Roosevelt Drive

Acton, MA 01720

HydroCAD storage data

Prepared by: Goldsmith, Prest & Ringwall Inc.

Designed

Events for Pond WQB-2:

Event	Inflow (cfs)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Storage (cubic-feet)
2-YR	0.6	0.1	0.1	0.0	264.37	827
10-YR	1.5	0.8	0.2	0.7	264.84	1,605
100-YR	**2.9**	**2.7**	**0.2**	**2.6**	**264.98**	**1,872**

Weir Height EL. = 264.75; Storage= 1,436 cubic-feet

Top of Berm EL. = 265.00; Storage= 1,920 cubic-feet

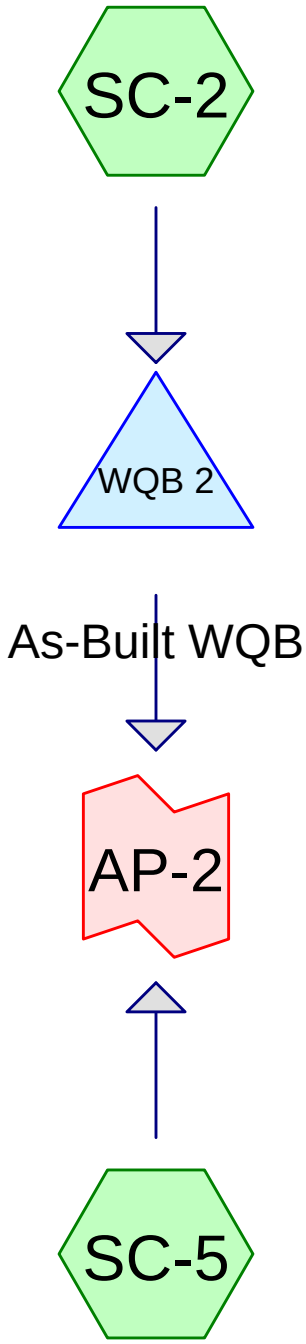
As-Built

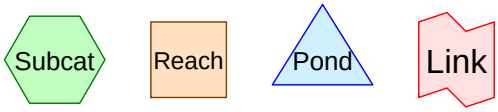
Events for Pond WQB 2: As-Built WQB

Event	Inflow (cfs)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)	Elevation (feet)	Storage (cubic-feet)
2-YR	0.6	0.0	0.0	0.0	264.46	1,382
10-YR	1.5	0.6	0.0	0.6	264.84	2,031
100-YR	**2.9**	**2.7**	**0.0**	**2.7**	**264.98**	**2,320**

Weir Weight EL. = 264.75; Storage= 1,693 cubic-feet

Top of Berm EL. = 265.00; Storage= 2,355 cubic-feet





Routing Diagram for Post-Development CRD
Prepared by Goldsmith, Prest & Ringwall, Inc., Printed 7/26/2016
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Weir Weight EL. = 264.75; Storage= 1,693 cubic-feet

Top of Berm EL. = 265.00; Storage= 2,355 cubic-feet

Summary for Subcatchment SC-2:

Runoff = 0.6 cfs @ 12.17 hrs, Volume= 2,537 cf, Depth> 0.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
2,491	98	Roofs, HSG B
7,369	98	Paved parking, HSG B
1,632	60	Woods, Fair, HSG B
28,124	61	>75% Grass cover, Good, HSG B
39,616	70	Weighted Average
29,756		75.11% Pervious Area
9,860		24.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	50	0.0200	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"
2.2	196	0.0459	1.50		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	15	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
10.6	261	Total			

Summary for Subcatchment SC-5:

Runoff = 0.0 cfs @ 12.14 hrs, Volume= 86 cf, Depth> 0.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-YR Rainfall=3.10"

Area (sf)	CN	Description
644	60	Woods, Fair, HSG B
1,914	61	>75% Grass cover, Good, HSG B
2,558	61	Weighted Average
2,558		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Pond WQB 2: As-Built WQB

Inflow Area = 39,616 sf, 24.89% Impervious, Inflow Depth > 0.77" for 2-YR event
Inflow = 0.6 cfs @ 12.17 hrs, Volume= 2,537 cf
Outflow = 0.0 cfs @ 16.27 hrs, Volume= 1,536 cf, Atten= 94%, Lag= 246.3 min
Discarded = 0.0 cfs @ 16.27 hrs, Volume= 1,536 cf
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 264.46' @ 16.27 hrs Surf.Area= 1,595 sf Storage= 1,382 cf

Plug-Flow detention time= 322.5 min calculated for 1,536 cf (61% of inflow)
Center-of-Mass det. time= 198.7 min (1,079.6 - 880.9)

Volume	Invert	Avail.Storage	Storage Description
#1	263.00'	2,355 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
263.00	332	83.8	0	0	332
264.00	1,222	264.7	730	730	5,352
264.50	1,626	274.0	710	1,440	5,773
265.00	2,044	283.0	916	2,355	6,195

Device	Routing	Invert	Outlet Devices
#1	Discarded	263.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	264.75'	**10.0' long x 4.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.36 2.52 2.70 2.68 2.67 2.67 2.65 2.66 2.66 2.67 2.70 2.70 2.72 2.75 2.81 2.93 3.10

Discarded OutFlow Max=0.0 cfs @ 16.27 hrs HW=264.46' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=263.00' TW=0.00' (Dynamic Tailwater)
└**2=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Summary for Link AP-2:

Inflow Area = 42,174 sf, 23.38% Impervious, Inflow Depth > 0.02" for 2-YR event
Inflow = 0.0 cfs @ 12.14 hrs, Volume= 86 cf
Primary = 0.0 cfs @ 12.14 hrs, Volume= 86 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Subcatchment SC-2:

