STORMWATER MANAGEMENT REPORT

LOT 7 – 280 ROWLEY BRIDGE ROAD
TOPSFIELD, MASSACHUSETTS

December 13, 2019

SUBMITTED TO:

TOWN OF TOPSFIELD
TOPSFIELD PLANNING BOARD
8 WEST COMMON STREET
TOPSFIELD, MA 01983

APPLICANT:

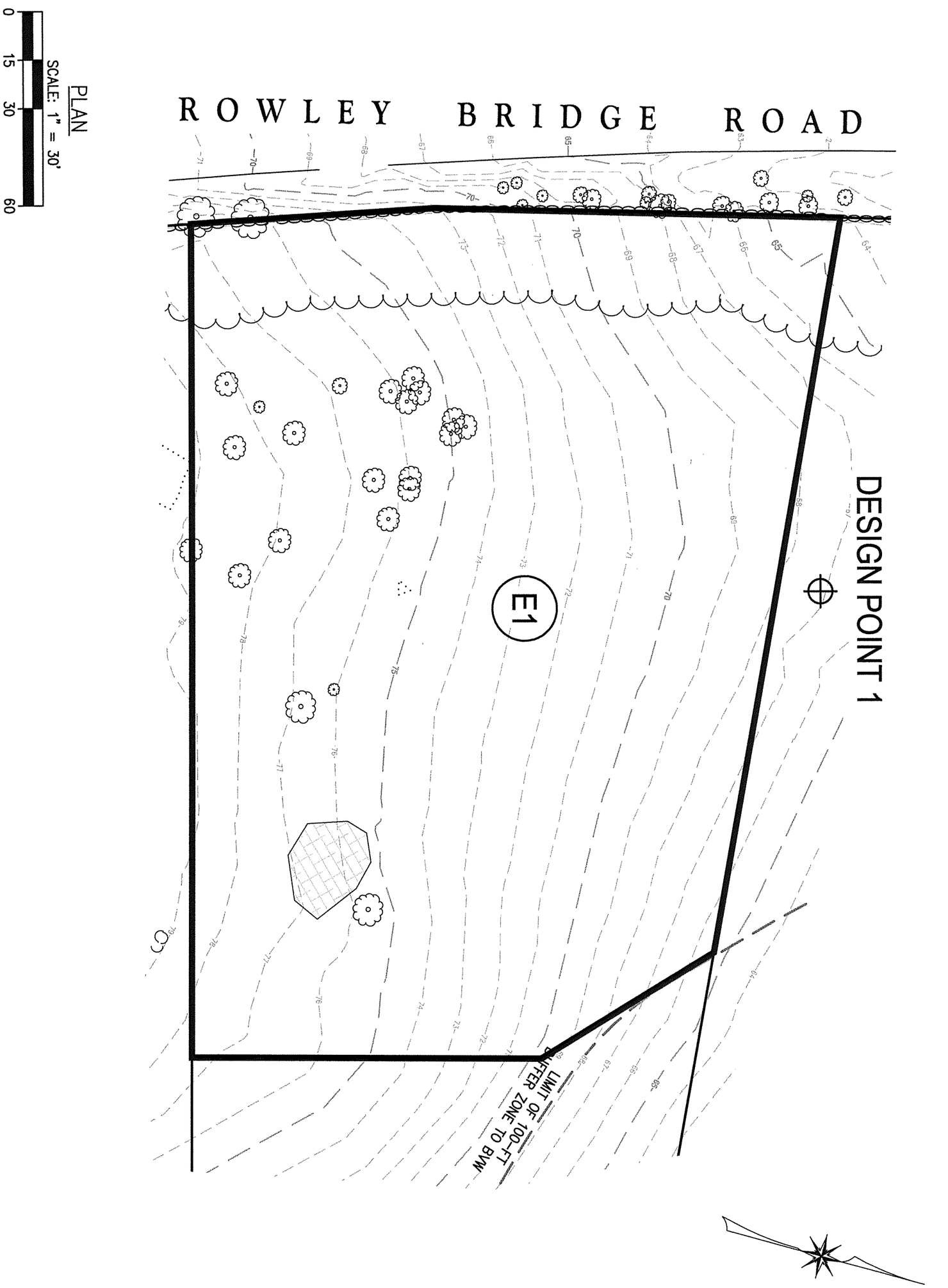
280 ROWLEY BRIDGE, LLC
66 ELM STREET
DANVERS, MA 01983

