Narrative as to Function of Infiltration Beds
78 Mountain Road
Burlington, MA

Infiltration Bed #1

The bed is located adjacent to Mountain Road off of the northwest corner of the proposed dwelling and will consist of 3-1000 gallon drywells in a stone-lined bed. The tributary area (Subcatchment 4S) includes the front half of the dwelling and a portion of yard area west of the dwelling. Roof drainage will be collected by gutters and piped into the most easterly drywell chamber. Surface runoff will be collected by 18-inch diameter catch basin grates on top of each chamber.

Infiltration Bed #2

The bed is located to the south of the proposed dwelling and will consist of 3-1000 gallon drywells in a stone lined bed. The tributary area (Subcatchment 3S) includes the front half of the dwelling and a portion of yard area west of the dwelling. Roof drainage will be collected by gutters and piped into the most northerly drywell chamber. Surface runoff will be collected by 18-inch diameter catch basin grates on top of each chamber.

Infiltration Bed #3

Infiltration Bed 3 is to be located beneath the driveway proposed to serve the new home and will consist of eight Cultec R-180HD chambers in a stone-lined bed. Driveway runoff will be collected in a trench drain, as shown on the site plan (Subcatchment 7S) and piped into the bed.

Summary for Pond 5P: INFILT. BED 2

Inflow Area = 0.120 ac, 15.63% Impervious, Inflow Depth > 0.73" for 2 year event
Inflow = 0.14 cfs @ 12.14 hrs, Volume= 0.007 af
Outflow = 0.01 cfs @ 12.00 hrs, Volume= 0.007 af, Atten= 94%, Lag= 0.0 min
Discarded = 0.01 cfs @ 12.00 hrs, Volume= 0.007 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 138.27' @ 13.90 hrs Surf.Area= 0.008 ac Storage= 0.004 af

Plug-Flow detention time= 209.4 min calculated for 0.007 af (100% of inflow)
Center-of-Mass det. time= 207.6 min (1,056.9 - 849.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	137.17'	0.004 af	**11.76'W x 28.00'L x 4.00'H Field A** 0.030 af Overall - 0.020 af Embedded = 0.010 af x 40.0% Voids
#2A	138.17'	0.015 af	**Shea Leaching Chamber 4x4x3** x 21 Inside #1 Inside= 41.0"W x 30.0"H => 8.72 sf x 3.50'L = 30.5 cf **Outside= 47.0"W x 36.0"H => 10.62 sf x 4.00'L = 42.5 cf** 21 Chambers in 3 Rows
		0.019 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	137.17'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	140.17'	**6.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.01 cfs @ 12.00 hrs HW=137.22' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=137.17' (Free Discharge)
↑—**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 5P: INFILT. BED 2 - Chamber Wizard Field A

Chamber Model = Shea Leaching Chamber 4x4x3 (Shea low-profile Galley)
Inside= 41.0"W x 30.0"H => 8.72 sf x 3.50'L = 30.5 cf
Outside= 47.0"W x 36.0"H => 10.62 sf x 4.00'L = 42.5 cf

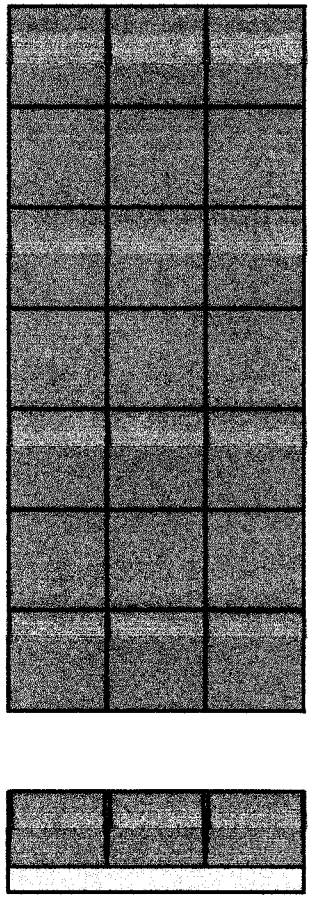
7 Chambers/Row x 4.00' Long = 28.00' Row Length
3 Rows x 47.0" Wide = 11.76' Base Width
12.0" Base + 36.0" Chamber Height = 4.00' Field Height

21 Chambers x 30.5 cf = 640.6 cf Chamber Storage
21 Chambers x 42.5 cf = 891.9 cf Displacement

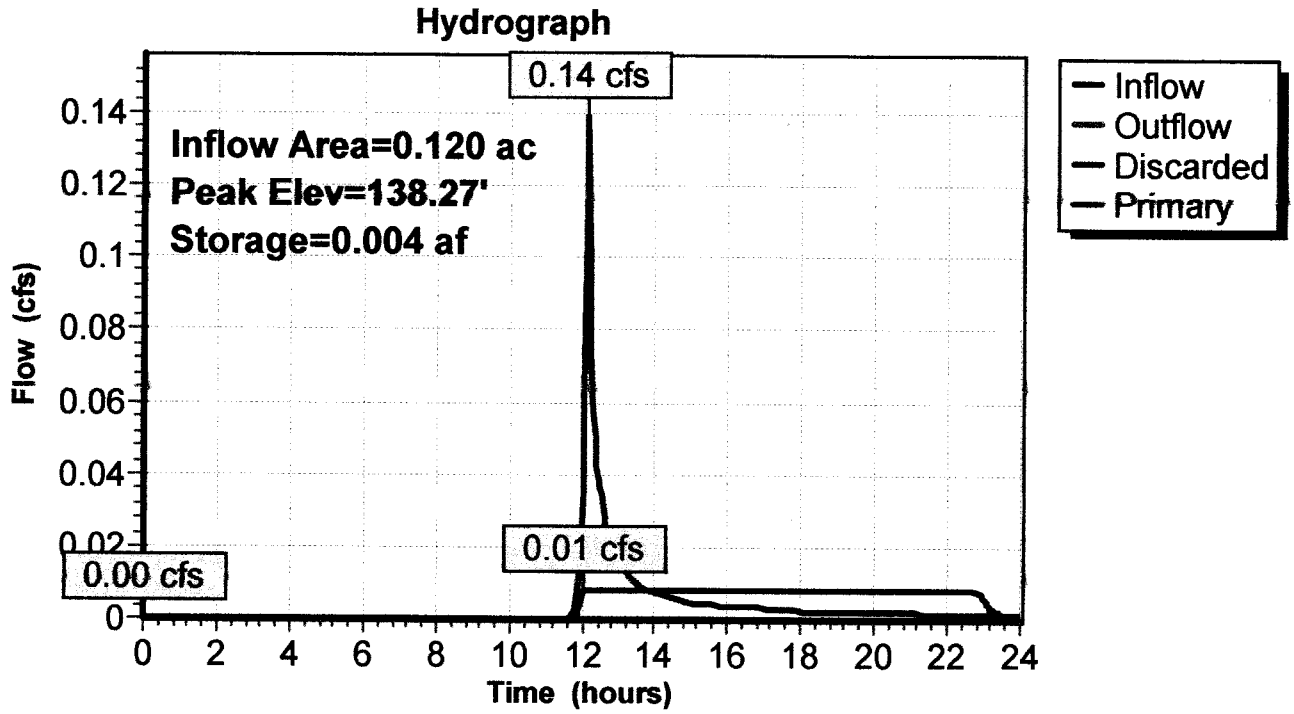
1,317.1 cf Field - 891.9 cf Chambers = 425.2 cf Stone x 40.0% Voids = 170.1 cf Stone Storage

Chamber Storage + Stone Storage = 810.6 cf = 0.019 af
Overall Storage Efficiency = 61.5%
Overall System Size = 28.00' x 11.76' x 4.00'

