

STORM WATER MANAGEMENT PLAN AND EROSION CONTROL PLANS  
& MAINTENANCE/OPERATION PLAN  
FOR

Maple Ridge Addition  
Town of Medary

**BACKGROUND & GENERAL INFORMATION**

This project is located along CTH "F" and off of Shady Maple Drive in the Town of Medary. The property was previously used for agricultural purposes but has not been planted for a few years. The parcel contains approximately 8.85 acres. No groundwater was encountered at the site. There are not believed to be any identified wetlands or wetland indicators within the project limits.

**Existing Drainage Conditions:**

The property has a ridge splitting the drainage. The southern portion drains to the CTH "F" ditch, while the north drains to a wooded area.

**Existing Drainage Calculations Summary:**

The existing drainage calculations are included at the end of this report. (S1)

**Existing Off-site Drainage:**

There is no off-site drainage entering onto this project site.

**Proposed Drainage Conditions:**

The proposed drainage patterns follow the pre-development drainage patterns. As stated above, the site drainage is split. The drainage areas have been designated on the attached site plan. All drainage areas will utilize a biofiltration area that will have 2 feet of fine filter sand. The discharges for each area will be a stand pipe, with the exception of the south area. All ponds will have an emergency overflow swale.

The proposed town road will have a ditch along the south side of the road and will discharge directly to the north ponding area via an 8" pvc pipe. All slopes created shall be no steeper than 3:1 and all will be covered with Class II, Type B erosion matting.

**Post-Development Runoff Summary**

Proposed drainage calculations for the 1, 2, 5, 10, and 25-year design storms have been included with this plan. with the summary as follows:

Pre-development to Post-development Comparison

Area	Event	Pre (cfs)	Post (cfs)
Shady N	1 yr.	0.04	0.03
	2 yr.	0.17	0.04
	5 yr.	1.12	0.21
	10 yr.	1.92	0.66
	25 yr.	3.08	2.12
Shady S	1 yr.	0.01	0.01
	2 yr.	0.09	0.01
	5 yr.	0.62	0.01
	10 yr.	1.05	0.01
	25 yr.	1.64	0.08
East	1 yr.	0.01	0.00
	2 yr.	0.07	0.03
	5 yr.	0.48	0.08
	10 yr.	0.81	0.15
	25 yr.	1.28	0.37
Lot 9	1 yr.	0.01	0.02
	2 yr.	0.08	0.05
	5 yr.	0.56	0.25
	10 yr.	0.96	0.98
	25 yr.	1.50	2.47
Total	1 yr.	0.07	0.06
	2 yr.	0.41	0.13
	5 yr.	2.78	0.55
	10 yr.	4.740	1.80
	25 yr.	7.50	5.04

Sequence:

The initial construction will consist of grading the proposed town road and constructing the bio-filtration areas. All erosion control devices shall be in place prior to commencement of work. Construction will begin in the Spring of 2016, as weather and soil conditions permit.

Maintenance:

During construction, the erosion control and maintenance of the property will be the responsibility of J-J Hengel. The maintenance will transfer to the home owner's association once all properties have been transferred and all areas are established.



DEPARTMENT OF LAND CONSERVATION  
 Erosion Control Permit Application  
 LA CROSSE COUNTY, WISCONSIN  
 608-785-9867

Site Visit Date \_\_\_\_\_

REQUIRED: Parcel No. 9-1401-4 Contact Zoning, Planning & Land Information Dept. at 785-9722 for parcel number. In order for an application to be processed, the applicant shall provide the parcel # of the site where all land disturbance activities will occur.

DAN & JULIA GERKE  
 (Landowner Name)

\_\_\_\_\_  
 (Telephone)

W5394 COUNTY ROAD F  
 (Address)

LA CROSSE, WI  
 (City)

54601  
 (Zip Code)

Person Responsible for Erosion Control:

JOE HENGEL - J-J HENGEL  
 (Landowner Name)

(608) 788-8080  
 (Telephone)

2302 S. AVE  
 (Address)

LA CROSSE, WI  
 (City)

54601  
 (Zip Code)

Description of Activity: SUBDIVISION

**For Office Use Only**

Amount of area to be disturbed: Square Feet \_\_\_\_\_ (or) Acres \_\_\_\_\_

Distance between disturbed area and perennial waters, streams, lakes, etc.  
 (Check one) 0-100' \_\_\_\_\_, 101-300' \_\_\_\_\_, Within 1/4 mile \_\_\_\_\_, Over 1/4 mile \_\_\_\_\_

Slope of site where land disturbance will occur: \_\_\_\_\_ % Fee received \$ \_\_\_\_\_

Category \_\_\_\_\_ erosion control plan required. Date \_\_\_\_/\_\_\_\_/\_\_\_\_



La Crosse County Department of Land Conservation  
 400 N 4<sup>th</sup> Street, Administration Building Room 3270  
 LA CROSSE, WI 54601  
 Phone: (608) 785-9867 FAX: (608) 789-7849

**Storm Water Permit Application Form**

Project Name: MAPLE RIDGE ADDITION

Project Type: 1 or 2 Family Residence  Subdivision  Commercial/Multifamily   
 Other \_\_\_\_\_

Impervious Area: 73529 ft<sup>2</sup> INCLUDING ASSUMED HOUSING, DRIVEWAYS & ACCESSORY BLDGS

Tax Parcel ID #(s): 9-1401-4

The following contacts are required at the time of application: (Enter information on 2nd page)

- **Responsible Party:** The person or entity holding fee title to the property or the person acting as the owner's representative, as delegated on page 2 of this form. 1) In the case of a corporation, by a principal executive officer of at least the level of vice-president or by the officer's authorized representative having overall responsibility for the operation of the site for which a permit is sought; 2) In the case of a limited liability company, by a member or manager; 3) In the case of a partnership, by the general partner; 4) In the case of a sole proprietorship, by the proprietor, or; 5) For a unit of government, by a principal executive officer, ranking elected official or other duly authorized representative.
- **Engineer or Designer:** The primary contact for the preparation of the storm water management plan. All plan review comments will be addressed to this contact. For all storm water plans and other engineering, this person must number and sign all plans submitted. If the designer is a licensed professional they shall stamp and sign all plans submitted as part of the permit. The designer or their designee shall oversee and verify construction of all practices.

If a pre-construction conference is required, contractor contact information will be required prior to issuing a permit.

Please indicate which one you wish to apply for: (Preliminary Review may be required by code.)

Preliminary Review Letter  
Items needed:

1. Signed Permit Application form
2. Application Fee
3. Site Plan Map (Checklist #1)
4. Storm Water Management Plan (Checklist #2)
5. Preliminary Maintenance Agreement

Storm Water Permit  
Items needed:

1. Signed Permit Application form and General Requirements Agreement form
2. Application Fee
3. Site Plan Map (Checklist #1)
4. Final Erosion Control Plan (see Chapter 21)
5. Final Storm Water Mgt. Plan (including construction inspection plan - Checklist #3)
6. Preliminary Maintenance Agreement
7. Financial Assurance
8. Copy of Preliminary Review Letter (if applicable)

**Storm Water Management Application (Page 2)**

**Responsible Party Contact Information: (owner information required to process application)**

Name:	JOE HENGEL		Company:	J-J HENGEL	
Mailing Address:	2302 S. AVE.				
City:	LA CROSSE	State:	WI	Zip Code:	54601
Daytime Phone:	(608) 788-8080	Cell Phone:		Fax:	
E-mail Address:					

I hereby certify that I meet the definition of "Responsible Party" on page 1 of this form. I understand that I will become the permit holder once a permit is issued. I also understand by submitting this application, County staff may enter upon the subject site to obtain information necessary to administer the storm water ordinance (Chapter 29 County Code of Ordinances).

I hereby authorize JOE HENGEL (name) to serve as my representative for purposes of this application

Signature of Applicant -  
Responsible Party:

*Joe Hengel*

Date:

8-2-12

**Designer Contact information: (required to process application)**

Name:	Frank Hill		Company:	LA CROSSE ENGINEERING & SURVEYING CO.	
Mailing Address:	1212 S. 3RD ST.				
City:	LA CROSSE	State:	WI	Zip Code:	54601
Daytime Phone:	(608) 782-2133	Cell Phone:		Fax:	(608) 782-3452
E-mail Address:	fhill@laxengineering.com				

If pre-construction conference is required, additional contact information is required prior to a permit being issued.

Preliminary Review Fee: \$ 100  
 Base Permit Fee: \$ 500  
 Additional Fee:  $1.194 \times 0.54 = 518.36$   
 (+\$.01 / ft<sup>2</sup> for impervious area over .5 acres)  
 Total Fee: \$ 1118.36

<u>Office use only</u>	
<input type="checkbox"/>	Double Fee
<input type="checkbox"/>	Fee Exemption
DATE RECEIVED	

*Maple Ridge Addition – Hwy F & Shady Maple Ridge Road*  
**Long-term Stormwater Management  
Maintenance Provisions**

**SITE NAME**

*Maple Ridge Addition – Hwy F & Shady Maple Ridge Road*

**PROPERTY LEGAL DESCRIPTION**

*Part of the SE ¼ of the SE ¼ of Section 35, T16N, R7W, Town of Medary, La Crosse County, WI.*

**RESPONSIBLE PARTY**

The facility owner is responsible for satisfying the provisions of this agreement. A Homeowner's Association shall be created to take responsible charge of requirements below once developer is a minority owner and devices are stable.

**PERMANENT COMPONENTS OF THE STORMWATER SYSTEM**

The stormwater system consists of the following components:

- + *Stormwater drainage ways and swales*
- + *Infiltration areas*

The locations of all permanent stormwater system components are shown in Figure 1, attached.

**INSPECTION AND MAINTENANCE**

All components of the stormwater system shall be inspected at least semiannually in early Spring and early Autumn. Repairs will be made whenever the performance of a stormwater control structure is compromised.

**MOWING / FERTILIZER & CHEMICAL APPLICATION**

Mowing in buffer areas, pond banks and drainage ways will be minimized in order to maximize filtration of runoff. If occasional mowing is necessary, the mowing height will be no shorter than three inches.

Applications of fertilizers, herbicides, pesticide or other chemical applications are prohibited in buffer areas, on pond banks and along drainage ways.

**DUTY TO PROVIDE MAINTENANCE**

It is the responsibility of the *facility owner* to maintain inspection and maintenance records, and to submit to the *Town of Medary* an annual report documenting the inspection and maintenance of the stormwater system. Proof of maintenance is required with each annual report.

In the event the facility owner fails to perform its obligations under this agreement, the *Town of Medary* shall have the authority to inspect and maintain all components of the stormwater system. In such an event, all associated costs will be assessed back as a special charge against the property pursuant to Sec. 66.0627 Wis. Stats. Said charge shall be a lien on the property and shall be collected with the real estate taxes.

**SIGNATURES**

The undersigned agrees to the provision set forth in this agreement.

  
\_\_\_\_\_  
*Signature or Authorized Agent for Responsible Party*

*MEMBER*  
\_\_\_\_\_  
*Title*

*JOSEPH HENGEL*  
\_\_\_\_\_  
*Legal name of Responsible Party*

*2302 SOUTH AVE, LA CROSSE, WI*  
\_\_\_\_\_  
*Street address, City, State, Zip Code*

*(608) 788-8080*  
\_\_\_\_\_  
*Contact information (phone, email, etc.)*

*12/22/15*  
\_\_\_\_\_  
*Date*



Shady North Exist



Shady South Exist



Shady North



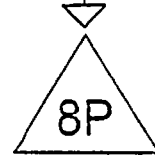
Road Pond



North of road



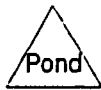
South Developed



South



North



**Shady**

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**Area Listing (all nodes)**

Area (acres)	CN	Description (subcatchment-numbers)
4.700	55	(1S, 2S)
3.469	61	>75% Grass cover, Good, HSG B (3S, 4S, 7S)
0.587	89	Paved roads w/open ditches, 50% imp, HSG B (3S, 4S, 7S)
0.565	98	Roofs, HSG B (3S, 4S, 7S)
9.321	62	TOTAL AREA



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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
4.621	HSG B	3S, 4S, 7S
0.000	HSG C	
0.000	HSG D	
4.700	Other	1S, 2S
9.321		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subr Nurr
0.000	0.000	0.000	0.000	4.700	4.700		
0.000	3.469	0.000	0.000	0.000	3.469	>75% Grass cover, Good	
0.000	0.587	0.000	0.000	0.000	0.587	Paved roads w/open ditches, 50% imp	
0.000	0.565	0.000	0.000	0.000	0.565	Roofs	
0.000	4.621	0.000	0.000	4.700	9.321	TOTAL AREA	

**Shady**

Type II 24-hr 1 yr Rainfall=2.50"

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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, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S: Shady North Exist**      Runoff Area=3.500 ac 0.00% Impervious    Runoff Depth>0.06"  
Flow Length=160' Tc=17.8 min CN=55    Runoff=0.04 cfs 0.018 af

**Subcatchment 2S: Shady South Exist**      Runoff Area=1.200 ac 0.00% Impervious    Runoff Depth>0.06"  
Flow Length=190' Tc=7.5 min CN=55    Runoff=0.01 cfs 0.006 af

**Subcatchment 3S: Shady North**            Runoff Area=1.280 ac 26.17% Impervious    Runoff Depth>0.46"  
Flow Length=160' Tc=17.1 min CN=72    Runoff=0.69 cfs 0.049 af

**Subcatchment 4S: North of road**          Runoff Area=2.140 ac 20.02% Impervious    Runoff Depth>0.40"  
Flow Length=350' Tc=11.8 min CN=70    Runoff=1.16 cfs 0.071 af

**Subcatchment 7S: South Developed**      Runoff Area=1.201 ac 7.91% Impervious    Runoff Depth>0.23"  
Flow Length=190' Tc=8.8 min CN=64    Runoff=0.32 cfs 0.023 af

**Pond 5P: Road Pond**                      Peak Elev=1,265.80' Storage=1,048 cf    Inflow=0.69 cfs 0.049 af  
Discarded=0.01 cfs 0.004 af    Primary=0.08 cfs 0.023 af    Outflow=0.09 cfs 0.027 af

**Pond 8P: South**                              Peak Elev=1,266.08' Storage=822 cf    Inflow=0.32 cfs 0.023 af  
Outflow=0.01 cfs 0.004 af

**Pond 10P: North**                            Peak Elev=1,243.71' Storage=3,382 cf    Inflow=1.16 cfs 0.094 af  
Outflow=0.03 cfs 0.016 af

**Total Runoff Area = 9.321 ac    Runoff Volume = 0.167 af    Average Runoff Depth = 0.21"**  
**90.79% Pervious = 8.462 ac    9.21% Impervious = 0.858 ac**

**Shady**

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Type II 24-hr 1 yr Rainfall=2.50"

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**Summary for Subcatchment 1S: Shady North Exist**

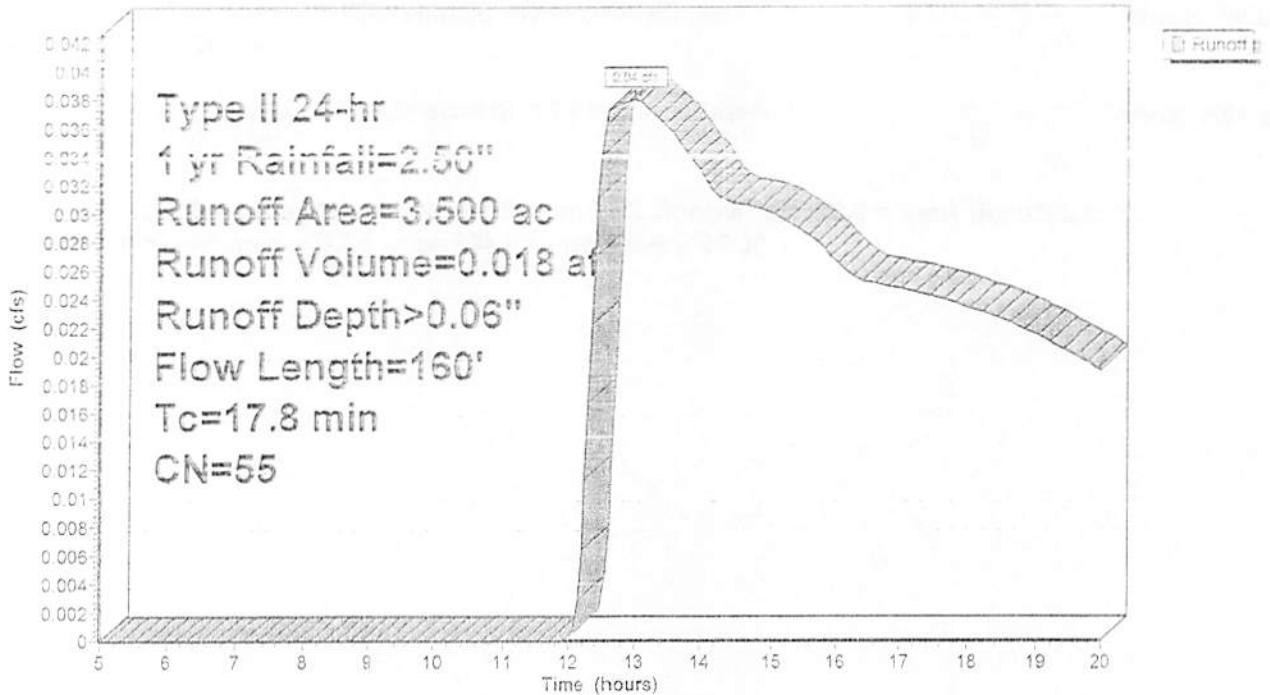
Runoff = 0.04 cfs @ 12.99 hrs, Volume= 0.018 af, Depth> 0.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type II 24-hr 1 yr Rainfall=2.50"

Area (ac)	CN	Description
* 3.500	55	
3.500		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	80	0.0100	0.08		Sheet Flow, Grass: Dense n= 0.240 P2= 2.90"
1.3	80	0.0200	0.99		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
17.8	160	Total			

**Subcatchment 1S: Shady North Exist**



**Shady**

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Type II 24-hr 1 yr Rainfall=2.50"

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**Summary for Subcatchment 2S: Shady South Exist**

Runoff = 0.01 cfs @ 12.46 hrs, Volume= 0.006 af, Depth> 0.06"

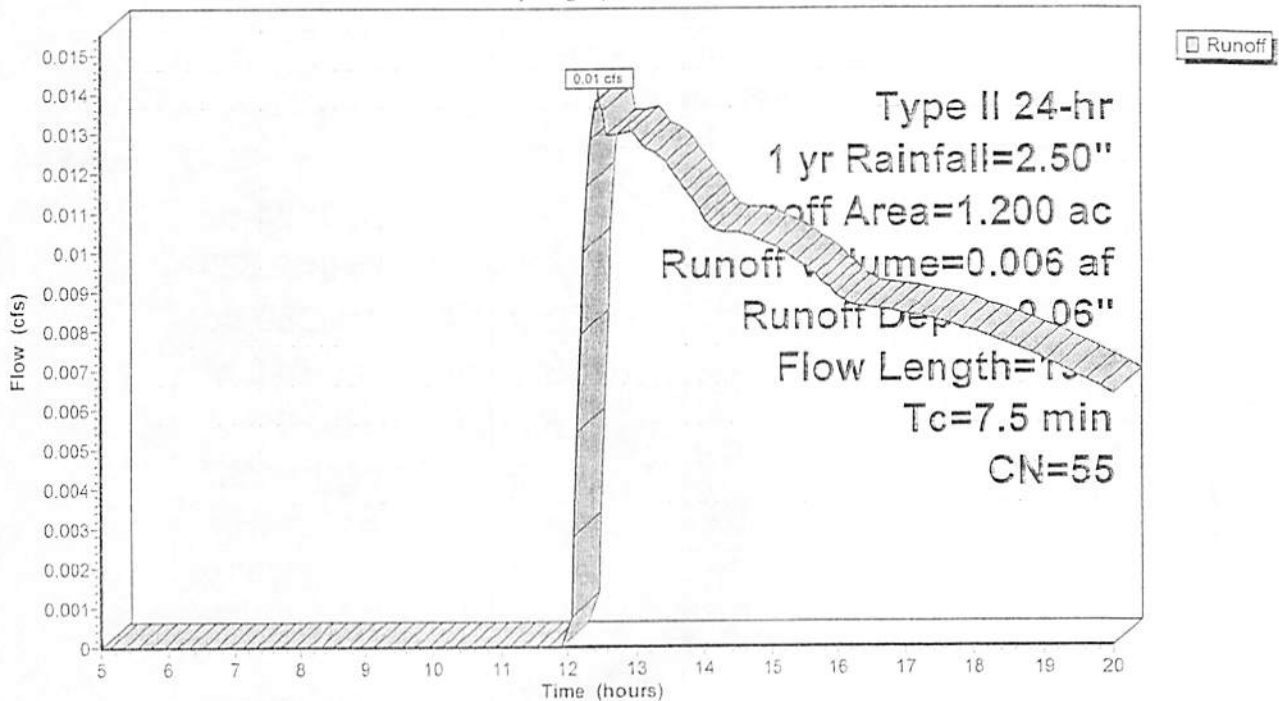
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type II 24-hr 1 yr Rainfall=2.50"

Area (ac)	CN	Description
* 1.200	55	
1.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	60	0.0330	0.16		Sheet Flow, Cultivated: Residue>20% n= 0.170 P2= 2.90"
1.3	130	0.0600	1.71		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
7.5	190	Total			

**Subcatchment 2S: Shady South Exist**

Hydrograph



**Shady**

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Type II 24-hr 1 yr Rainfall=2.50"

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**Summary for Subcatchment 3S: Shady North**

Runoff = 0.69 cfs @ 12.12 hrs, Volume= 0.049 af, Depth> 0.46"

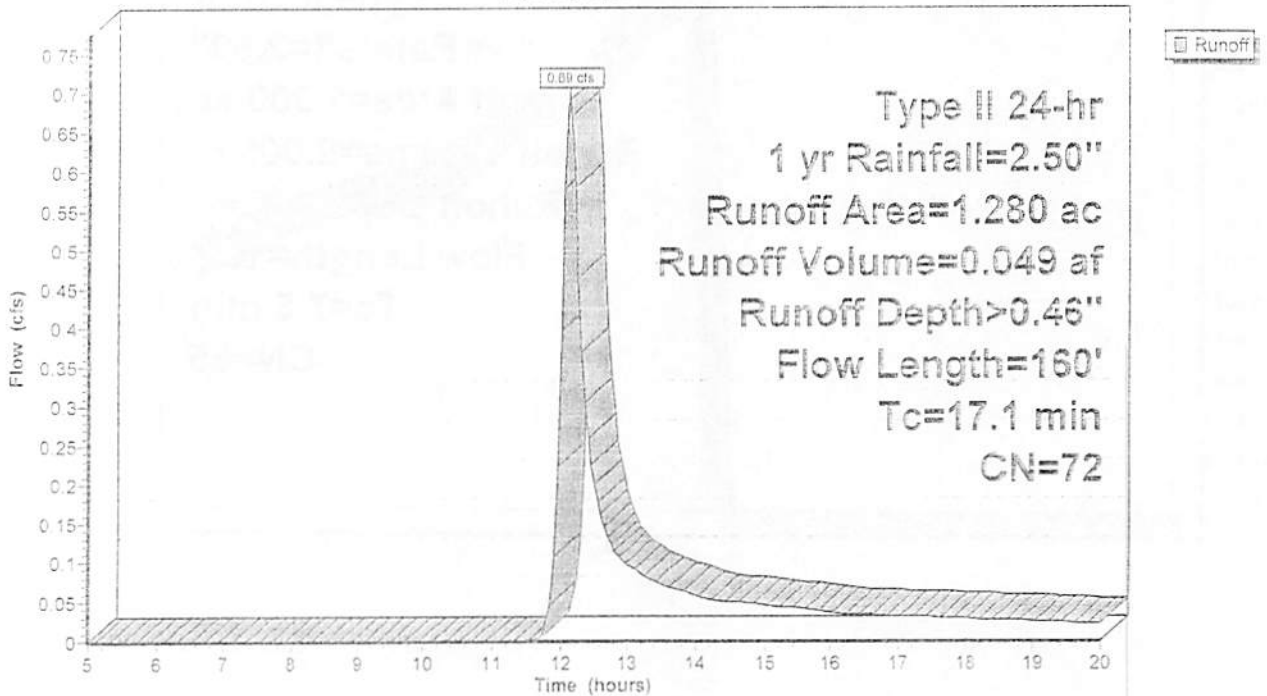
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 1 yr Rainfall=2.50"

Area (ac)	CN	Description
0.250	98	Roofs, HSG B
0.170	89	Paved roads w/open ditches, 50% imp, HSG B
0.860	61	>75% Grass cover, Good, HSG B
1.280	72	Weighted Average
0.945		73.83% Pervious Area
0.335		26.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	80	0.0100	0.08		Sheet Flow, Grass: Dense n= 0.240 P2= 2.90"
0.6	80	0.0200	2.12		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps

**Subcatchment 3S: Shady North**

Hydrograph



Summary for Subcatchment 4S: North of road

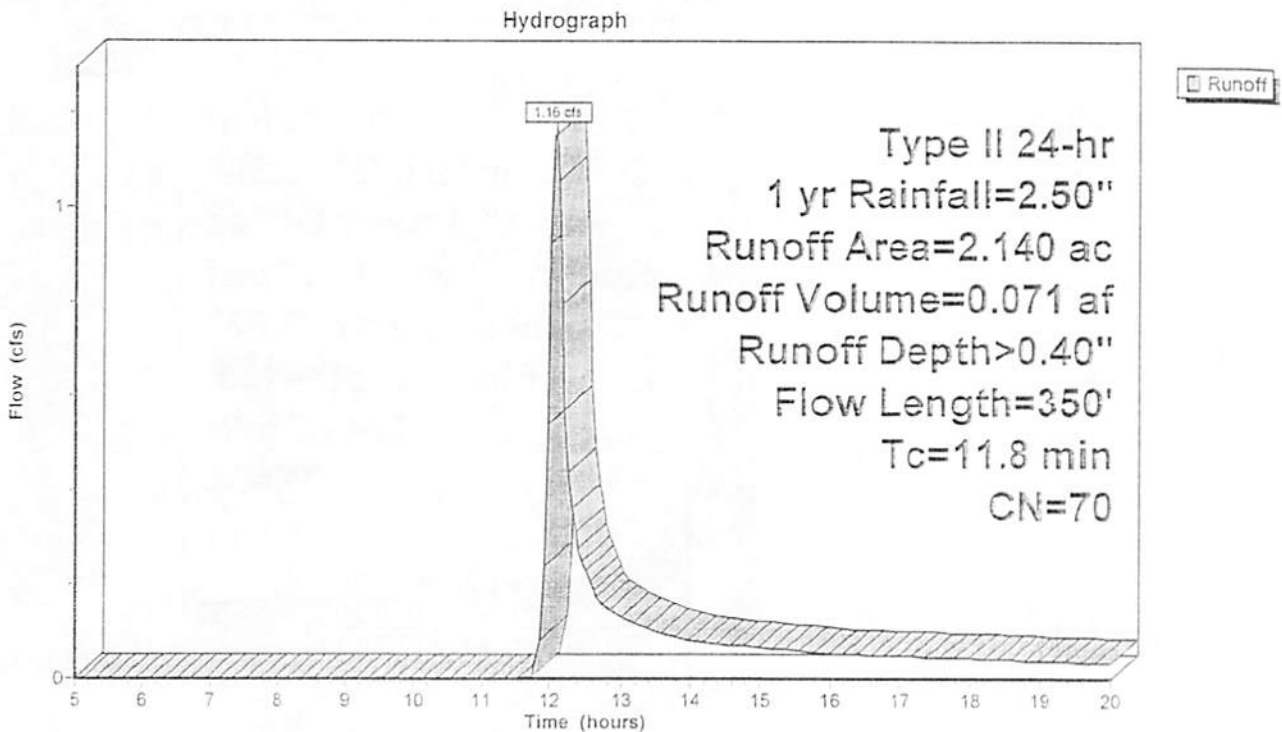
Runoff = 1.16 cfs @ 12.06 hrs, Volume= 0.071 af, Depth> 0.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 1 yr Rainfall=2.50"

Area (ac)	CN	Description
0.239	98	Roofs, HSG B
0.379	89	Paved roads w/open ditches, 50% imp, HSG B
1.522	61	>75% Grass cover, Good, HSG B
2.140	70	Weighted Average
1.711		79.98% Pervious Area
0.428		20.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	100	0.0600	0.17		Sheet Flow, Grass: Dense n= 0.240 P2= 2.90"
2.1	250	0.0800	1.98		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
11.8	350	Total			

Subcatchment 4S: North of road



**Summary for Subcatchment 7S: South Developed**

Runoff = 0.32 cfs @ 12.05 hrs, Volume= 0.023 af, Depth> 0.23"

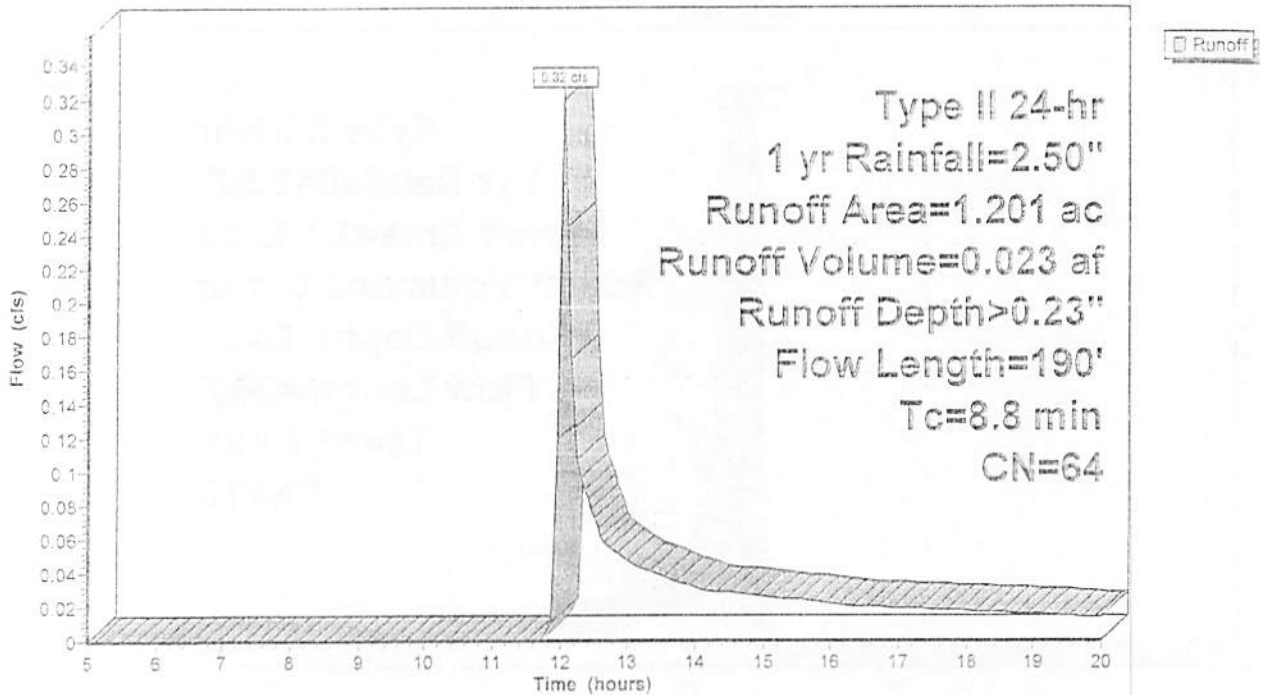
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type II 24-hr 1 yr Rainfall=2.50"

Area (ac)	CN	Description
0.076	98	Roofs, HSG B
0.038	89	Paved roads w/open ditches, 50% imp, HSG B
1.087	61	>75% Grass cover, Good, HSG B
1.201	64	Weighted Average
1.106		92.09% Pervious Area
0.095		7.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	60	0.0330	0.12		Sheet Flow, Grass: Dense n= 0.240 P2= 2.90"
0.6	130	0.0600	3.67		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps

**Subcatchment 7S: South Developed**

Hydrograph





**Summary for Pond 5P: Road Pond**

Inflow Area = 1.280 ac, 26.17% Impervious, Inflow Depth > 0.46" for 1 yr event  
 Inflow = 0.69 cfs @ 12.12 hrs, Volume= 0.049 af  
 Outflow = 0.09 cfs @ 13.12 hrs, Volume= 0.027 af, Atten= 87%, Lag= 60.2 min  
 Discarded = 0.01 cfs @ 13.12 hrs, Volume= 0.004 af  
 Primary = 0.08 cfs @ 13.12 hrs, Volume= 0.023 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 1,265.80' @ 13.12 hrs Surf.Area= 1,886 sf Storage= 1,048 cf

Plug-Flow detention time= 191.5 min calculated for 0.027 af (54% of inflow)  
 Center-of-Mass det. time= 94.7 min ( 929.8 - 835.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,265.00'	1,449 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,265.00	726	0	0
1,266.00	2,171	1,449	1,449

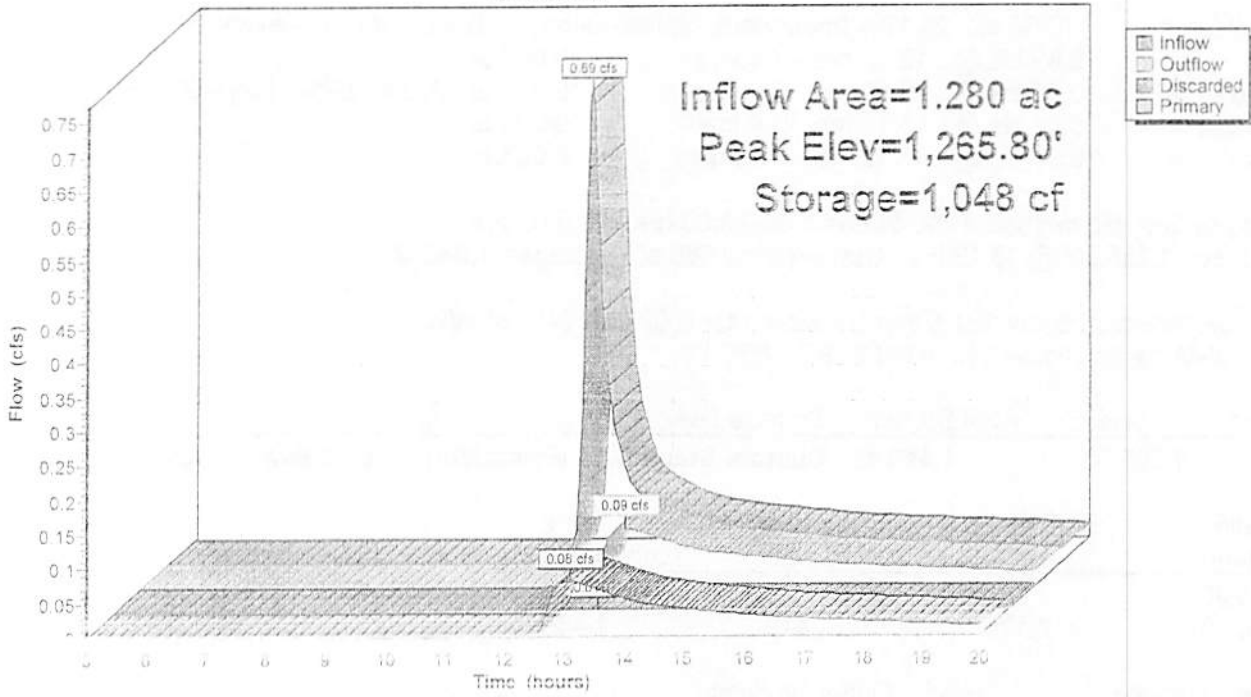
Device	Routing	Invert	Outlet Devices
#1	Primary	1,265.90'	10.0' long x 6.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83
#2	Discarded	1,265.00'	0.130 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 0.00'
#3	Primary	1,265.75'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Discarded OutFlow Max=0.01 cfs @ 13.12 hrs HW=1,265.80' (Free Discharge)  
 ↳2=Exfiltration ( Controls 0.01 cfs)

Primary OutFlow Max=0.08 cfs @ 13.12 hrs HW=1,265.80' (Free Discharge)  
 ↳1=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)  
 ↳3=Orifice/Grate (Weir Controls 0.08 cfs @ 0.75 fps)