PREPARED BY:

THE MORIN-CAMERON GROUP, INC.
66 ELM STREET
DANVERS, MA 01923

Hydrologic Summary

Event (Frequency in Years)	Existing Conditions (Peak CFS)	Proposed Conditions (Peak CFS)	Change in Peak (CFS)
DP1			
2	0.3	0.3	0.0
10	1.3	1.2	-0.1
100	4.8	4.8	0.0



PRE-DEVELOPMENT WATERSHED

AT:

LOT 7 – 280 ROWLEY BRIDGE ROAD
TOPSFIELD, MASSACHUSETTS

DATE: 12/13/19
SCALE: 1"=30'

The Morin-Cameron GROUP, INC.
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LAND SURVEYORS | LAND USE PLANNERS
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PROJ. #3902.8

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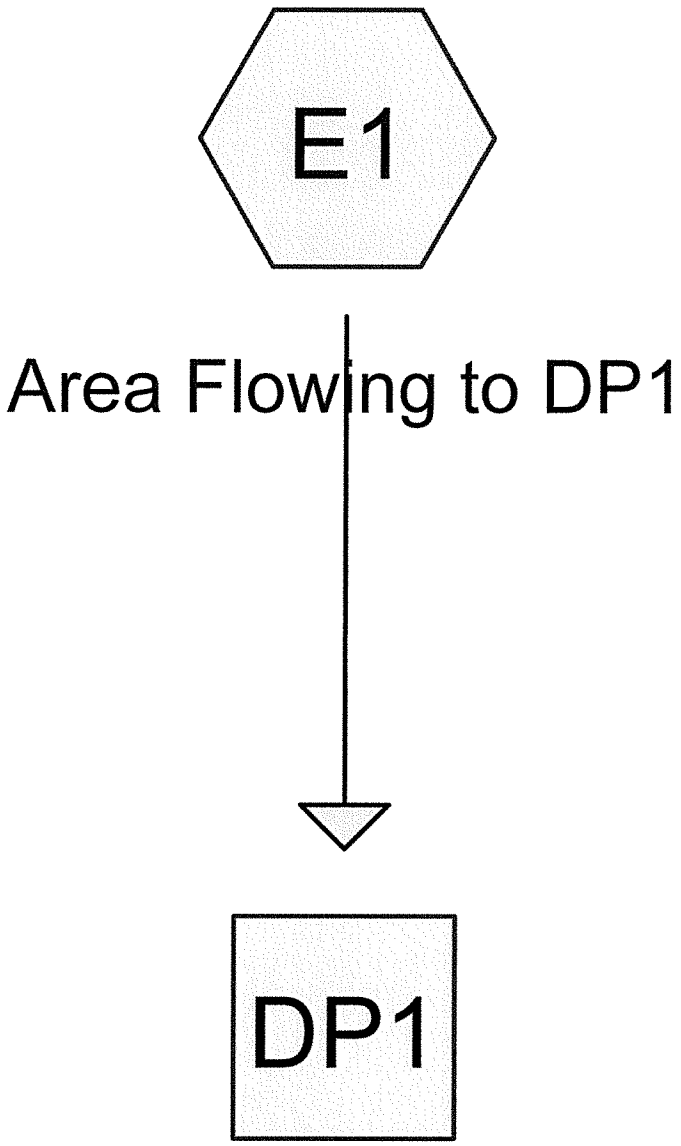


Subcat Reach Pond Link

Routing Diagram for Pre Development Lot 7
Prepared by The Morin-Cameron Group, Inc., Printed 12/13/2019

Summary for Subcatchment E1: Area Flowing to DP1

Runoff = 0.3 cfs @ 12.15 hrs, Volume= 1,485 cf, Depth= 0.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 2-Year Rainfall=3.15"

Area (sf)	CN	Description
5,428	55	Woods, Good, HSG B
40,384	61	>75% Grass cover, Good, HSG B
45,812	60	Weighted Average
45,812		100.00% Pervious Area

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

Summary for Reach DP1: Design Point 1

Inflow Area = 45,812 sf, 0.00% Impervious, Inflow Depth = 0.39" for 2-Year event
Inflow = 0.3 cfs @ 12.15 hrs, Volume= 1,485 cf
Outflow = 0.3 cfs @ 12.15 hrs, Volume= 1,485 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3

Summary for Subcatchment E1: Area Flowing to DP1

Runoff = 1.3 cfs @ 12.14 hrs, Volume= 4,593 cf, Depth= 1.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-Year Rainfall=4.83"

Area (sf)	CN	Description
5,428	55	Woods, Good, HSG B
40,384	61	>75% Grass cover, Good, HSG B
45,812	60	Weighted Average
45,812		100.00% Pervious Area

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

Summary for Reach DP1: Design Point 1

Inflow Area = 45,812 sf, 0.00% Impervious, Inflow Depth = 1.20" for 10-Year event
Inflow = 1.3 cfs @ 12.14 hrs, Volume= 4,593 cf
Outflow = 1.3 cfs @ 12.14 hrs, Volume= 4,593 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3

Summary for Subcatchment E1: Area Flowing to DP1

Runoff = 4.8 cfs @ 12.13 hrs, Volume= 15,476 cf, Depth= 4.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 100-Year Rainfall=8.94"

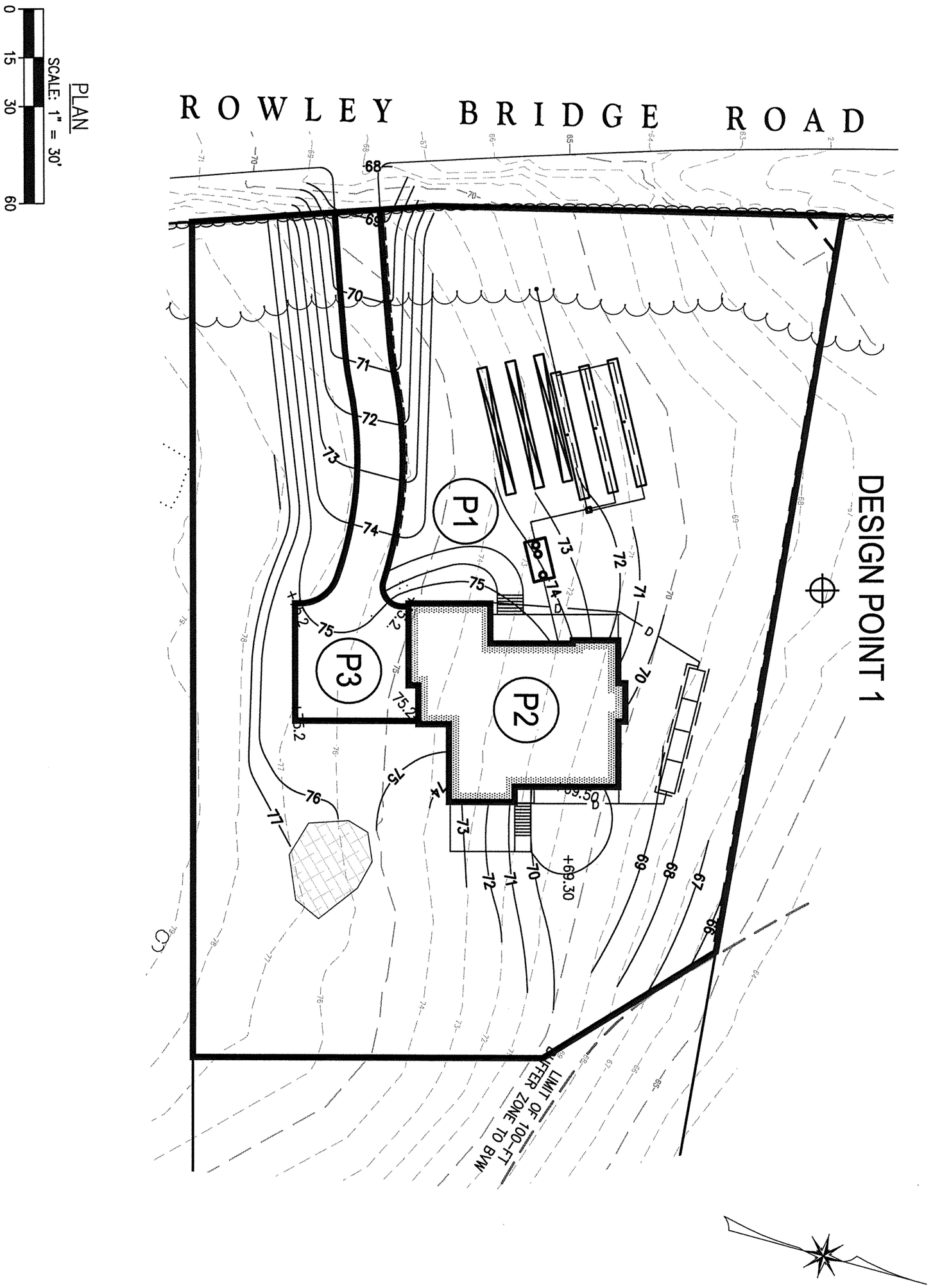
Area (sf)	CN	Description
5,428	55	Woods, Good, HSG B
40,384	61	>75% Grass cover, Good, HSG B
45,812	60	Weighted Average
45,812		100.00% Pervious Area

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

Summary for Reach DP1: Design Point 1

Inflow Area = 45,812 sf, 0.00% Impervious, Inflow Depth = 4.05" for 100-Year event
Inflow = 4.8 cfs @ 12.13 hrs, Volume= 15,476 cf
Outflow = 4.8 cfs @ 12.13 hrs, Volume= 15,476 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3



POST-DEVELOPMENT WATERSHED

AT:

LOT 7 – 280 ROWLEY BRIDGE ROAD
TOPSFIELD, MASSACHUSETTS

DATE: 12/13/19
SCALE: 1"=30'

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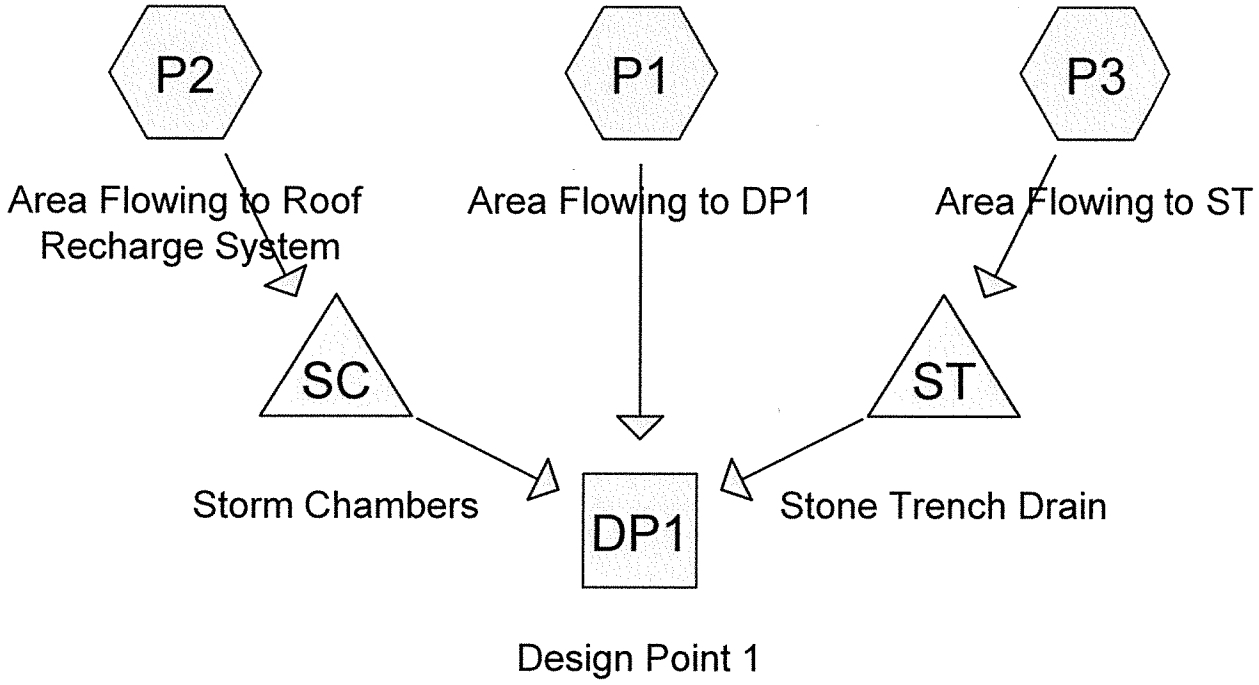

Design Point 1

Subcat Reach Pond Link

Routing Diagram for Post Development Lot 7
Prepared by The Morin-Cameron Group, Inc., Printed 12/13/2019
HydroCAD® 10.10-1 s/n 00401 © 2019 HydroCAD Software Solutions LLC

Summary for Subcatchment P1: Area Flowing to DP1

Runoff = 0.2 cfs @ 12.15 hrs, Volume= 1,288 cf, Depth= 0.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 2-Year Rainfall=3.15"

Area (sf)	CN	Description
4,052	55	Woods, Good, HSG B
35,679	61	>75% Grass cover, Good, HSG B
39,731	60	Weighted Average
39,731		100.00% Pervious Area

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

Summary for Subcatchment P2: Area Flowing to Roof Recharge System

Runoff = 0.2 cfs @ 12.13 hrs, Volume= 739 cf, Depth= 2.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 2-Year Rainfall=3.15"

Area (sf)	CN	Description
3,041	98	Unconnected roofs, HSG B
3,041		100.00% Impervious Area
3,041		100.00% Unconnected

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

Summary for Subcatchment P3: Area Flowing to ST

Runoff = 0.2 cfs @ 12.13 hrs, Volume= 739 cf, Depth= 2.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 2-Year Rainfall=3.15"

Area (sf)	CN	Description
3,040	98	Unconnected pavement, HSG B
3,040		100.00% Impervious Area
3,040		100.00% Unconnected

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

Summary for Reach DP1: Design Point 1

Inflow Area = 45,812 sf, 13.27% Impervious, Inflow Depth = 0.34" for 2-Year event
Inflow = 0.3 cfs @ 12.15 hrs, Volume= 1,314 cf
Outflow = 0.3 cfs @ 12.15 hrs, Volume= 1,314 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3

Summary for Pond SC: Storm Chambers

Inflow Area = 3,041 sf,100.00% Impervious, Inflow Depth = 2.92" for 2-Year event
Inflow = 0.2 cfs @ 12.13 hrs, Volume= 739 cf
Outflow = 0.0 cfs @ 11.27 hrs, Volume= 739 cf, Atten= 93%, Lag= 0.0 min
Discarded = 0.0 cfs @ 11.27 hrs, Volume= 739 cf
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 65.33' @ 13.54 hrs Surf.Area= 0.005 ac Storage= 0.006 af

Plug-Flow detention time= 149.8 min calculated for 739 cf (100% of inflow)
Center-of-Mass det. time= 149.7 min (910.6 - 760.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	63.60'	0.005 af	**7.00'W x 33.25'L x 3.83'H Field A** 0.020 af Overall - 0.007 af Embedded = 0.013 af x 40.0% Voids
#2A	64.10'	0.007 af	**NDS_StormChamber SC-34** x 4 Inside #1 Effective Size= 53.8"W x 34.0"H => 9.89 sf x 7.58'L = 75.0 cf Overall Size= 60.0"W x 34.0"H x 8.50'L with 0.92' Overlap Row Length Adjustment= +0.92' x 9.89 sf x 1 rows
#3	63.60'	0.000 af	**0.50'D x 15.00'H Downspout**
		0.013 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	63.60'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.08'
#2	Primary	69.50'	**4.0" W x 4.0" H Vert. Downspout Scupper** C= 0.600 Limited to weir flow at low heads
#3	Primary	71.50'	**4.0" W x 4.0" H Vert. Downspout Scupper X 2.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.0 cfs @ 11.27 hrs HW=63.75' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=63.60' TW=0.00' (Dynamic Tailwater)
├**2=Downspout Scupper** (Controls 0.0 cfs)
└**3=Downspout Scupper** (Controls 0.0 cfs)

Summary for Pond ST: Stone Trench Drain

Inflow Area = 3,040 sf,100.00% Impervious, Inflow Depth = 2.92" for 2-Year event
Inflow = 0.2 cfs @ 12.13 hrs, Volume= 739 cf
Outflow = 0.2 cfs @ 12.16 hrs, Volume= 739 cf, Atten= 13%, Lag= 2.0 min
Discarded = 0.1 cfs @ 12.16 hrs, Volume= 713 cf
Primary = 0.0 cfs @ 12.16 hrs, Volume= 26 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 68.79' @ 12.16 hrs Surf.Area= 2,682 sf Storage= 88 cf

Plug-Flow detention time= 45.9 min calculated for 739 cf (100% of inflow)
Center-of-Mass det. time= 45.9 min (806.7 - 760.8)

Volume	Invert	Avail.Storage	Storage Description
#1	67.50'	370 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 925 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
67.50	132	0	0
68.75	132	165	165
68.90	10,000	760	925

Device	Routing	Invert	Outlet Devices
#1	Discarded	67.50'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.02'
#2	Primary	68.75'	**1.2' long x 2.0' 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Discarded OutFlow Max=0.1 cfs @ 12.16 hrs HW=68.79' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.1 cfs)

Primary OutFlow Max=0.0 cfs @ 12.16 hrs HW=68.79' TW=0.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 0.0 cfs @ 0.50 fps)

Summary for Subcatchment P1: Area Flowing to DP1

Runoff = 1.1 cfs @ 12.14 hrs, Volume= 3,983 cf, Depth= 1.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-Year Rainfall=4.83"

Area (sf)	CN	Description
4,052	55	Woods, Good, HSG B
35,679	61	>75% Grass cover, Good, HSG B
39,731	60	Weighted Average
39,731		100.00% Pervious Area

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

Summary for Subcatchment P2: Area Flowing to Roof Recharge System

Runoff = 0.3 cfs @ 12.13 hrs, Volume= 1,164 cf, Depth= 4.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-Year Rainfall=4.83"

Area (sf)	CN	Description
3,041	98	Unconnected roofs, HSG B
3,041		100.00% Impervious Area
3,041		100.00% Unconnected

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

Summary for Subcatchment P3: Area Flowing to ST

Runoff = 0.3 cfs @ 12.13 hrs, Volume= 1,164 cf, Depth= 4.59"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 10-Year Rainfall=4.83"

Area (sf)	CN	Description
3,040	98	Unconnected pavement, HSG B
3,040		100.00% Impervious Area
3,040		100.00% Unconnected

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

Summary for Reach DP1: Design Point 1

Inflow Area = 45,812 sf, 13.27% Impervious, Inflow Depth = 1.06" for 10-Year event
Inflow = 1.2 cfs @ 12.14 hrs, Volume= 4,042 cf
Outflow = 1.2 cfs @ 12.14 hrs, Volume= 4,042 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3

Summary for Pond SC: Storm Chambers

Inflow Area = 3,041 sf,100.00% Impervious, Inflow Depth = 4.59" for 10-Year event
Inflow = 0.3 cfs @ 12.13 hrs, Volume= 1,164 cf
Outflow = 0.0 cfs @ 10.40 hrs, Volume= 1,164 cf, Atten= 96%, Lag= 0.0 min
Discarded = 0.0 cfs @ 10.40 hrs, Volume= 1,164 cf
Primary = 0.0 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 66.93' @ 14.76 hrs Surf.Area= 0.005 ac Storage= 0.011 af

Plug-Flow detention time= 319.2 min calculated for 1,164 cf (100% of inflow)
Center-of-Mass det. time= 319.2 min (1,070.4 - 751.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	63.60'	0.005 af	**7.00'W x 33.25'L x 3.83'H Field A** 0.020 af Overall - 0.007 af Embedded = 0.013 af x 40.0% Voids
#2A	64.10'	0.007 af	**NDS_StormChamber SC-34** x 4 Inside #1 Effective Size= 53.8"W x 34.0"H => 9.89 sf x 7.58'L = 75.0 cf Overall Size= 60.0"W x 34.0"H x 8.50'L with 0.92' Overlap Row Length Adjustment= +0.92' x 9.89 sf x 1 rows
#3	63.60'	0.000 af	**0.50'D x 15.00'H Downspout**
		0.013 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	63.60'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.08'
#2	Primary	69.50'	**4.0" W x 4.0" H Vert. Downspout Scupper** C= 0.600 Limited to weir flow at low heads
#3	Primary	71.50'	**4.0" W x 4.0" H Vert. Downspout Scupper X 2.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.0 cfs @ 10.40 hrs HW=63.75' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.0 cfs @ 0.00 hrs HW=63.60' TW=0.00' (Dynamic Tailwater)
├**2=Downspout Scupper** (Controls 0.0 cfs)
└**3=Downspout Scupper** (Controls 0.0 cfs)

Summary for Pond ST: Stone Trench Drain

Inflow Area = 3,040 sf,100.00% Impervious, Inflow Depth = 4.59" for 10-Year event
Inflow = 0.3 cfs @ 12.13 hrs, Volume= 1,164 cf
Outflow = 0.3 cfs @ 12.17 hrs, Volume= 1,164 cf, Atten= 17%, Lag= 2.4 min
Discarded = 0.2 cfs @ 12.17 hrs, Volume= 1,105 cf
Primary = 0.0 cfs @ 12.17 hrs, Volume= 58 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 68.81' @ 12.17 hrs Surf.Area= 3,813 sf Storage= 110 cf

Plug-Flow detention time= 46.9 min calculated for 1,163 cf (100% of inflow)
Center-of-Mass det. time= 46.9 min (798.1 - 751.2)

Volume	Invert	Avail.Storage	Storage Description
#1	67.50'	370 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 925 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
67.50	132	0	0
68.75	132	165	165
68.90	10,000	760	925

Device	Routing	Invert	Outlet Devices
#1	Discarded	67.50'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.02'
#2	Primary	68.75'	**1.2' long x 2.0' 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Discarded OutFlow Max=0.2 cfs @ 12.17 hrs HW=68.81' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.2 cfs)

Primary OutFlow Max=0.0 cfs @ 12.17 hrs HW=68.81' TW=0.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 0.0 cfs @ 0.60 fps)

Summary for Subcatchment P1: Area Flowing to DP1

Runoff = 4.1 cfs @ 12.13 hrs, Volume= 13,422 cf, Depth= 4.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 100-Year Rainfall=8.94"

Area (sf)	CN	Description
4,052	55	Woods, Good, HSG B
35,679	61	>75% Grass cover, Good, HSG B
39,731	60	Weighted Average
39,731		100.00% Pervious Area

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

Summary for Subcatchment P2: Area Flowing to Roof Recharge System

Runoff = 0.6 cfs @ 12.13 hrs, Volume= 2,205 cf, Depth= 8.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 100-Year Rainfall=8.94"

Area (sf)	CN	Description
3,041	98	Unconnected roofs, HSG B
3,041		100.00% Impervious Area
3,041		100.00% Unconnected

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

Summary for Subcatchment P3: Area Flowing to ST

Runoff = 0.6 cfs @ 12.13 hrs, Volume= 2,204 cf, Depth= 8.70"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
NRCC 24-hr D 100-Year Rainfall=8.94"

Area (sf)	CN	Description
3,040	98	Unconnected pavement, HSG B
3,040		100.00% Impervious Area
3,040		100.00% Unconnected

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

Summary for Reach DP1: Design Point 1

Inflow Area = 45,812 sf, 13.27% Impervious, Inflow Depth = 3.74" for 100-Year event
Inflow = 4.8 cfs @ 12.14 hrs, Volume= 14,281 cf
Outflow = 4.8 cfs @ 12.14 hrs, Volume= 14,281 cf, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3

Summary for Pond SC: Storm Chambers

Inflow Area = 3,041 sf,100.00% Impervious, Inflow Depth = 8.70" for 100-Year event
Inflow = 0.6 cfs @ 12.13 hrs, Volume= 2,205 cf
Outflow = 0.6 cfs @ 12.12 hrs, Volume= 2,205 cf, Atten= 0%, Lag= 0.0 min
Discarded = 0.0 cfs @ 7.46 hrs, Volume= 1,512 cf
Primary = 0.6 cfs @ 12.12 hrs, Volume= 693 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 70.91' @ 12.12 hrs Surf.Area= 0.005 ac Storage= 0.012 af

Plug-Flow detention time= 262.0 min calculated for 2,204 cf (100% of inflow)
Center-of-Mass det. time= 262.1 min (1,003.3 - 741.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	63.60'	0.005 af	**7.00'W x 33.25'L x 3.83'H Field A** 0.020 af Overall - 0.007 af Embedded = 0.013 af x 40.0% Voids
#2A	64.10'	0.007 af	**NDS_StormChamber SC-34** x 4 Inside #1 Effective Size= 53.8"W x 34.0"H => 9.89 sf x 7.58'L = 75.0 cf Overall Size= 60.0"W x 34.0"H x 8.50'L with 0.92' Overlap Row Length Adjustment= +0.92' x 9.89 sf x 1 rows
#3	63.60'	0.000 af	**0.50'D x 15.00'H Downspout**
		0.013 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	63.60'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.08'
#2	Primary	69.50'	**4.0" W x 4.0" H Vert. Downspout Scupper** C= 0.600 Limited to weir flow at low heads
#3	Primary	71.50'	**4.0" W x 4.0" H Vert. Downspout Scupper X 2.00** C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.0 cfs @ 7.46 hrs HW=63.75' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.0 cfs)

Primary OutFlow Max=0.6 cfs @ 12.12 hrs HW=70.88' TW=0.00' (Dynamic Tailwater)
├**2=Downspout Scupper** (Orifice Controls 0.6 cfs @ 5.31 fps)
└**3=Downspout Scupper** (Controls 0.0 cfs)

Summary for Pond ST: Stone Trench Drain

Inflow Area = 3,040 sf,100.00% Impervious, Inflow Depth = 8.70" for 100-Year event
Inflow = 0.6 cfs @ 12.13 hrs, Volume= 2,204 cf
Outflow = 0.4 cfs @ 12.18 hrs, Volume= 2,204 cf, Atten= 25%, Lag= 3.0 min
Discarded = 0.3 cfs @ 12.18 hrs, Volume= 2,038 cf
Primary = 0.1 cfs @ 12.18 hrs, Volume= 166 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 68.84' @ 12.18 hrs Surf.Area= 6,155 sf Storage= 181 cf

Plug-Flow detention time= 37.6 min calculated for 2,203 cf (100% of inflow)
Center-of-Mass det. time= 37.6 min (778.8 - 741.2)

Volume	Invert	Avail.Storage	Storage Description
#1	67.50'	370 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 925 cf Overall x 40.0% Voids

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
67.50	132	0	0
68.75	132	165	165
68.90	10,000	760	925

Device	Routing	Invert	Outlet Devices
#1	Discarded	67.50'	**2.410 in/hr Exfiltration over Surface area** Phase-In= 0.02'
#2	Primary	68.75'	**1.2' long x 2.0' 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 Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32

Discarded OutFlow Max=0.3 cfs @ 12.18 hrs HW=68.84' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.3 cfs)

Primary OutFlow Max=0.1 cfs @ 12.18 hrs HW=68.84' TW=0.00' (Dynamic Tailwater)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 0.1 cfs @ 0.77 fps)