SUPPLEMENTAL DATA REPORT

"RENWICK WAY"
45 MAIN STREET
ACTON, MA

April 26, 2006

Prepared for:

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Whenever land is developed, an increased amount of stormwater runoff is generated. It is the responsibility of the engineer to determine this increase in runoff and attenuate it so as not to adversely effect abutting lands. To accomplish this attenuation of flow and the balancing of peak off-site discharges, extended detention basins and infiltration systems have been designed. To best determine the amount of increased runoff, pre-development calculations must be compared to post-development calculations.

These studies are based on the recommendations and requirements of the Westford Planning Board, Conservation Commission and DEP's Stormwater Management Policy, and in accordance with standard engineering practice.

The hydrologic analysis determines peak rates of stormwater runoff for the pre-development and post-development conditions. Basic engineering techniques, including the use of hydrographs, allow for the determination of the current conditions, as well as what effect this development would have on the surrounding environment, and for the mitigation of this impact. The 100-year, 25-year, 10-year and 2-year storm events were analyzed for this site development. Appendix D.4 contains computer generated data for the pre and post-development conditions. The basis for these calculations are:

- Stormwater volume and peak rate of stormwater runoff were determined using the U.S. Department of Agriculture, Soil Conservation Service TR-20, using HydroCAD software.

- Type III distribution of storm rainfall with respect to time as applies for this part of the United States was used in these calculations in order to determine peak rates of runoff.

- Soil Classification established from the U.S. Department of Agriculture, Soil Conservation Service soil maps.

- Soil Hydrologic Group classifications were taken from the U.S. Department of Agriculture, Soil Conservation Service.

- Runoff Curve Number (CN) taken from the CN Determination Tables. The CN Determination Tables were compiled using base Curve Number Data from Technical Release #55.

- Runoff Equation is:

$$Q = \frac{(p-0.2s)^2}{(p+0.8s)}$$

where

Q= Accumulated direct surface runoff in inches

p= Accumulated rainfall (potential maximum runoff in inches)

s= Potential maximum retention = 1000/CN - 10

- Antecedent Moisture Condition (AMC) is based on the total rainfall in the five-day period preceding a storm.

- AMC II represents the average condition and was used for these calculations.

- A twenty-four hour storm duration was used.

LANDTECH Consultants, Inc.

Hydrologic Summary
Renwick Way
Acton, Massachusetts

April 26, 2006

2 Year Storm

	Pre-Development		Post-Development		Peak Flow Change (Percent)
Point of Analysis	SubCatchment Areas	Peak Flow (c.f.s.)	SubCatchment Areas	Peak Flow (c.f.s.)	
MAIN STREET WEST	1S	0.45	1S	0.34	-24%
ABUTTER SOUTH WEST	2S	0.26	2S	0.24	-8%
WETLANDS EAST	3S	2.88	99R	1.88	-35%

10 Year Storm

	Pre-Development		Post-Development		Peak Flow Change (Percent)
Point of Analysis	SubCatchment Areas	Peak Flow (c.f.s.)	SubCatchment Areas	Peak Flow (c.f.s.)	
MAIN STREET WEST	1S	0.71	1S	0.54	-24%
ABUTTER SOUTH WEST	2S	0.55	2S	0.45	-18%
WETLANDS EAST	3S	5.61	99R	4.89	-13%

25 Year Storm

	Pre-Development		Post-Development		Peak Flow Change (Percent)
Point of Analysis	SubCatchment Areas	Peak Flow (c.f.s.)	SubCatchment Areas	Peak Flow (c.f.s.)	
MAIN STREET WEST	1S	0.87	1S	0.66	-24%
ABUTTER SOUTH WEST	2S	0.73	2S	0.58	-21%
WETLANDS EAST	3S	7.27	99R	7.14	-2%

Hydrologic Summary
Renwick Way
Acton, Massachusetts

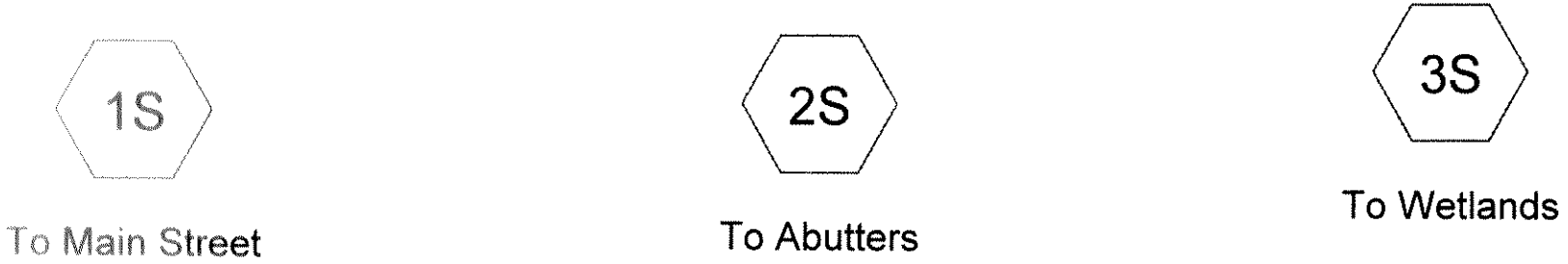
April 26, 2006

100 Year Storm

	Pre-Development		Post-Development		
Point of Analysis	SubCatchment Areas	Peak Flow (c.f.s.)	SubCatchment Areas	Peak Flow (c.f.s.)	Peak Flow Change (Percent)
MAIN STREET WEST	1S	1.08	1S	0.82	-24%
ABUTTER SOUTH WEST	2S	0.99	2S	0.77	-22%
WETLANDS EAST	3S	9.60	99R	9.48	-1%

2-YEAR STORM

PRE-DEVELOPMENT



Subcat Reach Pond Link

Drainage Diagram for DRAINAGE-PRE
Prepared by LANDTECH Consultants, INC. 4/25/2006
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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 1S: To Main Street Runoff Area=8,494 sf Runoff Depth=1.95"
Flow Length=534' Tc=7.2 min CN=90 Runoff=0.45 cfs 0.032 af

Subcatchment 2S: To Abutters Runoff Area=9,104 sf Runoff Depth=0.89"
Tc=0.0 min CN=74 Runoff=0.26 cfs 0.015 af

Subcatchment 3S: To Wetlands Runoff Area=92,826 sf Runoff Depth=1.10"
Flow Length=429' Tc=6.0 min CN=78 Runoff=2.88 cfs 0.196 af

Total Runoff Area = 2.535 ac Runoff Volume = 0.243 af Average Runoff Depth = 1.15"

Subcatchment 1S: To Main Street

Runoff = 0.45 cfs @ 12.10 hrs, Volume= 0.032 af, Depth= 1.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR Rainfall=3.10"

Area (sf)	CN	Description
653	73	trees
3,441	98	impervious
4,400	87	gravel
8,494	90	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	534	0.0350	1.2		**Lag/CN Method, 1**

Subcatchment 2S: To Abutters

Runoff = 0.26 cfs @ 12.01 hrs, Volume= 0.015 af, Depth= 0.89"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR Rainfall=3.10"

Area (sf)	CN	Description
8,712	73	trees
174	98	impervious
218	87	gravel
9,104	74	Weighted Average

Subcatchment 3S: To Wetlands

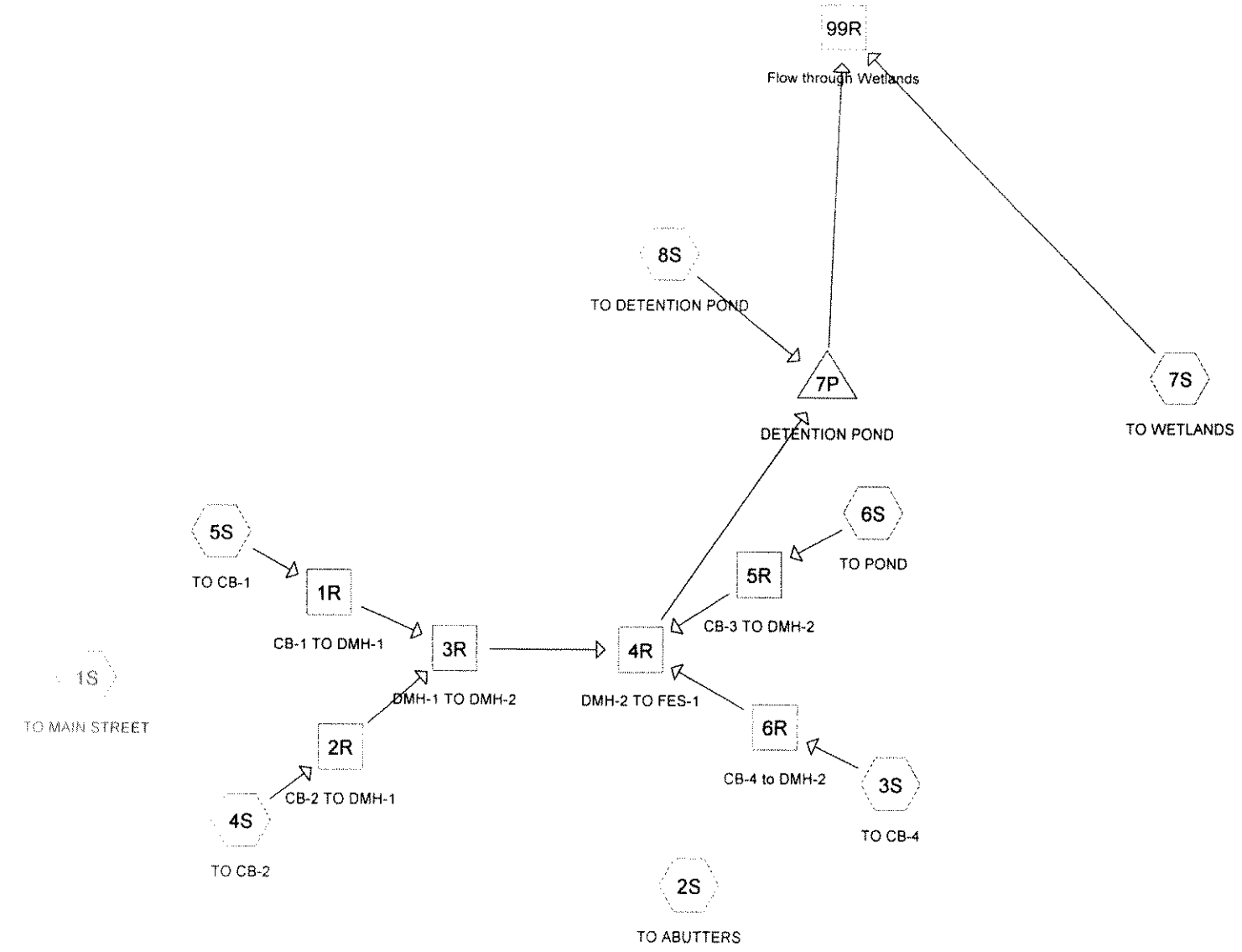
Runoff = 2.88 cfs @ 12.10 hrs, Volume= 0.196 af, Depth= 1.10"

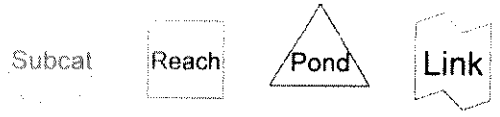
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR Rainfall=3.10"

Area (sf)	CN	Description
67,518	73	trees
8,668	98	impervious
16,640	87	gravel
92,826	78	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	429	0.0815	1.2		**Lag/CN Method,**

POST-DEVELOPMENT





Drainage Diagram for post

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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 1S: TO MAIN STREET Runoff Area=6,109 sf Runoff Depth=1.95"
Flow Length=293' Tc=5.1 min CN=90 Runoff=0.34 cfs 0.023 af

Subcatchment 2S: TO ABUTTERS Runoff Area=6,489 sf Runoff Depth=1.16"
Flow Length=119' Tc=2.7 min CN=79 Runoff=0.24 cfs 0.014 af

Subcatchment 3S: TO CB-4 Runoff Area=6,258 sf Runoff Depth=1.71"
Flow Length=117' Tc=2.3 min CN=87 Runoff=0.34 cfs 0.020 af

Subcatchment 4S: TO CB-2 Runoff Area=1,144 sf Runoff Depth=2.68"
Flow Length=115' Tc=1.5 min CN=98 Runoff=0.09 cfs 0.006 af

Subcatchment 5S: TO CB-1 Runoff Area=1,142 sf Runoff Depth=2.68"
Flow Length=115' Tc=1.5 min CN=98 Runoff=0.09 cfs 0.006 af

Subcatchment 6S: TO POND Runoff Area=20,711 sf Runoff Depth=1.42"
Flow Length=343' Tc=6.4 min CN=83 Runoff=0.82 cfs 0.056 af

Subcatchment 7S: TO WETLANDS Runoff Area=45,407 sf Runoff Depth=1.22"
Flow Length=340' Tc=5.8 min CN=80 Runoff=1.58 cfs 0.106 af

Subcatchment 8S: TO DETENTION POND Runoff Area=23,196 sf Runoff Depth=1.16"
Tc=0.0 min CN=79 Runoff=0.89 cfs 0.052 af

Reach 1R: CB-1 TO DMH-1 Peak Depth=0.10' Max Vel=2.2 fps Inflow=0.09 cfs 0.006 af
D=12.0" n=0.013 L=13.0' S=0.0154 '/' Capacity=4.42 cfs Outflow=0.08 cfs 0.006 af

Reach 2R: CB-2 TO DMH-1 Peak Depth=0.10' Max Vel=2.0 fps Inflow=0.09 cfs 0.006 af
D=12.0" n=0.013 L=17.0' S=0.0118 '/' Capacity=3.86 cfs Outflow=0.08 cfs 0.006 af

Reach 3R: DMH-1 TO DMH-2 Peak Depth=0.15' Max Vel=2.3 fps Inflow=0.17 cfs 0.012 af
D=12.0" n=0.013 L=195.0' S=0.0100 '/' Capacity=3.56 cfs Outflow=0.16 cfs 0.012 af

Reach 4R: DMH-2 TO FES-1 Peak Depth=0.41' Max Vel=3.5 fps Inflow=1.24 cfs 0.088 af
D=15.0" n=0.013 L=31.0' S=0.0068 '/' Capacity=5.32 cfs Outflow=1.24 cfs 0.088 af

Reach 5R: CB-3 TO DMH-2 Peak Depth=0.24' Max Vel=5.6 fps Inflow=0.82 cfs 0.056 af
D=12.0" n=0.013 L=12.0' S=0.0325 '/' Capacity=6.42 cfs Outflow=0.82 cfs 0.056 af

Reach 6R: CB-4 to DMH-2 Peak Depth=0.17' Max Vel=3.9 fps Inflow=0.34 cfs 0.020 af
D=12.0" n=0.013 L=16.0' S=0.0244 '/' Capacity=5.56 cfs Outflow=0.34 cfs 0.020 af

Reach 99R: Flow through Wetlands Peak Depth=0.02' Max Vel=0.3 fps Inflow=1.88 cfs 0.238 af
n=0.035 L=1.0' S=0.0100 '/' Capacity=1,272.81 cfs Outflow=1.88 cfs 0.238 af

Pond 7P: DETENTION POND

Peak Elev=87.03' Storage=2,510 cf Inflow=1.89 cfs 0.140 af
Outflow=0.39 cfs 0.132 af

Total Runoff Area = 2.536 ac Runoff Volume = 0.284 af Average Runoff Depth = 1.34"

Subcatchment 1S: TO MAIN STREET

Runoff = 0.34 cfs @ 12.08 hrs, Volume= 0.023 af, Depth= 1.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR Rainfall=3.10"

Area (sf)	CN	Description
3,543	98	IMPERVIOUS
2,566	79	50-75% Grass cover, Fair, HSG C
6,109	90	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	293	0.0273	1.0		**Lag/CN Method,**

Subcatchment 2S: TO ABUTTERS

Runoff = 0.24 cfs @ 12.05 hrs, Volume= 0.014 af, Depth= 1.16"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR Rainfall=3.10"

Area (sf)	CN	Description
6,489	79	50-75% Grass cover, Fair, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	119	0.0500	0.7		**Lag/CN Method,**

Subcatchment 3S: TO CB-4

Runoff = 0.34 cfs @ 12.04 hrs, Volume= 0.020 af, Depth= 1.71"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR Rainfall=3.10"

Area (sf)	CN	Description
2,721	98	IMPERVIOUS
3,537	79	50-75% Grass cover, Fair, HSG C
6,258	87	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	117	0.0400	0.9		**Lag/CN Method,**

Subcatchment 4S: TO CB-2

Runoff = 0.09 cfs @ 12.02 hrs, Volume= 0.006 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 2 YEAR Rainfall=3.10"

Area (sf)	CN	Description
1,144	98	IMPERVIOUS

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	115	0.0320	1.3		**Lag/CN Method,**

Subcatchment 5S: TO CB-1

Runoff = 0.09 cfs @ 12.02 hrs, Volume= 0.006 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 2 YEAR Rainfall=3.10"

Area (sf)	CN	Description
1,142	98	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	115	0.0320	1.3		**Lag/CN Method,**

Subcatchment 6S: TO POND

Runoff = 0.82 cfs @ 12.10 hrs, Volume= 0.056 af, Depth= 1.42"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR Rainfall=3.10"

Area (sf)	CN	Description
5,227	98	IMPERVIOUS
14,285	79	50-75% Grass cover, Fair, HSG C
1,199	73	Woods, Fair, HSG C
20,711	83	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	343	0.0370	0.9		**Lag/CN Method,**

Subcatchment 7S: TO WETLANDS

Runoff = 1.58 cfs @ 12.09 hrs, Volume= 0.106 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 2 YEAR Rainfall=3.10"

Area (sf)	CN	Description
17,327	73	Woods, Fair, HSG C
6,727	98	IMPERVIOUS
21,353	79	50-75% Grass cover, Fair, HSG C
45,407	80	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	340	0.0529	1.0		**Lag/CN Method,**

Subcatchment 8S: TO DETENTION POND

Runoff = 0.89 cfs @ 12.01 hrs, Volume= 0.052 af, Depth= 1.16"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2 YEAR Rainfall=3.10"

Area (sf)	CN	Description
2,547	73	Woods, Fair, HSG C
296	98	
20,353	79	50-75% Grass cover, Fair, HSG C
23,196	79	Weighted Average

Reach 1R: CB-1 TO DMH-1

Inflow Area = 0.026 ac, Inflow Depth = 2.68" for 2 YEAR event
Inflow = 0.09 cfs @ 12.02 hrs, Volume= 0.006 af
Outflow = 0.08 cfs @ 12.03 hrs, Volume= 0.006 af, Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 2.2 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 0.8 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.10' @ 12.02 hrs
Capacity at bank full= 4.42 cfs
Inlet Invert= 89.66', Outlet Invert= 89.46'
12.0" Diameter Pipe n= 0.013 Length= 13.0' Slope= 0.0154 '/'

Reach 2R: CB-2 TO DMH-1

Inflow Area = 0.026 ac, Inflow Depth = 2.68" for 2 YEAR event
Inflow = 0.09 cfs @ 12.02 hrs, Volume= 0.006 af
Outflow = 0.08 cfs @ 12.03 hrs, Volume= 0.006 af, Atten= 2%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 2.0 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 0.7 fps, Avg. Travel Time= 0.4 min

Peak Depth= 0.10' @ 12.02 hrs
Capacity at bank full= 3.86 cfs
Inlet Invert= 89.66', Outlet Invert= 89.46'
12.0" Diameter Pipe n= 0.013 Length= 17.0' Slope= 0.0118 '/'

Reach 3R: DMH-1 TO DMH-2

Inflow Area = 0.052 ac, Inflow Depth = 2.68" for 2 YEAR event
Inflow = 0.17 cfs @ 12.03 hrs, Volume= 0.012 af
Outflow = 0.16 cfs @ 12.07 hrs, Volume= 0.012 af, Atten= 7%, Lag= 2.5 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.3 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 0.9 fps, Avg. Travel Time= 3.8 min

Peak Depth= 0.15' @ 12.05 hrs
Capacity at bank full= 3.56 cfs
Inlet Invert= 89.36', Outlet Invert= 87.41'
12.0" Diameter Pipe n= 0.013 Length= 195.0' Slope= 0.0100 '/'

Reach 4R: DMH-2 TO FES-1

Inflow Area = 0.672 ac, Inflow Depth = 1.58" for 2 YEAR event
Inflow = 1.24 cfs @ 12.08 hrs, Volume= 0.088 af
Outflow = 1.24 cfs @ 12.08 hrs, Volume= 0.088 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.5 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.2 fps, Avg. Travel Time= 0.4 min

Peak Depth= 0.41' @ 12.08 hrs
Capacity at bank full= 5.32 cfs
Inlet Invert= 87.31', Outlet Invert= 87.10'
15.0" Diameter Pipe n= 0.013 Length= 31.0' Slope= 0.0068 '/'

Reach 5R: CB-3 TO DMH-2

Inflow Area = 0.475 ac, Inflow Depth = 1.42" for 2 YEAR event
Inflow = 0.82 cfs @ 12.10 hrs, Volume= 0.056 af
Outflow = 0.82 cfs @ 12.10 hrs, Volume= 0.056 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.6 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 2.2 fps, Avg. Travel Time= 0.1 min

Peak Depth= 0.24' @ 12.10 hrs
Capacity at bank full= 6.42 cfs
Inlet Invert= 87.80', Outlet Invert= 87.41'
12.0" Diameter Pipe n= 0.013 Length= 12.0' Slope= 0.0325 '/'