21 Chambers
48.8 cy Field
15.7 cy Stone



Pond 5P: INFILT. BED 2



Summary for Pond 5P: INFILT. BED 2

Inflow Area = 0.120 ac, 15.63% Impervious, Inflow Depth > 1.93" for 10 Year event
Inflow = 0.39 cfs @ 12.14 hrs, Volume= 0.019 af
Outflow = 0.01 cfs @ 11.65 hrs, Volume= 0.008 af, Atten= 98%, Lag= 0.0 min
Discarded = 0.01 cfs @ 11.65 hrs, Volume= 0.008 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 139.83' @ 16.36 hrs Surf.Area= 0.008 ac Storage= 0.013 af

Plug-Flow detention time= 340.4 min calculated for 0.008 af (42% of inflow)
Center-of-Mass det. time= 239.4 min (1,064.4 - 825.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	137.17'	0.004 af	**11.76'W x 28.00'L x 4.00'H Field A** 0.030 af Overall - 0.020 af Embedded = 0.010 af x 40.0% Voids
#2A	138.17'	0.015 af	**Shea Leaching Chamber 4x4x3** x 21 Inside #1 Inside= 41.0"W x 30.0"H => 8.72 sf x 3.50'L = 30.5 cf Outside= 47.0"W x 36.0"H => 10.62 sf x 4.00'L = 42.5 cf 21 Chambers in 3 Rows
		0.019 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	137.17'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	140.17'	**6.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.01 cfs @ 11.65 hrs HW=137.22' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=137.17' (Free Discharge)
↑**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 5P: INFILT. BED 2 - Chamber Wizard Field A

Chamber Model = Shea Leaching Chamber 4x4x3 (Shea low-profile Galley)
Inside= 41.0"W x 30.0"H => 8.72 sf x 3.50'L = 30.5 cf
Outside= 47.0"W x 36.0"H => 10.62 sf x 4.00'L = 42.5 cf

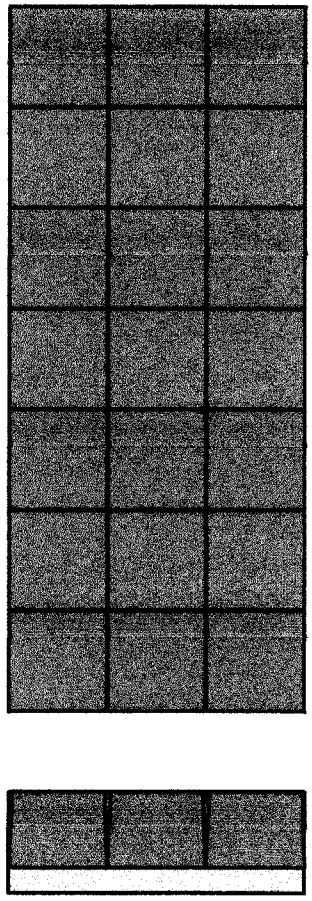
7 Chambers/Row x 4.00' Long = 28.00' Row Length
3 Rows x 47.0" Wide = 11.76' Base Width
12.0" Base + 36.0" Chamber Height = 4.00' Field Height

21 Chambers x 30.5 cf = 640.6 cf Chamber Storage
21 Chambers x 42.5 cf = 891.9 cf Displacement

1,317.1 cf Field - 891.9 cf Chambers = 425.2 cf Stone x 40.0% Voids = 170.1 cf Stone Storage

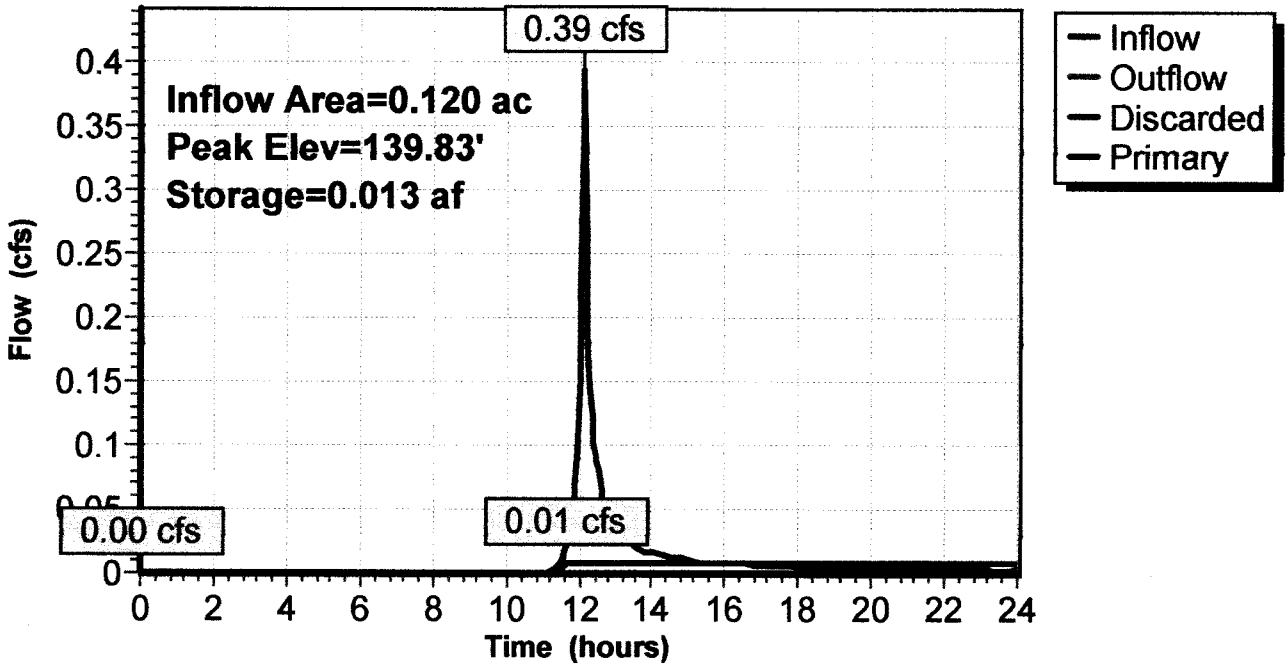
Chamber Storage + Stone Storage = 810.6 cf = 0.019 af
Overall Storage Efficiency = 61.5%
Overall System Size = 28.00' x 11.76' x 4.00'

21 Chambers
48.8 cy Field
15.7 cy Stone



Pond 5P: INFILT. BED 2

Hydrograph



Summary for Pond 5P: INFILT. BED 2

Inflow Area = 0.120 ac, 15.63% Impervious, Inflow Depth > 2.81" for 25 Year event
Inflow = 0.58 cfs @ 12.13 hrs, Volume= 0.028 af
Outflow = 0.06 cfs @ 12.89 hrs, Volume= 0.014 af, Atten= 90%, Lag= 45.5 min
Discarded = 0.01 cfs @ 11.35 hrs, Volume= 0.008 af
Primary = 0.05 cfs @ 12.89 hrs, Volume= 0.006 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 140.30' @ 12.89 hrs Surf.Area= 0.008 ac Storage= 0.016 af

Plug-Flow detention time= 241.0 min calculated for 0.014 af (49% of inflow)
Center-of-Mass det. time= 148.5 min (965.2 - 816.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	137.17'	0.004 af	**11.76'W x 28.00'L x 4.00'H Field A** 0.030 af Overall - 0.020 af Embedded = 0.010 af x 40.0% Voids
#2A	138.17'	0.015 af	**Shea Leaching Chamber 4x4x3** x 21 Inside #1 Inside= 41.0"W x 30.0"H => 8.72 sf x 3.50'L = 30.5 cf Outside= 47.0"W x 36.0"H => 10.62 sf x 4.00'L = 42.5 cf 21 Chambers in 3 Rows
		0.019 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	137.17'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	140.17'	**6.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.01 cfs @ 11.35 hrs HW=137.21' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.05 cfs @ 12.89 hrs HW=140.30' (Free Discharge)
↑—**2=Orifice/Grate** (Orifice Controls 0.05 cfs @ 1.23 fps)

Pond 5P: INFILT. BED 2 - Chamber Wizard Field A

Chamber Model = Shea Leaching Chamber 4x4x3 (Shea low-profile Galley)
Inside= 41.0"W x 30.0"H => 8.72 sf x 3.50'L = 30.5 cf
Outside= 47.0"W x 36.0"H => 10.62 sf x 4.00'L = 42.5 cf

7 Chambers/Row x 4.00' Long = 28.00' Row Length
3 Rows x 47.0" Wide = 11.76' Base Width
12.0" Base + 36.0" Chamber Height = 4.00' Field Height

21 Chambers x 30.5 cf = 640.6 cf Chamber Storage
21 Chambers x 42.5 cf = 891.9 cf Displacement

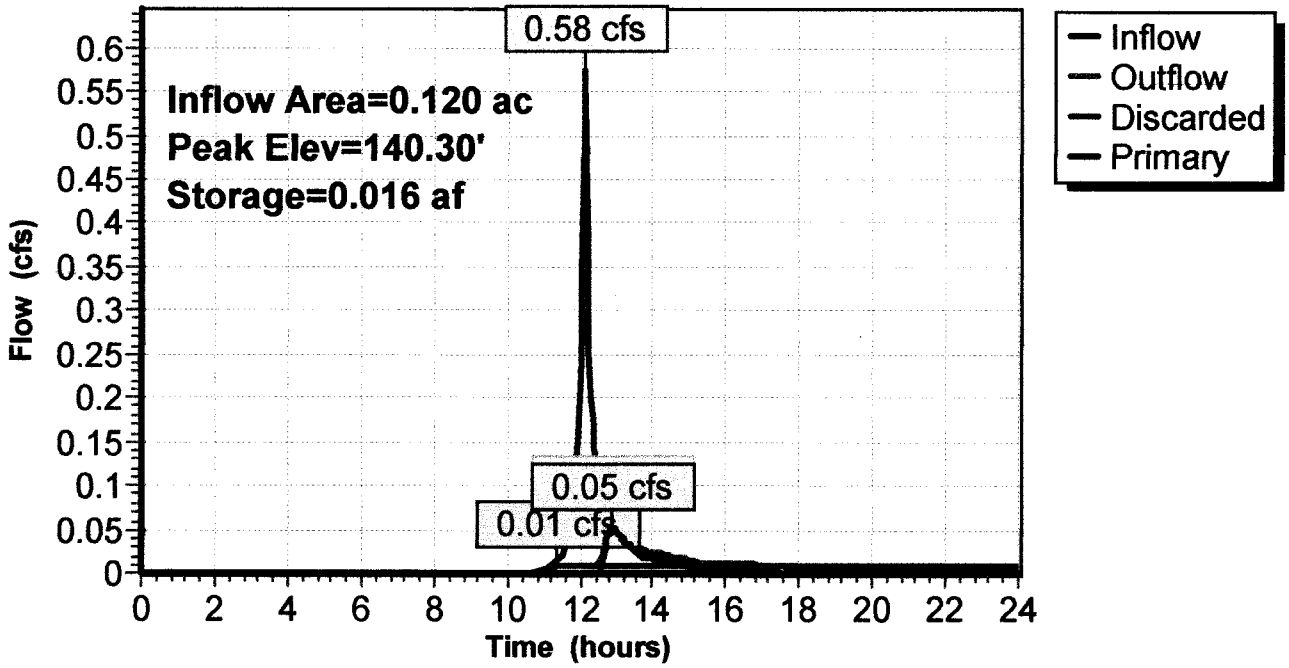
1,317.1 cf Field - 891.9 cf Chambers = 425.2 cf Stone x 40.0% Voids = 170.1 cf Stone Storage

Chamber Storage + Stone Storage = 810.6 cf = 0.019 af
Overall Storage Efficiency = 61.5%
Overall System Size = 28.00' x 11.76' x 4.00'

21 Chambers
48.8 cy Field
15.7 cy Stone

Pond 5P: INFILT. BED 2

Hydrograph



Summary for Pond 5P: INFILT. BED 2

Inflow Area = 0.120 ac, 15.63% Impervious, Inflow Depth > 4.28" for 100 year event
Inflow = 0.87 cfs @ 12.13 hrs, Volume= 0.043 af
Outflow = 0.35 cfs @ 12.28 hrs, Volume= 0.028 af, Atten= 60%, Lag= 8.7 min
Discarded = 0.01 cfs @ 10.90 hrs, Volume= 0.009 af
Primary = 0.34 cfs @ 12.28 hrs, Volume= 0.019 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 140.56' @ 12.28 hrs Surf.Area= 0.008 ac Storage= 0.018 af

Plug-Flow detention time= 146.0 min calculated for 0.028 af (65% of inflow)
Center-of-Mass det. time= 65.1 min (872.9 - 807.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	137.17'	0.004 af	**11.76'W x 28.00'L x 4.00'H Field A** 0.030 af Overall - 0.020 af Embedded = 0.010 af x 40.0% Voids
#2A	138.17'	0.015 af	**Shea Leaching Chamber 4x4x3** x 21 Inside #1 Inside= 41.0"W x 30.0"H => 8.72 sf x 3.50'L = 30.5 cf Outside= 47.0"W x 36.0"H => 10.62 sf x 4.00'L = 42.5 cf 21 Chambers in 3 Rows
		0.019 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	137.17'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	140.17'	**6.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.01 cfs @ 10.90 hrs HW=137.21' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.34 cfs @ 12.28 hrs HW=140.55' (Free Discharge)
↑**2=Orifice/Grate** (Orifice Controls 0.34 cfs @ 2.10 fps)

Pond 5P: INFILT. BED 2 - Chamber Wizard Field A

Chamber Model = Shea Leaching Chamber 4x4x3 (Shea low-profile Galley)
Inside= 41.0"W x 30.0"H => 8.72 sf x 3.50'L = 30.5 cf
Outside= 47.0"W x 36.0"H => 10.62 sf x 4.00'L = 42.5 cf

7 Chambers/Row x 4.00' Long = 28.00' Row Length
3 Rows x 47.0" Wide = 11.76' Base Width
12.0" Base + 36.0" Chamber Height = 4.00' Field Height

21 Chambers x 30.5 cf = 640.6 cf Chamber Storage
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1,317.1 cf Field - 891.9 cf Chambers = 425.2 cf Stone x 40.0% Voids = 170.1 cf Stone Storage

Chamber Storage + Stone Storage = 810.6 cf = 0.019 af
Overall Storage Efficiency = 61.5%
Overall System Size = 28.00' x 11.76' x 4.00'

21 Chambers
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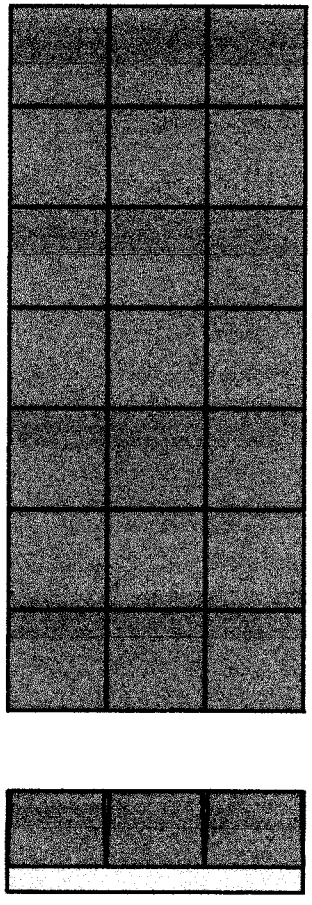

Pond 5P: INFILT. BED 2

Hydrograph