### Pond 5P: Road Pond

Hydrograph



**Summary for Pond 8P: South**

Inflow Area = 1.201 ac, 7.91% Impervious, Inflow Depth > 0.23" for 1 yr event  
 Inflow = 0.32 cfs @ 12.05 hrs, Volume= 0.023 af  
 Outflow = 0.01 cfs @ 20.00 hrs, Volume= 0.004 af, Atten= 98%, Lag= 477.3 min  
 Primary = 0.01 cfs @ 20.00 hrs, Volume= 0.004 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 1,266.08' @ 20.00 hrs Surf.Area= 2,010 sf Storage= 822 cf

Plug-Flow detention time= 245.8 min calculated for 0.004 af (17% of inflow)  
 Center-of-Mass det. time= 106.0 min ( 967.7 - 861.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,264.90'	5,713 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,264.90	2,010	0.0	0	0
1,265.00	2,010	30.0	60	60
1,266.00	2,010	30.0	603	663
1,267.00	2,010	100.0	2,010	2,673
1,268.00	4,070	100.0	3,040	5,713

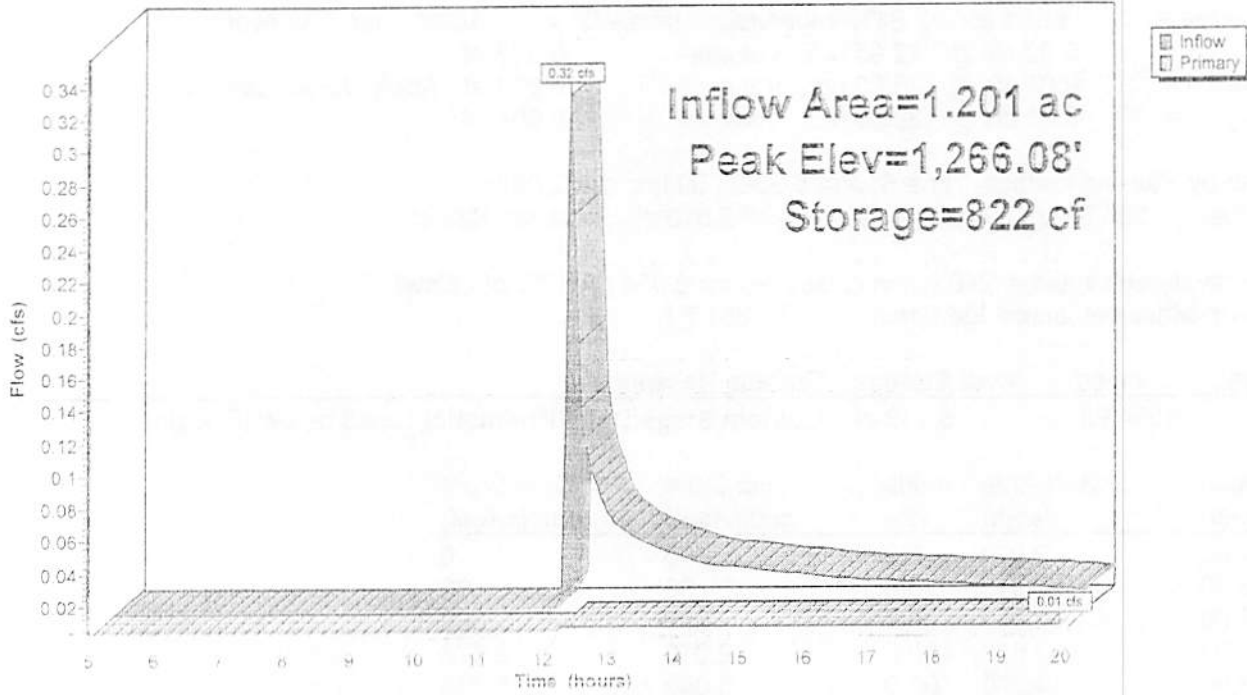
Device	Routing	Invert	Outlet Devices
#1	Device 3	1,264.90'	0.130 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 0.00'
#2	Primary	1,267.75'	10.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#3	Primary	1,265.25'	6.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.01 cfs @ 20.00 hrs HW=1,266.08' (Free Discharge)

- 2=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)
- 3=Orifice/Grate (Passes 0.01 cfs of 0.72 cfs potential flow)
- 1=Exfiltration ( Controls 0.01 cfs)

### Pond 8P: South

Hydrograph



Summary for Pond 10P: North

Inflow Area = 3.420 ac, 22.32% Impervious, Inflow Depth > 0.33" for 1 yr event  
 Inflow = 1.16 cfs @ 12.06 hrs, Volume= 0.094 af  
 Outflow = 0.03 cfs @ 20.00 hrs, Volume= 0.016 af, Atten= 97%, Lag= 476.4 min  
 Primary = 0.03 cfs @ 20.00 hrs, Volume= 0.016 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 1,243.71' @ 20.00 hrs Surf.Area= 2,621 sf Storage= 3,382 cf

Plug-Flow detention time= 265.6 min calculated for 0.016 af (17% of inflow)  
 Center-of-Mass det. time= 127.5 min ( 986.9 - 859.4 )

Volume	Invert	Avail.Storage	Storage Description		
#1	1,240.90'	11,014 cf	Custom Stage Data (Prismatic) Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	
1,240.90	1,460	0.0	0	0	
1,241.00	1,460	30.0	44	44	
1,242.00	1,460	30.0	438	482	
1,243.00	1,460	100.0	1,460	1,942	
1,244.00	3,105	100.0	2,283	4,224	
1,245.00	5,010	100.0	4,058	8,282	
1,245.50	5,920	100.0	2,733	11,014	

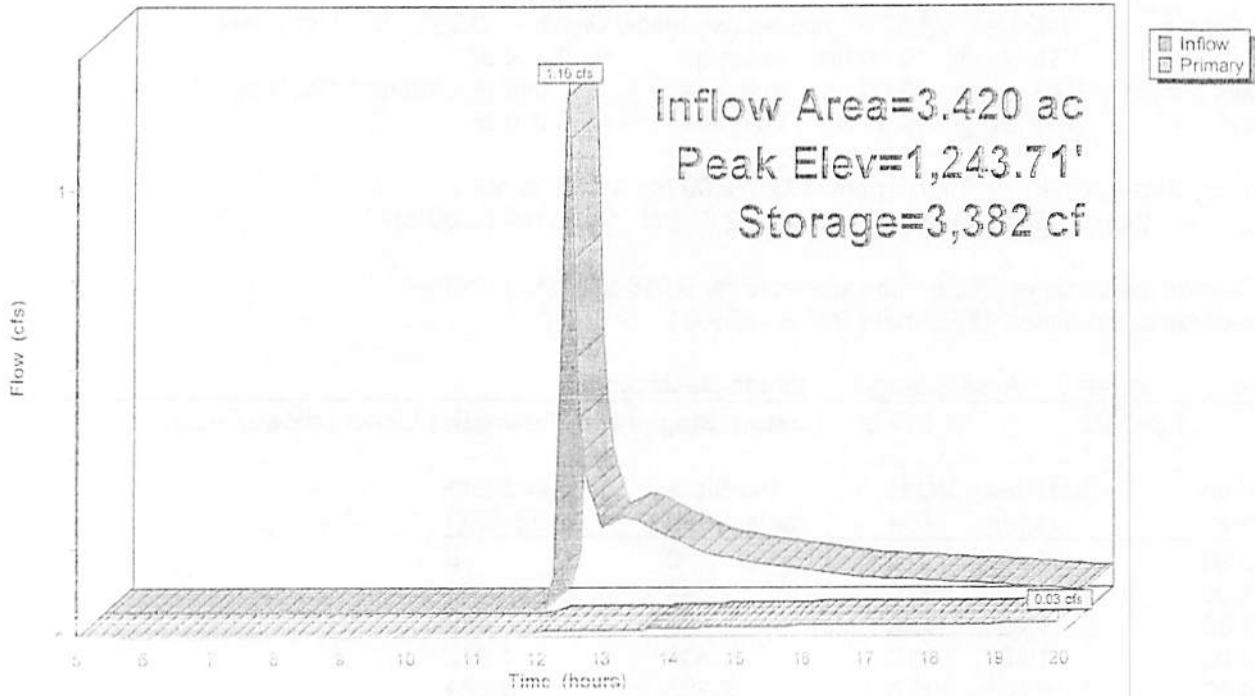
Device	Routing	Invert	Outlet Devices	
#1	Primary	1,245.10'	10.0' long x 4.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32	
#2	Device 5	1,240.90'	0.500 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 0.00'	
#3	Primary	1,244.45'	8.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads	
#4	Device 3	1,244.00'	1.0" Horiz. Orifice/Grate X 2.00 C= 0.600 Limited to weir flow at low heads	
#5	Primary	1,241.25'	6.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads	

Primary OutFlow Max=0.03 cfs @ 20.00 hrs HW=1,243.71' (Free Discharge)

- 1=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)
- 3=Orifice/Grate ( Controls 0.00 cfs)
- 4=Orifice/Grate ( Controls 0.00 cfs)
- 5=Orifice/Grate (Passes 0.03 cfs of 1.48 cfs potential flow)
- 2=Exfiltration ( Controls 0.03 cfs)

### Pond 10P: North

Hydrograph



**Shady**

Type II 24-hr 2 yr Rainfall=2.90"

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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, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

<b>Subcatchment 1S: Shady North Exist</b>	Runoff Area=3.500 ac 0.00% Impervious Runoff Depth>0.13" Flow Length=160' Tc=17.8 min CN=55 Runoff=0.17 cfs 0.039 af
<b>Subcatchment 2S: Shady South Exist</b>	Runoff Area=1.200 ac 0.00% Impervious Runoff Depth>0.14" Flow Length=190' Tc=7.5 min CN=55 Runoff=0.09 cfs 0.014 af
<b>Subcatchment 3S: Shady North</b>	Runoff Area=1.280 ac 26.17% Impervious Runoff Depth>0.66" Flow Length=160' Tc=17.1 min CN=72 Runoff=1.05 cfs 0.071 af
<b>Subcatchment 4S: North of road</b>	Runoff Area=2.140 ac 20.02% Impervious Runoff Depth>0.58" Flow Length=350' Tc=11.8 min CN=70 Runoff=1.82 cfs 0.104 af
<b>Subcatchment 7S: South Developed</b>	Runoff Area=1.201 ac 7.91% Impervious Runoff Depth>0.37" Flow Length=190' Tc=8.8 min CN=64 Runoff=0.62 cfs 0.037 af
<b>Pond 5P: Road Pond</b>	Peak Elev=1,265.87' Storage=1,188 cf Inflow=1.05 cfs 0.071 af Discarded=0.01 cfs 0.004 af Primary=0.30 cfs 0.044 af Outflow=0.31 cfs 0.048 af
<b>Pond 8P: South</b>	Peak Elev=1,266.38' Storage=1,424 cf Inflow=0.62 cfs 0.037 af Outflow=0.01 cfs 0.004 af
<b>Pond 10P: North</b>	Peak Elev=1,244.34' Storage=5,392 cf Inflow=1.82 cfs 0.148 af Outflow=0.04 cfs 0.024 af

**Total Runoff Area = 9.321 ac Runoff Volume = 0.264 af Average Runoff Depth = 0.34"**  
**90.79% Pervious = 8.462 ac 9.21% Impervious = 0.858 ac**

**Shady**

Type II 24-hr 5 yr Rainfall=3.80"

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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, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S: Shady North Exist** Runoff Area=3.500 ac 0.00% Impervious Runoff Depth>0.38"  
Flow Length=160' Tc=17.8 min CN=55 Runoff=1.12 cfs 0.111 af

**Subcatchment 2S: Shady South Exist** Runoff Area=1.200 ac 0.00% Impervious Runoff Depth>0.38"  
Flow Length=190' Tc=7.5 min CN=55 Runoff=0.62 cfs 0.038 af

**Subcatchment 3S: Shady North** Runoff Area=1.280 ac 26.17% Impervious Runoff Depth>1.19"  
Flow Length=160' Tc=17.1 min CN=72 Runoff=1.97 cfs 0.127 af

**Subcatchment 4S: North of road** Runoff Area=2.140 ac 20.02% Impervious Runoff Depth>1.08"  
Flow Length=350' Tc=11.8 min CN=70 Runoff=3.55 cfs 0.192 af

**Subcatchment 7S: South Developed** Runoff Area=1.201 ac 7.91% Impervious Runoff Depth>0.76"  
Flow Length=190' Tc=8.8 min CN=64 Runoff=1.51 cfs 0.076 af

**Pond 5P: Road Pond** Peak Elev=1,266.00' Storage=1,449 cf Inflow=1.97 cfs 0.127 af  
Discarded=0.01 cfs 0.004 af Primary=1.65 cfs 0.100 af Outflow=1.66 cfs 0.104 af

**Pond 6P: Pond** Peak Elev=1,257.00' Storage=1,449 cf Inflow=1.97 cfs 0.127 af  
Discarded=0.01 cfs 0.004 af Primary=1.65 cfs 0.100 af Outflow=0.01 cfs 0.004 af

**Pond 10P: North** Peak Elev=1,245.10' Storage=6,927 cf Inflow=3.58 cfs 0.292 af  
Outflow=0.21 cfs 0.089 af

**Total Runoff Area = 9.321 ac Runoff Volume = 0.545 af Average Runoff Depth = 0.70"**  
**90.79% Pervious = 8.462 ac 9.21% Impervious = 0.858 ac**



**Shady**

Type II 24-hr 10 yr Rainfall=4.30"

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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, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

<b>Subcatchment 1S: Shady North Exist</b>	Runoff Area=3.500 ac 0.00% Impervious Runoff Depth>0.56" Flow Length=160' Tc=17.8 min CN=55 Runoff=1.92 cfs 0.164 af
<b>Subcatchment 2S: Shady South Exist</b>	Runoff Area=1.200 ac 0.00% Impervious Runoff Depth>0.57" Flow Length=190' Tc=7.5 min CN=55 Runoff=1.05 cfs 0.057 af
<b>Subcatchment 3S: Shady North</b>	Runoff Area=1.280 ac 26.17% Impervious Runoff Depth>1.52" Flow Length=160' Tc=17.1 min CN=72 Runoff=2.53 cfs 0.162 af
<b>Subcatchment 4S: North of road</b>	Runoff Area=2.140 ac 20.02% Impervious Runoff Depth>1.39" Flow Length=350' Tc=11.8 min CN=70 Runoff=4.61 cfs 0.247 af
<b>Subcatchment 7S: South Developed</b>	Runoff Area=1.201 ac 7.91% Impervious Runoff Depth>1.02" Flow Length=190' Tc=8.8 min CN=64 Runoff=2.07 cfs 0.102 af
<b>Pond 5P: Road Pond</b>	Peak Elev=1,266.07' Storage=1,449 cf Inflow=2.53 cfs 0.162 af Discarded=0.01 cfs 0.004 af Primary=2.55 cfs 0.134 af Outflow=2.55 cfs 0.138 af
<b>Pond 8P: South</b>	Peak Elev=1,267.59' Storage=4,215 cf Inflow=2.07 cfs 0.102 af Outflow=0.01 cfs 0.005 af
<b>Pond 10P: North</b>	Peak Elev=1,245.18' Storage=9,217 cf Inflow=6.35 cfs 0.381 af Outflow=0.66 cfs 0.178 af

**Total Runoff Area = 9.321 ac Runoff Volume = 0.732 af Average Runoff Depth = 0.94"**  
**90.79% Pervious = 8.462 ac 9.21% Impervious = 0.858 ac**

**Shady**

Type II 24-hr 25 yr Rainfall=4.90"

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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, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 1S: Shady North Exist** Runoff Area=3.500 ac 0.00% Impervious Runoff Depth>0.81"  
Flow Length=160' Tc=17.8 min CN=55 Runoff=3.08 cfs 0.236 af

**Subcatchment 2S: Shady South Exist** Runoff Area=1.200 ac 0.00% Impervious Runoff Depth>0.82"  
Flow Length=190' Tc=7.5 min CN=55 Runoff=1.64 cfs 0.082 af

**Subcatchment 3S: Shady North** Runoff Area=1.280 ac 26.17% Impervious Runoff Depth>1.93"  
Flow Length=160' Tc=17.1 min CN=72 Runoff=3.24 cfs 0.206 af

**Subcatchment 4S: North of road** Runoff Area=2.140 ac 20.02% Impervious Runoff Depth>1.78"  
Flow Length=350' Tc=11.8 min CN=70 Runoff=5.96 cfs 0.318 af

**Subcatchment 7S: South Developed** Runoff Area=1.201 ac 7.91% Impervious Runoff Depth>1.36"  
Flow Length=190' Tc=8.8 min CN=64 Runoff=2.81 cfs 0.136 af

**Pond 5P: Road Pond** Peak Elev=1,266.10' Storage=1,449 cf Inflow=3.24 cfs 0.206 af  
Discarded=0.01 cfs 0.004 af Primary=3.18 cfs 0.178 af Outflow=3.19 cfs 0.182 af

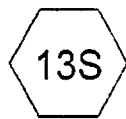
**Pond 6P: Road Pond** Peak Elev=1,267.10' Storage=1,449 cf Inflow=3.24 cfs 0.206 af  
Discarded=0.01 cfs 0.004 af Primary=3.18 cfs 0.178 af Outflow=3.19 cfs 0.182 af

**Pond 10P: North** Peak Elev=1,245.29' Storage=9,819 cf Inflow=9.23 cfs 0.496 af  
Discarded=0.01 cfs 0.004 af Primary=9.22 cfs 0.492 af Outflow=2.12 cfs 0.292 af

**Total Runoff Area = 9.321 ac Runoff Volume = 0.978 af Average Runoff Depth = 1.26"**  
**90.79% Pervious = 8.462 ac 9.21% Impervious = 0.858 ac**



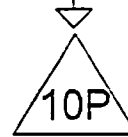
Lot 9 Exist



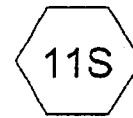
East\_exist



East developed



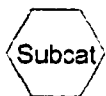
East



Lot 9



Lot 9



Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.190	55	(13S, 14S)
0.010	98	(14S)
1.956	61	>75% Grass cover, Good, HSG B (9S, 11S)
0.217	89	Paved roads w/open ditches, 50% imp, HSG B (9S, 11S)
0.257	98	Roofs, HSG B (9S, 11S)
4.630	62	TOTAL AREA