Runoff = 1.5 cfs @ 12.16 hrs, Volume= 5,513 cf, Depth> 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.50"

Area (sf)	CN	Description
2,491	98	Roofs, HSG B
7,369	98	Paved parking, HSG B
1,632	60	Woods, Fair, HSG B
28,124	61	>75% Grass cover, Good, HSG B
39,616	70	Weighted Average
29,756		75.11% Pervious Area
9,860		24.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	50	0.0200	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"
2.2	196	0.0459	1.50		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	15	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
10.6	261	Total			

Summary for Subcatchment SC-5:

Runoff = 0.1 cfs @ 12.11 hrs, Volume= 230 cf, Depth> 1.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.50"

Area (sf)	CN	Description
644	60	Woods, Fair, HSG B
1,914	61	>75% Grass cover, Good, HSG B
2,558	61	Weighted Average
2,558		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Pond WQB 2: As-Built WQB

Inflow Area = 39,616 sf, 24.89% Impervious, Inflow Depth > 1.67" for 10-YR event
Inflow = 1.5 cfs @ 12.16 hrs, Volume= 5,513 cf
Outflow = 0.6 cfs @ 12.50 hrs, Volume= 3,809 cf, Atten= 57%, Lag= 20.3 min
Discarded = 0.0 cfs @ 12.50 hrs, Volume= 1,918 cf
Primary = 0.6 cfs @ 12.50 hrs, Volume= 1,891 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 264.84' @ 12.50 hrs Surf.Area= 1,901 sf Storage= 2,031 cf

Plug-Flow detention time= 191.7 min calculated for 3,801 cf (69% of inflow)
Center-of-Mass det. time= 89.6 min (946.0 - 856.4)

Volume	Invert	Avail.Storage	Storage Description
#1	263.00'	2,355 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
263.00	332	83.8	0	0	332
264.00	1,222	264.7	730	730	5,352
264.50	1,626	274.0	710	1,440	5,773
265.00	2,044	283.0	916	2,355	6,195

Device	Routing	Invert	Outlet Devices
#1	Discarded	263.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	264.75'	**10.0' long x 4.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.36 2.52 2.70 2.68 2.67 2.67 2.65 2.66 2.66 2.67 2.70 2.70 2.72 2.75 2.81 2.93 3.10

Discarded OutFlow Max=0.0 cfs @ 12.50 hrs HW=264.84' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.6 cfs @ 12.50 hrs HW=264.84' TW=0.00' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 0.6 cfs @ 0.69 fps)

Summary for Link AP-2:

Inflow Area = 42,174 sf, 23.38% Impervious, Inflow Depth > 0.60" for 10-YR event
Inflow = 0.6 cfs @ 12.49 hrs, Volume= 2,121 cf
Primary = 0.6 cfs @ 12.49 hrs, Volume= 2,121 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Subcatchment SC-2:

Runoff = 2.9 cfs @ 12.15 hrs, Volume= 10,567 cf, Depth> 3.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=6.50"

Area (sf)	CN	Description
2,491	98	Roofs, HSG B
7,369	98	Paved parking, HSG B
1,632	60	Woods, Fair, HSG B
28,124	61	>75% Grass cover, Good, HSG B
39,616	70	Weighted Average
29,756		75.11% Pervious Area
9,860		24.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	50	0.0200	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.10"
2.2	196	0.0459	1.50		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	15	0.0200	2.87		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
10.6	261	Total			

Summary for Subcatchment SC-5:

Runoff = 0.2 cfs @ 12.10 hrs, Volume= 500 cf, Depth> 2.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-YR Rainfall=6.50"

Area (sf)	CN	Description
644	60	Woods, Fair, HSG B
1,914	61	>75% Grass cover, Good, HSG B
2,558	61	Weighted Average
2,558		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Summary for Pond WQB 2: As-Built WQB

Inflow Area = 39,616 sf, 24.89% Impervious, Inflow Depth > 3.20" for 100-YR event
Inflow = 2.9 cfs @ 12.15 hrs, Volume= 10,567 cf
Outflow = 2.7 cfs @ 12.21 hrs, Volume= 8,694 cf, Atten= 6%, Lag= 3.2 min
Discarded = 0.0 cfs @ 12.21 hrs, Volume= 2,055 cf
Primary = 2.7 cfs @ 12.21 hrs, Volume= 6,639 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 264.98' @ 12.21 hrs Surf.Area= 2,029 sf Storage= 2,320 cf

Plug-Flow detention time= 106.2 min calculated for 8,694 cf (82% of inflow)
Center-of-Mass det. time= 34.0 min (871.4 - 837.4)

Volume	Invert	Avail.Storage	Storage Description
#1	263.00'	2,355 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
263.00	332	83.8	0	0	332
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Device	Routing	Invert	Outlet Devices
#1	Discarded	263.00'	**1.020 in/hr Exfiltration over Surface area**
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Discarded OutFlow Max=0.0 cfs @ 12.21 hrs HW=264.98' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=2.6 cfs @ 12.21 hrs HW=264.98' TW=0.00' (Dynamic Tailwater)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 2.6 cfs @ 1.14 fps)

Summary for Link AP-2:

Inflow Area = 42,174 sf, 23.38% Impervious, Inflow Depth > 2.03" for 100-YR event
Inflow = 2.8 cfs @ 12.21 hrs, Volume= 7,139 cf
Primary = 2.8 cfs @ 12.21 hrs, Volume= 7,139 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs