STORMWATER MANAGEMENT SUMMARY

"MARSH VIEW"
93 Central Street, Acton, MA
6730
June 19, 2009
Revised September 21, 2009

EXISTING RUNOFF PATTERNS

The site is located on the northerly side of Central Street at the northwest corner of the intersection with Pine Ridge Road and currently consists of a single family residence. The property is surrounded by residential properties on all sides.

There are no wetland resource areas located on the property and the site is located above the 500 year flood zone elevation as referenced on FIRM Map, Community Panel 250176-0003 C, dated January 6, 1988. Topography at the site slopes gently from a high elevation located in the center of the property to lower elevations located at the southeast corner of the property and towards Central Street located to the southwest. Surface characteristics of the property are an equal mix of thickly wooded and sparse grassy lawn surfaces as well as the impervious roof and driveway surfaces.

Currently surface runoff collects and flows from the center of the property to the southeast and southwest. There are no point source discharges.

SURFICIAL GEOLOGY

The site is shown to be located on a ground moraine (USGS 1948) and soils consisted of till soils containing ground rock fragments ranging from silt size particles to boulders.

STORMWATER MANAGEMENT SYSTEM

The proposed stormwater collection system for the project consists of a series of driveway recharge trenches and drip-line recharge trenches and a deep sump hooded catch basin. The stormwater collection system and recharge trenches have been sized accordingly to collect, store and recharge the projected increase in runoff volume at the site for a 10-year Type III storm event (see recharge volume calculations). There is a slight increase in the rate of runoff for the proposed project, however the increase is minimal and should have no impact on downstream flooding.

The stormwater management system utilizes subsurface recharge for runoff collected from impervious roof and driveway areas. These recharge trenches were selected to allow the design of a stormwater management system to increase recharge to the local aquifer, minimize the impacts of stormwater runoff as well as providing water quality treatment for runoff from the proposed driveway area.

The proposed stormwater management system collects surface runoff through the deep sump hooded catch basin and from the recharge trenches located on the site and recharges

runoff on-site. Overflow occurring from the recharge areas exceeding storage volumes for storm events exceeding a 10 year storm discharge will flow overland towards the southwest and southeast of the property as currently occurs at the site.

RESULTS OF STORMWATER MODEL

As shown by the following results of the recharge volume calculations and information from the HydroCad computer analysis; insignificant increases in the rate and volume of runoff occur and should have no effect on down stream flooding effects.

METHODOLOGY FOR STORMWATER CALCULATIONS

Calculations were performed based on TR-20 methods with a computer model created with the use of HydroCAD software [Version 8].

A complete data sheets for the model is included as well as the results of the HydroCAD modeling.

STORMWATER MANAGEMENT SUMMARY

"MARSH VIEW"
93 Central Street, Acton, MA
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September 21, 2009 ADDENDUM

To

Stormwater Management Summary

The driveway recharge trenches on the site have been increased in width and length in order to more effectively attenuate the peak flowrate and volume of stormwater runoff for the various storm events. The plans have been revised to show the new trenches, and the HydroCAD computer model was used to analyze the modified design. The results of the updated HydroCAD model are tabulated below.

EASTERN HALF OF SITE (Combines PRE Subcatchments 1 and 3)
PRE - to Wetlands
POST - to Wetlands

STORM FREQ	PRE Q (cfs)	POST Q (cfs)	ΔQ (cfs)	PRE Vol (acre-ft)	POST Vol (acre-ft)	ΔVol (acre-ft)
2	0.11	0.00	-0.11	0.016	0	-0.016
10	0.42	0.31	-0.11	0.046	0.003	-0.043
25	0.66	1.23	0.57	0.067	0.051	-0.016
100	1.05	2.08	1.03	0.103	0.178	0.075

WESTERN HALF OF SITE
PRE - to Central Street
POST - to Central Street

STORM FREQ	PRE Q (cfs)	POST Q (cfs)	ΔQ (cfs)	PRE Vol (acre-ft)	POST Vol (acre-ft)	ΔVol (acre-ft)
2	0.55	0.37	-0.18	0.047	0.004	-0.043
10	1.14	1.07	-0.07	0.093	0.029	-0.064
25	1.50	1.30	-0.20	0.122	0.034	-0.088
100	2.06	2.17	0.11	0.168	0.114	-0.054

TOTAL DISCHARGE FROM SITE

STORM FREQ	PRE Q (cfs)	POST Q (cfs)	ΔQ (cfs)	PRE Vol (acre-ft)	POST Vol (acre-ft)	ΔVol (acre-ft)
2	0.66	0.37	-0.29	0.063	0.004	-0.059
10	1.56	1.38	-0.18	0.139	0.032	-0.107
25	2.16	2.53	0.37	0.189	0.085	-0.104
100	3.11	4.25	1.14	0.271	0.292	0.021

Acton Survey & Engineering, Inc.
P.O. Box 666, 97 Great Rd. #6, Acton, MA 01720
Phone: (978) 263-3666 Fax: (978) 635-0218
Email: actonsurvey@actonsurvey.com

STORMWATER MANAGEMENT SUMMARY

"MARSH VIEW"
93 Central Street, Acton, MA
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June 19, 2009
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The post-development peak flowrate and volume of runoff have been reduced for both the 2-year and 10-year storms, relative to pre-development conditions. This complies with the Town of Acton's Subdivision Rules and Regulations.

Some insignificant post-development increases in the rates and volumes of runoff occur for the 25-year and 100-year storms, but these increases should have virtually no effect on downstream flooding. In the case of the eastern half of the site, all runoff merely flows to the wetland east of the site.

Complete data sheets for the HydroCAD model are included.

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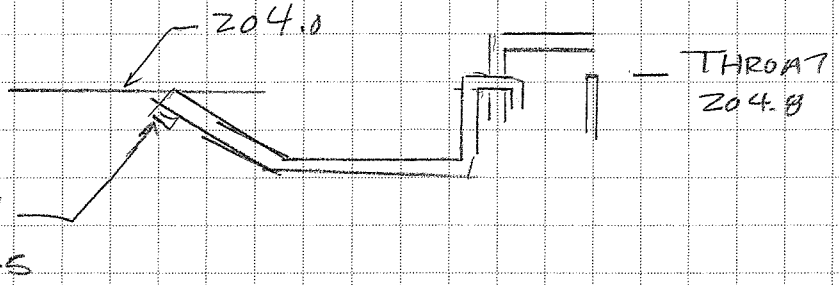
Acton Survey & Engineering, Inc.
P.O. Box 666 97 Great Rd. Suite 6
Acton, MA 01720-0666
(978) 263-3666 Fax (978) 635-0218
Email: actonsurvey@verizon.net

JOB MARSH VIEW 6730
SHEET NO. 1 OF 1
CALCULATED BY MTD DATE 9-27-09
CHECKED BY DATE
SCALE HYDRAULICS

CATCH BASIN TO TRENCH

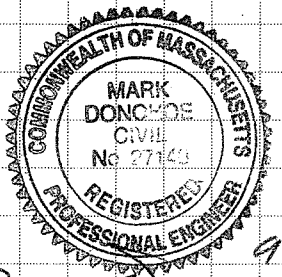


HAZEN-WILLIAMS VIA FLOWMASTER

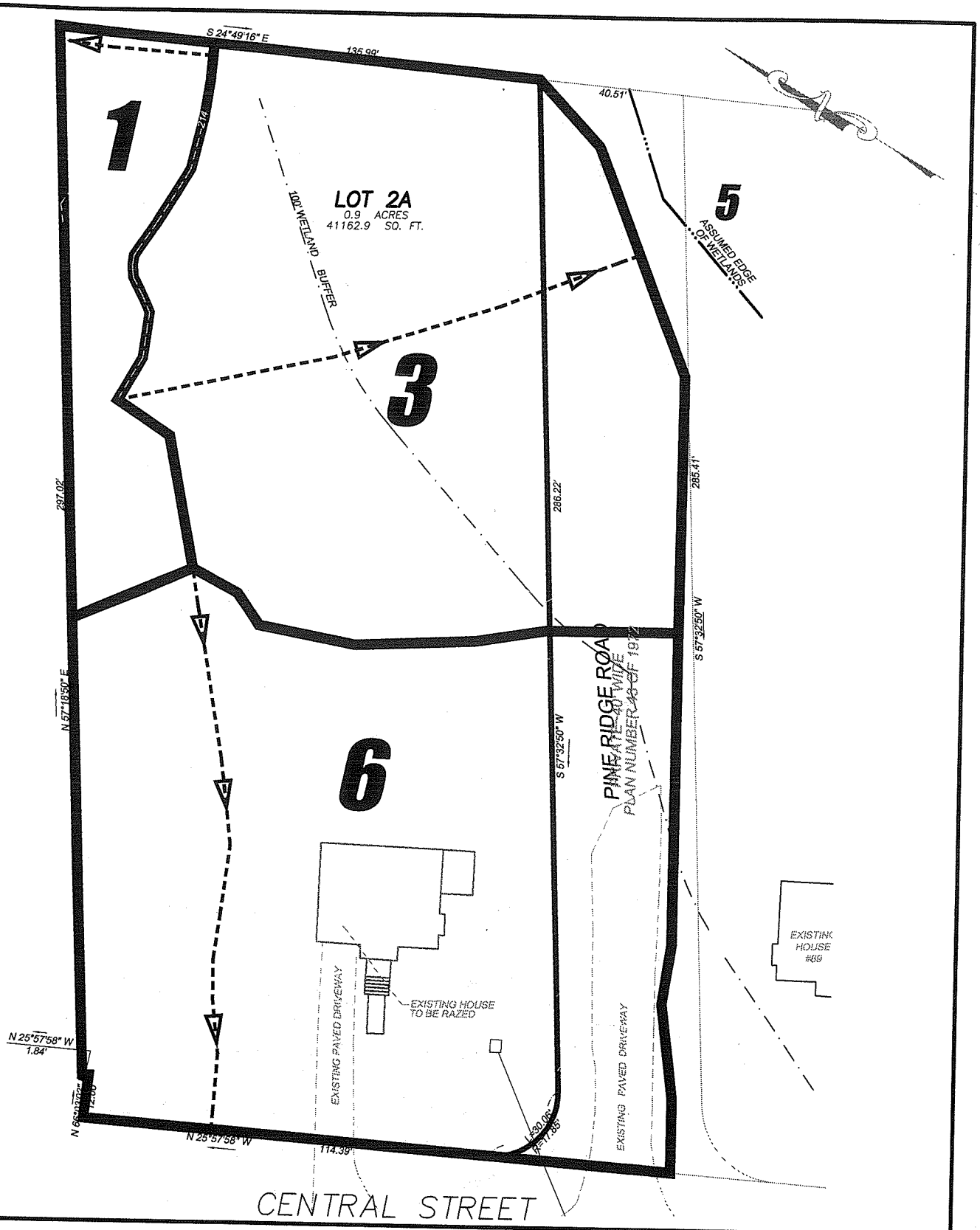
H = 1.3 C = 140 L = 30

Q = 3.8 CFS OK Q 25 STR =

IF H = 0.8 L = 40
Q = 2.5 CFS



9.29.9



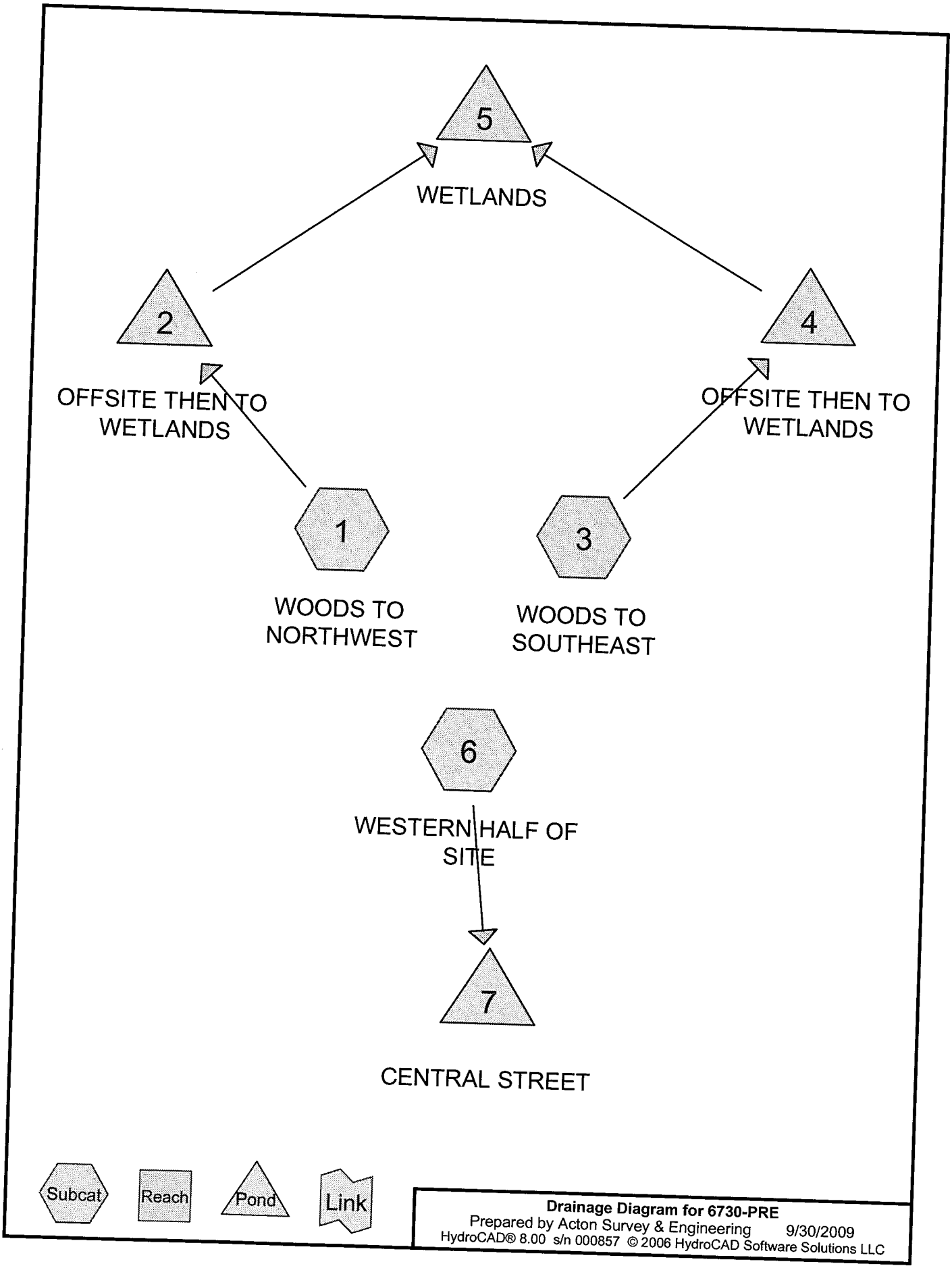
PRE-DEVELOPMENT DRAINAGE AREAS

MARSH VIEW
93 CENTRAL STREET
ACTON, MA

PREPARED FOR:
MARSH VIEW, LLC
SCALE: 1"=40' SEPTEMBER 29, 2009

Acton Survey & Engineering, Inc.
Since 1967

97 GREAT ROAD
P.O. BOX 666
ACTON, MA 01720
PH. (978) 263-3666
FAX (978) 635-0218


5
WETLANDS
2
4
OFFSITE THEN TO WETLANDS
OFFSITE THEN TO WETLANDS
1
3
WOODS TO NORTHWEST
WOODS TO SOUTHEAST
6
WESTERN HALF OF SITE
7
CENTRAL STREET
Subcat
Reach
Pond
Link
Drainage Diagram for 6730-PRE
Prepared by Acton Survey & Engineering 9/30/2009
HydroCAD® 8.00 s/n 000857 © 2006 HydroCAD Software Solutions LLC

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: WOODS TO NORTHWEST Runoff Area=4,727 sf Runoff Depth>0.32"
Flow Length=44' Tc=10.0 min CN=60 Runoff=0.02 cfs 0.003 af

Subcatchment 3: WOODS TO SOUTHEAST Runoff Area=21,564 sf Runoff Depth>0.32"
Flow Length=153' Tc=18.2 min CN=60 Runoff=0.09 cfs 0.013 af

Subcatchment 6: WESTERN HALF OF SITE Runoff Area=24,615 sf Runoff Depth>0.99"
Flow Length=160' Tc=12.1 min CN=76 Runoff=0.55 cfs 0.047 af

Pond 2: OFFSITE THEN TO WETLANDS Inflow=0.02 cfs 0.003 af
Primary=0.02 cfs 0.003 af

Pond 4: OFFSITE THEN TO WETLANDS Inflow=0.09 cfs 0.013 af
Primary=0.09 cfs 0.013 af

Pond 5: WETLANDS Inflow=0.11 cfs 0.016 af
Primary=0.11 cfs 0.016 af

Pond 7: CENTRAL STREET Inflow=0.55 cfs 0.047 af
Primary=0.55 cfs 0.047 af

Total Runoff Area = 1.169 ac Runoff Volume = 0.063 af Average Runoff Depth = 0.64"
92.86% Pervious Area = 1.085 ac 7.14% Impervious Area = 0.083 ac

Subcatchment 1: WOODS TO NORTHWEST

Runoff = 0.02 cfs @ 12.20 hrs, Volume= 0.003 af, Depth> 0.32"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 002 yr Rainfall=3.10"

Area (sf)	CN	Description
4,727	60	Woods, Fair, HSG B
4,727		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	44		0.07		**Direct Entry, Through woods**

Subcatchment 3: WOODS TO SOUTHEAST

Runoff = 0.09 cfs @ 12.42 hrs, Volume= 0.013 af, Depth> 0.32"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 002 yr Rainfall=3.10"

Area (sf)	CN	Description
21,564	60	Woods, Fair, HSG B
21,564		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.4	100	0.0350	0.10		**Sheet Flow, Through woods**
					Woods: Light underbrush n= 0.400 P2= 3.10"
0.8	53	0.0500	1.12		**Shallow Concentrated Flow, Through woods toward wetlanc**
					Woodland Kv= 5.0 fps
18.2	153	Total			

Subcatchment 6: WESTERN HALF OF SITE

Runoff = 0.55 cfs @ 12.18 hrs, Volume= 0.047 af, Depth> 0.99"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 002 yr Rainfall=3.10"

Area (sf)	CN	Description
3,889	60	Woods, Fair, HSG B
6,002	69	50-75% Grass cover, Fair, HSG B
11,091	79	50-75% Grass cover, Fair, HSG C
3,633	98	Paved parking & roofs
24,615	76	Weighted Average
20,982		Pervious Area
3,633		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	36	0.0470	0.09		**Sheet Flow, Through woods**
					Woods: Light underbrush n= 0.400 P2= 3.10"
4.9	64	0.0470	0.22		**Sheet Flow, Through yard**
					Grass: Short n= 0.150 P2= 3.10"
0.4	60	0.1100	2.32		**Shallow Concentrated Flow, Through yard to street**
					Short Grass Pasture Kv= 7.0 fps
12.1	160	Total			

Pond 2: OFFSITE THEN TO WETLANDS

Inflow Area = 0.109 ac, Inflow Depth > 0.32" for Middlesex 002 yr event
Inflow = 0.02 cfs @ 12.20 hrs, Volume= 0.003 af
Primary = 0.02 cfs @ 12.20 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond 4: OFFSITE THEN TO WETLANDS

Inflow Area = 0.495 ac, Inflow Depth > 0.32" for Middlesex 002 yr event
Inflow = 0.09 cfs @ 12.42 hrs, Volume= 0.013 af
Primary = 0.09 cfs @ 12.42 hrs, Volume= 0.013 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond 5: WETLANDS

Inflow Area = 0.604 ac, Inflow Depth > 0.32" for Middlesex 002 yr event
Inflow = 0.11 cfs @ 12.39 hrs, Volume= 0.016 af
Primary = 0.11 cfs @ 12.39 hrs, Volume= 0.016 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond 7: CENTRAL STREET

Inflow Area = 0.565 ac, Inflow Depth > 0.99" for Middlesex 002 yr event
Inflow = 0.55 cfs @ 12.18 hrs, Volume= 0.047 af
Primary = 0.55 cfs @ 12.18 hrs, Volume= 0.047 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: WOODS TO NORTHWEST Runoff Area=4,727 sf Runoff Depth>0.91"
Flow Length=44' Tc=10.0 min CN=60 Runoff=0.10 cfs 0.008 af

Subcatchment 3: WOODS TO SOUTHEAST Runoff Area=21,564 sf Runoff Depth>0.91"
Flow Length=153' Tc=18.2 min CN=60 Runoff=0.35 cfs 0.038 af

Subcatchment 6: WESTERN HALF OF SITE Runoff Area=24,615 sf Runoff Depth>1.97"
Flow Length=160' Tc=12.1 min CN=76 Runoff=1.14 cfs 0.093 af

Pond 2: OFFSITE THEN TO WETLANDS
Inflow=0.10 cfs 0.008 af
Primary=0.10 cfs 0.008 af

Pond 4: OFFSITE THEN TO WETLANDS
Inflow=0.35 cfs 0.038 af
Primary=0.35 cfs 0.038 af

Pond 5: WETLANDS
Inflow=0.42 cfs 0.046 af
Primary=0.42 cfs 0.046 af

Pond 7: CENTRAL STREET
Inflow=1.14 cfs 0.093 af
Primary=1.14 cfs 0.093 af

Total Runoff Area = 1.169 ac Runoff Volume = 0.138 af Average Runoff Depth = 1.42"
92.86% Pervious Area = 1.085 ac 7.14% Impervious Area = 0.083 ac

Subcatchment 1: WOODS TO NORTHWEST

Runoff = 0.10 cfs @ 12.16 hrs, Volume= 0.008 af, Depth> 0.91"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 010 yr Rainfall=4.50"

Area (sf)	CN	Description
4,727	60	Woods, Fair, HSG B
4,727		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	44		0.07		**Direct Entry, Through woods**

Subcatchment 3: WOODS TO SOUTHEAST

Runoff = 0.35 cfs @ 12.30 hrs, Volume= 0.038 af, Depth> 0.91"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 010 yr Rainfall=4.50"

Area (sf)	CN	Description
21,564	60	Woods, Fair, HSG B
21,564		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.4	100	0.0350	0.10		**Sheet Flow, Through woods**
					Woods: Light underbrush n= 0.400 P2= 3.10"
0.8	53	0.0500	1.12		**Shallow Concentrated Flow, Through woods toward wetlanc**
					Woodland Kv= 5.0 fps
18.2	153	Total			

Subcatchment 6: WESTERN HALF OF SITE

Runoff = 1.14 cfs @ 12.17 hrs, Volume= 0.093 af, Depth> 1.97"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 010 yr Rainfall=4.50"

Area (sf)	CN	Description
3,889	60	Woods, Fair, HSG B
6,002	69	50-75% Grass cover, Fair, HSG B
11,091	79	50-75% Grass cover, Fair, HSG C
3,633	98	Paved parking & roofs
24,615	76	Weighted Average
20,982		Pervious Area
3,633		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	36	0.0470	0.09		**Sheet Flow, Through woods**
					Woods: Light underbrush n= 0.400 P2= 3.10"
4.9	64	0.0470	0.22		**Sheet Flow, Through yard**
					Grass: Short n= 0.150 P2= 3.10"
0.4	60	0.1100	2.32		**Shallow Concentrated Flow, Through yard to street**
					Short Grass Pasture Kv= 7.0 fps
12.1	160	Total			

Pond 2: OFFSITE THEN TO WETLANDS

Inflow Area = 0.109 ac, Inflow Depth > 0.91" for Middlesex 010 yr event
Inflow = 0.10 cfs @ 12.16 hrs, Volume= 0.008 af
Primary = 0.10 cfs @ 12.16 hrs, Volume= 0.008 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond 4: OFFSITE THEN TO WETLANDS

Inflow Area = 0.495 ac, Inflow Depth > 0.91" for Middlesex 010 yr event
Inflow = 0.35 cfs @ 12.30 hrs, Volume= 0.038 af
Primary = 0.35 cfs @ 12.30 hrs, Volume= 0.038 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond 5: WETLANDS

Inflow Area = 0.604 ac, Inflow Depth > 0.91" for Middlesex 010 yr event
Inflow = 0.42 cfs @ 12.28 hrs, Volume= 0.046 af
Primary = 0.42 cfs @ 12.28 hrs, Volume= 0.046 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond 7: CENTRAL STREET

Inflow Area = 0.565 ac, Inflow Depth > 1.97" for Middlesex 010 yr event
Inflow = 1.14 cfs @ 12.17 hrs, Volume= 0.093 af
Primary = 1.14 cfs @ 12.17 hrs, Volume= 0.093 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: WOODS TO NORTHWEST Runoff Area=4,727 sf Runoff Depth>1.34"
Flow Length=44' Tc=10.0 min CN=60 Runoff=0.15 cfs 0.012 af

Subcatchment 3: WOODS TO SOUTHEAST Runoff Area=21,564 sf Runoff Depth>1.33"
Flow Length=153' Tc=18.2 min CN=60 Runoff=0.54 cfs 0.055 af

Subcatchment 6: WESTERN HALF OF SITE Runoff Area=24,615 sf Runoff Depth>2.59"
Flow Length=160' Tc=12.1 min CN=76 Runoff=1.50 cfs 0.122 af

Pond 2: OFFSITE THEN TO WETLANDS
Inflow=0.15 cfs 0.012 af
Primary=0.15 cfs 0.012 af

Pond 4: OFFSITE THEN TO WETLANDS
Inflow=0.54 cfs 0.055 af
Primary=0.54 cfs 0.055 af

Pond 5: WETLANDS
Inflow=0.66 cfs 0.067 af
Primary=0.66 cfs 0.067 af

Pond 7: CENTRAL STREET
Inflow=1.50 cfs 0.122 af
Primary=1.50 cfs 0.122 af

Total Runoff Area = 1.169 ac Runoff Volume = 0.189 af Average Runoff Depth = 1.94"
92.86% Pervious Area = 1.085 ac 7.14% Impervious Area = 0.083 ac

Subcatchment 1: WOODS TO NORTHWEST

Runoff = 0.15 cfs @ 12.16 hrs, Volume= 0.012 af, Depth> 1.34"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 025 yr Rainfall=5.30"

Area (sf)	CN	Description
4,727	60	Woods, Fair, HSG B
4,727		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	44		0.07		**Direct Entry, Through woods**

Subcatchment 3: WOODS TO SOUTHEAST

Runoff = 0.54 cfs @ 12.28 hrs, Volume= 0.055 af, Depth> 1.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 025 yr Rainfall=5.30"

Area (sf)	CN	Description
21,564	60	Woods, Fair, HSG B
21,564		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.4	100	0.0350	0.10		**Sheet Flow, Through woods**
					Woods: Light underbrush n= 0.400 P2= 3.10"
0.8	53	0.0500	1.12		**Shallow Concentrated Flow, Through woods toward wetlanc**
					Woodland Kv= 5.0 fps
18.2	153	Total			

Subcatchment 6: WESTERN HALF OF SITE

Runoff = 1.50 cfs @ 12.17 hrs, Volume= 0.122 af, Depth> 2.59"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 025 yr Rainfall=5.30"

Area (sf)	CN	Description
3,889	60	Woods, Fair, HSG B
6,002	69	50-75% Grass cover, Fair, HSG B
11,091	79	50-75% Grass cover, Fair, HSG C
3,633	98	Paved parking & roofs
24,615	76	Weighted Average
20,982		Pervious Area
3,633		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	36	0.0470	0.09		**Sheet Flow, Through woods**
					Woods: Light underbrush n= 0.400 P2= 3.10"
4.9	64	0.0470	0.22		**Sheet Flow, Through yard**
					Grass: Short n= 0.150 P2= 3.10"
0.4	60	0.1100	2.32		**Shallow Concentrated Flow, Through yard to street**
					Short Grass Pasture Kv= 7.0 fps
12.1	160	Total			

Pond 2: OFFSITE THEN TO WETLANDS

Inflow Area = 0.109 ac, Inflow Depth > 1.34" for Middlesex 025 yr event
Inflow = 0.15 cfs @ 12.16 hrs, Volume= 0.012 af
Primary = 0.15 cfs @ 12.16 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond 4: OFFSITE THEN TO WETLANDS

Inflow Area = 0.495 ac, Inflow Depth > 1.33" for Middlesex 025 yr event
Inflow = 0.54 cfs @ 12.28 hrs, Volume= 0.055 af
Primary = 0.54 cfs @ 12.28 hrs, Volume= 0.055 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond 5: WETLANDS

Inflow Area = 0.604 ac, Inflow Depth > 1.33" for Middlesex 025 yr event
Inflow = 0.66 cfs @ 12.26 hrs, Volume= 0.067 af
Primary = 0.66 cfs @ 12.26 hrs, Volume= 0.067 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond 7: CENTRAL STREET

Inflow Area = 0.565 ac, Inflow Depth > 2.59" for Middlesex 025 yr event
Inflow = 1.50 cfs @ 12.17 hrs, Volume= 0.122 af
Primary = 1.50 cfs @ 12.17 hrs, Volume= 0.122 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Subcatchment 1: WOODS TO NORTHWEST

Runoff = 0.24 cfs @ 12.15 hrs, Volume= 0.019 af, Depth> 2.06"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 100 yr Rainfall=6.50"

Area (sf)	CN	Description
4,727	60	Woods, Fair, HSG B
4,727		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	44		0.07		**Direct Entry, Through woods**

Subcatchment 3: WOODS TO SOUTHEAST

Runoff = 0.87 cfs @ 12.27 hrs, Volume= 0.085 af, Depth> 2.05"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 100 yr Rainfall=6.50"

Area (sf)	CN	Description
21,564	60	Woods, Fair, HSG B
21,564		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.4	100	0.0350	0.10		**Sheet Flow, Through woods**
					Woods: Light underbrush n= 0.400 P2= 3.10"
0.8	53	0.0500	1.12		**Shallow Concentrated Flow, Through woods toward wetland**
					Woodland Kv= 5.0 fps
18.2	153	Total			

Subcatchment 6: WESTERN HALF OF SITE

Runoff = 2.06 cfs @ 12.17 hrs, Volume= 0.168 af, Depth> 3.56"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 100 yr Rainfall=6.50"

Area (sf)	CN	Description
3,889	60	Woods, Fair, HSG B
6,002	69	50-75% Grass cover, Fair, HSG B
11,091	79	50-75% Grass cover, Fair, HSG C
3,633	98	Paved parking & roofs
24,615	76	Weighted Average
20,982		Pervious Area
3,633		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8	36	0.0470	0.09		**Sheet Flow, Through woods**
					Woods: Light underbrush n= 0.400 P2= 3.10"
4.9	64	0.0470	0.22		**Sheet Flow, Through yard**
					Grass: Short n= 0.150 P2= 3.10"
0.4	60	0.1100	2.32		**Shallow Concentrated Flow, Through yard to street**
					Short Grass Pasture Kv= 7.0 fps
12.1	160	Total			

Pond 2: OFFSITE THEN TO WETLANDS

Inflow Area = 0.109 ac, Inflow Depth > 2.06" for Middlesex 100 yr event
Inflow = 0.24 cfs @ 12.15 hrs, Volume= 0.019 af
Primary = 0.24 cfs @ 12.15 hrs, Volume= 0.019 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond 4: OFFSITE THEN TO WETLANDS

Inflow Area = 0.495 ac, Inflow Depth > 2.05" for Middlesex 100 yr event
Inflow = 0.87 cfs @ 12.27 hrs, Volume= 0.085 af
Primary = 0.87 cfs @ 12.27 hrs, Volume= 0.085 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond 5: WETLANDS

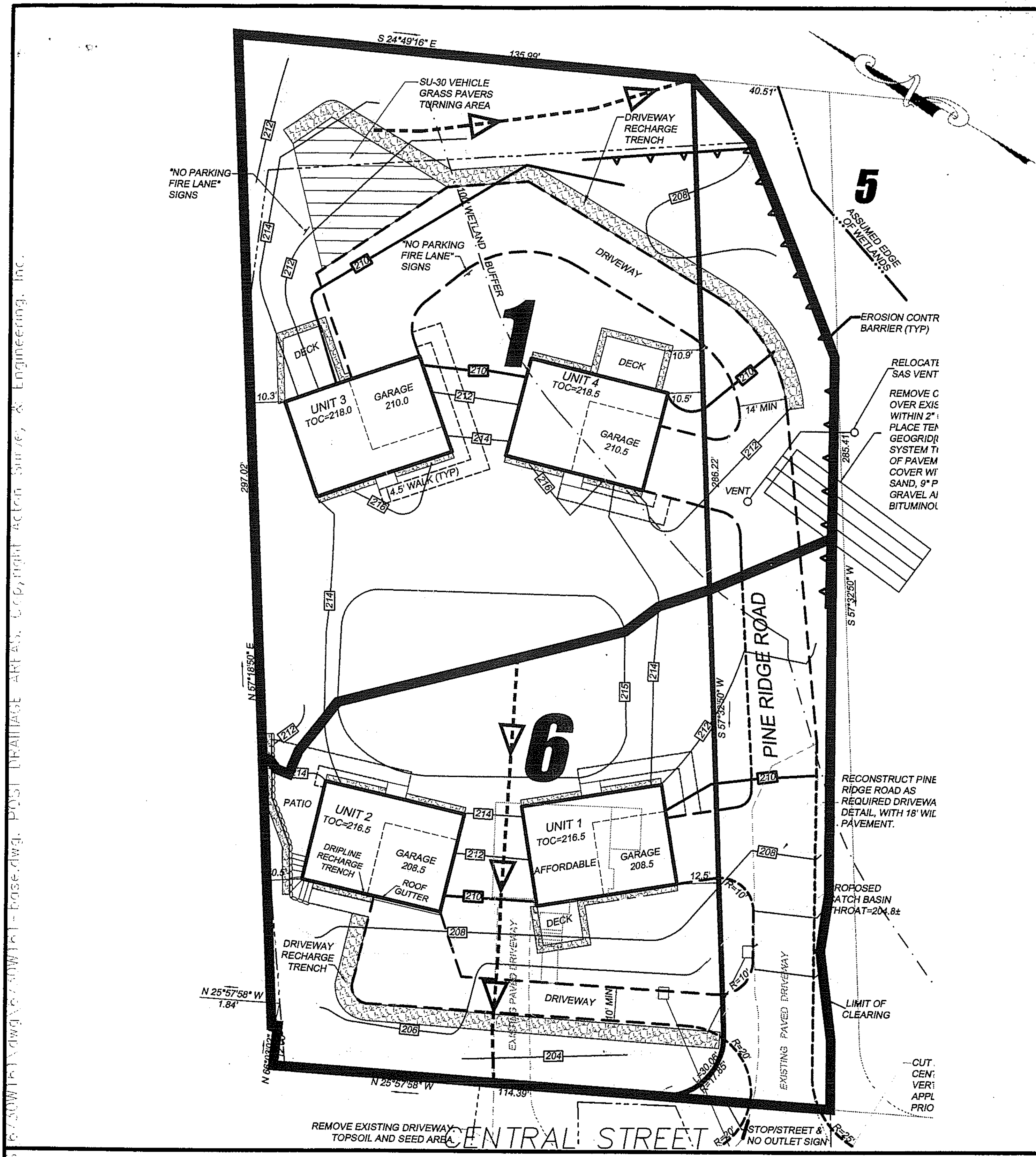
Inflow Area = 0.604 ac, Inflow Depth > 2.05" for Middlesex 100 yr event
Inflow = 1.05 cfs @ 12.25 hrs, Volume= 0.103 af
Primary = 1.05 cfs @ 12.25 hrs, Volume= 0.103 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond 7: CENTRAL STREET

Inflow Area = 0.565 ac, Inflow Depth > 3.56" for Middlesex 100 yr event
Inflow = 2.06 cfs @ 12.17 hrs, Volume= 0.168 af
Primary = 2.06 cfs @ 12.17 hrs, Volume= 0.168 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs



POST-DEVELOPMENT DRAINAGE AREAS

MARSH VIEW

93 CENTRAL STREET
ACTON, MA

PREPARED FOR:

MARSH VIEW, LLC

SCALE: 1"=40' SEPTEMBER 29, 2009

Acton Survey & Engineering, Inc.
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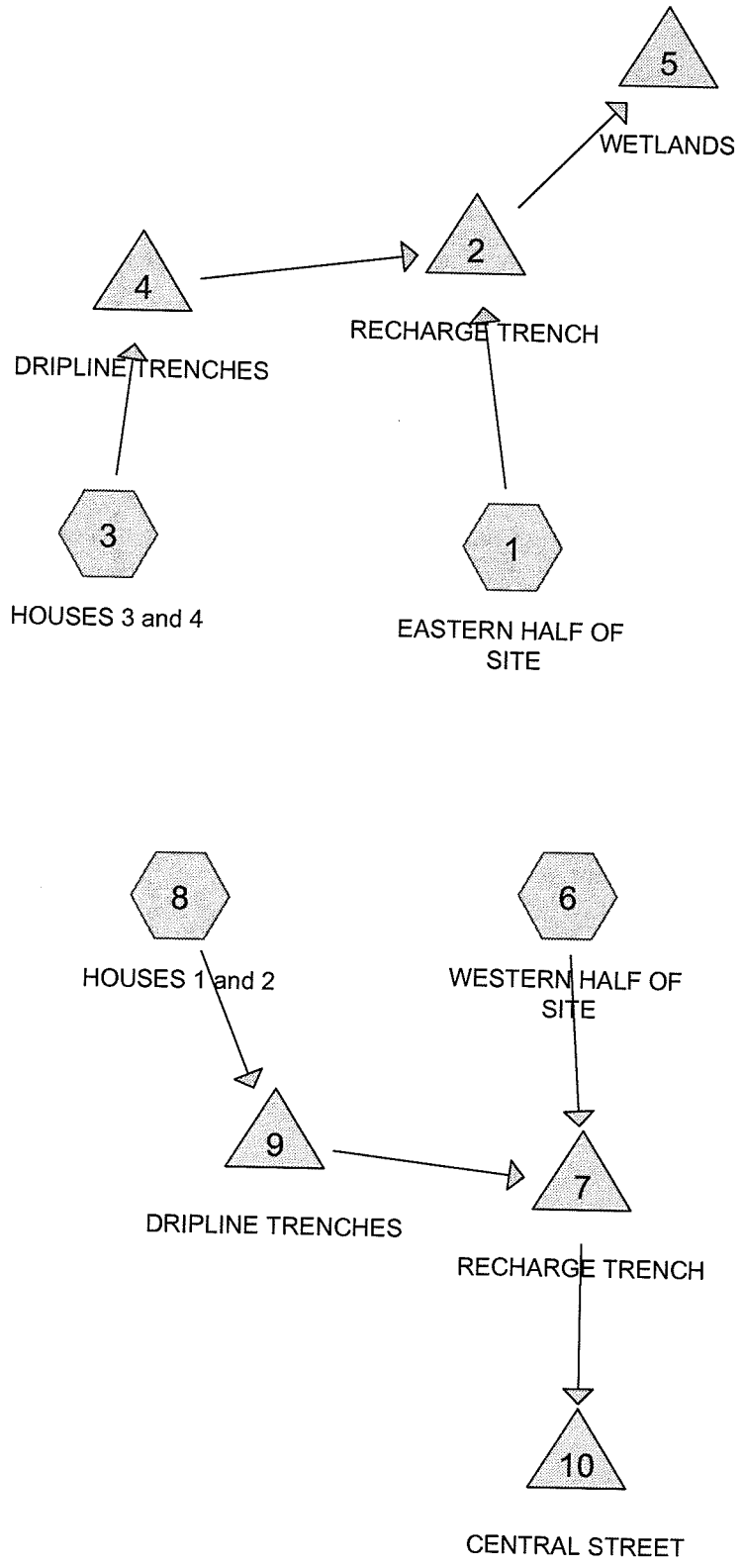

Subcat Reach Pond Link

Drainage Diagram for 6730-POST
Prepared by Acton Survey & Engineering 9/30/2009
HydroCAD® 8.00 s/n 000857 © 2006 HydroCAD Software Solutions LLC

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: EASTERN HALF OF SITE Runoff Area=26,411 sf Runoff Depth>0.56"
Flow Length=97' Slope=0.0620 '/' Tc=13.5 min CN=67 Runoff=0.29 cfs 0.029 af

Subcatchment 3: HOUSES 3 and 4 Runoff Area=2,520 sf Runoff Depth>2.68"
Tc=10.0 min CN=98 Runoff=0.15 cfs 0.013 af

Subcatchment 6: WESTERN HALF OF SITE Runoff Area=19,074 sf Runoff Depth>1.22"
Flow Length=128' Tc=10.0 min CN=80 Runoff=0.58 cfs 0.045 af

Subcatchment 8: HOUSES 1 and 2 Runoff Area=2,897 sf Runoff Depth>2.68"
Tc=10.0 min CN=98 Runoff=0.17 cfs 0.015 af

Pond 2: RECHARGE TRENCH Peak Elev=2.00' Storage=670 cf Inflow=0.46 cfs 0.036 af
Discarded=0.02 cfs 0.014 af Primary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.014 af

Pond 4: DRIPLINE TRENCHES Peak Elev=0.51' Storage=74 cf Inflow=0.15 cfs 0.013 af
Discarded=0.01 cfs 0.008 af Primary=0.19 cfs 0.007 af Outflow=0.20 cfs 0.016 af

Pond 5: WETLANDS Inflow=0.00 cfs 0.000 af
Primary=0.00 cfs 0.000 af

Pond 7: RECHARGE TRENCH Peak Elev=2.01' Storage=498 cf Inflow=0.74 cfs 0.049 af
Discarded=0.02 cfs 0.012 af Primary=0.37 cfs 0.004 af Outflow=0.39 cfs 0.016 af

Pond 9: DRIPLINE TRENCHES Peak Elev=0.50' Storage=87 cf Inflow=0.17 cfs 0.015 af
Discarded=0.01 cfs 0.010 af Primary=0.16 cfs 0.005 af Outflow=0.17 cfs 0.014 af

Pond 10: CENTRAL STREET Inflow=0.37 cfs 0.004 af
Primary=0.37 cfs 0.004 af

Total Runoff Area = 1.169 ac Runoff Volume = 0.101 af Average Runoff Depth = 1.04"
68.03% Pervious Area = 0.795 ac 31.97% Impervious Area = 0.374 ac

Subcatchment 1: EASTERN HALF OF SITE

Runoff = 0.29 cfs @ 12.22 hrs, Volume= 0.029 af, Depth> 0.56"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 002 yr Rainfall=3.10"

Area (sf)	CN	Description
4,467	60	Woods, Fair, HSG B
4,060	98	Paved parking & roofs
17,168	61	>75% Grass cover, Good, HSG B
716	74	>75% Grass cover, Good, HSG C
26,411	67	Weighted Average
22,351		Pervious Area
4,060		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	97	0.0620	0.12		**Sheet Flow, through woods to wetlands** Woods: Light underbrush n= 0.400 P2= 3.10"

Subcatchment 3: HOUSES 3 and 4

Runoff = 0.15 cfs @ 12.14 hrs, Volume= 0.013 af, Depth> 2.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 002 yr Rainfall=3.10"

Area (sf)	CN	Description
2,520	98	Paved parking & roofs
2,520		Impervious Area

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

Subcatchment 6: WESTERN HALF OF SITE

Runoff = 0.58 cfs @ 12.15 hrs, Volume= 0.045 af, Depth> 1.22"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 002 yr Rainfall=3.10"

Area (sf)	CN	Description
7,979	74	>75% Grass cover, Good, HSG C
4,299	61	>75% Grass cover, Good, HSG B
6,796	98	Paved parking & roofs
19,074	80	Weighted Average
12,278		Pervious Area
6,796		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	128		0.21		**Direct Entry, over lawn, driveway, to prop line**

Subcatchment 8: HOUSES 1 and 2

Runoff = 0.17 cfs @ 12.14 hrs, Volume= 0.015 af, Depth> 2.68"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 002 yr Rainfall=3.10"

Area (sf)	CN	Description
2,897	98	Paved parking & roofs
2,897		Impervious Area

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

Pond 2: RECHARGE TRENCH

Inflow Area = 0.664 ac, Inflow Depth > 0.65" for Middlesex 002 yr event
Inflow = 0.46 cfs @ 12.19 hrs, Volume= 0.036 af
Outflow = 0.02 cfs @ 12.80 hrs, Volume= 0.014 af, Atten= 95%, Lag= 36.4 min
Discarded = 0.02 cfs @ 12.81 hrs, Volume= 0.014 af
Primary = 0.00 cfs @ 12.80 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2.00' @ 12.81 hrs Surf.Area= 916 sf Storage= 670 cf

Plug-Flow detention time= 224.2 min calculated for 0.014 af (40% of inflow)
Center-of-Mass det. time= 134.8 min (958.5 - 823.7)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	670 cf	**4.00'W x 190.00'L x 2.00'H Prismatoid Z=0.2** 1,676 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	2.00'	**190.0' long x 2.5' 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 Coef. (English) 2.48 2.60 2.60 2.60 2.64 2.65 2.68 2.75 2.74 2.76 2.89 3.05 3.19 3.32

Discarded OutFlow Max=0.02 cfs @ 12.81 hrs HW=2.00' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 12.80 hrs HW=2.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 0.00 cfs @ 0.01 fps)

Pond 4: DRIPLINE TRENCHES

Inflow Area =	0.058 ac,	Inflow Depth >	2.68"	for Middlesex 002 yr event
Inflow =	0.15 cfs @	12.14 hrs,	Volume=	0.013 af
Outflow =	0.20 cfs @	12.14 hrs,	Volume=	0.016 af, Atten= 0%, Lag= 0.0 min
Discarded =	0.01 cfs @	10.35 hrs,	Volume=	0.008 af
Primary =	0.19 cfs @	12.14 hrs,	Volume=	0.007 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 4
Peak Elev= 0.51' @ 12.14 hrs Surf.Area= 372 sf Storage= 74 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 38.1 min (779.9 - 741.9)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	74 cf	**2.00'W x 186.00'L x 0.50'H Prismatoid** 186 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	0.50'	**186.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Discarded	0.00'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 10.35 hrs HW=0.01' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.19 cfs @ 12.14 hrs HW=0.51' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.19 cfs @ 0.19 fps)

Pond 5: WETLANDS

Inflow Area =	0.664 ac,	Inflow Depth =	0.00"	for Middlesex 002 yr event
Inflow =	0.00 cfs @	12.80 hrs,	Volume=	0.000 af
Primary =	0.00 cfs @	12.80 hrs,	Volume=	0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond 7: RECHARGE TRENCH

Inflow Area = 0.504 ac, Inflow Depth > 1.17" for Middlesex 002 yr event
Inflow = 0.74 cfs @ 12.15 hrs, Volume= 0.049 af
Outflow = 0.39 cfs @ 12.21 hrs, Volume= 0.016 af, Atten= 48%, Lag= 4.0 min
Discarded = 0.02 cfs @ 12.20 hrs, Volume= 0.012 af
Primary = 0.37 cfs @ 12.21 hrs, Volume= 0.004 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2.01' @ 12.20 hrs Surf.Area= 681 sf Storage= 498 cf

Plug-Flow detention time= 161.2 min calculated for 0.016 af (33% of inflow)
Center-of-Mass det. time= 74.9 min (876.2 - 801.4)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	498 cf	**4.00'W x 141.00'L x 2.00'H Prismatoid Z=0.2** 1,244 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	2.00'	**141.0' long x 2.5' 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 Coef. (English) 2.48 2.60 2.60 2.60 2.64 2.65 2.68 2.75 2.74 2.76 2.89 3.05 3.19 3.32

Discarded OutFlow Max=0.02 cfs @ 12.20 hrs HW=2.01' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.19 cfs @ 12.21 hrs HW=2.01' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 0.19 cfs @ 0.20 fps)

Pond 9: DRIPLINE TRENCHES

Inflow Area = 0.067 ac, Inflow Depth > 2.68" for Middlesex 002 yr event
Inflow = 0.17 cfs @ 12.14 hrs, Volume= 0.015 af
Outflow = 0.17 cfs @ 12.14 hrs, Volume= 0.014 af, Atten= 1%, Lag= 0.0 min
Discarded = 0.01 cfs @ 10.40 hrs, Volume= 0.010 af
Primary = 0.16 cfs @ 12.14 hrs, Volume= 0.005 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 4
Peak Elev= 0.50' @ 12.14 hrs Surf.Area= 436 sf Storage= 87 cf

Plug-Flow detention time= 56.8 min calculated for 0.014 af (97% of inflow)
Center-of-Mass det. time= 45.5 min (787.4 - 741.9)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	87 cf	**2.00'W x 218.00'L x 0.50'H Prismatoid** 218 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	0.50'	**218.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Discarded	0.00'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 10.40 hrs HW=0.01' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.14 cfs @ 12.14 hrs HW=0.50' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.14 cfs @ 0.17 fps)

Pond 10: CENTRAL STREET

Inflow Area = 0.504 ac, Inflow Depth = 0.09" for Middlesex 002 yr event
Inflow = 0.37 cfs @ 12.21 hrs, Volume= 0.004 af
Primary = 0.37 cfs @ 12.21 hrs, Volume= 0.004 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: EASTERN HALF OF SITE Runoff Area=26,411 sf Runoff Depth>1.33"
Flow Length=97' Slope=0.0620 '/' Tc=13.5 min CN=67 Runoff=0.77 cfs 0.067 af

Subcatchment 3: HOUSES 3 and 4 Runoff Area=2,520 sf Runoff Depth>3.96"
Tc=10.0 min CN=98 Runoff=0.22 cfs 0.019 af

Subcatchment 6: WESTERN HALF OF SITE Runoff Area=19,074 sf Runoff Depth>2.29"
Flow Length=128' Tc=10.0 min CN=80 Runoff=1.09 cfs 0.084 af

Subcatchment 8: HOUSES 1 and 2 Runoff Area=2,897 sf Runoff Depth>3.96"
Tc=10.0 min CN=98 Runoff=0.25 cfs 0.022 af

Pond 2: RECHARGE TRENCH Peak Elev=2.00' Storage=670 cf Inflow=0.91 cfs 0.072 af
Discarded=0.02 cfs 0.016 af Primary=0.31 cfs 0.003 af Outflow=0.33 cfs 0.018 af

Pond 4: DRIPLINE TRENCHES Peak Elev=0.50' Storage=74 cf Inflow=0.22 cfs 0.019 af
Discarded=0.01 cfs 0.010 af Primary=0.17 cfs 0.005 af Outflow=0.18 cfs 0.014 af

Pond 5: WETLANDS Inflow=0.31 cfs 0.003 af
Primary=0.31 cfs 0.003 af

Pond 7: RECHARGE TRENCH Peak Elev=2.02' Storage=498 cf Inflow=1.33 cfs 0.092 af
Discarded=0.02 cfs 0.014 af Primary=1.07 cfs 0.029 af Outflow=1.09 cfs 0.043 af

Pond 9: DRIPLINE TRENCHES Peak Elev=0.51' Storage=87 cf Inflow=0.25 cfs 0.022 af
Discarded=0.01 cfs 0.011 af Primary=0.24 cfs 0.009 af Outflow=0.25 cfs 0.020 af

Pond 10: CENTRAL STREET Inflow=1.07 cfs 0.029 af
Primary=1.07 cfs 0.029 af

Total Runoff Area = 1.169 ac Runoff Volume = 0.192 af Average Runoff Depth = 1.97"
68.03% Pervious Area = 0.795 ac 31.97% Impervious Area = 0.374 ac

Subcatchment 1: EASTERN HALF OF SITE

Runoff = 0.77 cfs @ 12.20 hrs, Volume= 0.067 af, Depth> 1.33"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 010 yr Rainfall=4.50"

Area (sf)	CN	Description
4,467	60	Woods, Fair, HSG B
4,060	98	Paved parking & roofs
17,168	61	>75% Grass cover, Good, HSG B
716	74	>75% Grass cover, Good, HSG C
26,411	67	Weighted Average
22,351		Pervious Area
4,060		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	97	0.0620	0.12		**Sheet Flow, through woods to wetlands** Woods: Light underbrush n= 0.400 P2= 3.10"

Subcatchment 3: HOUSES 3 and 4

Runoff = 0.22 cfs @ 12.14 hrs, Volume= 0.019 af, Depth> 3.96"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 010 yr Rainfall=4.50"

Area (sf)	CN	Description
2,520	98	Paved parking & roofs
2,520		Impervious Area

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

Subcatchment 6: WESTERN HALF OF SITE

Runoff = 1.09 cfs @ 12.14 hrs, Volume= 0.084 af, Depth> 2.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 010 yr Rainfall=4.50"

Area (sf)	CN	Description
7,979	74	>75% Grass cover, Good, HSG C
4,299	61	>75% Grass cover, Good, HSG B
6,796	98	Paved parking & roofs
19,074	80	Weighted Average
12,278		Pervious Area
6,796		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	128		0.21		**Direct Entry, over lawn, driveway, to prop line**

Subcatchment 8: HOUSES 1 and 2

Runoff = 0.25 cfs @ 12.14 hrs, Volume= 0.022 af, Depth> 3.96"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 010 yr Rainfall=4.50"

Area (sf)	CN	Description
2,897	98	Paved parking & roofs
2,897		Impervious Area

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

Pond 2: RECHARGE TRENCH

Inflow Area = 0.664 ac, Inflow Depth > 1.30" for Middlesex 010 yr event
Inflow = 0.91 cfs @ 12.19 hrs, Volume= 0.072 af
Outflow = 0.33 cfs @ 12.26 hrs, Volume= 0.018 af, Atten= 63%, Lag= 4.5 min
Discarded = 0.02 cfs @ 12.25 hrs, Volume= 0.016 af
Primary = 0.31 cfs @ 12.26 hrs, Volume= 0.003 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2.00' @ 12.25 hrs Surf.Area= 916 sf Storage= 670 cf

Plug-Flow detention time= 188.7 min calculated for 0.018 af (25% of inflow)
Center-of-Mass det. time= 92.8 min (910.4 - 817.5)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	670 cf	**4.00'W x 190.00'L x 2.00'H Prismatoid Z=0.2** 1,676 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	2.00'	**190.0' long x 2.5' 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 Coef. (English) 2.48 2.60 2.60 2.60 2.64 2.65 2.68 2.75 2.74 2.76 2.89 3.05 3.19 3.32

Discarded OutFlow Max=0.02 cfs @ 12.25 hrs HW=2.00' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.13 cfs @ 12.26 hrs HW=2.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 0.13 cfs @ 0.16 fps)

Pond 4: DRIPLINE TRENCHES

Inflow Area =	0.058 ac,	Inflow Depth >	3.96"	for Middlesex 010 yr event
Inflow =	0.22 cfs @	12.14 hrs,	Volume=	0.019 af
Outflow =	0.18 cfs @	12.14 hrs,	Volume=	0.014 af, Atten= 17%, Lag= 0.0 min
Discarded =	0.01 cfs @	9.05 hrs,	Volume=	0.010 af
Primary =	0.17 cfs @	12.14 hrs,	Volume=	0.005 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 4
Peak Elev= 0.50' @ 12.14 hrs Surf.Area= 372 sf Storage= 74 cf

Plug-Flow detention time= 98.4 min calculated for 0.014 af (76% of inflow)
Center-of-Mass det. time= 37.3 min (776.0 - 738.7)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	74 cf	**2.00'W x 186.00'L x 0.50'H Prismatoid** 186 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	0.50'	**186.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Discarded	0.00'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 9.05 hrs HW=0.01' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.17 cfs @ 12.14 hrs HW=0.50' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.17 cfs @ 0.19 fps)

Pond 5: WETLANDS

Inflow Area =	0.664 ac,	Inflow Depth =	0.05"	for Middlesex 010 yr event
Inflow =	0.31 cfs @	12.26 hrs,	Volume=	0.003 af
Primary =	0.31 cfs @	12.26 hrs,	Volume=	0.003 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond 7: RECHARGE TRENCH

Inflow Area =	0.504 ac,	Inflow Depth >	2.20"	for Middlesex 010 yr event
Inflow =	1.33 cfs @	12.14 hrs,	Volume=	0.092 af
Outflow =	1.09 cfs @	12.14 hrs,	Volume=	0.043 af, Atten= 18%, Lag= 0.0 min
Discarded =	0.02 cfs @	11.95 hrs,	Volume=	0.014 af
Primary =	1.07 cfs @	12.14 hrs,	Volume=	0.029 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2.02' @ 12.14 hrs Surf.Area= 681 sf Storage= 498 cf

Plug-Flow detention time= 69.5 min calculated for 0.043 af (46% of inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	498 cf	**4.00'W x 141.00'L x 2.00'H Prismatoid Z=0.2** 1,244 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	2.00'	**141.0' long x 2.5' 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 Coef. (English) 2.48 2.60 2.60 2.60 2.64 2.65 2.68 2.75 2.74 2.76 2.89 3.05 3.19 3.32

Discarded OutFlow Max=0.02 cfs @ 11.95 hrs HW=2.01' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=1.05 cfs @ 12.14 hrs HW=2.02' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 1.05 cfs @ 0.36 fps)

Pond 9: DRIPLINE TRENCHES

Inflow Area =	0.067 ac,	Inflow Depth >	3.96"	for Middlesex 010 yr event
Inflow =	0.25 cfs @	12.14 hrs,	Volume=	0.022 af
Outflow =	0.25 cfs @	12.14 hrs,	Volume=	0.020 af, Atten= 3%, Lag= 0.0 min
Discarded =	0.01 cfs @	9.10 hrs,	Volume=	0.011 af
Primary =	0.24 cfs @	12.14 hrs,	Volume=	0.009 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 4
Peak Elev= 0.51' @ 12.13 hrs Surf.Area= 436 sf Storage= 87 cf