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
2.430	HSG B	9S, 11S
0.000	HSG C	
0.000	HSG D	
2.200	Other	13S, 14S
4.630		TOTAL AREA

Shady\_East

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subr Num
0.000	0.000	0.000	0.000	2.200	2.200		
0.000	1.956	0.000	0.000	0.000	1.956	>75% Grass cover, Good	
0.000	0.217	0.000	0.000	0.000	0.217	Paved roads w/open ditches, 50% imp	
0.000	0.257	0.000	0.000	0.000	0.257	Roofs	
0.000	2.430	0.000	0.000	2.200	4.630	<b>TOTAL AREA</b>	

**Shady\_East**

Type II 24-hr 1 yr Rainfall=2.50"

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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, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

**Subcatchment 9S: East developed**      Runoff Area=1.060 ac 18.44% Impervious    Runoff Depth>0.37"  
Flow Length=320' Tc=9.3 min CN=69    Runoff=0.57 cfs 0.032 af

**Subcatchment 11S: Lot 9**      Runoff Area=1.370 ac 12.41% Impervious    Runoff Depth>0.28"  
Flow Length=270' Tc=7.9 min CN=66    Runoff=0.53 cfs 0.032 af

**Subcatchment 13S: East\_exist**      Runoff Area=1.060 ac 0.00% Impervious    Runoff Depth>0.06"  
Flow Length=320' Tc=10.2 min CN=55    Runoff=0.01 cfs 0.005 af

**Subcatchment 14S: Lot 9 Exist**      Runoff Area=1.140 ac 0.88% Impervious    Runoff Depth>0.06"  
Flow Length=270' Tc=8.2 min CN=55    Runoff=0.01 cfs 0.006 af

**Pond 10P: East**      Peak Elev=1,243.08' Storage=1,325 cf    Inflow=0.57 cfs 0.032 af  
Outflow=0.00 cfs 0.002 af

**Pond 12P: Lot 9**      Peak Elev=1,234.28' Storage=1,151 cf    Inflow=0.53 cfs 0.032 af  
Outflow=0.02 cfs 0.005 af

**Total Runoff Area = 4.630 ac    Runoff Volume = 0.075 af    Average Runoff Depth = 0.20"**  
**91.89% Pervious = 4.255 ac    8.11% Impervious = 0.376 ac**

Summary for Subcatchment 9S: East developed

Runoff = 0.57 cfs @ 12.03 hrs, Volume= 0.032 af, Depth> 0.37"

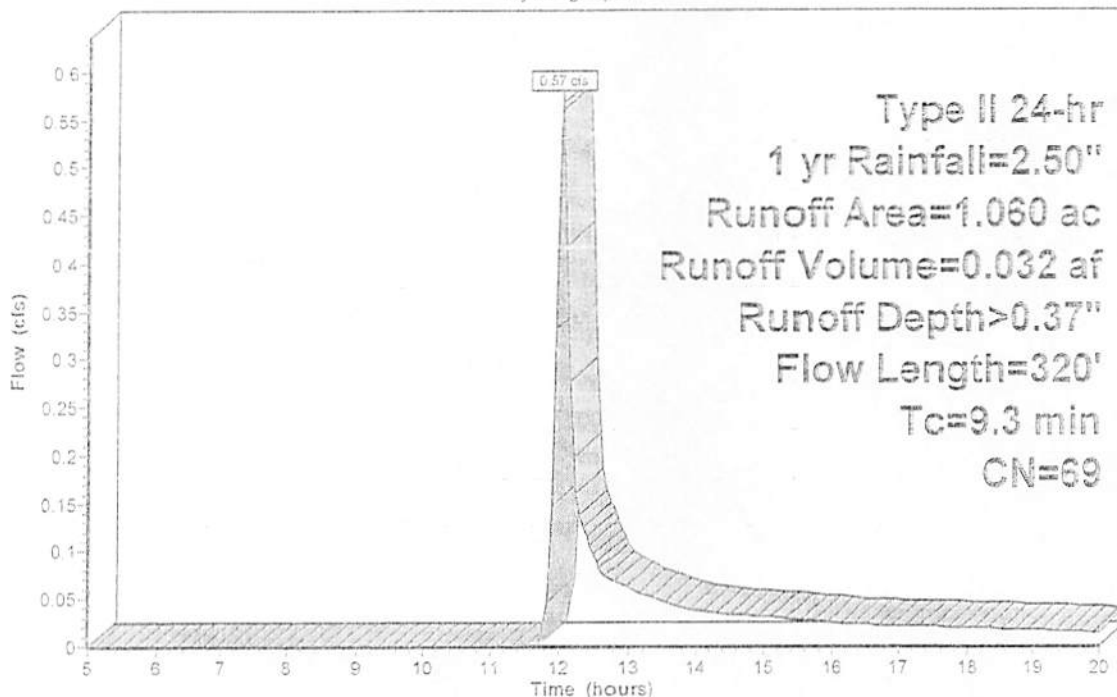
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type II 24-hr 1 yr Rainfall=2.50"

Area (ac)	CN	Description
0.147	98	Roofs, HSG B
0.097	89	Paved roads w/open ditches, 50% imp, HSG B
0.816	61	>75% Grass cover, Good, HSG B
1.060	69	Weighted Average
0.864		81.56% Pervious Area
0.195		18.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	70	0.0400	0.14		Sheet Flow, Grass: Dense n= 0.240 P2= 2.90"
0.4	100	0.1000	4.74		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
0.4	150	0.1500	5.10		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
9.3	320	Total			

Subcatchment 9S: East developed

Hydrograph



Runoff



Summary for Subcatchment 11S: Lot 9

Runoff = 0.53 cfs @ 12.02 hrs, Volume= 0.032 af, Depth> 0.28"

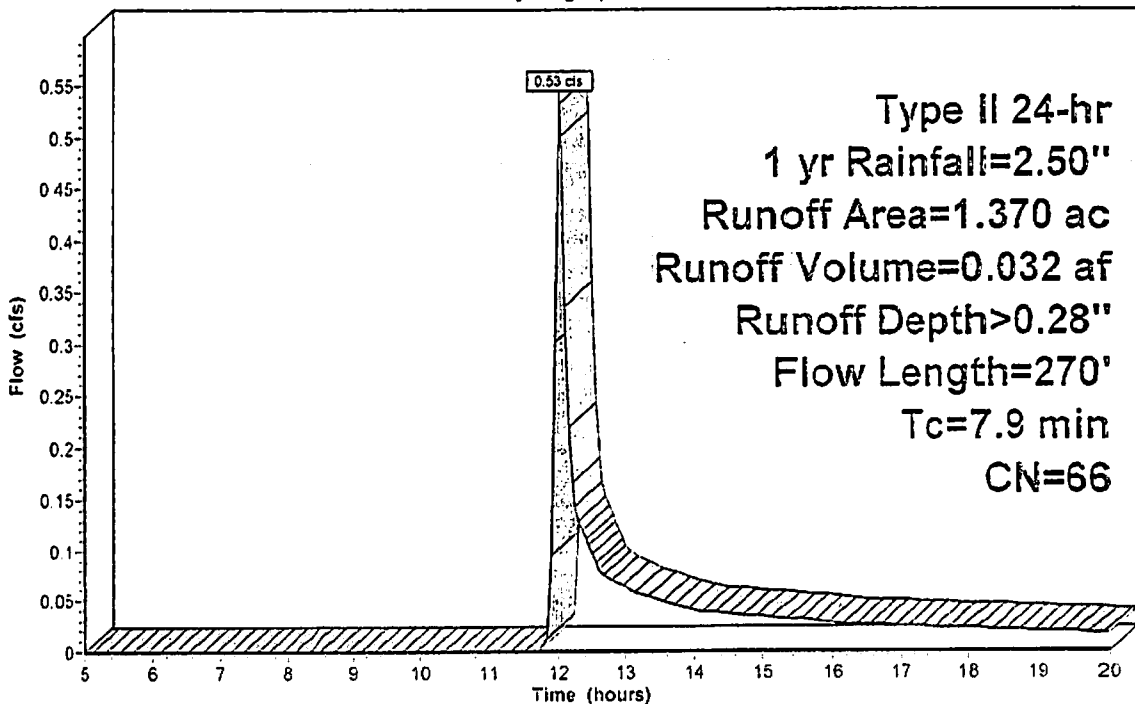
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 1 yr Rainfall=2.50"

Area (ac)	CN	Description
0.110	98	Roofs, HSG B
0.120	89	Paved roads w/open ditches, 50% imp, HSG B
1.140	61	>75% Grass cover. Good, HSG B
1.370	66	Weighted Average
1.200		87.59% Pervious Area
0.170		12.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	50	0.0300	0.11		Sheet Flow, Grass: Dense n= 0.240 P2= 2.90"
0.4	120	0.1000	4.74		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
0.2	100	0.2000	6.71		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
7.9	270	Total			

Subcatchment 11S: Lot 9

Hydrograph



Summary for Subcatchment 13S: East\_exist

Runoff = 0.01 cfs @ 12.51 hrs, Volume= 0.005 af, Depth> 0.06"

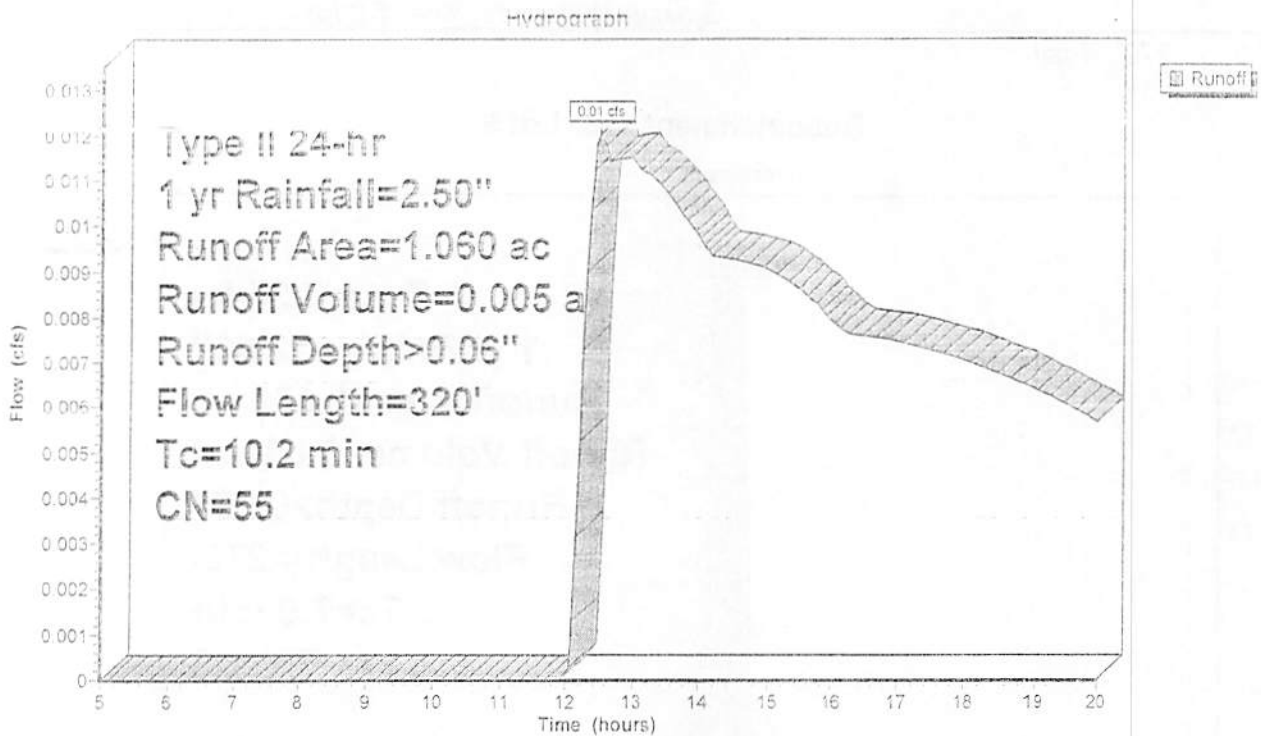
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Type II 24-hr 1 yr Rainfall=2.50"

Area (ac)	CN	Description
* 1.060	55	
1.060		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.5	70	0.0400	0.14		Sheet Flow, Grass: Dense n= 0.240 P2= 2.90"
0.8	100	0.1000	2.21		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.9	150	0.1700	2.89		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
10.2	320	Total			

Subcatchment 13S: East\_exist



Summary for Subcatchment 14S: Lot 9 Exist

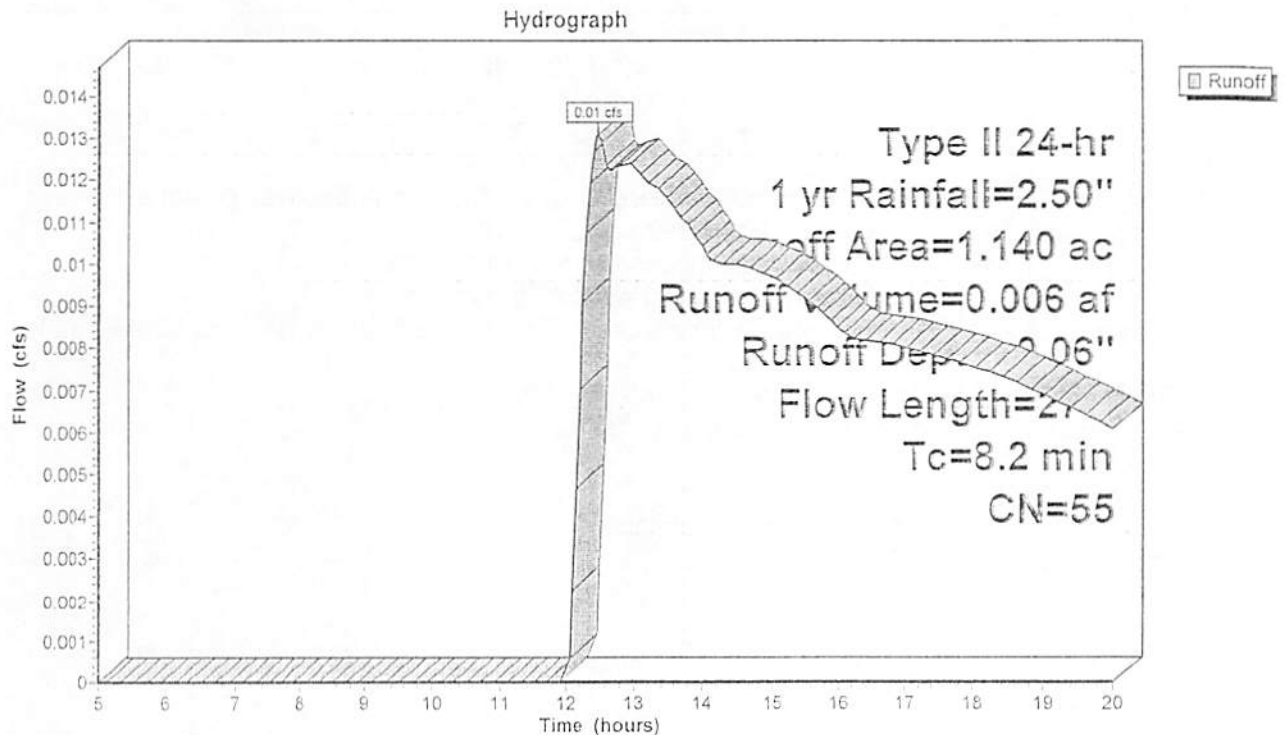
Runoff = 0.01 cfs @ 12.47 hrs, Volume= 0.006 af, Depth> 0.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type II 24-hr 1 yr Rainfall=2.50"

Area (ac)	CN	Description
* 0.010	98	
* 1.130	55	
1.140	55	Weighted Average
1.130		99.12% Pervious Area
0.010		0.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	50	0.0300	0.11		Sheet Flow, Grass: Dense n= 0.240 P2= 2.90"
0.4	120	0.1000	4.74		Shallow Concentrated Flow, Grassed Waterway Kv= 15.0 fps
0.5	100	0.2000	3.13		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
8.2	270	Total			

Subcatchment 14S: Lot 9 Exist



**Shady\_East**

Type II 24-hr 1 yr Rainfall=2.50"

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**Summary for Pond 10P: East**

Inflow Area = 1.060 ac, 18.44% Impervious, Inflow Depth > 0.37" for 1 yr event  
 Inflow = 0.57 cfs @ 12.03 hrs, Volume= 0.032 af  
 Outflow = 0.00 cfs @ 20.00 hrs, Volume= 0.002 af, Atten= 99%, Lag= 478.0 min  
 Primary = 0.00 cfs @ 20.00 hrs, Volume= 0.002 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 1,243.08' @ 20.00 hrs Surf.Area= 1,166 sf Storage= 1,325 cf

Plug-Flow detention time= 273.7 min calculated for 0.002 af (6% of inflow)  
 Center-of-Mass det. time= 148.8 min ( 985.7 - 839.9 )

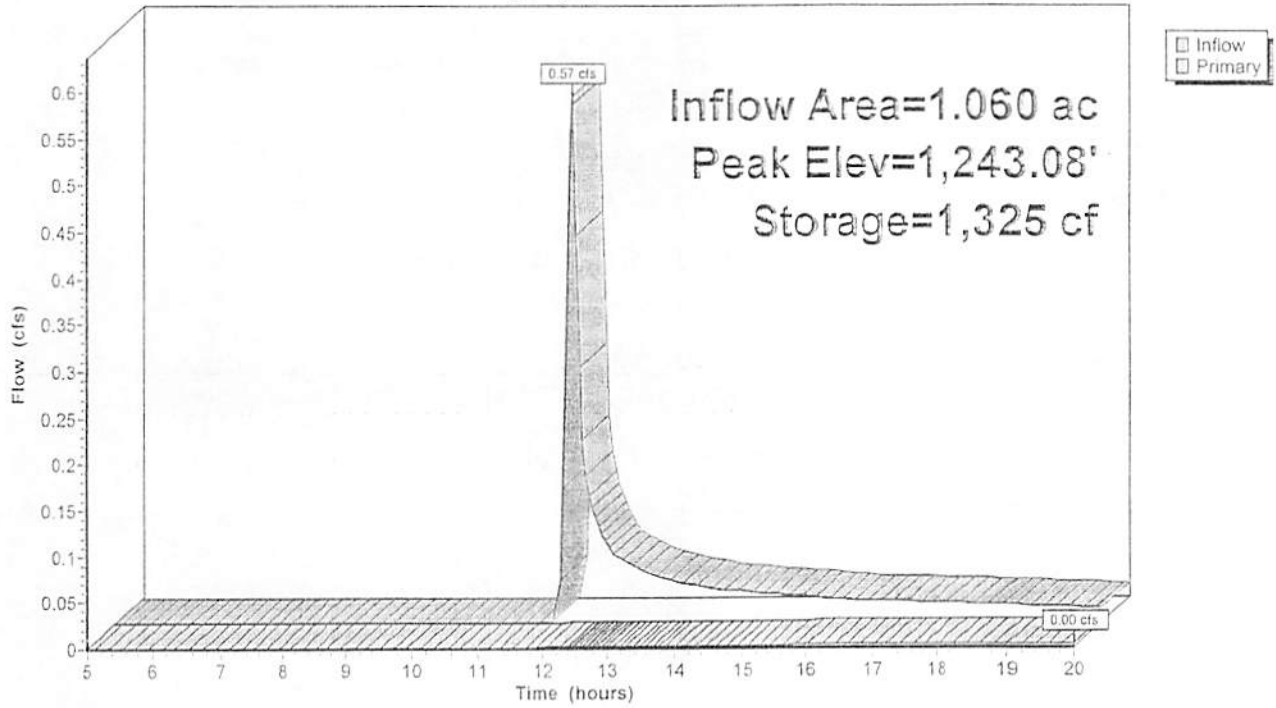
Volume #1	Invert	Avail.Storage	Storage Description	
	1,239.90'	5,372 cf	Custom Stage Data (Prismatic) Listed below (Recalc)	
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,239.90	376	0.0	0	0
1,240.00	376	30.0	11	11
1,241.00	376	30.0	113	124
1,242.00	376	100.0	376	500
1,243.00	1,090	100.0	733	1,233
1,244.00	2,926	100.0	1,558	2,791
1,245.00	3,135	100.0	2,581	5,372

Device	Routing	Invert	Outlet Devices
#1	Primary	1,244.60'	8.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88
#2	Primary	1,243.25'	2.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#3	Primary	1,243.90'	6.0" Vert. Orifice/Grate C= 0.600
#4	Device 5	1,239.90'	0.130 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 0.00'
#5	Primary	1,240.25'	6.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 20.00 hrs HW=1,243.08' (Free Discharge)  
 1=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)  
 2=Orifice/Grate ( Controls 0.00 cfs)  
 3=Orifice/Grate ( Controls 0.00 cfs)  
 5=Orifice/Grate (Passes 0.00 cfs of 1.59 cfs potential flow)  
 4=Exfiltration ( Controls 0.00 cfs)

### Pond 10P: East

#### Hydrograph



**Summary for Pond 12P: Lot 9**

Inflow Area = 1.370 ac, 12.41% Impervious, Inflow Depth > 0.28" for 1 yr event  
 Inflow = 0.53 cfs @ 12.02 hrs, Volume= 0.032 af  
 Outflow = 0.02 cfs @ 19.21 hrs, Volume= 0.005 af, Atten= 96%, Lag= 431.5 min  
 Primary = 0.02 cfs @ 19.21 hrs, Volume= 0.005 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 1,234.28' @ 19.21 hrs Surf.Area= 1,314 sf Storage= 1,151 cf

Plug-Flow detention time= 343.8 min calculated for 0.005 af (17% of inflow)  
 Center-of-Mass det. time= 212.6 min ( 1,063.9 - 851.3 )

Volume #1	Invert	Avail.Storage	Storage Description
	1,230.90'	2,348 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,230.90	163	0.0	0	0
1,231.00	163	30.0	5	5
1,232.00	163	30.0	49	54
1,233.00	163	100.0	163	217
1,234.00	1,050	100.0	607	825
1,235.00	2,000	100.0	1,526	2,348

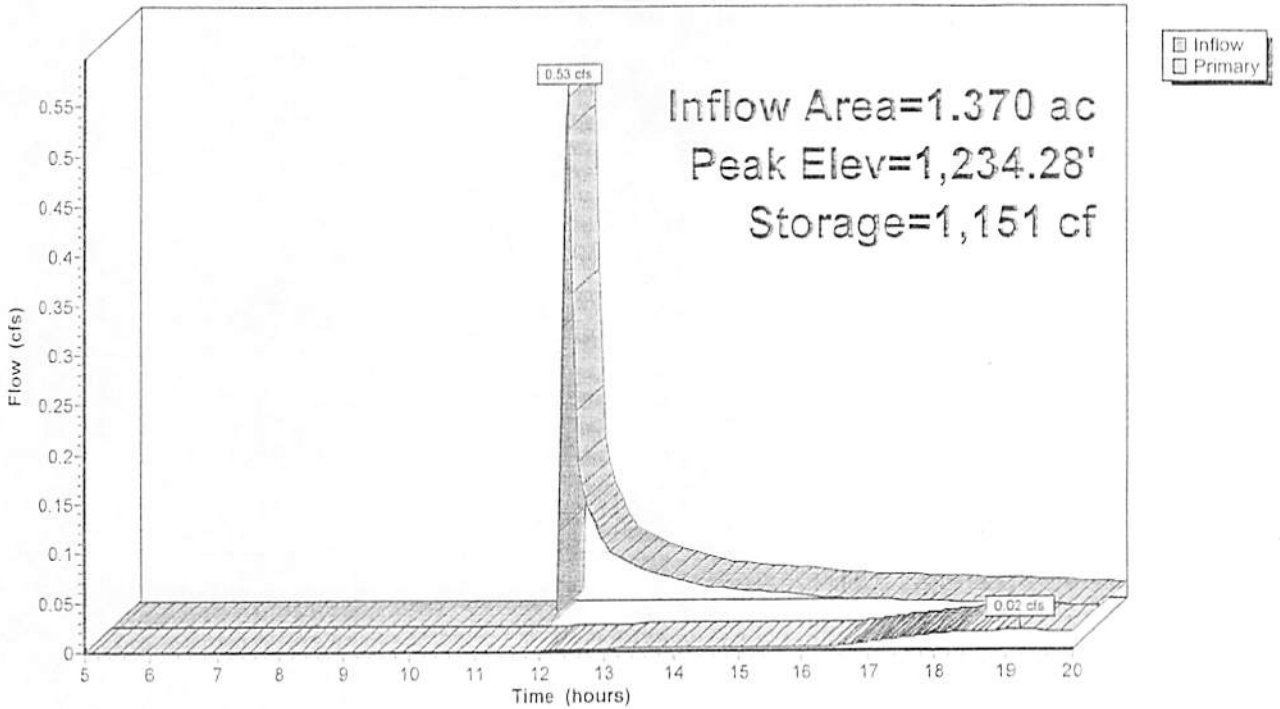
Device	Routing	Invert	Outlet Devices
#1	Device 1	1,230.90'	0.130 in/hr Exfiltration over Surface area Conductivity to Groundwater Elevation = 0.00'
#2	Primary	1,234.75'	8.0' long x 5.0' breadth Broad-Crested Rectangular Weir Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65
#3	Primary	1,234.20'	4.0" Vert. Orifice/Grate C= 0.600
#4	Primary	1,231.25'	6.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=0.02 cfs @ 19.21 hrs HW=1,234.28' (Free Discharge)

- ↑ 2=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)
- ↑ 3=Orifice/Grate (Orifice Controls 0.01 cfs @ 0.95 fps)
- ↑ 4=Orifice/Grate (Passes 0.00 cfs of 1.58 cfs potential flow)
- ↑ 1=Exfiltration ( Controls 0.00 cfs)

### Pond 12P: Lot 9

Hydrograph



UNITED STATES DEPARTMENT OF JUSTICE  
FEDERAL BUREAU OF INVESTIGATION  
WASHINGTON, D. C. 20535

MEMORANDUM

TO : SAC, NEW YORK

FROM : SAC, NEW YORK

SUBJECT: [Illegible]

RE: [Illegible]

[Illegible]

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**Shady\_East**

Type II 24-hr 2 yr Rainfall=2.90"

Prepared by {enter your company name here}

Printed 12/18/2015

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Page 1

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

**Subcatchment 9S: East developed**      Runoff Area=1.060 ac 18.44% Impervious    Runoff Depth>0.54"  
Flow Length=320'    Tc=9.3 min    CN=69    Runoff=0.91 cfs 0.048 af

**Subcatchment 11S: Lot 9**      Runoff Area=1.370 ac 12.41% Impervious    Runoff Depth>0.43"  
Flow Length=270'    Tc=7.9 min    CN=66    Runoff=0.94 cfs 0.049 af

**Subcatchment 13S: East\_exist**      Runoff Area=1.060 ac 0.00% Impervious    Runoff Depth>0.13"  
Flow Length=320'    Tc=10.2 min    CN=55    Runoff=0.07 cfs 0.012 af

**Subcatchment 14S: Lot 9 Exist**      Runoff Area=1.140 ac 0.88% Impervious    Runoff Depth>0.13"  
Flow Length=270'    Tc=8.2 min    CN=55    Runoff=0.08 cfs 0.013 af

**Pond 10P: East**      Peak Elev=1,243.31'    Storage=1,622 cf    Inflow=0.91 cfs 0.048 af  
Outflow=0.03 cfs 0.011 af

**Pond 12P: Lot 9**      Peak Elev=1,234.35'    Storage=1,243 cf    Inflow=0.94 cfs 0.049 af  
Outflow=0.05 cfs 0.022 af

**Total Runoff Area = 4.630 ac    Runoff Volume = 0.122 af    Average Runoff Depth = 0.32"**  
**91.89% Pervious = 4.255 ac    8.11% Impervious = 0.376 ac**

Shady\_East

Type II 24-hr 5 yr Rainfall=3.80"

Prepared by {enter your company name here}

Printed 12/18/2015

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Page 2

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

Subcatchment 9S: East developed	Runoff Area=1.060 ac 18.44% Impervious Runoff Depth>1.02" Flow Length=320' Tc=9.3 min CN=69 Runoff=1.81 cfs 0.090 af
Subcatchment 11S: Lot 9	Runoff Area=1.370 ac 12.41% Impervious Runoff Depth>0.86" Flow Length=270' Tc=7.9 min CN=66 Runoff=2.07 cfs 0.098 af
Subcatchment 13S: East_exist	Runoff Area=1.060 ac 0.00% Impervious Runoff Depth>0.38" Flow Length=320' Tc=10.2 min CN=55 Runoff=0.48 cfs 0.034 af
Subcatchment 14S: Lot 9 Exist	Runoff Area=1.140 ac 0.88% Impervious Runoff Depth>0.38" Flow Length=270' Tc=8.2 min CN=55 Runoff=0.56 cfs 0.037 af
Pond 10P: East	Peak Elev=1,243.75' Storage=2.311 cf Inflow=1.81 cfs 0.090 af Outflow=0.08 cfs 0.045 af
Pond 12P: Lot 9	Peak Elev=1,234.69' Storage=1.782 cf Inflow=2.07 cfs 0.098 af Outflow=0.25 cfs 0.070 af

Total Runoff Area = 4.630 ac Runoff Volume = 0.289 af Average Runoff Depth = 0.062 ft  
91.89% Pervious = 4.255 ac 0.44% Impervious = 0.376 ac

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

Subcatchment 9S: East developed      Runoff Area=1.060 ac 18.44% Impervious Runoff Depth>1.32"  
Flow Length=320' Tc=9.3 min CN=69 Runoff=2.38 cfs 0.117 af

Subcatchment 11S: Lot 9      Runoff Area=1.370 ac 12.41% Impervious Runoff Depth>1.14"  
Flow Length=270' Tc=7.9 min CN=66 Runoff=2.78 cfs 0.130 af

Subcatchment 13S: East\_exist      Runoff Area=1.060 ac 0.00% Impervious Runoff Depth>0.56"  
Flow Length=320' Tc=10.2 min CN=55 Runoff=0.81 cfs 0.050 af

Subcatchment 14S: Lot 9 Exist      Runoff Area=1.140 ac 0.88% Impervious Runoff Depth>0.57"  
Flow Length=270' Tc=8.2 min CN=55 Runoff=0.96 cfs 0.054 af

Pond 10P: East      Peak Elev=1,244.03' Storage=2,848 cf Inflow=2.38 cfs 0.117 af  
Outflow=0.15 cfs 0.066 af

Pond 12P: Lot 9      Peak Elev=1,234.86' Storage=2,075 cf Inflow=2.78 cfs 0.130 af  
Outflow=0.98 cfs 0.101 af

Total Runoff Area = 4.630 ac Runoff Volume = 0.350 af Average Runoff Depth = 0.91"  
91.89% Pervious = 4.255 ac 8.11% Impervious = 0.376 ac

Shady\_East

Type II 24-hr 25 yr Rainfall=4.90"

Prepared by {enter your company name here}

Printed 12/18/2015

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Page 4

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

Subcatchment 9S: East developed      Runoff Area=1.060 ac 18.44% Impervious    Runoff Depth>1.71"  
Flow Length=320'    Tc=9.3 min    CN=69    Runoff=3.09 cfs 0.151 af

Subcatchment 11S: Lot 9      Runoff Area=1.370 ac 12.41% Impervious    Runoff Depth>1.50"  
Flow Length=270'    Tc=7.9 min    CN=66    Runoff=3.69 cfs 0.171 af

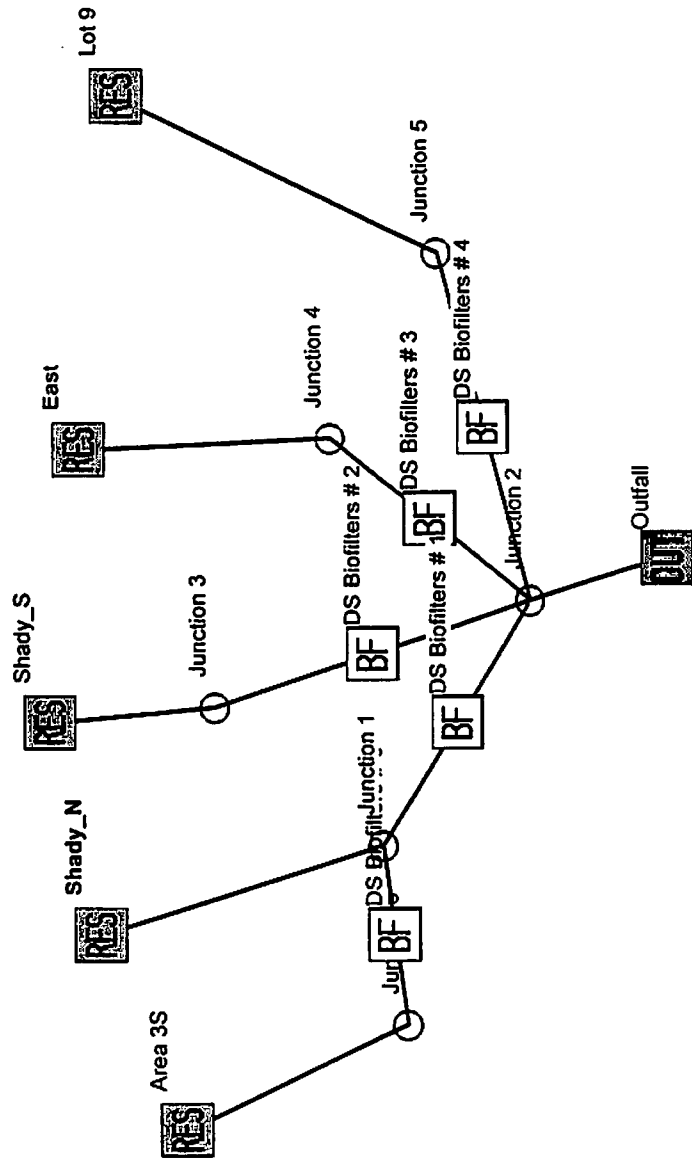
Subcatchment 13S: East\_exist      Runoff Area=1.060 ac 0.00% Impervious    Runoff Depth>0.81"  
Flow Length=320'    Tc=10.2 min    CN=55    Runoff=1.28 cfs 0.072 af

Subcatchment 14S: Lot 9 Exist      Runoff Area=1.140 ac 0.88% Impervious    Runoff Depth>0.82"  
Flow Length=270'    Tc=8.2 min    CN=55    Runoff=1.50 cfs 0.077 af

Pond 10P: East      Peak Elev=1,244.22'    Storage=3,274 cf    Inflow=3.09 cfs 0.151 af  
Outflow=0.37 cfs 0.097 af

Pond 12P: Lot 9      Peak Elev=1,234.98'    Storage=2,315 cf    Inflow=3.69 cfs 0.171 af  
Outflow=2.47 cfs 0.142 af

Total Runoff Area = 4.630 ac    Runoff volume = 6.472 af    Average runoff depth = 1.22"  
91.89% Pervious = 4.255 ac    8.11% Impervious = 0.376 ac





Data file name: C:\Program Files (x86)\WinSLAMM v10\Shady Maple.mdb  
WinSLAMM Version 10.1.6

Rain file name: C:\WinSLAMM Files\Rain Files\MN Minneapolis 59.RAN

Particulate Solids Concentration file name: C:\WinSLAMM Files\w10.1 WI\_AVG01.pscx

Runoff Coefficient file name: C:\WinSLAMM Files\WI\_SL06 Dec06.rsvx

Residential Street Delivery file name: C:\WinSLAMM Files\WI\_Res and Other Urban Dec06.std

Institutional Street Delivery file name: C:\WinSLAMM Files\WI\_Com Inst Indust Dec06.std

Commercial Street Delivery file name: C:\WinSLAMM Files\WI\_Com Inst Indust Dec06.std

Industrial Street Delivery file name: C:\WinSLAMM Files\WI\_Com Inst Indust Dec06.std

Other Urban Street Delivery file name: C:\WinSLAMM Files\WI\_Res and Other Urban Dec06.std

Freeway Street Delivery file name: C:\WinSLAMM Files\Freeway Dec06.std

Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False

Pollutant Relative Concentration file name: C:\WinSLAMM Files\WI\_GEO03.ppdx

Cost Data file name:

Seed for random number generator: -42

Study period starting date: 03/13/59

Study period ending date: 11/04/59

Date: 12-18-2015

Time: 13:29:31

Site information:

LU# 1 - Residential: Shady\_N Total area (ac): 2.140

1 - Roofs 1: 0.239 ac. Pitched Disconnected Normal Silty

25 - Driveways 1: 0.079 ac. Disconnected Normal Silty

37 - Streets 1: 0.300 ac. Intermediate Street Length = 0.308 curb-mi Default St. Dirt Accum.

45 - Large Landscaped Areas 1: 1.522 ac. Normal Silty

LU# 2 - Residential: Shady\_S Total area (ac): 1.201

1 - Roofs 1: 0.076 ac. Pitched Disconnected Normal Silty

37 - Streets 1: 0.038 ac. Intermediate Street Length = 0.057 curb-mi Default St. Dirt Accum.

45 - Large Landscaped Areas 1: 1.087 ac. Normal Silty

LU# 3 - Residential: East Total area (ac): 1.060

1 - Roofs 1: 0.147 ac. Pitched Disconnected Normal Silty

25 - Driveways 1: 0.097 ac. Disconnected Normal Silty

45 - Large Landscaped Areas 1: 0.816 ac. Normal Silty

LU# 4 - Residential: Lot 9 Total area (ac): 1.370

1 - Roofs 1: 0.110 ac. Pitched Disconnected Normal Silty

25 - Driveways 1: 0.120 ac. Disconnected Normal Silty

45 - Large Landscaped Areas 1: 1.140 ac. Normal Silty

LU# 5 - Residential: Residential 5 Total area (ac): 1.280

1 - Roofs 1: 0.250 ac. Pitched Disconnected Normal Silty

25 - Driveways 1: 0.060 ac. Connected Connected

37 - Streets 1: 0.110 ac. Smooth Street Length = 0.08 curb-mi Default St. Dirt Accum.

45 - Large Landscaped Areas 1: 0.860 ac. Normal Silty

Control Practice 1: Biofilter CP# 1 (DS) - DS Biofilters # 1

1. Top area (square feet) = 3852

2. Bottom area (square feet) = 1460

3. Depth (ft): 4

4. Biofilter width (ft) - for Cost Purposes Only: 10

5. Infiltration rate (in/hr) = 0.13

6. Random infiltration rate generation? No

7. Infiltration rate fraction (side): 1

8. Infiltration rate fraction (bottom): 1

9. Depth of biofilter that is rock filled (ft) 0

10. Fraction of rock filled volume as voids = 0

11. Engineered soil infiltration rate: 0.5

12. Engineered soil depth (ft) = 2

13. Engineered soil void ratio = 0.27

14. Percent solids reduction due to flow through engineered soil = 0

15. Biofilter peak to average flow ratio = 3.8

16. Number of biofiltration control devices = 1

17. Particle size distribution file: Not needed - calculated by program

18. Initial water surface elevation (ft): 0

Soil Data Soil Type Fraction in Eng. Soil

Biofilter Outlet/Discharge Characteristics:

Outlet type: Broad Crested Weir

1. Weir crest length (ft): 4

2. Weir crest width (ft): 5

3. Height of datum to bottom of weir opening: 2.8

Outlet type: Drain Tile/Underdrain

1. Underdrain outlet diameter (ft): 0.5

2. Invert elevation above datum (ft): 0.25

3. Number of underdrain outlets: 1

Control Practice 2: Biofilter CP# 2 (DS) - DS Biofilters # 2

1. Top area (square feet) = 4000

2. Bottom area (square feet) = 2017

3. Depth (ft): 3

4. Biofilter width (ft) - for Cost Purposes Only: 10

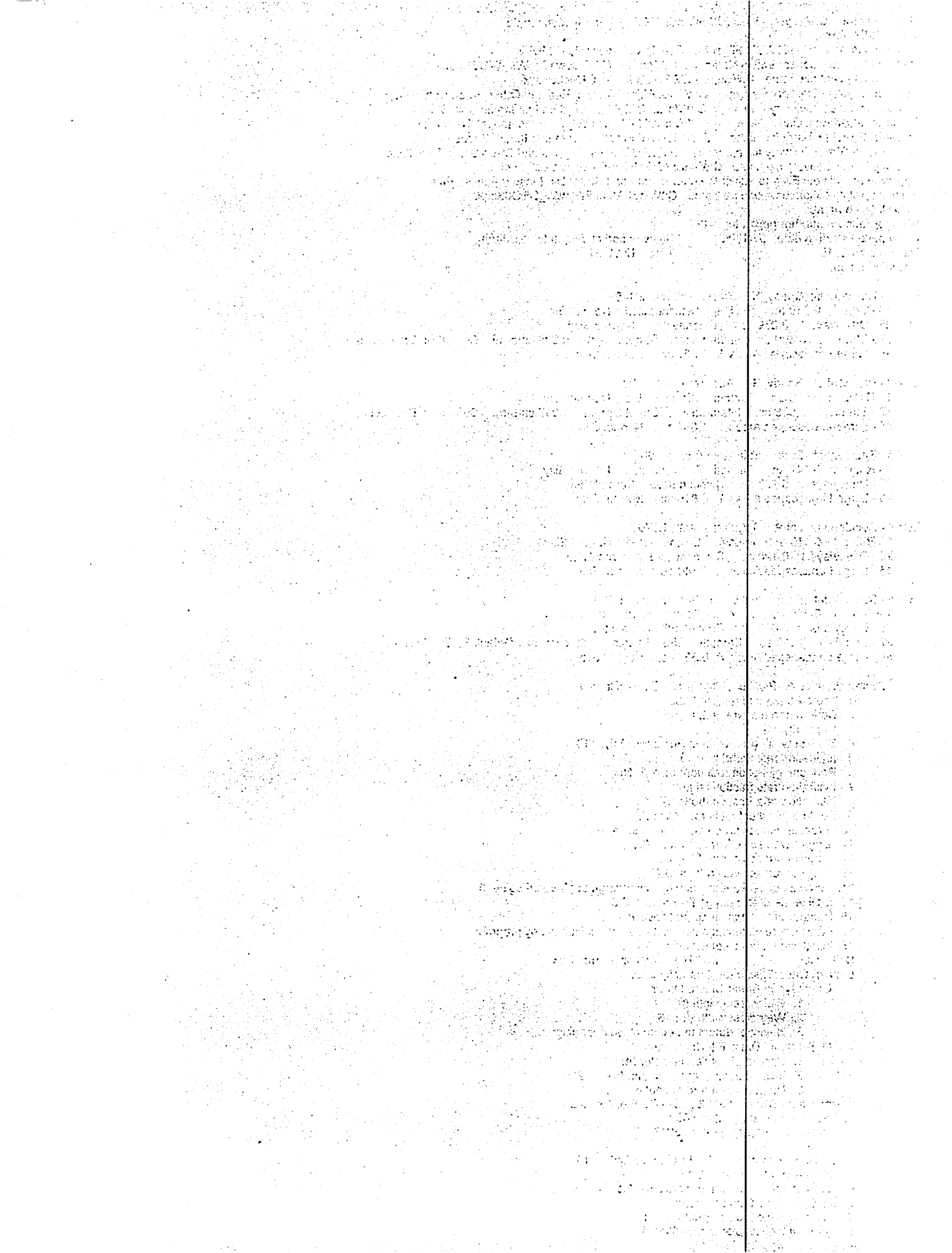
5. Infiltration rate (in/hr) = 0.13

6. Random infiltration rate generation? No

7. Infiltration rate fraction (side): 1

8. Infiltration rate fraction (bottom): 1

9. Depth of biofilter that is rock filled (ft) 0





10. Fraction of rock filled volume as voids = 0
11. Engineered soil infiltration rate: 0.5
12. Engineered soil depth (ft) = 2
13. Engineered soil void ratio = 0.27
14. Percent solids reduction due to flow through engineered soil = 0
15. Biofilter peak to average flow ratio = 3.8
16. Number of biofiltration control devices = 1
17. Particle size distribution file: Not needed - calculated by program
18. Initial water surface elevation (ft): 0

Soil Data                      Soil Type Fraction in Eng. Soil

Biofilter Outlet/Discharge Characteristics:

Outlet type: Broad Crested Weir

1. Weir crest length (ft): 4
2. Weir crest width (ft): 5
3. Height of datum to bottom of weir opening: 2.75

Outlet type: Drain Tile/Underdrain

1. Underdrain outlet diameter (ft): 0.5
2. Invert elevation above datum (ft): 0.25
3. Number of underdrain outlets: 1

Control Practice 3: Biofilter CP# 3 (DS) - DS Biofilters # 3

1. Top area (square feet) = 3135
2. Bottom area (square feet) = 430
3. Depth (ft): 5
4. Biofilter width (ft) - for Cost Purposes Only: 10
5. Infiltration rate (in/hr) = 0.13
6. Random infiltration rate generation? No
7. Infiltration rate fraction (side): 1
8. Infiltration rate fraction (bottom): 1
9. Depth of biofilter that is rock filled (ft) 0
10. Fraction of rock filled volume as voids = 0
11. Engineered soil infiltration rate: 0.5
12. Engineered soil depth (ft) = 2
13. Engineered soil void ratio = 0.27
14. Percent solids reduction due to flow through engineered soil = 0
15. Biofilter peak to average flow ratio = 3.8
16. Number of biofiltration control devices = 1
17. Particle size distribution file: Not needed - calculated by program
18. Initial water surface elevation (ft): 0

Soil Data                      Soil Type Fraction in Eng. Soil

Biofilter Outlet/Discharge Characteristics:

Outlet type: Sharp Crested Weir

1. Weir length (ft): 0.16
2. Invert elevation above datum (ft): 3.25

Outlet type: Broad Crested Weir

1. Weir crest length (ft): 10
2. Weir crest width (ft): 5
3. Height of datum to bottom of weir opening: 4.6

Outlet type: Vertical Stand Pipe

1. Stand pipe diameter (ft): 0.5
2. Stand pipe height above datum (ft): 3.9

Outlet type: Drain Tile/Underdrain

1. Underdrain outlet diameter (ft): 0.5
2. Invert elevation above datum (ft): 0.25
3. Number of underdrain outlets: 1

Control Practice 4: Biofilter CP# 4 (DS) - DS Biofilters # 4

1. Top area (square feet) = 2000
2. Bottom area (square feet) = 163
3. Depth (ft): 4
4. Biofilter width (ft) - for Cost Purposes Only: 10
5. Infiltration rate (in/hr) = 0.13
6. Random infiltration rate generation? No
7. Infiltration rate fraction (side): 1
8. Infiltration rate fraction (bottom): 1
9. Depth of biofilter that is rock filled (ft) 0
10. Fraction of rock filled volume as voids = 0
11. Engineered soil infiltration rate: 0.5
12. Engineered soil depth (ft) = 2
13. Engineered soil void ratio = 0.27
14. Percent solids reduction due to flow through engineered soil = 0
15. Biofilter peak to average flow ratio = 3.8
16. Number of biofiltration control devices = 1
17. Particle size distribution file: Not needed - calculated by program
18. Initial water surface elevation (ft): 0

Soil Data                      Soil Type Fraction in Eng. Soil

Biofilter Outlet/Discharge Characteristics:

Outlet type: Broad Crested Weir

1. Weir crest length (ft): 5
2. Weir crest width (ft): 4
3. Height of datum to bottom of weir opening: 3.75

Outlet type: Vertical Stand Pipe

1. Stand pipe diameter (ft): 0.33
2. Stand pipe height above datum (ft): 3.25

Outlet type: Drain Tile/Underdrain

1. Underdrain outlet diameter (ft): 0.5
2. Invert elevation above datum (ft): 0.25

3. Number of underdrain outlets: 1

Control Practice 5: Biofilter CP# 5 (DS) - DS Biofilters # 5

1. Top area (square feet) = 2171
2. Bottom area (square feet) = 726
3. Depth (ft): 3
4. Biofilter width (ft) - for Cost Purposes Only: 10
5. Infiltration rate (in/hr) = 0.13
6. Random infiltration rate generation? No
7. Infiltration rate fraction (side): 1
8. Infiltration rate fraction (bottom): 1
9. Depth of biofilter that is rock filled (ft) 0
10. Fraction of rock filled volume as voids = 0
11. Engineered soil infiltration rate: 0.5
12. Engineered soil depth (ft) = 2
13. Engineered soil void ratio = 0.27
14. Percent solids reduction due to flow through engineered soil = 0
15. Biofilter peak to average flow ratio = 3.8
16. Number of biofiltration control devices = 1
17. Particle size distribution file: Not needed - calculated by program
18. Initial water surface elevation (ft): 0

Soil Data                      Soil Type Fraction in Eng. Soil

Biofilter Outlet/Discharge Characteristics:

Outlet type: Broad Crested Weir

1. Weir crest length (ft): 6
2. Weir crest width (ft): 4
3. Height of datum to bottom of weir opening: 2.9

Outlet type: Vertical Stand Pipe

1. Stand pipe diameter (ft): 0.66
2. Stand pipe height above datum (ft): 2.75



TRIPLE EDGE ADDITION

CHINA N DRAINAGE AREA (3.42 AC.)

FRONT 1/2 LOTS 1, 2, 3

ALL LOTS 4, 7, 8

ASSUMING AVG SINGLE FAMILY HOUSE = 2,200 S.F. ROOF

ASSUMING AVG DUPLEX BLDG = 4,000 S.F. ROOF

AVG SINGLE FAMILY DRIVEWAY = 900 S.F.

AVG DUPLEX DRIVEWAY = 1650 S.F.

AVG ACCESSORY BLDG = 1000 S.F. FLOOR

ROADWAY W/ DITCHES 17,840 S.F.  $\Rightarrow$  0.41 AC.

ROOF  $(\frac{1}{2})(3)(2200) + (2200) + (2)(4000) + (2)(1000) + 5000 + 2660 = 23160$  S.F.  $\Rightarrow$  0.532 AC.

DRIVEWAY  $(4)(900) + (2)(1650) = 6900$  S.F.  $\Rightarrow$  0.158 AC.

1.1 AC.

GREEN AREA 3.42 - 1.1 = 2.32 AC.

TO POND ALONG <sup>NEW</sup> ROAD (1.25 AC) (3S)

FRONT 1/2 LOTS 1, 2, 3, ACCESSORY BLDG, (3) DRIVEWAYS

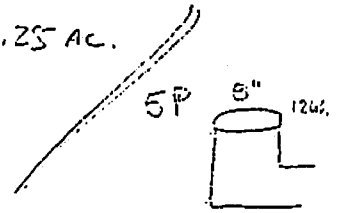
TOWN ROAD  $(450 \text{ LF}) \times (11 \text{ FT}) = 4950$  S.F.  $\Rightarrow$  0.11 AC.

ROOF  $(\frac{1}{2})(3)(2200) + 5000 + 2660 = 10960$  S.F.  $\Rightarrow$  0.25 AC.

DRIVEWAY  $(3)(900) = 2700$  S.F.  $\Rightarrow$  0.06 AC.

0.42 AC.

GREEN AREA 1.25 AC - 0.42 AC = 0.83 AC.



10' CONC RETAINING WALL 6" DIA 90

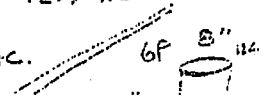
TO NORTH POND (2.14) (4S)

TOWN ROAD 0.3 AC

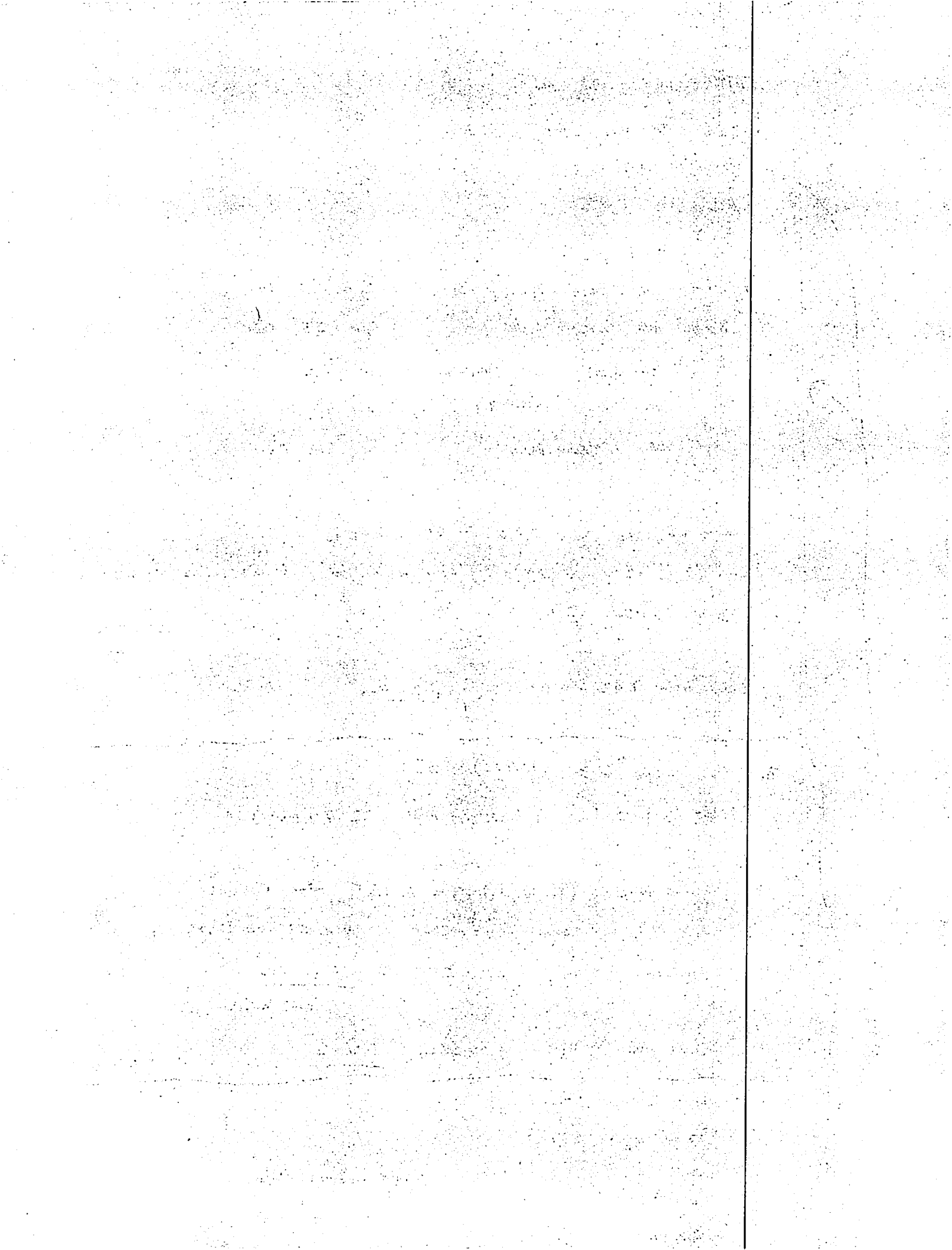
ROOF  $(\frac{1}{2})(2200) + (4000) + (2)(1000) = 10,400$  S.F.  $\Rightarrow$  0.239 AC.

DRIVEWAY  $(2)(900) + (1650) = 3,450$  S.F.  $\Rightarrow$  0.079 AC.

BLDG 1.5 AC



BREAKDOWN



**SOIL EVALUATION - STORM**

in accordance with Comm 82.365 & 85, Wis. Adm. Code

Attach complete site plan on paper not less than 8 1/2 x 11 inches in size. Plan must include, but not limited to: vertical and horizontal reference point (BM), direction and percent slope, scale or dimensions, north arrow, and BM referenced to nearest road.

Please print all information.

Personal information you provide may be used for secondary purposes (Privacy Law, s. 15.04 (1) (m))

County	La Crosse
Parcel I.D.	9-1401-4
Reviewed by	Date

Property Owner <i>Joe Hengel c/o La Crosse Engineering</i>	Property Location Govt. Lot <i>5E 1/4 SE 1/4 S 35 T 16 N R 7 E (or W)</i>
Property Owner's Mailing Address <i>1212 S. 3rd St.</i>	Lot # <i>N.A.</i> Block # <i>N.A.</i> Subd. Name or CSM# <i>N.A.</i>
City <i>La Crosse</i> State <i>WI</i> Zip Code <i>54601</i> Phone Number <i>608-782-3433</i>	<input type="checkbox"/> City <input type="checkbox"/> Village <input checked="" type="checkbox"/> Town Nearest Road <i>Shady Maple Rd. / Ridge Rd.</i> <i>Medary</i> <i>CTH "F"</i>

Drainage area <u>5.57</u> <input type="checkbox"/> sq. ft. <input checked="" type="checkbox"/> Acres	Hydraulic Application Test Method:
Optional: Test Site Suitable for (check all that apply) <input checked="" type="checkbox"/> Irrigation <input type="checkbox"/> Bioretention trench <input type="checkbox"/> Trench(es) <input checked="" type="checkbox"/> Rain garden <input checked="" type="checkbox"/> Grassed swale <input type="checkbox"/> Reuse <input checked="" type="checkbox"/> Infiltration trench <input type="checkbox"/> SDS (> 15' wide) <input type="checkbox"/> Other _____	<input checked="" type="checkbox"/> Morphological Evaluation <input type="checkbox"/> Double-Ring Infiltrometer <input type="checkbox"/> Other (specify) _____

1 Obs. #  Boring  Pit Ground surface elev. 97.5 ft. Depth to limiting factor 37 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
Ap	0-12	7.5YR3/3	none	sil	dcgr	mtr	gw	0	.13
B/E	12-22	7.5YR4/4	none	sil	2cshk	mtr	gi	0	.13
B/C	22-37	7.5YR4/6	none	sil	2mshk	mtr	gi	0	.13
C1	37-75	10YR4/4	C2d 7.5YR6/1-5YR4/8	sil-sil	1cabk	mtr	gi	5	.04
C2	75-87	10YR4/6	C2d 7.5YR6/1-5YR4/8	st sil	massive	mti	db	30	.04
Cr	87-100	7.5YR4/8	m3p 7.5YR6/1-5YR4/8	1-sil-cl	massive	mti	-	≥50%	.04
									Cr conditions

2 Obs. #  Boring  Pit Ground surface elev. 95.8 ft. Depth to limiting factor 43 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate Inches/Hr
Ap	0-7	7.5YR3/3	none	sil	2mgr	mtr	cu	0	.13
B/E	7-16	7.5YR4/4	none	sil	2cshk	mtr	gw	0	.13
B/C	16-43	7.5YR4/6	none	sil	2mshk	mtr	gi	5	.13
C	43-84	10YR4/4	C2d 7.5YR6/1	sil-sil	2cabk	mtr	gi	30	.04
Cr	84-96	7.5YR4/8	Cr @ 84"	sil-cl	massive	mti	-	≥50%	.04

CST/ISS Name (Please Print) <i>Michael G. Hawlik</i>	Signature <i>Michael G. Hawlik</i>	CST/ISS Number <i>5234975 #206</i>
Address <i>W464 County Rd. K Stoddard, WI 54658</i>	Date Evaluation Conducted <i>May 25, 2014</i>	Telephone Number <i>(608) 782-7870</i>

Property Owner La Crosse Engineering

Parcel ID # 9-1401-4

Page 2 of 3

3 Obs. #

Boring  
 Pit

Ground surface elev. 93.0 ft.

Depth to limiting factor 18 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate
									Inches/Hr
Ap	0-10	7.5YR3/3	none	sil	2mgr	mtr	cu	0	.13
E/B	10-18	10YR4/6	none	sil	2mabk	mtr	gi	0	.13
B	18-30	7.5YR4/4	cd 7.5YR6/1-5YR4/4	sil	2mabk	mtr	gi	10	.13
Cc	30-74	5YR5/8	Cc sandstone	1-sided	massive	mti	-	≈50%	.04

4 Obs. #

Boring  
 Pit

Ground surface elev. 80.3 ft.

Depth to limiting factor 24 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate
									Inches/Hr
Ap	0-7	7.5YR3/3	none	sil	2mgr	mtr	cu	0	.13
B/E	7-16	7.5YR4/4	none	sil	3cabk	mtr	gi	0	.13
B	16-24	10YR4/4	none	sil	2cabk	mtr	gi	0	.13
C	24-32	10YR5/6	cd 7.5YR6/1-5YR4/4	sil-sil	2cabk	mtr	db	10	.04
Cc	32-71	5YR5/8	Cc sandstone	1-sided	massive	mti	-	≈50%	.04

Test Results and/or Summary Comments

2006 La Crosse County Soil Survey shows  
 soil map units 137C2 Valton Series  
 137B2 Valton Series  
 137C2 Valton Series

For Septic Systems map unit shows restricted permeability  
 pit # 1 At-grade Pit  
 pit # 2 At-grade Pit  
 pit # 3 Mound Pit  
 pit # 4 Mound Pit

Property Owner La Crosse Engineering

Parcel ID # 9-1401-4

Page 2 of 3

3 Obs. #

Boring  
 Pit

Ground surface elev. 83.0 ft.

Depth to limiting factor 18 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate
									Inches/Hr
Ap	0-10	7.5YR3/3	none	sil	2mgr	mtc	cu	0	.13
E/B	10-18	10YR4/6	none	sil	2micbk	mtc	gi	0	.13
B	18-30	7.5YR4/4	cd 7.5YR6/1-5YR4/4	sil	2micbk	mtc	gw	10	.13
Cr	30-79	5YR5/8	Cr conditions	1-sid-d	massive	mti	-	≥50%	.04

4 Obs. #

Boring  
 Pit

Ground surface elev. 80.3 ft.

Depth to limiting factor 24 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate
									Inches/Hr
Ap	0-7	7.5YR3/3	none	sil	2mgr	mtc	cu	0	.13
B/E	7-16	7.5YR4/4	none	sil	3cabk	mtc	gw	0	.13
B	16-24	10YR4/4	none	sil	2micbk	mtc	gi	0	.13
C	24-32	10YR5/6	cd 7.5YR6/1-5YR4/4	sil-sil	2micbk	mtc	db	10	.04
Cr	32-71	5YR5/8	Cr conditions	1-sid-d	massive	mti	-	≥50%	.04

Test Results and/or Summary Comments

2006 La Crosse County Soil Survey shows  
 soil map units 132C2 Valton Series  
 132Bd Valton Series  
 132C2 Valton Series

For septic systems map unit shows restricted permeability  
 pit # 1 At-grade Pit  
 pit # 2 At-grade Pit  
 pit # 3 mound Pit  
 pit # 4 mound Pit



**Hydrograph for Pond 4P: Southwest**

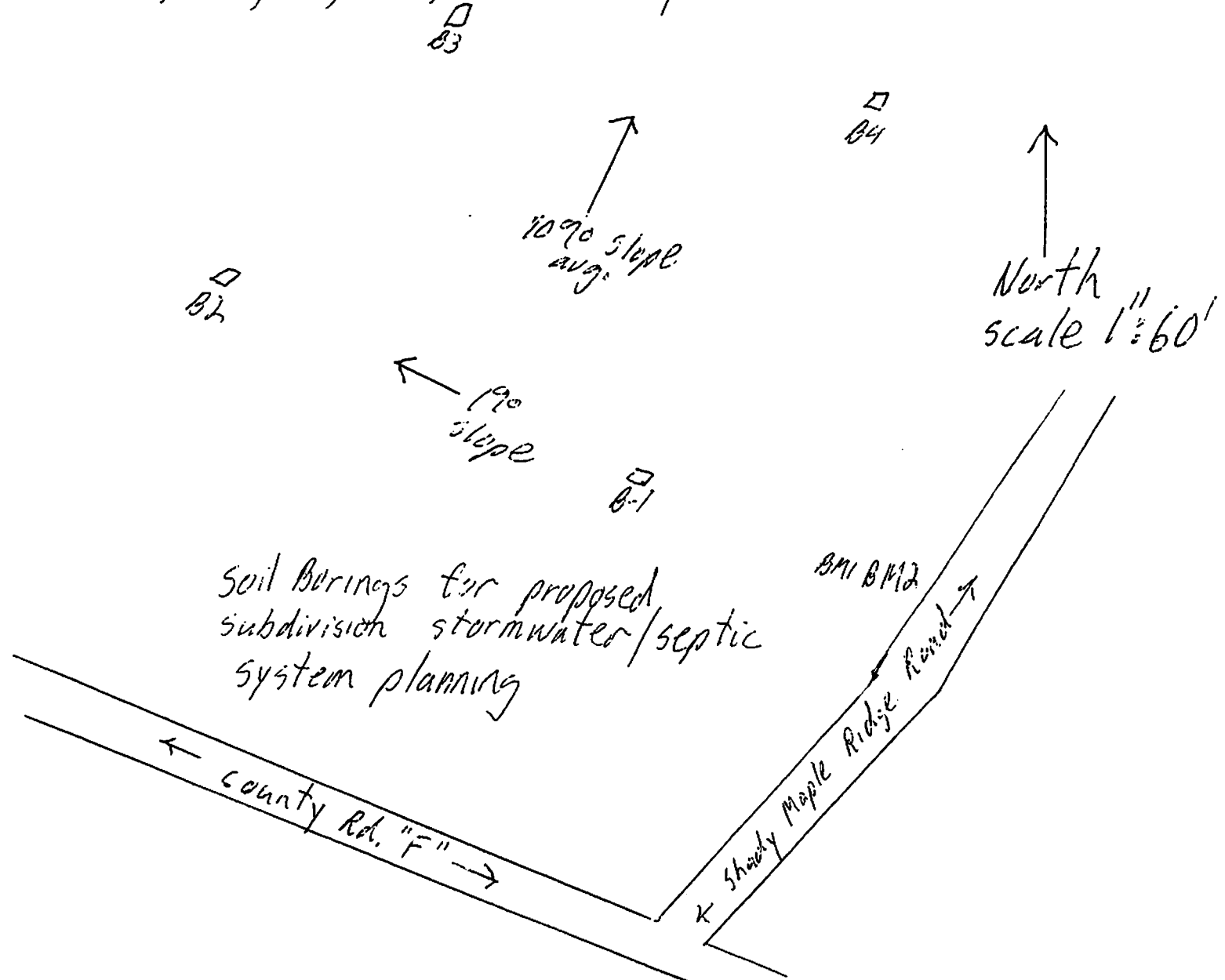
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Discarded (cfs)	Primary (cfs)
5.00	0.00	0	712.00	0.00	0.00	0.00
5.50	0.00	0	712.00	0.00	0.00	0.00
6.00	0.00	0	712.00	0.00	0.00	0.00
6.50	0.00	0	712.00	0.00	0.00	0.00
7.00	0.00	0	712.00	0.00	0.00	0.00
7.50	0.00	0	712.00	0.00	0.00	0.00
8.00	0.00	0	712.00	0.00	0.00	0.00
8.50	0.00	0	712.00	0.00	0.00	0.00
9.00	0.00	0	712.00	0.00	0.00	0.00
9.50	0.00	0	712.00	0.00	0.00	0.00
10.00	0.00	0	712.00	0.00	0.00	0.00
10.50	0.01	1	712.01	0.01	0.01	0.00
11.00	0.02	3	712.02	0.01	0.01	0.00
11.50	0.04	20	712.10	0.02	0.02	0.00
12.00	0.90	723	713.62	0.50	0.07	0.43
12.50	0.12	522	713.35	0.24	0.06	0.19
13.00	0.07	355	713.06	0.12	0.04	0.07
13.50	0.05	336	713.02	0.06	0.04	0.02
14.00	0.04	331	713.01	0.04	0.04	0.01
14.50	0.04	327	713.00	0.04	0.04	0.00
15.00	0.03	322	712.99	0.04	0.04	0.00
15.50	0.03	312	712.97	0.04	0.04	0.00
16.00	0.03	296	712.93	0.04	0.04	0.00
16.50	0.02	277	712.89	0.04	0.04	0.00
17.00	0.02	258	712.84	0.03	0.03	0.00
17.50	0.02	237	712.79	0.03	0.03	0.00
18.00	0.02	217	712.74	0.03	0.03	0.00
18.50	0.02	196	712.69	0.03	0.03	0.00
19.00	0.02	175	712.63	0.03	0.03	0.00
19.50	0.02	153	712.57	0.03	0.03	0.00
20.00	0.02	132	712.50	0.03	0.03	0.00

PLOT PLAN

Property Owner's Name(s) Joe Hengel C/O La Crosse Engineering

Mailing Address/Legal Description 1212 S. 3rd St. La Crosse, WI, 54601

SE 1/4, SE 1/4 S35, T16N, R7W. Medary TWP. La Crosse Co. WI



Benchmark = BM1 - El. 100.0' Top of survey  
 pin Rod 6" Behind Phone Ped # GORM  
 B-01-1A - BM12 El. 102.8 - Top of Phone Ped

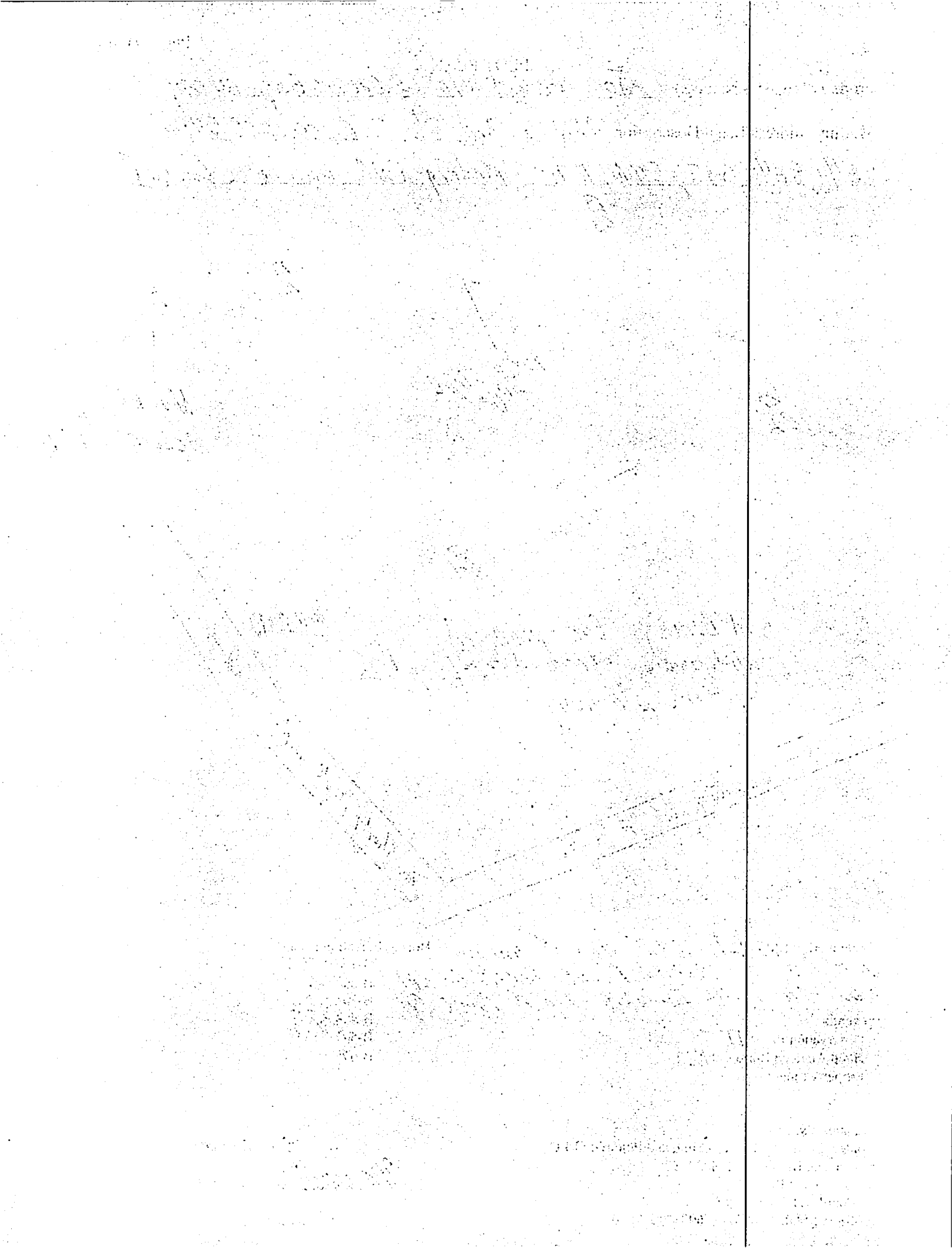
Boring Elevation Data:

B-1@	97.5'
B-2@	95.8'
B-3@	83.0'
B-4@	90.3'
B-5@	
B-6@	

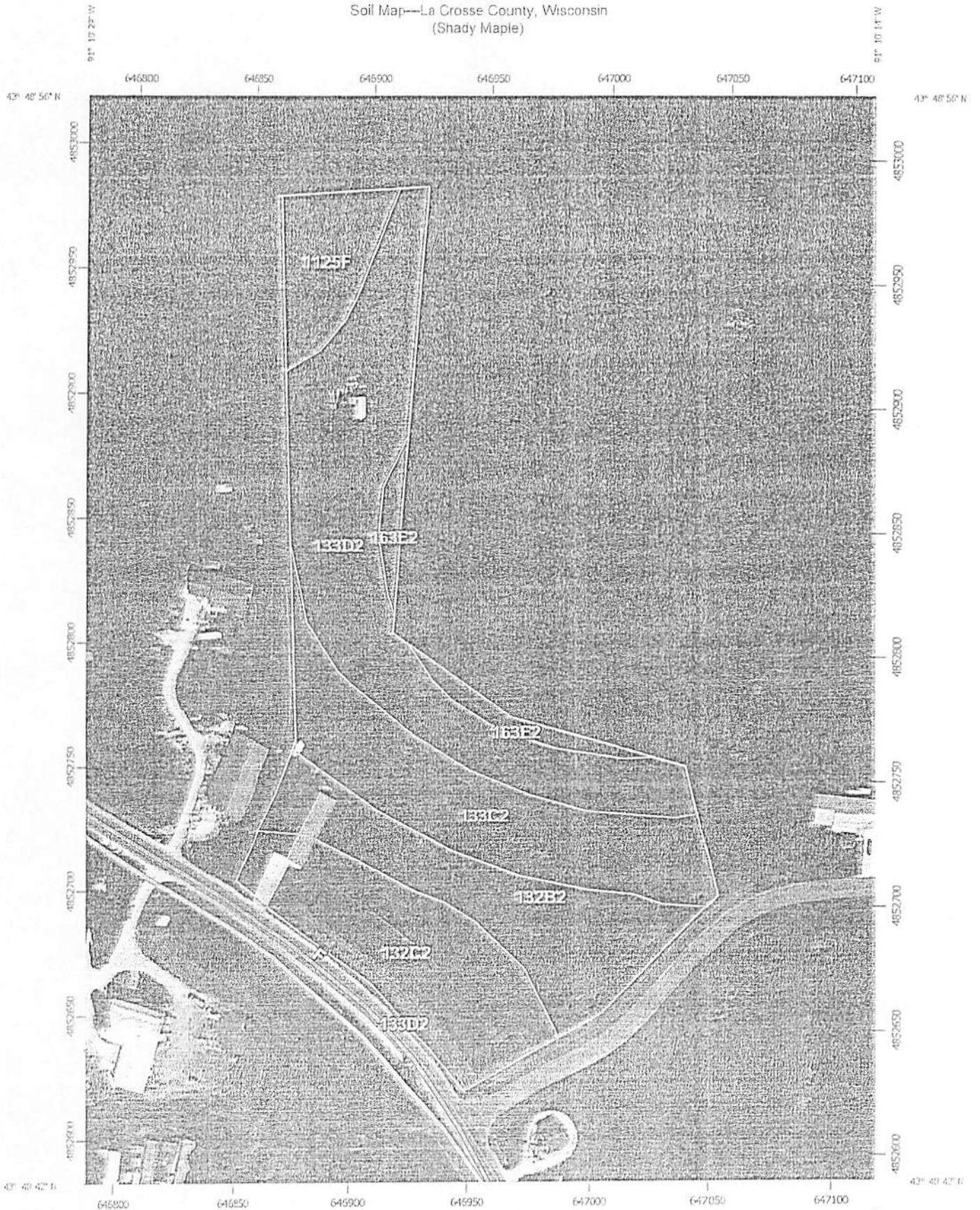
Legend:  
 Observation Pit = □  
 Hand Augered Boring = N.A.  
 Property Line = ----

Prepared By:  
 Coulee Soil Testing, Excavating, and Plumbing LLC  
 Michael G. Havlik, CSTM#224975  
 W464 County Rd. K  
 Stoddard, WI 54658-9062  
 (608)-782-SOIL (7645) or (608)-782-7870

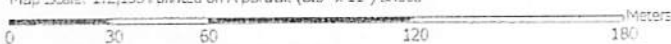
Signature:  
Michael G. Havlik  
 Date: May 25, 2014



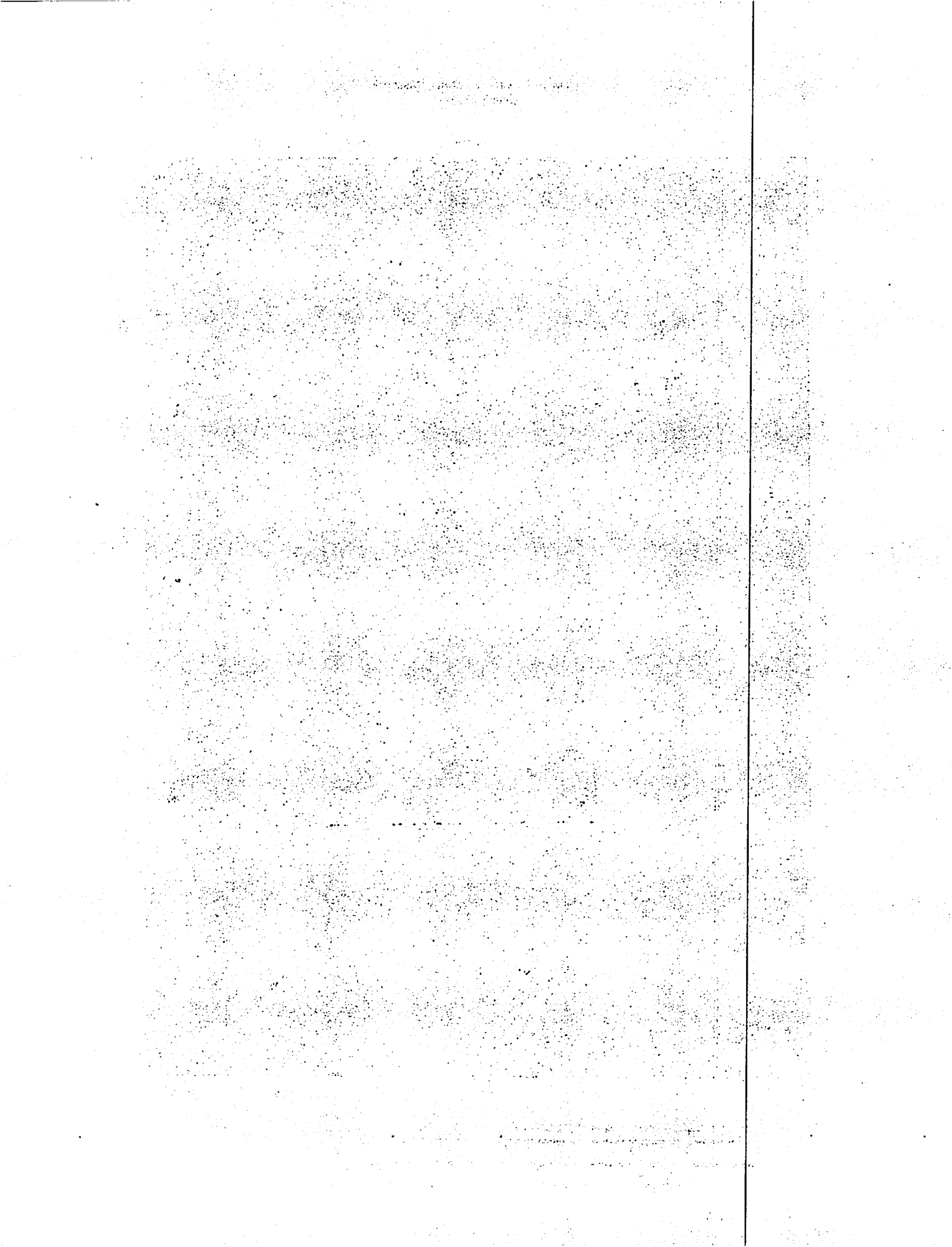
Soil Map—La Crosse County, Wisconsin  
(Shady Maple)



Map Scale: 1:2,130 Printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM, Zone 15N WGS84



MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: La Crosse County, Wisconsin  
Survey Area Date: Version 12, Dec 24, 2013

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Nov 1, 2010—Sep 11, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

MAP LEGEND

- |  |                        |  |                     |
|--|------------------------|--|---------------------|
|  | Area of Interest (AOI) |  | Soils               |
|  | Soil Map Unit Polygons |  | Soil Map Unit Lines |
|  | Soil Map Unit Points   |  |                     |
|  | Special Point Features |  |                     |
|  | Blowout                |  |                     |
|  | Borrow Pit             |  |                     |
|  | Clay Spot              |  |                     |
|  | Closed Depression      |  |                     |
|  | Gravel Pit             |  |                     |
|  | Gravelly Spot          |  |                     |
|  | Landfill               |  |                     |
|  | Lava Flow              |  |                     |
|  | Marsh or Swamp         |  |                     |
|  | Mine or Quarry         |  |                     |
|  | Miscellaneous Water    |  |                     |
|  | Perennial Water        |  |                     |
|  | Rock Outcrop           |  |                     |
|  | Saline Spot            |  |                     |
|  | Sandy Spot             |  |                     |
|  | Severely Eroded Spot   |  |                     |
|  | Sinkhole               |  |                     |
|  | Slide or Slip          |  |                     |
|  | Soddy Spot             |  |                     |
|  | Spot                   |  |                     |
|  | Stony Spot             |  |                     |
|  | Very Stony Spot        |  |                     |
|  | Wet Spot               |  |                     |
|  | Other                  |  |                     |
|  | Special Line Features  |  |                     |
|  | Water Features         |  |                     |
|  | Ditches and Canals     |  |                     |
|  | Transportation         |  |                     |
|  | Interstate Highways    |  |                     |
|  | US Routes              |  |                     |
|  | Major Roads            |  |                     |
|  | Local Roads            |  |                     |
|  | Background             |  |                     |
|  | Aerial Photography     |  |                     |

## Map Unit Legend

La Crosse County, Wisconsin (M1063)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
132B2	Brinkman silt loam, 2 to 6 percent slopes, moderately eroded	1.4	17.8%
132C2	Brinkman silt loam, 6 to 12 percent slopes, moderately eroded	1.5	18.9%
133C2	Valton silt loam, 6 to 12 percent slopes, moderately eroded	1.6	20.9%
133D2	Valton silt loam, 12 to 20 percent slopes, moderately eroded	2.5	31.8%
163E2	Elbaville silt loam, 20 to 30 percent slopes, moderately eroded	0.3	3.5%
1125F	Dornton, very stony-Elbaville complex, 30 to 60 percent slopes	0.6	7.1%
		7.9	100.0%

FOOTNOTES FOR ACRRES AND PERCENTS:

## La Crosse County, Wisconsin

### 132B2—Brinkman silt loam, 2 to 6 percent slopes, moderately eroded

#### Map Unit Setting

*National map unit symbol:* 1q9my

*Elevation:* 700 to 1,400 feet

*Mean annual precipitation:* 28 to 34 inches

*Mean annual air temperature:* 45 to 52 degrees F

*Frost-free period:* 135 to 160 days

*Farmland classification:* All areas are prime farmland

#### Map Unit Composition

*Brinkman and similar soils:* 90 percent

*Minor components:* 10 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Brinkman

##### Setting

*Landform:* Hills

*Landform position (two-dimensional):* Summit

*Down-slope shape:* Convex

*Across-slope shape:* Linear

*Parent material:* Loess over clayey pedisegment

##### Typical profile

*Ap - 0 to 9 inches:* silt loam

*Bt - 9 to 71 inches:* silt loam

*2Bt - 71 to 80 inches:* clay

##### Properties and qualities

*Slope:* 2 to 6 percent

*Depth to restrictive feature:* More than 80 inches

*Natural drainage class:* Moderately well drained

*Runoff class:* Low

*Capacity of the most limiting layer to transmit water (Ksat):* Low to moderately high (0.01 to 0.20 in/hr)

*Depth to water table:* About 42 to 72 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water storage in profile:* Very high (about 12.7 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 2e

*Hydrologic Soil Group:* B

*Other vegetative classification:* High AWC, adequately drained (G105XY008W1)



### Minor Components

#### Valton

*Percent of map unit:* 8 percent

*Landform:* Hills

*Landform position (two-dimensional):* Summit, shoulder

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Other vegetative classification:* Mod AWC, adequately drained  
(G105XY005WI)

#### Mt. carroll

*Percent of map unit:* 2 percent

*Landform:* Hills

*Landform position (two-dimensional):* Summit, shoulder

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Other vegetative classification:* High AWC, adequately drained  
(G105XY008WI)

### Data Source Information

Soil Survey Area: La Crosse County, Wisconsin

Survey Area Data: Version 14, Sep 17, 2015

## La Crosse County, Wisconsin

### 133C2—Valton silt loam, 6 to 12 percent slopes, moderately eroded

#### Map Unit Setting

*National map unit symbol:* 1q9n4

*Elevation:* 680 to 1,400 feet

*Mean annual precipitation:* 28 to 35 inches

*Mean annual air temperature:* 43 to 52 degrees F

*Frost-free period:* 135 to 170 days

*Farmland classification:* Farmland of statewide importance

#### Map Unit Composition

*Valton and similar soils:* 90 percent

*Minor components:* 10 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Valton

##### Setting

*Landform:* Hills

*Landform position (two-dimensional):* Shoulder, backslope

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Parent material:* Loess over clayey pedisegment

##### Typical profile

*Ap - 0 to 9 inches:* silt loam

*Bt - 9 to 22 inches:* silt loam

*2Bt - 22 to 60 inches:* clay

##### Properties and qualities

*Slope:* 6 to 12 percent

*Depth to restrictive feature:* More than 80 inches

*Natural drainage class:* Well drained

*Runoff class:* High

*Capacity of the most limiting layer to transmit water (Ksat):* Low to moderately high (0.01 to 0.20 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water storage in profile:* Moderate (about 8.8 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 3e

*Hydrologic Soil Group:* C

*Other vegetative classification:* Mod AWC, adequately drained (G105XY005W1)

### Minor Components

#### Brinkman

*Percent of map unit:* 6 percent

*Landform:* Hills

*Landform position (two-dimensional):* Summit

*Down-slope shape:* Convex

*Across-slope shape:* Linear

*Other vegetative classification:* High AWC, adequately drained  
(G105XY008WI)

#### Lamoille

*Percent of map unit:* 4 percent

*Landform:* Hills

*Landform position (two-dimensional):* Shoulder, backslope

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Other vegetative classification:* Mod AWC, adequately drained  
(G105XY005WI)

### Data Source Information

Soil Survey Area: La Crosse County, Wisconsin

Survey Area Data: Version 14, Sep 17, 2015

## La Crosse County, Wisconsin

### 163E2—Elbaville silt loam, 20 to 30 percent slopes, moderately eroded

#### Map Unit Setting

*National map unit symbol:* 2t7zh  
*Elevation:* 800 to 1,300 feet  
*Mean annual precipitation:* 31 to 39 inches  
*Mean annual air temperature:* 41 to 50 degrees F  
*Frost-free period:* 120 to 190 days  
*Farmland classification:* Not prime farmland

#### Map Unit Composition

*Elbaville and similar soils:* 75 percent  
*Minor components:* 25 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Elbaville

##### Setting

*Landform:* Ridges  
*Landform position (two-dimensional):* Shoulder, backslope  
*Landform position (three-dimensional):* Head slope  
*Down-slope shape:* Linear  
*Across-slope shape:* Concave  
*Parent material:* Loess over clayey pedisegment derived from dolomite over loamy skeletal colluvium derived from dolomite

##### Typical profile

*A - 0 to 5 inches:* silt loam  
*E1 - 5 to 8 inches:* silt loam  
*E2 - 8 to 11 inches:* silt loam  
*B/E - 11 to 17 inches:* silt loam  
*Bt1 - 17 to 21 inches:* silt loam  
*2Bt2 - 21 to 26 inches:* silty clay  
*3Bt3 - 26 to 37 inches:* very flaggy silty clay loam  
*3C - 37 to 79 inches:* extremely flaggy sandy loam

##### Properties and qualities

*Slope:* 20 to 30 percent  
*Depth to restrictive feature:* More than 80 inches  
*Natural drainage class:* Well drained  
*Runoff class:* Very high  
*Capacity of the most limiting layer to transmit water (Ksat):*  
Moderately low to moderately high (0.06 to 0.20 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Calcium carbonate, maximum in profile:* 10 percent

*Salinity, maximum in profile:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

*Available water storage in profile:* Moderate (about 7.1 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 6e

*Hydrologic Soil Group:* C

*Other vegetative classification:* Mod AWC, adequately drained with limitations (G105XY006WI)

**Minor Components**

**Lamolle**

*Percent of map unit:* 10 percent

*Landform:* Valley sides

*Landform position (two-dimensional):* Backslope, shoulder

*Landform position (three-dimensional):* Nose slope

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Other vegetative classification:* Mod AWC, adequately drained with limitations (G105XY006WI)

**Newglarus, deep**

*Percent of map unit:* 6 percent

*Landform:* Ridges

*Landform position (two-dimensional):* Backslope, shoulder

*Landform position (three-dimensional):* Side slope

*Down-slope shape:* Convex

*Across-slope shape:* Linear

*Other vegetative classification:* Mod AWC, adequately drained with limitations (G105XY006WI)

**Dorerton, very stony**

*Percent of map unit:* 5 percent

*Landform:* Valley sides

*Landform position (two-dimensional):* Backslope

*Landform position (three-dimensional):* Side slope

*Down-slope shape:* Linear

*Across-slope shape:* Linear

**Valton**

*Percent of map unit:* 4 percent

*Landform:* Ridges

*Landform position (two-dimensional):* Backslope

*Landform position (three-dimensional):* Side slope

*Down-slope shape:* Linear

*Across-slope shape:* Linear