of device (ft)

Length of device (ft)

Invert elevation of seepage basin inlet above datum (ft)

Control Practice #: 1

CP Index #: 1

# Wet Detention Control Device

**Wet Detention Control Device**

**Pond Number 1**  
**Drainage System Control Practice**

Select Particle Size Distribution File  
Not needed - calculated by program

Initial Stage Elevation (ft): 5  
Peak to Average Flow Ratio: 3.8  
Maximum Inflow into Pond (cfs):  
Enter 0 or leave blank for no limit:  
Copy Pond Data Paste Pond Data  
Enter fraction (greater than 0) that you want to modify all pond areas by and then select 'Modify Pond Areas' button: 0.00  
Modify Pond Areas

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

Recalculate Cumulative Volume

**Add Sharp Crested Weir**  
Weir Length (ft)  
Height from datum to

**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)
	0.00	0.000
	0.00	0.000
	0.00	0.000
	0.00	0.000
	0.00	0.000
	0.00	0.000
	0.00	0.000
	0.00	0.000
	0.00	0.000
	0.00	0.000
	0.00	0.000
	0.00	0.000
	0.00	0.000
Dec	0.00	0.000

Stage (ft)	Natural Seepage Rate (in/hr)	Other Outflow Rate (cfs)
0.00	0.00	0.000
0.01	0.00	0.000
2.50		
5.00		
7.00		
9.00		
0.00		

**Remove Broad Crested Weir (Required)**  
Weir crest length (ft) 10.00  
Weir crest width (ft) 10.00  
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)

Vertical Dimension Only to Relative Scale

Delete Pond Cancel Continue

Control Practice #: 1 CP Index #: 1

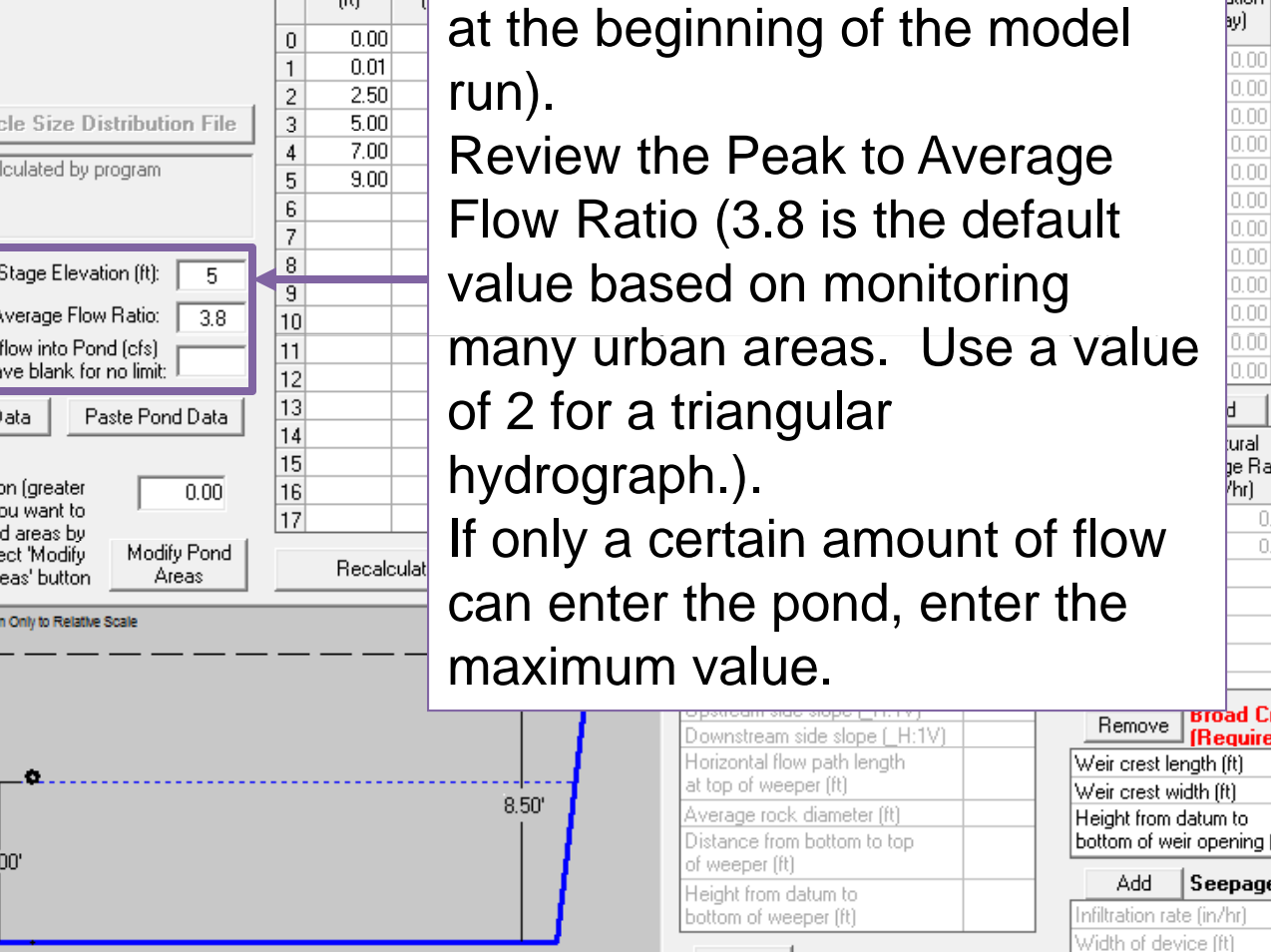
The particle size distribution will be calculated automatically using the particle size distributions from the source areas.

# Wet Detention Control Device

Enter the Initial Stage Elevation (the depth of water in the pond at the beginning of the model run).

Review the Peak to Average Flow Ratio (3.8 is the default value based on monitoring many urban areas. Use a value of 2 for a triangular hydrograph.).

If only a certain amount of flow can enter the pond, enter the maximum value.



Wet Detention Control Device

Pond Number 1  
Drainage System Control Practice

Select Particle Size Distribution File

Not needed - calculated by program

Initial Stage Elevation (ft): 5

Peak to Average Flow Ratio: 3.8

Maximum Inflow into Pond (cfs)  
Enter 0 or leave blank for no limit:

Copy Pond Data Paste Pond Data

Enter fraction (greater than 0) that you want to modify all pond areas by and then select 'Modify Pond Areas' button: 0.00

Modify Pond Areas

Recalculate

Vertical Dimension Only to Relative Scale

9.00'

5.00'

8.50'

Delete Pond Cancel Continue

Control Practice #: 1 CP Index #: 1

Upstream side slope (L:H:V)

Downstream side slope (L:H:V)

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)

Remove Broad Crested Weir (Required)

Weir crest length (ft) 10.00

Weir crest width (ft) 10.00

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)

# Wet Detention Control Device

**Wet Detention Control Device**

**Pond Number 1**  
**Drainage System Control Practice**

Select Particle Size Distribution File  
Not needed - calculated by program

Initial Stage Elevation (ft): 5  
Peak to Average Flow Ratio: 3.8  
Maximum Inflow into Pond (cfs):  
Enter 0 or leave blank for no limit:

Copy Pond Data Paste Pond Data

Enter fraction (greater than 0) that you want to modify all pond areas by and then select 'Modify Pond Areas' button: 0.00

Modify Pond Areas

Recalculate Cumulative Volume

	Stage (ft)	Area (acres)	Cumulative Volume (ac-ft)
0	0.00	0.000	0.000
1	0.01	0.0300	0.000
2	2.50	0.0700	0.125
3	5.00	0.1100	0.350
4	7.00	0.1600	0.620
5	9.00	0.2300	1.010
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			

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:1:V)

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	0.00	0.000
0.01	0.00	0.000
2.50		
5.00		
7.00		
9.00		

Vertical Dimension Only to Relative Scale

10.00'

Enter the Stage Area Data for the pond. At least five stage increments must be entered. The area of the pond at the datum must be zero. Enter the first stage of the bottom of the pond as 0.01.

The 'Cumulative Volume' is calculated for informational purposes only. The program divides the pond volume into much finer slices when routing runoff through the pond.

# Wet Detention Control Device

**Wet Detention Control Device**

**Pond Number 1**  
**Drainage System Control Practice**

Select Particle Size Distribution File  
Not needed - calculated by program

	Stage (ft)	Area (acres)	Cumulative Volume (ac-ft)
0	0.00	0.000	0.000
1	0.01	0.0300	0.000
2	2.50	0.0700	0.125
3	5.00	0.1100	0.350
4	7.00	0.1600	0.620
5	9.00	0.2300	1.010
6			

Enter the outlet structure data. Information regarding each outlet structure can be found in the Help File. You must have a Broad Crested Weir as an emergency overflow. Select "Add" to add the outlet or "Remove" to delete the outlet.

00' 8.50'

Delete Pond Cancel Continue

Control Practice #: 1 CP Index #: 1

**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)

**Add Add Add**

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

**Add Add**

Stage (ft)	Natural Seepage Rate (in/hr)	Other Outflow Rate (cfs)
0.00	0.00	0.000
0.01	0.00	0.000
2.50		
5.00		
7.00		
9.00		
0.00		

**Remove Broad Crested Weir (Required)**

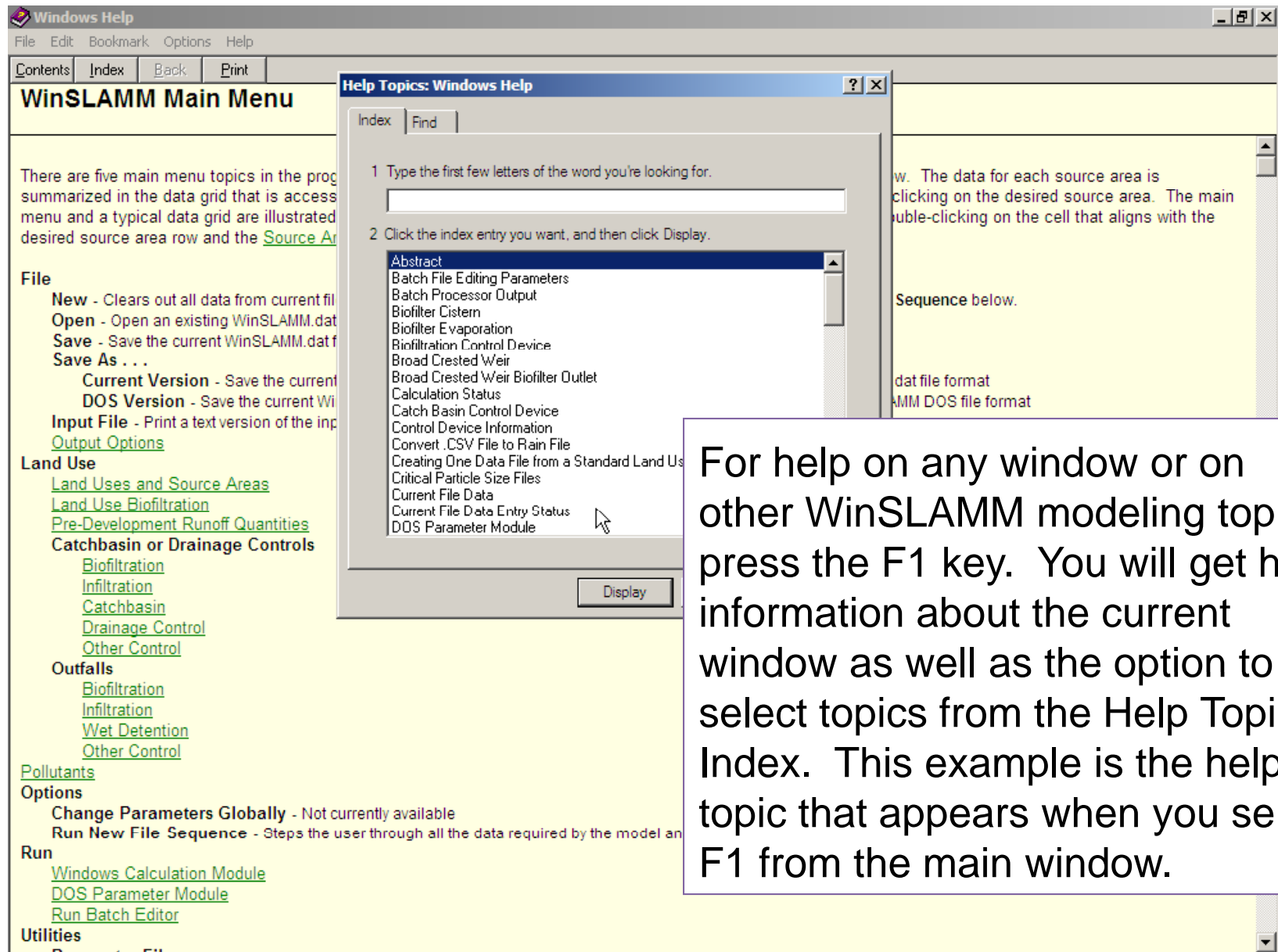
Weir crest length (ft) 10.00  
Weir crest width (ft) 10.00  
Height from datum to bottom of weir opening (ft) 8.50

**Add Seepage Basin**

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

For Additional Information  
See . . .

# The Context-Sensitive Help in the Program







# Questions?

For model information, go to [www.winslamm.com](http://www.winslamm.com)  
*Remember to Press the “F1” to access the Help File*