Reach 6R: CB-4 to DMH-2

Inflow Area = 0.144 ac, Inflow Depth = 1.71" for 2 YEAR event
Inflow = 0.34 cfs @ 12.04 hrs, Volume= 0.020 af
Outflow = 0.34 cfs @ 12.04 hrs, Volume= 0.020 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.9 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.4 fps, Avg. Travel Time= 0.2 min

Peak Depth= 0.17' @ 12.04 hrs
Capacity at bank full= 5.56 cfs
Inlet Invert= 87.80', Outlet Invert= 87.41'
12.0" Diameter Pipe n= 0.013 Length= 16.0' Slope= 0.0244 '/'

Reach 99R: Flow through Wetlands

Inflow Area = 2.247 ac, Inflow Depth = 1.27" for 2 YEAR event
Inflow = 1.88 cfs @ 12.10 hrs, Volume= 0.238 af
Outflow = 1.88 cfs @ 12.10 hrs, Volume= 0.238 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.3 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 0.2 fps, Avg. Travel Time= 0.1 min

Peak Depth= 0.02' @ 12.10 hrs
Capacity at bank full= 1,272.81 cfs
Inlet Invert= 76.00', Outlet Invert= 75.99'
300.00' x 1.00' deep channel, n= 0.035 Length= 1.0' Slope= 0.0100 '/'
Side Slope Z-value= 1.0 '/'

Pond 7P: DETENTION POND

Inflow Area =	1.204 ac,	Inflow Depth =	1.40"	for	2 YEAR event
Inflow =	1.89 cfs @	12.05 hrs,	Volume=	0.140 af	
Outflow =	0.39 cfs @	12.53 hrs,	Volume=	0.132 af,	Atten= 79%, Lag= 29.2 min
Primary =	0.39 cfs @	12.53 hrs,	Volume=	0.132 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 87.03' @ 12.53 hrs Surf.Area= 2,497 sf Storage= 2,510 cf
Plug-Flow detention time= 92.8 min calculated for 0.132 af (94% of inflow)
Center-of-Mass det. time= 72.5 min (865.2 - 792.7)

#	Invert	Avail.Storage	Storage Description
1	86.00'	15,509 cf	**Custom Stage Data (Prismatic)** Listed below

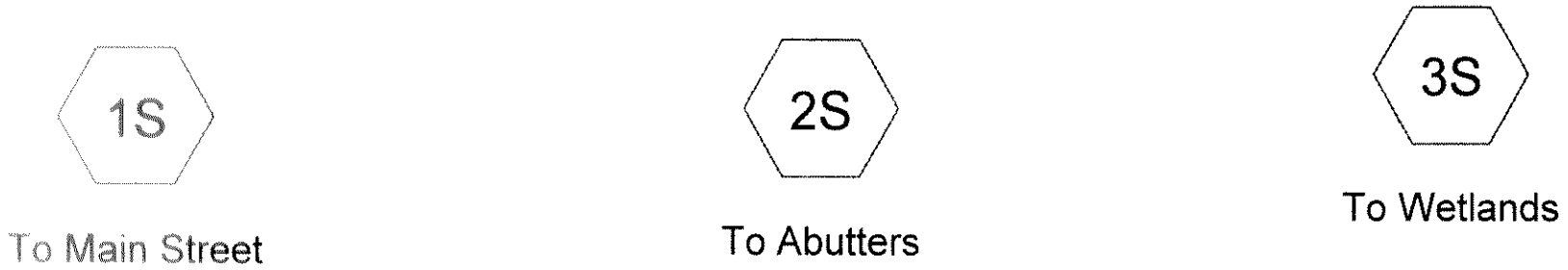
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
86.00	419	0	0
88.00	4,456	4,875	4,875
90.00	6,178	10,634	15,509

#	Routing	Invert	Outlet Devices
1	Primary	89.00'	**5.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
2	Primary	86.00'	**4.0" Vert. Orifice/Grate** C= 0.600
3	Primary	87.30'	**0.17' x 0.17' Horiz. Orifice/Grate X 49.00** Limited to weir flow C= 0.600

Primary OutFlow Max=0.39 cfs @ 12.53 hrs HW=87.03' (Free Discharge)
- **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
- **2=Orifice/Grate** (Orifice Controls 0.39 cfs @ 4.5 fps)
- **3=Orifice/Grate** (Controls 0.00 cfs)

10-YEAR STORM

PRE-DEVELOPMENT



Subcat Reach Pond Link

Drainage Diagram for DRAINAGE-PRE
Prepared by LANDTECH Consultants, INC. 4/25/2006
HydroCAD® 7.00 s/n 000798 © 1986-2003 Applied Microcomputer Systems

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Runoff by SCS TR-20 method, UH=SCS
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: To Main Street Runoff Area=8,494 sf Runoff Depth=3.21"
Flow Length=534' Tc=7.2 min CN=90 Runoff=0.71 cfs 0.052 af

Subcatchment 2S: To Abutters Runoff Area=9,104 sf Runoff Depth=1.83"
Tc=0.0 min CN=74 Runoff=0.55 cfs 0.032 af

Subcatchment 3S: To Wetlands Runoff Area=92,826 sf Runoff Depth=2.13"
Flow Length=429' Tc=6.0 min CN=78 Runoff=5.61 cfs 0.378 af

Total Runoff Area = 2.535 ac Runoff Volume = 0.462 af Average Runoff Depth = 2.19"

Subcatchment 1S: To Main Street

Runoff = 0.71 cfs @ 12.10 hrs, Volume= 0.052 af, Depth= 3.21"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=4.50"

Area (sf)	CN	Description
653	73	trees
3,441	98	impervious
4,400	87	gravel
8,494	90	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	534	0.0350	1.2		**Lag/CN Method, 1**

Subcatchment 2S: To Abutters

Runoff = 0.55 cfs @ 12.01 hrs, Volume= 0.032 af, Depth= 1.83"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=4.50"

Area (sf)	CN	Description
8,712	73	trees
174	98	impervious
218	87	gravel
9,104	74	Weighted Average

Subcatchment 3S: To Wetlands

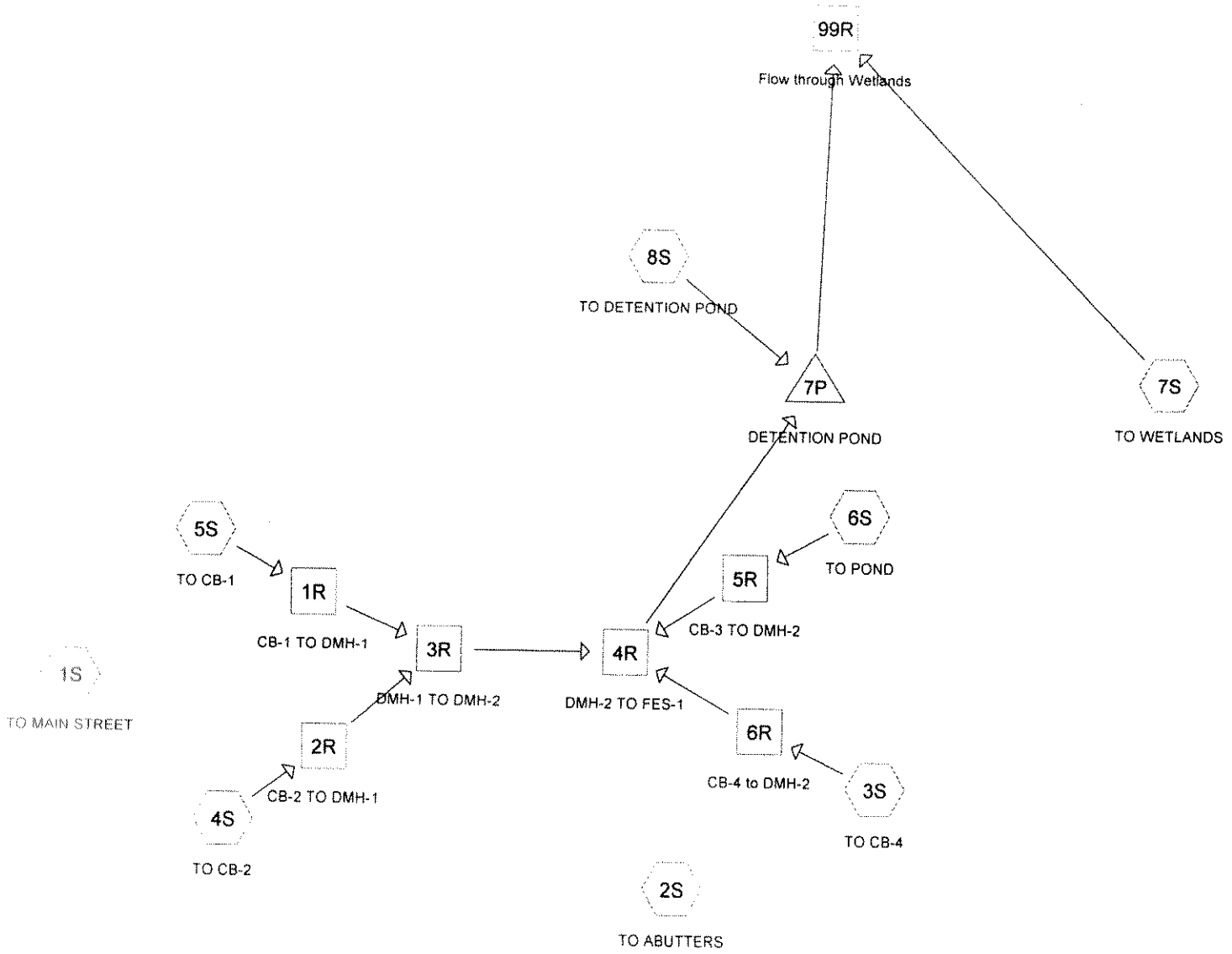
Runoff = 5.61 cfs @ 12.09 hrs, Volume= 0.378 af, Depth= 2.13"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=4.50"

Area (sf)	CN	Description
67,518	73	trees
8,668	98	impervious
16,640	87	gravel
92,826	78	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	429	0.0815	1.2		**Lag/CN Method,**

POST-DEVELOPMENT



Subcat Reach Pond Link

Drainage Diagram for post

Prepared by LANDTECH Consultants, INC. 4/25/2006

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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 1S: TO MAIN STREET Runoff Area=6,109 sf Runoff Depth=3.21"
Flow Length=293' Tc=5.1 min CN=90 Runoff=0.54 cfs 0.037 af

Subcatchment 2S: TO ABUTTERS Runoff Area=6,489 sf Runoff Depth=2.21"
Flow Length=119' Tc=2.7 min CN=79 Runoff=0.45 cfs 0.027 af

Subcatchment 3S: TO CB-4 Runoff Area=6,258 sf Runoff Depth=2.92"
Flow Length=117' Tc=2.3 min CN=87 Runoff=0.56 cfs 0.035 af

Subcatchment 4S: TO CB-2 Runoff Area=1,144 sf Runoff Depth=3.96"
Flow Length=115' Tc=1.5 min CN=98 Runoff=0.13 cfs 0.009 af

Subcatchment 5S: TO CB-1 Runoff Area=1,142 sf Runoff Depth=3.96"
Flow Length=115' Tc=1.5 min CN=98 Runoff=0.13 cfs 0.009 af

Subcatchment 6S: TO POND Runoff Area=20,711 sf Runoff Depth=2.55"
Flow Length=343' Tc=6.4 min CN=83 Runoff=1.47 cfs 0.101 af

Subcatchment 7S: TO WETLANDS Runoff Area=45,407 sf Runoff Depth=2.29"
Flow Length=340' Tc=5.8 min CN=80 Runoff=2.96 cfs 0.199 af

Subcatchment 8S: TO DETENTION POND Runoff Area=23,196 sf Runoff Depth=2.22"
Tc=0.0 min CN=79 Runoff=1.71 cfs 0.098 af

Reach 1R: CB-1 TO DMH-1 Peak Depth=0.12' Max Vel=2.4 fps Inflow=0.13 cfs 0.009 af
D=12.0" n=0.013 L=13.0' S=0.0154 '/' Capacity=4.42 cfs Outflow=0.12 cfs 0.009 af

Reach 2R: CB-2 TO DMH-1 Peak Depth=0.12' Max Vel=2.2 fps Inflow=0.13 cfs 0.009 af
D=12.0" n=0.013 L=17.0' S=0.0118 '/' Capacity=3.86 cfs Outflow=0.12 cfs 0.009 af

Reach 3R: DMH-1 TO DMH-2 Peak Depth=0.18' Max Vel=2.6 fps Inflow=0.25 cfs 0.017 af
D=12.0" n=0.013 L=195.0' S=0.0100 '/' Capacity=3.56 cfs Outflow=0.23 cfs 0.017 af

Reach 4R: DMH-2 TO FES-1 Peak Depth=0.55' Max Vel=4.1 fps Inflow=2.13 cfs 0.153 af
D=15.0" n=0.013 L=31.0' S=0.0068 '/' Capacity=5.32 cfs Outflow=2.13 cfs 0.153 af

Reach 5R: CB-3 TO DMH-2 Peak Depth=0.33' Max Vel=6.6 fps Inflow=1.47 cfs 0.101 af
D=12.0" n=0.013 L=12.0' S=0.0325 '/' Capacity=6.42 cfs Outflow=1.47 cfs 0.101 af

Reach 6R: CB-4 to DMH-2 Peak Depth=0.22' Max Vel=4.5 fps Inflow=0.56 cfs 0.035 af
D=12.0" n=0.013 L=16.0' S=0.0244 '/' Capacity=5.56 cfs Outflow=0.56 cfs 0.035 af

Reach 99R: Flow through Wetlands Peak Depth=0.04' Max Vel=0.5 fps Inflow=4.91 cfs 0.440 af
n=0.035 L=1.0' S=0.0100 '/' Capacity=1,272.81 cfs Outflow=4.89 cfs 0.441 af

Pond 7P: DETENTION POND Peak Elev=87.40' Storage=3,408 cf Inflow=3.39 cfs 0.252 af
Outflow=2.66 cfs 0.241 af

Total Runoff Area = 2.536 ac Runoff Volume = 0.516 af Average Runoff Depth = 2.44"

Subcatchment 1S: TO MAIN STREET

Runoff = 0.54 cfs @ 12.07 hrs, Volume= 0.037 af, Depth= 3.21"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=4.50"

Area (sf)	CN	Description
3,543	98	IMPERVIOUS
2,566	79	50-75% Grass cover, Fair, HSG C
6,109	90	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	293	0.0273	1.0		**Lag/CN Method,**

Subcatchment 2S: TO ABUTTERS

Runoff = 0.45 cfs @ 12.05 hrs, Volume= 0.027 af, Depth= 2.21"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=4.50"

Area (sf)	CN	Description
6,489	79	50-75% Grass cover, Fair, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	119	0.0500	0.7		**Lag/CN Method,**

Subcatchment 3S: TO CB-4

Runoff = 0.56 cfs @ 12.04 hrs, Volume= 0.035 af, Depth= 2.92"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=4.50"

Area (sf)	CN	Description
2,721	98	IMPERVIOUS
3,537	79	50-75% Grass cover, Fair, HSG C
6,258	87	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	117	0.0400	0.9		**Lag/CN Method,**

Subcatchment 4S: TO CB-2

Runoff = 0.13 cfs @ 12.02 hrs, Volume= 0.009 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 10 YEAR Rainfall=4.50"

Area (sf)	CN	Description
1,144	98	IMPERVIOUS

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	115	0.0320	1.3		**Lag/CN Method,**

Subcatchment 5S: TO CB-1

Runoff = 0.13 cfs @ 12.02 hrs, Volume= 0.009 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 10 YEAR Rainfall=4.50"

Area (sf)	CN	Description
1,142	98	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	115	0.0320	1.3		**Lag/CN Method,**

Subcatchment 6S: TO POND

Runoff = 1.47 cfs @ 12.10 hrs, Volume= 0.101 af, Depth= 2.55"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=4.50"

Area (sf)	CN	Description
5,227	98	IMPERVIOUS
14,285	79	50-75% Grass cover, Fair, HSG C
1,199	73	Woods, Fair, HSG C
20,711	83	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	343	0.0370	0.9		**Lag/CN Method,**

Subcatchment 7S: TO WETLANDS

Runoff = 2.96 cfs @ 12.09 hrs, Volume= 0.199 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 10 YEAR Rainfall=4.50"

Area (sf)	CN	Description
17,327	73	Woods, Fair, HSG C
6,727	98	IMPERVIOUS
21,353	79	50-75% Grass cover, Fair, HSG C
45,407	80	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	340	0.0529	1.0		**Lag/CN Method,**

Subcatchment 8S: TO DETENTION POND

Runoff = 1.71 cfs @ 12.00 hrs, Volume= 0.098 af, Depth= 2.22"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 10 YEAR Rainfall=4.50"

Area (sf)	CN	Description
2,547	73	Woods, Fair, HSG C
296	98	
20,353	79	50-75% Grass cover, Fair, HSG C
23,196	79	Weighted Average

Reach 1R: CB-1 TO DMH-1

Inflow Area = 0.026 ac, Inflow Depth = 3.96" for 10 YEAR event
Inflow = 0.13 cfs @ 12.02 hrs, Volume= 0.009 af
Outflow = 0.12 cfs @ 12.02 hrs, Volume= 0.009 af, Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 2.4 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 0.9 fps, Avg. Travel Time= 0.2 min

Peak Depth= 0.12' @ 12.02 hrs
Capacity at bank full= 4.42 cfs
Inlet Invert= 89.66', Outlet Invert= 89.46'
12.0" Diameter Pipe n= 0.013 Length= 13.0' Slope= 0.0154 '/'

Reach 2R: CB-2 TO DMH-1

Inflow Area = 0.026 ac, Inflow Depth = 3.96" for 10 YEAR event
Inflow = 0.13 cfs @ 12.02 hrs, Volume= 0.009 af
Outflow = 0.12 cfs @ 12.03 hrs, Volume= 0.009 af, Atten= 2%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 2.2 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 0.8 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.12' @ 12.02 hrs
Capacity at bank full= 3.86 cfs
Inlet Invert= 89.66', Outlet Invert= 89.46'
12.0" Diameter Pipe n= 0.013 Length= 17.0' Slope= 0.0118 '/'

Reach 3R: DMH-1 TO DMH-2

Inflow Area = 0.052 ac, Inflow Depth = 3.96" for 10 YEAR event
Inflow = 0.25 cfs @ 12.03 hrs, Volume= 0.017 af
Outflow = 0.23 cfs @ 12.06 hrs, Volume= 0.017 af, Atten= 6%, Lag= 2.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.6 fps, Min. Travel Time= 1.3 min
Avg. Velocity = 1.0 fps, Avg. Travel Time= 3.4 min

Peak Depth= 0.18' @ 12.04 hrs
Capacity at bank full= 3.56 cfs
Inlet Invert= 89.36', Outlet Invert= 87.41'
12.0" Diameter Pipe n= 0.013 Length= 195.0' Slope= 0.0100 '/'

Reach 4R: DMH-2 TO FES-1

Inflow Area = 0.672 ac, Inflow Depth = 2.74" for 10 YEAR event
Inflow = 2.13 cfs @ 12.08 hrs, Volume= 0.153 af
Outflow = 2.13 cfs @ 12.08 hrs, Volume= 0.153 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.1 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.5 fps, Avg. Travel Time= 0.4 min

Peak Depth= 0.55' @ 12.08 hrs
Capacity at bank full= 5.32 cfs
Inlet Invert= 87.31', Outlet Invert= 87.10'
15.0" Diameter Pipe n= 0.013 Length= 31.0' Slope= 0.0068 '/'

Reach 5R: CB-3 TO DMH-2

Inflow Area = 0.475 ac, Inflow Depth = 2.55" for 10 YEAR event
Inflow = 1.47 cfs @ 12.10 hrs, Volume= 0.101 af
Outflow = 1.47 cfs @ 12.10 hrs, Volume= 0.101 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 6.6 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 2.5 fps, Avg. Travel Time= 0.1 min

Peak Depth= 0.33' @ 12.10 hrs
Capacity at bank full= 6.42 cfs
Inlet Invert= 87.80', Outlet Invert= 87.41'
12.0" Diameter Pipe n= 0.013 Length= 12.0' Slope= 0.0325 '/'

Reach 6R: CB-4 to DMH-2

Inflow Area = 0.144 ac, Inflow Depth = 2.92" for 10 YEAR event
Inflow = 0.56 cfs @ 12.04 hrs, Volume= 0.035 af
Outflow = 0.56 cfs @ 12.04 hrs, Volume= 0.035 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.5 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.6 fps, Avg. Travel Time= 0.2 min

Peak Depth= 0.22' @ 12.04 hrs
Capacity at bank full= 5.56 cfs
Inlet Invert= 87.80', Outlet Invert= 87.41'
12.0" Diameter Pipe n= 0.013 Length= 16.0' Slope= 0.0244 '/'

Reach 99R: Flow through Wetlands

Inflow Area = 2.247 ac, Inflow Depth = 2.35" for 10 YEAR event
Inflow = 4.91 cfs @ 12.15 hrs, Volume= 0.440 af
Outflow = 4.89 cfs @ 12.15 hrs, Volume= 0.441 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.5 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.2 fps, Avg. Travel Time= 0.1 min