Plug-Flow detention time= 62.9 min calculated for 0.020 af (91% of inflow)
Center-of-Mass det. time= 32.6 min (771.3 - 738.7)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	87 cf	**2.00'W x 218.00'L x 0.50'H Prismatoid** 218 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	0.50'	**218.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Discarded	0.00'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 9.10 hrs HW=0.01' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.23 cfs @ 12.14 hrs HW=0.51' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 0.23 cfs @ 0.20 fps)

Pond 10: CENTRAL STREET

Inflow Area = 0.504 ac, Inflow Depth = 0.68" for Middlesex 010 yr event
Inflow = 1.07 cfs @ 12.14 hrs, Volume= 0.029 af
Primary = 1.07 cfs @ 12.14 hrs, Volume= 0.029 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: EASTERN HALF OF SITE Runoff Area=26,411 sf Runoff Depth>1.84"
Flow Length=97' Slope=0.0620 '/' Tc=13.5 min CN=67 Runoff=1.09 cfs 0.093 af

Subcatchment 3: HOUSES 3 and 4 Runoff Area=2,520 sf Runoff Depth>4.69"
Tc=10.0 min CN=98 Runoff=0.26 cfs 0.023 af

Subcatchment 6: WESTERN HALF OF SITE Runoff Area=19,074 sf Runoff Depth>2.95"
Flow Length=128' Tc=10.0 min CN=80 Runoff=1.40 cfs 0.108 af

Subcatchment 8: HOUSES 1 and 2 Runoff Area=2,897 sf Runoff Depth>4.69"
Tc=10.0 min CN=98 Runoff=0.30 cfs 0.026 af

Pond 2: RECHARGE TRENCH Peak Elev=2.02' Storage=670 cf Inflow=1.32 cfs 0.109 af
Discarded=0.02 cfs 0.016 af Primary=1.23 cfs 0.051 af Outflow=1.25 cfs 0.067 af

Pond 4: DRIPLINE TRENCHES Peak Elev=0.51' Storage=74 cf Inflow=0.26 cfs 0.023 af
Discarded=0.01 cfs 0.010 af Primary=0.27 cfs 0.016 af Outflow=0.28 cfs 0.026 af

Pond 5: WETLANDS Inflow=1.23 cfs 0.051 af
Primary=1.23 cfs 0.051 af

Pond 7: RECHARGE TRENCH Peak Elev=2.02' Storage=498 cf Inflow=1.66 cfs 0.116 af
Discarded=0.02 cfs 0.015 af Primary=1.30 cfs 0.034 af Outflow=1.32 cfs 0.049 af

Pond 9: DRIPLINE TRENCHES Peak Elev=0.51' Storage=87 cf Inflow=0.30 cfs 0.026 af
Discarded=0.01 cfs 0.012 af Primary=0.26 cfs 0.009 af Outflow=0.27 cfs 0.020 af

Pond 10: CENTRAL STREET Inflow=1.30 cfs 0.034 af
Primary=1.30 cfs 0.034 af

Total Runoff Area = 1.169 ac Runoff Volume = 0.249 af Average Runoff Depth = 2.56"
68.03% Pervious Area = 0.795 ac 31.97% Impervious Area = 0.374 ac

Subcatchment 1: EASTERN HALF OF SITE

Runoff = 1.09 cfs @ 12.20 hrs, Volume= 0.093 af, Depth> 1.84"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 025 yr Rainfall=5.30"

Area (sf)	CN	Description
4,467	60	Woods, Fair, HSG B
4,060	98	Paved parking & roofs
17,168	61	>75% Grass cover, Good, HSG B
716	74	>75% Grass cover, Good, HSG C
26,411	67	Weighted Average
22,351		Pervious Area
4,060		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	97	0.0620	0.12		**Sheet Flow, through woods to wetlands** Woods: Light underbrush n= 0.400 P2= 3.10"

Subcatchment 3: HOUSES 3 and 4

Runoff = 0.26 cfs @ 12.14 hrs, Volume= 0.023 af, Depth> 4.69"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 025 yr Rainfall=5.30"

Area (sf)	CN	Description
2,520	98	Paved parking & roofs
2,520		Impervious Area

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

Subcatchment 6: WESTERN HALF OF SITE

Runoff = 1.40 cfs @ 12.14 hrs, Volume= 0.108 af, Depth> 2.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 025 yr Rainfall=5.30"

Area (sf)	CN	Description
7,979	74	>75% Grass cover, Good, HSG C
4,299	61	>75% Grass cover, Good, HSG B
6,796	98	Paved parking & roofs
19,074	80	Weighted Average
12,278		Pervious Area
6,796		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	128		0.21		**Direct Entry, over lawn, driveway, to prop line**

Subcatchment 8: HOUSES 1 and 2

Runoff = 0.30 cfs @ 12.14 hrs, Volume= 0.026 af, Depth> 4.69"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 025 yr Rainfall=5.30"

Area (sf)	CN	Description
2,897	98	Paved parking & roofs
2,897		Impervious Area

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

Pond 2: RECHARGE TRENCH

Inflow Area = 0.664 ac, Inflow Depth > 1.97" for Middlesex 025 yr event
Inflow = 1.32 cfs @ 12.19 hrs, Volume= 0.109 af
Outflow = 1.25 cfs @ 12.19 hrs, Volume= 0.067 af, Atten= 5%, Lag= 0.0 min
Discarded = 0.02 cfs @ 12.10 hrs, Volume= 0.016 af
Primary = 1.23 cfs @ 12.19 hrs, Volume= 0.051 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2.02' @ 12.19 hrs Surf.Area= 916 sf Storage= 670 cf

Plug-Flow detention time= 60.0 min calculated for 0.067 af (61% of inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	670 cf	**4.00'W x 190.00'L x 2.00'H Prismatoid Z=0.2** 1,676 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	2.00'	**190.0' long x 2.5' 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 Coef. (English) 2.48 2.60 2.60 2.60 2.64 2.65 2.68 2.75 2.74 2.76 2.89 3.05 3.19 3.32

Discarded OutFlow Max=0.02 cfs @ 12.10 hrs HW=2.01' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=1.16 cfs @ 12.19 hrs HW=2.02' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 1.16 cfs @ 0.34 fps)

Pond 4: DRIPLINE TRENCHES

Inflow Area =	0.058 ac,	Inflow Depth >	4.69"	for Middlesex 025 yr event
Inflow =	0.26 cfs @	12.14 hrs,	Volume=	0.023 af
Outflow =	0.28 cfs @	12.14 hrs,	Volume=	0.026 af, Atten= 0%, Lag= 0.0 min
Discarded =	0.01 cfs @	8.55 hrs,	Volume=	0.010 af
Primary =	0.27 cfs @	12.14 hrs,	Volume=	0.016 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 4
Peak Elev= 0.51' @ 12.14 hrs Surf.Area= 372 sf Storage= 74 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 27.3 min (765.0 - 737.7)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	74 cf	**2.00'W x 186.00'L x 0.50'H Prismatoid** 186 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	0.50'	**186.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Discarded	0.00'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 8.55 hrs HW=0.01' (Free Discharge)
↑**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.25 cfs @ 12.14 hrs HW=0.51' (Free Discharge)
↑**1=Broad-Crested Rectangular Weir** (Weir Controls 0.25 cfs @ 0.21 fps)

Pond 5: WETLANDS

Inflow Area =	0.664 ac,	Inflow Depth =	0.91"	for Middlesex 025 yr event
Inflow =	1.23 cfs @	12.19 hrs,	Volume=	0.051 af
Primary =	1.23 cfs @	12.19 hrs,	Volume=	0.051 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond 7: RECHARGE TRENCH

Inflow Area = 0.504 ac, Inflow Depth > 2.77" for Middlesex 025 yr event
Inflow = 1.66 cfs @ 12.14 hrs, Volume= 0.116 af
Outflow = 1.32 cfs @ 12.14 hrs, Volume= 0.049 af, Atten= 21%, Lag= 0.0 min
Discarded = 0.02 cfs @ 11.85 hrs, Volume= 0.015 af
Primary = 1.30 cfs @ 12.14 hrs, Volume= 0.034 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2.02' @ 12.14 hrs Surf.Area= 681 sf Storage= 498 cf

Plug-Flow detention time= 69.2 min calculated for 0.049 af (42% of inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	498 cf	**4.00'W x 141.00'L x 2.00'H Prismatoid Z=0.2** 1,244 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	2.00'	**141.0' long x 2.5' 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 Coef. (English) 2.48 2.60 2.60 2.60 2.64 2.65 2.68 2.75 2.74 2.76 2.89 3.05 3.19 3.32

Discarded OutFlow Max=0.02 cfs @ 11.85 hrs HW=2.00' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=1.24 cfs @ 12.14 hrs HW=2.02' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 1.24 cfs @ 0.38 fps)

Pond 9: DRIPLINE TRENCHES

Inflow Area = 0.067 ac, Inflow Depth > 4.69" for Middlesex 025 yr event
Inflow = 0.30 cfs @ 12.14 hrs, Volume= 0.026 af
Outflow = 0.27 cfs @ 12.14 hrs, Volume= 0.020 af, Atten= 9%, Lag= 0.0 min
Discarded = 0.01 cfs @ 8.60 hrs, Volume= 0.012 af
Primary = 0.26 cfs @ 12.14 hrs, Volume= 0.009 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 4
Peak Elev= 0.51' @ 12.14 hrs Surf.Area= 436 sf Storage= 87 cf

Plug-Flow detention time= 81.9 min calculated for 0.020 af (78% of inflow)
Center-of-Mass det. time= 25.6 min (763.3 - 737.7)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	87 cf	**2.00'W x 218.00'L x 0.50'H Prismatoid** 218 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	0.50'	**218.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Discarded	0.00'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 8.60 hrs HW=0.01' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.25 cfs @ 12.14 hrs HW=0.51' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.25 cfs @ 0.20 fps)