Peak Depth= 0.04' @ 12.15 hrs
Capacity at bank full= 1,272.81 cfs
Inlet Invert= 76.00', Outlet Invert= 75.99'
300.00' x 1.00' deep channel, n= 0.035 Length= 1.0' Slope= 0.0100 '/'
Side Slope Z-value= 1.0 '/'

Pond 7P: DETENTION POND

Inflow Area =	1.204 ac,	Inflow Depth =	2.51"	for	10 YEAR event
Inflow =	3.39 cfs @	12.04 hrs,	Volume=	0.252 af	
Outflow =	2.66 cfs @	12.17 hrs,	Volume=	0.241 af,	Atten= 22%, Lag= 7.6 min
Primary =	2.66 cfs @	12.17 hrs,	Volume=	0.241 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 87.40' @ 12.16 hrs Surf.Area= 3,241 sf Storage= 3,408 cf
Plug-Flow detention time= 81.9 min calculated for 0.240 af (95% of inflow)
Center-of-Mass det. time= 66.3 min (847.0 - 780.7)

#	Invert	Avail.Storage	Storage Description
1	86.00'	15,509 cf	**Custom Stage Data (Prismatic)** Listed below

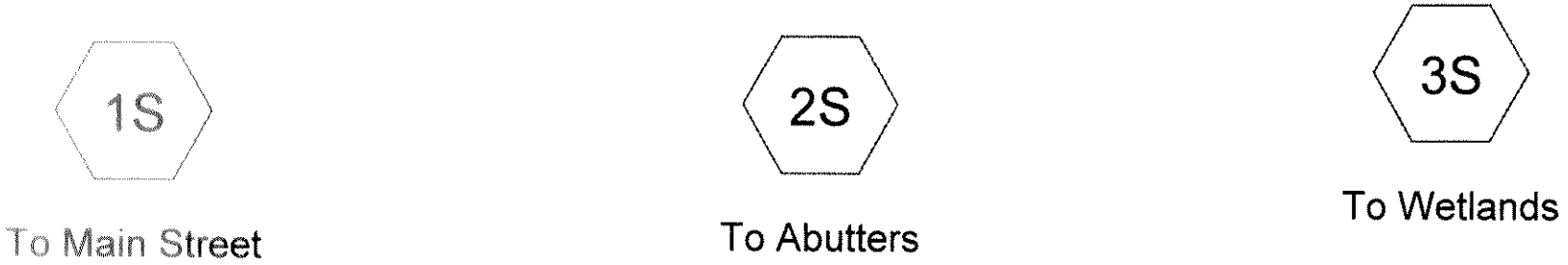
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
86.00	419	0	0
88.00	4,456	4,875	4,875
90.00	6,178	10,634	15,509

#	Routing	Invert	Outlet Devices
1	Primary	89.00'	**5.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
2	Primary	86.00'	**4.0" Vert. Orifice/Grate** C= 0.600
3	Primary	87.30'	**0.17' x 0.17' Horiz. Orifice/Grate X 49.00** Limited to weir flow C= 0.600

Primary OutFlow Max=2.49 cfs @ 12.17 hrs HW=87.39' (Free Discharge)
- **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
- **2=Orifice/Grate** (Orifice Controls 0.46 cfs @ 5.3 fps)
- **3=Orifice/Grate** (Orifice Controls 2.02 cfs @ 1.4 fps)

25-YEAR STORM

PRE-DEVELOPMENT



Subcat Reach Pond Link

Drainage Diagram for DRAINAGE-PRE
Prepared by LANDTECH Consultants, INC. 4/25/2006
HydroCAD® 7.00 s/n 000798 © 1986-2003 Applied Microcomputer Systems

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 1S: To Main Street Runoff Area=8,494 sf Runoff Depth=3.94"
Flow Length=534' Tc=7.2 min CN=90 Runoff=0.87 cfs 0.064 af

Subcatchment 2S: To Abutters Runoff Area=9,104 sf Runoff Depth=2.42"
Tc=0.0 min CN=74 Runoff=0.73 cfs 0.042 af

Subcatchment 3S: To Wetlands Runoff Area=92,826 sf Runoff Depth=2.77"
Flow Length=429' Tc=6.0 min CN=78 Runoff=7.27 cfs 0.492 af

Total Runoff Area = 2.535 ac Runoff Volume = 0.598 af Average Runoff Depth = 2.83"

Subcatchment 1S: To Main Street

Runoff = 0.87 cfs @ 12.10 hrs, Volume= 0.064 af, Depth= 3.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YEAR Rainfall=5.30"

Area (sf)	CN	Description
653	73	trees
3,441	98	impervious
4,400	87	gravel
8,494	90	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	534	0.0350	1.2		**Lag/CN Method, 1**

Subcatchment 2S: To Abutters

Runoff = 0.73 cfs @ 12.01 hrs, Volume= 0.042 af, Depth= 2.42"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YEAR Rainfall=5.30"

Area (sf)	CN	Description
8,712	73	trees
174	98	impervious
218	87	gravel
9,104	74	Weighted Average

Subcatchment 3S: To Wetlands

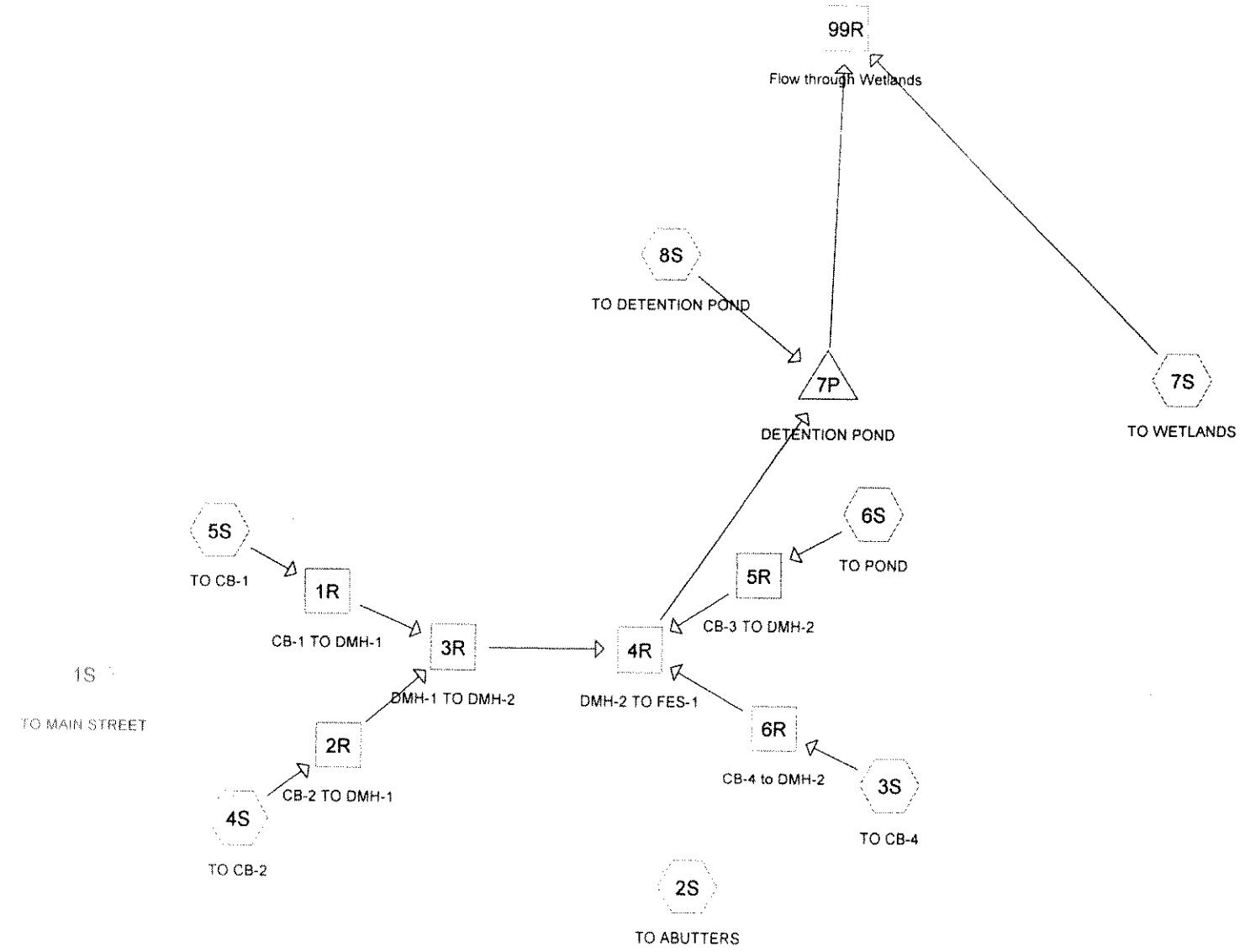
Runoff = 7.27 cfs @ 12.09 hrs, Volume= 0.492 af, Depth= 2.77"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YEAR Rainfall=5.30"

Area (sf)	CN	Description
67,518	73	trees
8,668	98	impervious
16,640	87	gravel
92,826	78	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	429	0.0815	1.2		**Lag/CN Method,**

POST-DEVELOPMENT



Subcat Reach Pond Link

Drainage Diagram for post

Prepared by LANDTECH Consultants, INC. 4/25/2006

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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 1S: TO MAIN STREET Runoff Area=6,109 sf Runoff Depth=3.94"
Flow Length=293' Tc=5.1 min CN=90 Runoff=0.66 cfs 0.046 af

Subcatchment 2S: TO ABUTTERS Runoff Area=6,489 sf Runoff Depth=2.86"
Flow Length=119' Tc=2.7 min CN=79 Runoff=0.58 cfs 0.036 af

Subcatchment 3S: TO CB-4 Runoff Area=6,258 sf Runoff Depth=3.63"
Flow Length=117' Tc=2.3 min CN=87 Runoff=0.69 cfs 0.044 af

Subcatchment 4S: TO CB-2 Runoff Area=1,144 sf Runoff Depth=4.69"
Flow Length=115' Tc=1.5 min CN=98 Runoff=0.15 cfs 0.010 af

Subcatchment 5S: TO CB-1 Runoff Area=1,142 sf Runoff Depth=4.69"
Flow Length=115' Tc=1.5 min CN=98 Runoff=0.15 cfs 0.010 af

Subcatchment 6S: TO POND Runoff Area=20,711 sf Runoff Depth=3.23"
Flow Length=343' Tc=6.4 min CN=83 Runoff=1.85 cfs 0.128 af

Subcatchment 7S: TO WETLANDS Runoff Area=45,407 sf Runoff Depth=2.95"
Flow Length=340' Tc=5.8 min CN=80 Runoff=3.79 cfs 0.256 af

Subcatchment 8S: TO DETENTION POND Runoff Area=23,196 sf Runoff Depth=2.87"
Tc=0.0 min CN=79 Runoff=2.20 cfs 0.127 af

Reach 1R: CB-1 TO DMH-1 Peak Depth=0.13' Max Vel=2.6 fps Inflow=0.15 cfs 0.010 af
D=12.0" n=0.013 L=13.0' S=0.0154 '/' Capacity=4.42 cfs Outflow=0.15 cfs 0.010 af

Reach 2R: CB-2 TO DMH-1 Peak Depth=0.13' Max Vel=2.3 fps Inflow=0.15 cfs 0.010 af
D=12.0" n=0.013 L=17.0' S=0.0118 '/' Capacity=3.86 cfs Outflow=0.15 cfs 0.010 af

Reach 3R: DMH-1 TO DMH-2 Peak Depth=0.19' Max Vel=2.7 fps Inflow=0.29 cfs 0.021 af
D=12.0" n=0.013 L=195.0' S=0.0100 '/' Capacity=3.56 cfs Outflow=0.28 cfs 0.020 af

Reach 4R: DMH-2 TO FES-1 Peak Depth=0.63' Max Vel=4.3 fps Inflow=2.66 cfs 0.192 af
D=15.0" n=0.013 L=31.0' S=0.0068 '/' Capacity=5.32 cfs Outflow=2.65 cfs 0.192 af

Reach 5R: CB-3 TO DMH-2 Peak Depth=0.37' Max Vel=7.1 fps Inflow=1.85 cfs 0.128 af
D=12.0" n=0.013 L=12.0' S=0.0325 '/' Capacity=6.42 cfs Outflow=1.85 cfs 0.128 af

Reach 6R: CB-4 to DMH-2 Peak Depth=0.24' Max Vel=4.8 fps Inflow=0.69 cfs 0.044 af
D=12.0" n=0.013 L=16.0' S=0.0244 '/' Capacity=5.56 cfs Outflow=0.69 cfs 0.044 af

Reach 99R: Flow through Wetlands Peak Depth=0.04' Max Vel=0.5 fps Inflow=7.15 cfs 0.564 af
n=0.035 L=1.0' S=0.0100 '/' Capacity=1,272.81 cfs Outflow=7.14 cfs 0.564 af

Pond 7P: DETENTION POND Peak Elev=87.49' Storage=3,627 cf Inflow=4.28 cfs 0.319 af
Outflow=3.45 cfs 0.307 af

Total Runoff Area = 2.536 ac Runoff Volume = 0.657 af Average Runoff Depth = 3.11"

Subcatchment 1S: TO MAIN STREET

Runoff = 0.66 cfs @ 12.07 hrs, Volume= 0.046 af, Depth= 3.94"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YEAR Rainfall=5.30"

Area (sf)	CN	Description
3,543	98	IMPERVIOUS
2,566	79	50-75% Grass cover, Fair, HSG C
6,109	90	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	293	0.0273	1.0		**Lag/CN Method,**

Subcatchment 2S: TO ABUTTERS

Runoff = 0.58 cfs @ 12.05 hrs, Volume= 0.036 af, Depth= 2.86"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YEAR Rainfall=5.30"

Area (sf)	CN	Description
6,489	79	50-75% Grass cover, Fair, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	119	0.0500	0.7		**Lag/CN Method,**

Subcatchment 3S: TO CB-4

Runoff = 0.69 cfs @ 12.04 hrs, Volume= 0.044 af, Depth= 3.63"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YEAR Rainfall=5.30"

Area (sf)	CN	Description
2,721	98	IMPERVIOUS
3,537	79	50-75% Grass cover, Fair, HSG C
6,258	87	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	117	0.0400	0.9		**Lag/CN Method,**

Subcatchment 4S: TO CB-2

Runoff = 0.15 cfs @ 12.02 hrs, Volume= 0.010 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 25 YEAR Rainfall=5.30"

Area (sf)	CN	Description
1,144	98	IMPERVIOUS

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	115	0.0320	1.3		**Lag/CN Method,**

Subcatchment 5S: TO CB-1

Runoff = 0.15 cfs @ 12.02 hrs, Volume= 0.010 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 25 YEAR Rainfall=5.30"

Area (sf)	CN	Description
1,142	98	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	115	0.0320	1.3		**Lag/CN Method,**

Subcatchment 6S: TO POND

Runoff = 1.85 cfs @ 12.10 hrs, Volume= 0.128 af, Depth= 3.23"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YEAR Rainfall=5.30"

Area (sf)	CN	Description
5,227	98	IMPERVIOUS
14,285	79	50-75% Grass cover, Fair, HSG C
1,199	73	Woods, Fair, HSG C
20,711	83	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	343	0.0370	0.9		**Lag/CN Method,**

Subcatchment 7S: TO WETLANDS

Runoff = 3.79 cfs @ 12.09 hrs, Volume= 0.256 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 25 YEAR Rainfall=5.30"

Area (sf)	CN	Description
17,327	73	Woods, Fair, HSG C
6,727	98	IMPERVIOUS
21,353	79	50-75% Grass cover, Fair, HSG C
45,407	80	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	340	0.0529	1.0		**Lag/CN Method,**

Subcatchment 8S: TO DETENTION POND

Runoff = 2.20 cfs @ 12.00 hrs, Volume= 0.127 af, Depth= 2.87"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 25 YEAR Rainfall=5.30"

Area (sf)	CN	Description
2,547	73	Woods, Fair, HSG C
296	98	
20,353	79	50-75% Grass cover, Fair, HSG C
23,196	79	Weighted Average

Reach 1R: CB-1 TO DMH-1

Inflow Area = 0.026 ac, Inflow Depth = 4.69" for 25 YEAR event
Inflow = 0.15 cfs @ 12.02 hrs, Volume= 0.010 af
Outflow = 0.15 cfs @ 12.02 hrs, Volume= 0.010 af, Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 2.6 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.0 fps, Avg. Travel Time= 0.2 min

Peak Depth= 0.13' @ 12.02 hrs
Capacity at bank full= 4.42 cfs
Inlet Invert= 89.66', Outlet Invert= 89.46'
12.0" Diameter Pipe n= 0.013 Length= 13.0' Slope= 0.0154 '/'

Reach 2R: CB-2 TO DMH-1

Inflow Area = 0.026 ac, Inflow Depth = 4.69" for 25 YEAR event
Inflow = 0.15 cfs @ 12.02 hrs, Volume= 0.010 af
Outflow = 0.15 cfs @ 12.03 hrs, Volume= 0.010 af, Atten= 2%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 2.3 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 0.9 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.13' @ 12.02 hrs
Capacity at bank full= 3.86 cfs
Inlet Invert= 89.66', Outlet Invert= 89.46'
12.0" Diameter Pipe n= 0.013 Length= 17.0' Slope= 0.0118 '/'

Reach 3R: DMH-1 TO DMH-2

Inflow Area = 0.052 ac, Inflow Depth = 4.69" for 25 YEAR event
Inflow = 0.29 cfs @ 12.02 hrs, Volume= 0.021 af
Outflow = 0.28 cfs @ 12.06 hrs, Volume= 0.020 af, Atten= 6%, Lag= 2.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.7 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 1.0 fps, Avg. Travel Time= 3.2 min

Peak Depth= 0.19' @ 12.04 hrs
Capacity at bank full= 3.56 cfs
Inlet Invert= 89.36', Outlet Invert= 87.41'
12.0" Diameter Pipe n= 0.013 Length= 195.0' Slope= 0.0100 '/'

Reach 4R: DMH-2 TO FES-1

Inflow Area = 0.672 ac, Inflow Depth = 3.43" for 25 YEAR event
Inflow = 2.66 cfs @ 12.08 hrs, Volume= 0.192 af
Outflow = 2.65 cfs @ 12.08 hrs, Volume= 0.192 af, Atten= 0%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.3 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.6 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.63' @ 12.08 hrs
Capacity at bank full= 5.32 cfs
Inlet Invert= 87.31', Outlet Invert= 87.10'
15.0" Diameter Pipe n= 0.013 Length= 31.0' Slope= 0.0068 '/'

Reach 5R: CB-3 TO DMH-2

Inflow Area = 0.475 ac, Inflow Depth = 3.23" for 25 YEAR event
Inflow = 1.85 cfs @ 12.10 hrs, Volume= 0.128 af
Outflow = 1.85 cfs @ 12.10 hrs, Volume= 0.128 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.1 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 2.6 fps, Avg. Travel Time= 0.1 min

Peak Depth= 0.37' @ 12.10 hrs
Capacity at bank full= 6.42 cfs
Inlet Invert= 87.80', Outlet Invert= 87.41'
12.0" Diameter Pipe n= 0.013 Length= 12.0' Slope= 0.0325 '/'

Reach 6R: CB-4 to DMH-2

Inflow Area = 0.144 ac, Inflow Depth = 3.63" for 25 YEAR event
Inflow = 0.69 cfs @ 12.04 hrs, Volume= 0.044 af
Outflow = 0.69 cfs @ 12.04 hrs, Volume= 0.044 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.8 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.6 fps, Avg. Travel Time= 0.2 min

Peak Depth= 0.24' @ 12.04 hrs
Capacity at bank full= 5.56 cfs
Inlet Invert= 87.80', Outlet Invert= 87.41'
12.0" Diameter Pipe n= 0.013 Length= 16.0' Slope= 0.0244 '/'

Reach 99R: Flow through Wetlands

Inflow Area = 2.247 ac, Inflow Depth = 3.01" for 25 YEAR event
Inflow = 7.15 cfs @ 12.10 hrs, Volume= 0.564 af
Outflow = 7.14 cfs @ 12.10 hrs, Volume= 0.564 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.5 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.2 fps, Avg. Travel Time= 0.1 min

Peak Depth= 0.04' @ 12.10 hrs
Capacity at bank full= 1,272.81 cfs
Inlet Invert= 76.00', Outlet Invert= 75.99'
300.00' x 1.00' deep channel, n= 0.035 Length= 1.0' Slope= 0.0100 '/'
Side Slope Z-value= 1.0 '/'

Pond 7P: DETENTION POND

Inflow Area =	1.204 ac,	Inflow Depth =	3.18"	for	25 YEAR event
Inflow =	4.28 cfs @	12.04 hrs,	Volume=	0.319 af	
Outflow =	3.45 cfs @	12.12 hrs,	Volume=	0.307 af,	Atten= 19%, Lag= 5.1 min
Primary =	3.45 cfs @	12.12 hrs,	Volume=	0.307 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 87.49' @ 12.12 hrs Surf.Area= 3,423 sf Storage= 3,627 cf
Plug-Flow detention time= 73.7 min calculated for 0.307 af (96% of inflow)
Center-of-Mass det. time= 59.4 min (835.0 - 775.6)

#	Invert	Avail.Storage	Storage Description
1	86.00'	15,509 cf	**Custom Stage Data (Prismatic)** Listed below

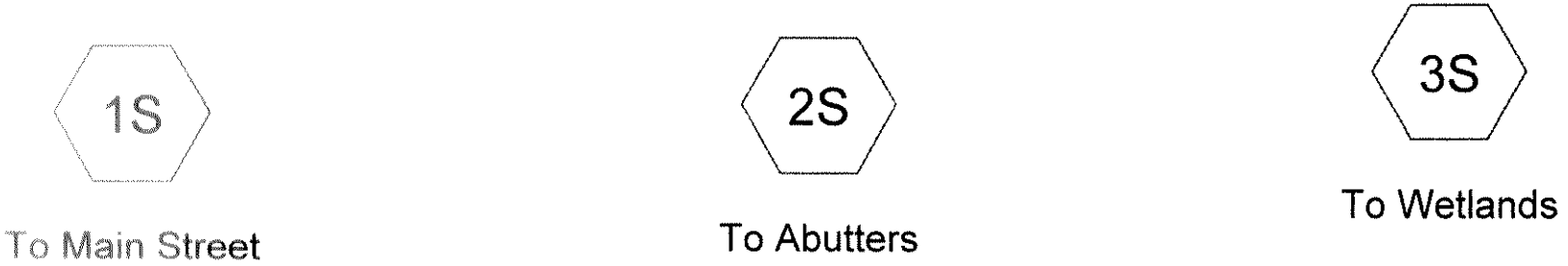
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
86.00	419	0	0
88.00	4,456	4,875	4,875
90.00	6,178	10,634	15,509

#	Routing	Invert	Outlet Devices
1	Primary	89.00'	**5.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
2	Primary	86.00'	**4.0" Vert. Orifice/Grate** C= 0.600
3	Primary	87.30'	**0.17' x 0.17' Horiz. Orifice/Grate X 49.00** Limited to weir flow C= 0.600

Primary OutFlow Max=3.37 cfs @ 12.12 hrs HW=87.48' (Free Discharge)
- **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
- **2=Orifice/Grate** (Orifice Controls 0.48 cfs @ 5.5 fps)
- **3=Orifice/Grate** (Orifice Controls 2.89 cfs @ 2.0 fps)

100-YEAR STORM

PRE-DEVELOPMENT



Subcat Reach Pond Link

Drainage Diagram for DRAINAGE-PRE
Prepared by LANDTECH Consultants, INC. 4/25/2006
HydroCAD® 7.00 s/n 000798 © 1986-2003 Applied Microcomputer Systems

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 1S: To Main Street Runoff Area=8,494 sf Runoff Depth=4.95"
Flow Length=534' Tc=7.2 min CN=90 Runoff=1.08 cfs 0.080 af

Subcatchment 2S: To Abutters Runoff Area=9,104 sf Runoff Depth=3.29"
Tc=0.0 min CN=74 Runoff=0.99 cfs 0.057 af

Subcatchment 3S: To Wetlands Runoff Area=92,826 sf Runoff Depth=3.68"
Flow Length=429' Tc=6.0 min CN=78 Runoff=9.60 cfs 0.654 af

Total Runoff Area = 2.535 ac Runoff Volume = 0.792 af Average Runoff Depth = 3.75"

Subcatchment 1S: To Main Street

Runoff = 1.08 cfs @ 12.10 hrs, Volume= 0.080 af, Depth= 4.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year Rainfall=6.40"

Area (sf)	CN	Description
653	73	trees
3,441	98	impervious
4,400	87	gravel
8,494	90	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	534	0.0350	1.2		**Lag/CN Method, 1**

Subcatchment 2S: To Abutters

Runoff = 0.99 cfs @ 12.00 hrs, Volume= 0.057 af, Depth= 3.29"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year Rainfall=6.40"

Area (sf)	CN	Description
8,712	73	trees
174	98	impervious
218	87	gravel
9,104	74	Weighted Average

Subcatchment 3S: To Wetlands

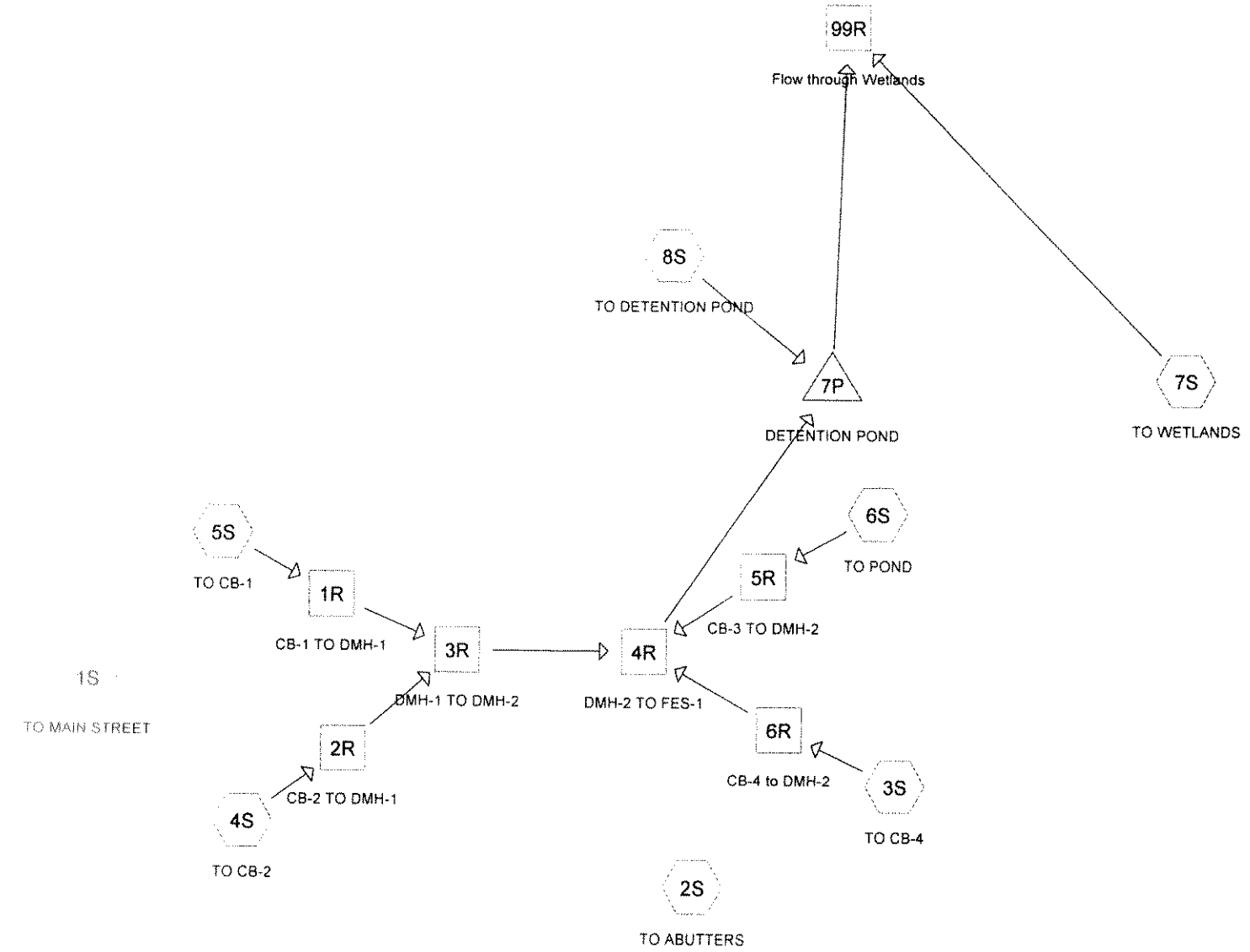
Runoff = 9.60 cfs @ 12.09 hrs, Volume= 0.654 af, Depth= 3.68"

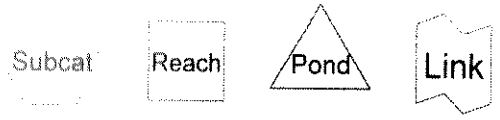
Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 year Rainfall=6.40"

Area (sf)	CN	Description
67,518	73	trees
8,668	98	impervious
16,640	87	gravel
92,826	78	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0	429	0.0815	1.2		**Lag/CN Method,**

POST-DEVELOPMENT





Drainage Diagram for post

Prepared by LANDTECH Consultants, INC. 4/25/2006

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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 1S: TO MAIN STREET Runoff Area=6,109 sf Runoff Depth=4.95"
Flow Length=293' Tc=5.1 min CN=90 Runoff=0.82 cfs 0.058 af

Subcatchment 2S: TO ABUTTERS Runoff Area=6,489 sf Runoff Depth=3.79"
Flow Length=119' Tc=2.7 min CN=79 Runoff=0.77 cfs 0.047 af

Subcatchment 3S: TO CB-4 Runoff Area=6,258 sf Runoff Depth=4.63"
Flow Length=117' Tc=2.3 min CN=87 Runoff=0.87 cfs 0.055 af

Subcatchment 4S: TO CB-2 Runoff Area=1,144 sf Runoff Depth=5.69"
Flow Length=115' Tc=1.5 min CN=98 Runoff=0.18 cfs 0.012 af

Subcatchment 5S: TO CB-1 Runoff Area=1,142 sf Runoff Depth=5.69"
Flow Length=115' Tc=1.5 min CN=98 Runoff=0.18 cfs 0.012 af

Subcatchment 6S: TO POND Runoff Area=20,711 sf Runoff Depth=4.20"
Flow Length=343' Tc=6.4 min CN=83 Runoff=2.38 cfs 0.166 af

Subcatchment 7S: TO WETLANDS Runoff Area=45,407 sf Runoff Depth=3.89"
Flow Length=340' Tc=5.8 min CN=80 Runoff=4.95 cfs 0.338 af

Subcatchment 8S: TO DETENTION POND Runoff Area=23,196 sf Runoff Depth=3.79"
Tc=0.0 min CN=79 Runoff=2.88 cfs 0.168 af

Reach 1R: CB-1 TO DMH-1 Peak Depth=0.14' Max Vel=2.7 fps Inflow=0.18 cfs 0.012 af
D=12.0" n=0.013 L=13.0' S=0.0154 '/' Capacity=4.42 cfs Outflow=0.18 cfs 0.012 af

Reach 2R: CB-2 TO DMH-1 Peak Depth=0.15' Max Vel=2.5 fps Inflow=0.18 cfs 0.012 af
D=12.0" n=0.013 L=17.0' S=0.0118 '/' Capacity=3.86 cfs Outflow=0.18 cfs 0.012 af

Reach 3R: DMH-1 TO DMH-2 Peak Depth=0.21' Max Vel=2.9 fps Inflow=0.35 cfs 0.025 af
D=12.0" n=0.013 L=195.0' S=0.0100 '/' Capacity=3.56 cfs Outflow=0.33 cfs 0.025 af

Reach 4R: DMH-2 TO FES-1 Peak Depth=0.72' Max Vel=4.6 fps Inflow=3.40 cfs 0.247 af
D=15.0" n=0.013 L=31.0' S=0.0068 '/' Capacity=5.32 cfs Outflow=3.37 cfs 0.247 af

Reach 5R: CB-3 TO DMH-2 Peak Depth=0.42' Max Vel=7.6 fps Inflow=2.38 cfs 0.166 af
D=12.0" n=0.013 L=12.0' S=0.0325 '/' Capacity=6.42 cfs Outflow=2.37 cfs 0.166 af

Reach 6R: CB-4 to DMH-2 Peak Depth=0.27' Max Vel=5.1 fps Inflow=0.87 cfs 0.055 af
D=12.0" n=0.013 L=16.0' S=0.0244 '/' Capacity=5.56 cfs Outflow=0.87 cfs 0.055 af

Reach 99R: Flow through Wetlands Peak Depth=0.05' Max Vel=0.6 fps Inflow=9.49 cfs 0.738 af
n=0.035 L=1.0' S=0.0100 '/' Capacity=1,272.81 cfs Outflow=9.48 cfs 0.739 af

Pond 7P: DETENTION POND Peak Elev=87.66' Storage=4,036 cf Inflow=5.52 cfs 0.415 af
Outflow=4.58 cfs 0.401 af

Total Runoff Area = 2.536 ac Runoff Volume = 0.858 af Average Runoff Depth = 4.06"

Subcatchment 1S: TO MAIN STREET

Runoff = 0.82 cfs @ 12.07 hrs, Volume= 0.058 af, Depth= 4.95"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YEAR Rainfall=6.40"

Area (sf)	CN	Description
3,543	98	IMPERVIOUS
2,566	79	50-75% Grass cover, Fair, HSG C
6,109	90	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.1	293	0.0273	1.0		**Lag/CN Method,**

Subcatchment 2S: TO ABUTTERS

Runoff = 0.77 cfs @ 12.05 hrs, Volume= 0.047 af, Depth= 3.79"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YEAR Rainfall=6.40"

Area (sf)	CN	Description
6,489	79	50-75% Grass cover, Fair, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	119	0.0500	0.7		**Lag/CN Method,**

Subcatchment 3S: TO CB-4

Runoff = 0.87 cfs @ 12.04 hrs, Volume= 0.055 af, Depth= 4.63"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YEAR Rainfall=6.40"

Area (sf)	CN	Description
2,721	98	IMPERVIOUS
3,537	79	50-75% Grass cover, Fair, HSG C
6,258	87	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.3	117	0.0400	0.9		**Lag/CN Method,**

Subcatchment 4S: TO CB-2

Runoff = 0.18 cfs @ 12.02 hrs, Volume= 0.012 af, Depth= 5.69"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YEAR Rainfall=6.40"

Area (sf)	CN	Description
1,144	98	IMPERVIOUS

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	115	0.0320	1.3		**Lag/CN Method,**

Subcatchment 5S: TO CB-1

Runoff = 0.18 cfs @ 12.02 hrs, Volume= 0.012 af, Depth= 5.69"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YEAR Rainfall=6.40"

Area (sf)	CN	Description
1,142	98	

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	115	0.0320	1.3		**Lag/CN Method,**

Subcatchment 6S: TO POND

Runoff = 2.38 cfs @ 12.09 hrs, Volume= 0.166 af, Depth= 4.20"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YEAR Rainfall=6.40"

Area (sf)	CN	Description
5,227	98	IMPERVIOUS
14,285	79	50-75% Grass cover, Fair, HSG C
1,199	73	Woods, Fair, HSG C
20,711	83	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.4	343	0.0370	0.9		**Lag/CN Method,**

Subcatchment 7S: TO WETLANDS

Runoff = 4.95 cfs @ 12.09 hrs, Volume= 0.338 af, Depth= 3.89"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YEAR Rainfall=6.40"

Area (sf)	CN	Description
17,327	73	Woods, Fair, HSG C
6,727	98	IMPERVIOUS
21,353	79	50-75% Grass cover, Fair, HSG C
45,407	80	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	340	0.0529	1.0		**Lag/CN Method,**

Subcatchment 8S: TO DETENTION POND

Runoff = 2.88 cfs @ 12.00 hrs, Volume= 0.168 af, Depth= 3.79"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 100 YEAR Rainfall=6.40"

Area (sf)	CN	Description
2,547	73	Woods, Fair, HSG C
296	98	
20,353	79	50-75% Grass cover, Fair, HSG C
23,196	79	Weighted Average

Reach 1R: CB-1 TO DMH-1

Inflow Area = 0.026 ac, Inflow Depth = 5.69" for 100 YEAR event
Inflow = 0.18 cfs @ 12.02 hrs, Volume= 0.012 af
Outflow = 0.18 cfs @ 12.02 hrs, Volume= 0.012 af, Atten= 1%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 2.7 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.0 fps, Avg. Travel Time= 0.2 min

Peak Depth= 0.14' @ 12.02 hrs
Capacity at bank full= 4.42 cfs
Inlet Invert= 89.66', Outlet Invert= 89.46'
12.0" Diameter Pipe n= 0.013 Length= 13.0' Slope= 0.0154 '/'

Reach 2R: CB-2 TO DMH-1

Inflow Area = 0.026 ac, Inflow Depth = 5.69" for 100 YEAR event
Inflow = 0.18 cfs @ 12.02 hrs, Volume= 0.012 af
Outflow = 0.18 cfs @ 12.03 hrs, Volume= 0.012 af, Atten= 2%, Lag= 0.2 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 3
Max. Velocity= 2.5 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 0.9 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.15' @ 12.02 hrs
Capacity at bank full= 3.86 cfs
Inlet Invert= 89.66', Outlet Invert= 89.46'
12.0" Diameter Pipe n= 0.013 Length= 17.0' Slope= 0.0118 '/'

Reach 3R: DMH-1 TO DMH-2

Inflow Area = 0.052 ac, Inflow Depth = 5.69" for 100 YEAR event
Inflow = 0.35 cfs @ 12.02 hrs, Volume= 0.025 af
Outflow = 0.33 cfs @ 12.06 hrs, Volume= 0.025 af, Atten= 6%, Lag= 2.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.9 fps, Min. Travel Time= 1.1 min
Avg. Velocity = 1.1 fps, Avg. Travel Time= 3.0 min

Peak Depth= 0.21' @ 12.04 hrs
Capacity at bank full= 3.56 cfs
Inlet Invert= 89.36', Outlet Invert= 87.41'
12.0" Diameter Pipe n= 0.013 Length= 195.0' Slope= 0.0100 '/'

Reach 4R: DMH-2 TO FES-1

Inflow Area = 0.672 ac, Inflow Depth = 4.41" for 100 YEAR event
Inflow = 3.40 cfs @ 12.07 hrs, Volume= 0.247 af
Outflow = 3.37 cfs @ 12.08 hrs, Volume= 0.247 af, Atten= 1%, Lag= 0.3 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.6 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.7 fps, Avg. Travel Time= 0.3 min

Peak Depth= 0.72' @ 12.08 hrs
Capacity at bank full= 5.32 cfs
Inlet Invert= 87.31', Outlet Invert= 87.10'
15.0" Diameter Pipe n= 0.013 Length= 31.0' Slope= 0.0068 '/'

Reach 5R: CB-3 TO DMH-2

Inflow Area = 0.475 ac, Inflow Depth = 4.20" for 100 YEAR event
Inflow = 2.38 cfs @ 12.09 hrs, Volume= 0.166 af
Outflow = 2.37 cfs @ 12.10 hrs, Volume= 0.166 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 7.6 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 2.7 fps, Avg. Travel Time= 0.1 min

Peak Depth= 0.42' @ 12.09 hrs
Capacity at bank full= 6.42 cfs
Inlet Invert= 87.80', Outlet Invert= 87.41'
12.0" Diameter Pipe n= 0.013 Length= 12.0' Slope= 0.0325 '/'

Reach 6R: CB-4 to DMH-2

Inflow Area = 0.144 ac, Inflow Depth = 4.63" for 100 YEAR event
Inflow = 0.87 cfs @ 12.04 hrs, Volume= 0.055 af
Outflow = 0.87 cfs @ 12.04 hrs, Volume= 0.055 af, Atten= 0%, Lag= 0.1 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.1 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 1.8 fps, Avg. Travel Time= 0.1 min

Peak Depth= 0.27' @ 12.04 hrs
Capacity at bank full= 5.56 cfs
Inlet Invert= 87.80', Outlet Invert= 87.41'
12.0" Diameter Pipe n= 0.013 Length= 16.0' Slope= 0.0244 '/'

Reach 99R: Flow through Wetlands

Inflow Area = 2.247 ac, Inflow Depth = 3.94" for 100 YEAR event
Inflow = 9.49 cfs @ 12.09 hrs, Volume= 0.738 af
Outflow = 9.48 cfs @ 12.09 hrs, Volume= 0.739 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs / 2
Max. Velocity= 0.6 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.2 fps, Avg. Travel Time= 0.1 min

Peak Depth= 0.05' @ 12.09 hrs
Capacity at bank full= 1,272.81 cfs
Inlet Invert= 76.00', Outlet Invert= 75.99'
300.00' x 1.00' deep channel, n= 0.035 Length= 1.0' Slope= 0.0100 '/'
Side Slope Z-value= 1.0 '/'

Pond 7P: DETENTION POND

Inflow Area =	1.204 ac,	Inflow Depth =	4.14"	for	100 YEAR event
Inflow =	5.52 cfs @	12.04 hrs,	Volume=	0.415 af	
Outflow =	4.58 cfs @	12.11 hrs,	Volume=	0.401 af,	Atten= 17%, Lag= 4.5 min
Primary =	4.58 cfs @	12.11 hrs,	Volume=	0.401 af	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 87.66' @ 12.11 hrs Surf.Area= 3,761 sf Storage= 4,036 cf
Plug-Flow detention time= 66.1 min calculated for 0.399 af (96% of inflow)
Center-of-Mass det. time= 52.8 min (822.6 - 769.8)

#	Invert	Avail.Storage	Storage Description
1	86.00'	15,509 cf	**Custom Stage Data (Prismatic)** Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
86.00	419	0	0
88.00	4,456	4,875	4,875
90.00	6,178	10,634	15,509

#	Routing	Invert	Outlet Devices
1	Primary	89.00'	**5.0' long x 10.0' breadth Broad-Crested Rectangular Weir**
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60
			Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64
2	Primary	86.00'	**4.0" Vert. Orifice/Grate** C= 0.600
3	Primary	87.30'	**0.17' x 0.17' Horiz. Orifice/Grate X 49.00** Limited to weir flow C= 0.600

Primary OutFlow Max=4.54 cfs @ 12.11 hrs HW=87.65' (Free Discharge)
- **1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
- **2=Orifice/Grate** (Orifice Controls 0.51 cfs @ 5.9 fps)
- **3=Orifice/Grate** (Orifice Controls 4.03 cfs @ 2.8 fps)