Pond 10: CENTRAL STREET

Inflow Area = 0.504 ac, Inflow Depth = 0.82" for Middlesex 025 yr event
Inflow = 1.30 cfs @ 12.14 hrs, Volume= 0.034 af
Primary = 1.30 cfs @ 12.14 hrs, Volume= 0.034 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: EASTERN HALF OF SITE Runoff Area=26,411 sf Runoff Depth>2.69"
Flow Length=97' Slope=0.0620 '/' Tc=13.5 min CN=67 Runoff=1.60 cfs 0.136 af

Subcatchment 3: HOUSES 3 and 4 Runoff Area=2,520 sf Runoff Depth>5.78"
Tc=10.0 min CN=98 Runoff=0.32 cfs 0.028 af

Subcatchment 6: WESTERN HALF OF SITE Runoff Area=19,074 sf Runoff Depth>3.97"
Flow Length=128' Tc=10.0 min CN=80 Runoff=1.87 cfs 0.145 af

Subcatchment 8: HOUSES 1 and 2 Runoff Area=2,897 sf Runoff Depth>5.78"
Tc=10.0 min CN=98 Runoff=0.37 cfs 0.032 af

Pond 2: RECHARGE TRENCH Peak Elev=2.03' Storage=670 cf Inflow=1.87 cfs 0.150 af
Discarded=0.02 cfs 0.018 af Primary=2.08 cfs 0.178 af Outflow=2.11 cfs 0.196 af

Pond 4: DRIPLINE TRENCHES Peak Elev=0.51' Storage=74 cf Inflow=0.32 cfs 0.028 af
Discarded=0.01 cfs 0.010 af Primary=0.30 cfs 0.014 af Outflow=0.31 cfs 0.024 af

Pond 5: WETLANDS Inflow=2.08 cfs 0.178 af
Primary=2.08 cfs 0.178 af

Pond 7: RECHARGE TRENCH Peak Elev=2.03' Storage=498 cf Inflow=2.23 cfs 0.167 af
Discarded=0.02 cfs 0.016 af Primary=2.17 cfs 0.114 af Outflow=2.19 cfs 0.130 af

Pond 9: DRIPLINE TRENCHES Peak Elev=0.51' Storage=87 cf Inflow=0.37 cfs 0.032 af
Discarded=0.01 cfs 0.012 af Primary=0.37 cfs 0.022 af Outflow=0.38 cfs 0.034 af

Pond 10: CENTRAL STREET Inflow=2.17 cfs 0.114 af
Primary=2.17 cfs 0.114 af

Total Runoff Area = 1.169 ac Runoff Volume = 0.341 af Average Runoff Depth = 3.50"
68.03% Pervious Area = 0.795 ac 31.97% Impervious Area = 0.374 ac

Subcatchment 1: EASTERN HALF OF SITE

Runoff = 1.60 cfs @ 12.20 hrs, Volume= 0.136 af, Depth> 2.69"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 100 yr Rainfall=6.50"

Area (sf)	CN	Description
4,467	60	Woods, Fair, HSG B
4,060	98	Paved parking & roofs
17,168	61	>75% Grass cover, Good, HSG B
716	74	>75% Grass cover, Good, HSG C
26,411	67	Weighted Average
22,351		Pervious Area
4,060		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	97	0.0620	0.12		**Sheet Flow, through woods to wetlands** Woods: Light underbrush n= 0.400 P2= 3.10"

Subcatchment 3: HOUSES 3 and 4

Runoff = 0.32 cfs @ 12.14 hrs, Volume= 0.028 af, Depth> 5.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 100 yr Rainfall=6.50"

Area (sf)	CN	Description
2,520	98	Paved parking & roofs
2,520		Impervious Area

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

Subcatchment 6: WESTERN HALF OF SITE

Runoff = 1.87 cfs @ 12.14 hrs, Volume= 0.145 af, Depth> 3.97"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 100 yr Rainfall=6.50"

Area (sf)	CN	Description
7,979	74	>75% Grass cover, Good, HSG C
4,299	61	>75% Grass cover, Good, HSG B
6,796	98	Paved parking & roofs
19,074	80	Weighted Average
12,278		Pervious Area
6,796		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	128		0.21		**Direct Entry, over lawn, driveway, to prop line**

Subcatchment 8: HOUSES 1 and 2

Runoff = 0.37 cfs @ 12.14 hrs, Volume= 0.032 af, Depth> 5.78"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr Middlesex 100 yr Rainfall=6.50"

Area (sf)	CN	Description
2,897	98	Paved parking & roofs
2,897		Impervious Area

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

Pond 2: RECHARGE TRENCH

Inflow Area = 0.664 ac, Inflow Depth > 2.71" for Middlesex 100 yr event
Inflow = 1.87 cfs @ 12.18 hrs, Volume= 0.150 af
Outflow = 2.11 cfs @ 12.18 hrs, Volume= 0.196 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.02 cfs @ 12.00 hrs, Volume= 0.018 af
Primary = 2.08 cfs @ 12.18 hrs, Volume= 0.178 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2.03' @ 12.18 hrs Surf.Area= 916 sf Storage= 670 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 25.3 min (826.6 - 801.3)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	670 cf	**4.00'W x 190.00'L x 2.00'H Prismatoid Z=0.2** 1,676 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	2.00'	**190.0' long x 2.5' 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 Coef. (English) 2.48 2.60 2.60 2.60 2.64 2.65 2.68 2.75 2.74 2.76 2.89 3.05 3.19 3.32

Discarded OutFlow Max=0.02 cfs @ 12.00 hrs HW=2.02' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=1.97 cfs @ 12.18 hrs HW=2.03' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 1.97 cfs @ 0.40 fps)

Pond 4: DRIPLINE TRENCHES

Inflow Area =	0.058 ac,	Inflow Depth >	5.78"	for Middlesex 100 yr event
Inflow =	0.32 cfs @	12.14 hrs,	Volume=	0.028 af
Outflow =	0.31 cfs @	12.14 hrs,	Volume=	0.024 af, Atten= 2%, Lag= 0.0 min
Discarded =	0.01 cfs @	7.90 hrs,	Volume=	0.010 af
Primary =	0.30 cfs @	12.14 hrs,	Volume=	0.014 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 4
Peak Elev= 0.51' @ 12.14 hrs Surf.Area= 372 sf Storage= 74 cf

Plug-Flow detention time= 52.9 min calculated for 0.024 af (87% of inflow)
Center-of-Mass det. time= 14.1 min (750.9 - 736.7)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	74 cf	**2.00'W x 186.00'L x 0.50'H Prismatoid** 186 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	0.50'	**186.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Discarded	0.00'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 7.90 hrs HW=0.01' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.29 cfs @ 12.14 hrs HW=0.51' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.29 cfs @ 0.22 fps)

Pond 5: WETLANDS

Inflow Area =	0.664 ac,	Inflow Depth >	3.22"	for Middlesex 100 yr event
Inflow =	2.08 cfs @	12.18 hrs,	Volume=	0.178 af
Primary =	2.08 cfs @	12.18 hrs,	Volume=	0.178 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Pond 7: RECHARGE TRENCH

Inflow Area = 0.504 ac, Inflow Depth > 3.97" for Middlesex 100 yr event
Inflow = 2.23 cfs @ 12.14 hrs, Volume= 0.167 af
Outflow = 2.19 cfs @ 12.14 hrs, Volume= 0.130 af, Atten= 2%, Lag= 0.0 min
Discarded = 0.02 cfs @ 11.40 hrs, Volume= 0.016 af
Primary = 2.17 cfs @ 12.14 hrs, Volume= 0.114 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 2.03' @ 12.14 hrs Surf.Area= 681 sf Storage= 498 cf

Plug-Flow detention time= 37.9 min calculated for 0.130 af (78% of inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	498 cf	**4.00'W x 141.00'L x 2.00'H Prismatoid Z=0.2** 1,244 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	**1.020 in/hr Exfiltration over Surface area**
#2	Primary	2.00'	**141.0' long x 2.5' 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 Coef. (English) 2.48 2.60 2.60 2.60 2.64 2.65 2.68 2.75 2.74 2.76 2.89 3.05 3.19 3.32

Discarded OutFlow Max=0.02 cfs @ 11.40 hrs HW=2.00' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=2.07 cfs @ 12.14 hrs HW=2.03' (Free Discharge)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 2.07 cfs @ 0.45 fps)

Pond 9: DRIPLINE TRENCHES

Inflow Area = 0.067 ac, Inflow Depth > 5.78" for Middlesex 100 yr event
Inflow = 0.37 cfs @ 12.14 hrs, Volume= 0.032 af
Outflow = 0.38 cfs @ 12.14 hrs, Volume= 0.034 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.01 cfs @ 8.00 hrs, Volume= 0.012 af
Primary = 0.37 cfs @ 12.14 hrs, Volume= 0.022 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 4
Peak Elev= 0.51' @ 12.14 hrs Surf.Area= 436 sf Storage= 87 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 23.1 min (759.9 - 736.7)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	87 cf	**2.00'W x 218.00'L x 0.50'H Prismatoid** 218 cf Overall x 40.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	0.50'	**218.0' long x 1.0' 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 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32
#2	Discarded	0.00'	**1.020 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 8.00 hrs HW=0.01' (Free Discharge)
↑—**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.34 cfs @ 12.14 hrs HW=0.51' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 0.34 cfs @ 0.22 fps)

Pond 10: CENTRAL STREET

Inflow Area = 0.504 ac, Inflow Depth = 2.72" for Middlesex 100 yr event
Inflow = 2.17 cfs @ 12.14 hrs, Volume= 0.114 af
Primary = 2.17 cfs @ 12.14 hrs, Volume= 0.114 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs