CASH WAGGNER & ASSOCIATES, PC
CONSULTING ENGINEERS • LAND SURVEYORS

DATE: 05.18.21
PROJECT NO.: 14-1838
REFERENCE: Green River Meadows
YOUR FILE NO.:

ATTENTION: Linda Freeman
COMPANY: Vanderburgh County Surveyor
ADDRESS: Civic Center Complex – Room 325
CITY, ST, ZIP: Evansville, IN 47708
PHONE:

LETTER OF TRANSMITTAL

THE FOLLOWING ITEMS:

COPIES:	ORIG./LAST REV. DATE:	DESCRIPTION:
1	10.22.14	Drainage Plan & Details
1	05.17.21	Preliminary Drainage Report
1	10.22.14	Drainage Sub-basin Exhibits

ARE TRANSMITTED:

- ☐ PER YOUR REQUEST
- ☐ FOR YOUR FILES
- ☒ FOR REVIEW & COMMENT
- ☐ OTHER

FOR YOUR:

- ☒ APPROVAL
- ☐ USE
- ☐ INFORMATION
- ☐ OTHER

VIA:

- ☐ COURIER
- ☐ FOR PICK UP
- ☐ USPS
- ☐ NEXT DAY ☐ FED EX ☐ UPS ☐ DHL
  - ☐ SATURDAY DELIVERY
  - ☐ TRACKING # ____
- ☒ OTHER DELIVERED

COMMENTS:

Please review the attached preliminary drainage plan, details, sub-basin exhibits and if acceptable take to the May 25th Drainage Board meeting for Preliminary Drainage Plan approval. If you have any questions or comments, please give me a call. Thank you

414 CITADEL CIRCLE
SUITE B
EVANSVILLE, IN 47715
PH: 812.401.5561
FAX: 812.401.5563
GMERITT@CASHWAGGNER.COM

FROM:

GLEN MERITT, JR., P.E.

CC: File

T:\JOBS\1838\DOCUMENTS\210518 FREEMAN.DOC

RECEIVED BY THE VANDERBURGH COUNTY SURVEYOR'S OFFICE
5-18-2021
8:00 AM
AR

CASH WAGGNER
& ASSOCIATES, PC
CONSULTING ENGINEERS • LAND SURVEYORS

5-17-21

GLEN A. MERITT, JR.
REGISTERED
No. PE10403870
STATE OF
INDIANA
PROFESSIONAL ENGINEER

May 17, 2021

Ms. Linda Freeman
Vanderburgh County Surveyor
Room 325 Civic Center - 1 NW Martin Luther King Jr. Blvd.
Evansville, IN 47708

RE: Preliminary Drainage Report
Green River Meadows
Green River Road
Our Project #: 14-1838

Ms. Freeman:

Below is a summary of the drainage calculations for the above-referenced project.

SITE DESCRIPTION

This development consists of a single-family residential subdivision with 47 lots and its associated improvements (i.e. roads, utilities). The entire project will be constructed in one phase and the entire property will be disturbed during construction of the subdivision. The site is located on an 18.49-acre parcel on the west side of Green River Road approximately 600 feet south of the Green River Road and Windham Drive intersection.

DRAINAGE PATTERNS

The east half of the site was previously utilized as a cultivated field and drains in an easterly direction to an existing culvert under Green River Road. This culvert flows to the east into Section 7 of Wynnfield Subdivision and ultimately to Bluegrass Creek.

The west half of the site is wooded, drains in a westerly direction and discharges into an existing ditch located near the southwest corner of the property. This ditch flows west and then south thru Green River Estates Subdivision.

The proposed development has been divided into 20 developed drainage sub-basins with the 25-year flow calculated for each sub-basin. See attached Developed Sub-basin Exhibit for locations of each sub-basin. There are also three off-site sub-basins north of the site that will be routed through the proposed drainage improvements for this subdivision. See attached Undeveloped & Off-Site Sub-basin Exhibit for locations of each sub-basin. A drainage swale and storm sewer network will be installed within the development to capture the majority of the storm water runoff and convey it to one of the two detention basins located on the east and west ends of the property. The primary and emergency spillway for Detention Basin #1 discharge to the existing ditch located on the west side of Green River Road. The

414 CITADEL CIRCLE, SUITE B
EVANSVILLE, IN 47715 E-MAIL: GMERITT@CASHWAGGNER.COM
PH: 812.4[illegible]
FAX: 812.401.5563

primary and emergency spillway for Detention Basin #2 discharge to an existing ditch located along the south property line.

CALCULATIONS

The Rational Method and HERPICC Manual were utilized in performing the drainage calculations for this project. All storm sewers and swales were designed to carry the 25-year developed runoff. Detention basin #1 was designed to contain the peak 25-year developed runoff from the site while allowing a release rate slightly above 10-year undeveloped runoff rate from the site. The emergency spillway for Detention Basin #1 was designed to carry the 100-year storm flow.

Detention basin #2 was designed to contain the peak 25-year developed runoff from the site while allowing a release rate less than the 10-year undeveloped runoff rate from the site. The emergency spillway for Detention Basin #2 was designed to carry the 100-year storm flow.

Below is a summary of the detention basin design elements:

		NOTES
Detention Basin #1 Developed Q(25)	12.81 – cfs	
Detention Basin #1 Developed Q(100)	15.75 – cfs	
Detention Basin #1 Undeveloped Q(10)	13.84 – cfs	UN-2
10/25-yr. Req'd Volume	12,938 c.f.	
25-yr. Provided Volume	20,232 c.f.	
Undetained Developed Q(25)	7.54 – cfs	#1, #2, #19 and #20
Off-Site Existing Q(25)	0.28 – cfs	OS-3
Allowable Release Rate	13.84 + 0.28 – 7.54 = 6.58 – cfs	Undeveloped Q(10) + Off-Site Q(25) – Undetained Developed Q(25)
Proposed Release Rate	*1.99 - cfs*	*Detention Basin #1 Discharge*
Outfall Structure	*38-LF of 10" HDPE*	*P-521*
Outfall I.E.	388.00	
25-year Storage Vol. Elev.	389.01	
HW (25-yr. elev. – I.E.)	1.01 – ft.	
Minimum Top/Bank	390.00	

CASH WAGGNER & ASSOCIATES, PC

414 CITADEL CIRCLE, STE. B
EVANSVILLE, IN 47715

PH: 812.401.5561
FAX: 812.401.5563

		NOTES
Detention Basin #2 Developed Q(25)	32.50 – cfs	
Detention Basin #2 Developed Q(100)	40.13 – cfs	
Detention Basin #2 Undeveloped Q(10)	7.85 – cfs	UN-1
10/25-yr. Req'd Volume	17,016 c.f.	
25-yr. Provided Volume	17,150 c.f.	
Undetained Developed Q(25)	0.65 – cfs	#18
Off-Site Existing Q(25)	10.40 – cfs	OS-1 & OS-2
Allowable Release Rate	7.85 + 10.40 – 0.65 = 17.60 – cfs	Undeveloped Q(10) + Off-Site Q(25) – Undetained Q(25)
Proposed Release Rate	*17.38 cfs*	*Detention Basin #2 Discharge*
Outfall Structure	*(2) 32-LF of 18" RCP*	*P-547 & P-551*
Outfall I.E.	388.66	
25-year Storage Vol. Elev.	390.16	
HW (25-yr. elev. – I.E.)	1.49 – ft.	
Minimum Top/Bank	390.66	

W:\141838\Civil\Drainage\DRAINAGE REPORT.doc

CASH WAGGNER & ASSOCIATES, PC
414 CITADEL CIRCLE, STE. B
EVANSVILLE, IN 47715
PH: 812.401.5561
FAX: 812.401.5563

STORM SEWER CALCULATIONS

Design Return Period: 25 Year

Mannings 'n': 0.012

Project Name: **Green River Meadows**
Project #: 14-1838
Date: 10/23/14

Line NO.	SUB-BASIN NO.	UPSTREAM STRUCTURE	PIPE #	DOWNSTREAM STRUCTURE	LENGTH (ft)	Cj	Aj (ac.)	CjAj	SUM CjAj	Tj (min)	Tcum (min)	I (in/hr)	PIPE Q (cfs)	PIPE DIA. (in)	PIPE SLOPE (ft/ft)	I.E. (Upstream)	I.E. (Downstream)	CAP. (cfs)	TRAVEL VELOCITY (ft/sec)	TIME (min)
1		166		165	5	0.775	0.23	0.18	0.18	11.00	11.00	5.516	0.98	12	0.0020	394.23	394.22	1.73	2.20	0.04
2		168		167	5	0.563	0.25	0.14	0.14	11.00	11.00	5.516	0.77	12	0.0160	393.30	393.22	4.88	6.22	0.01
3		172		171	5	0.562	0.27	0.15	0.15	11.00	11.00	5.516	0.82	12	0.0040	390.50	390.48	2.44	3.11	0.03
4		175		174	5	0.537	0.30	0.16	0.16	13.00	13.00	5.108	0.81	12	0.0160	387.95	387.87	4.88	6.22	0.01
5		179		178	5	0.555	0.28	0.15	0.15	12.00	12.00	5.312	0.81	12	0.0160	387.20	387.12	4.88	6.22	0.01
6	1	502	503	504	27	0.577	1.08	0.62	0.62	16.29	16.29	4.914	3.06	12	0.0080	387.14	386.92	3.45	4.40	0.10
6	2	504	505	506	22	0.596	0.62	0.37	1.77	14.04	16.39	4.904	8.68	24	0.0064	385.45	385.31	19.60	6.24	0.06
7	3	508	509	510	26	0.508	0.68	0.35	0.35	16.80	16.80	4.867	1.68	12	0.0050	394.14	394.01	2.73	3.48	0.12
7	4	510	511	512	252	0.565	0.12	0.07	0.41	13.14	16.92	4.854	2.01	12	0.0195	394.01	389.10	5.39	6.86	0.61
7	5	512	513	514	34	0.499	0.87	0.43	0.85	11.52	17.54	5.516	4.67	12	0.0323	389.10	388.00	6.94	8.84	0.06
8	6	516	517	518	58	0.599	1.39	0.83	0.83	17.21	17.21	4.829	4.02	12	0.0328	389.90	388.00	6.99	8.90	0.11
9	8 + OS-2	524	525	526	165	0.354	6.38	2.26	2.26	21.53	21.53	4.429	10.00	18	0.0095	394.00	392.43	11.09	6.28	0.44
9	9	526	527	528	42	0.564	0.89	0.50	2.76	17.81	21.97	4.389	12.12	18	0.0140	392.43	391.84	13.46	7.62	0.09
9	10	528	529	530	168	0.568	0.80	0.45	3.21	17.29	22.06	4.380	14.08	24	0.0041	391.84	391.16	15.69	5.00	0.56
9	11	530	531	536	200	0.335	1.22	0.41	3.62	14.51	22.62	4.328	15.68	24	0.0051	391.16	390.14	17.50	5.57	0.60
9	12	532	533	534	26	0.448	0.73	0.33	0.33	16.06	16.06	4.935	1.61	12	0.0050	391.61	391.48	2.73	3.48	0.12
9	13	534	535	536	168	0.546	0.45	0.25	0.57	15.60	16.18	4.924	2.82	12	0.0070	391.48	390.30	3.23	4.11	0.68
9	14	536	537	538	208	0.331	0.51	0.17	4.37	14.73	23.22	4.273	18.65	24	0.0071	390.14	388.66	20.64	6.57	0.53
10	15 + OS-1	540	541	542	26	0.316	4.55	1.44	1.44	20.96	20.96	4.482	6.44	15	0.0133	390.31	389.96	8.07	6.58	0.07
10	16	542	543	544	136	0.554	0.76	0.42	1.86	17.21	21.03	4.475	8.32	18	0.0096	389.96	388.66	11.15	6.31	0.36

19" x 30" Elliptical R.C.P.

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 1

Total Area = 47,119 S.F.
1.08 Acres

Surface								C	N
Structures	3.5	@	2500	=	8,750	S.F. =	0.20 Ac.	0.92	0.02
Pavement				=	9,366	S.F. =	0.22 Ac.	0.92	0.02
Drives	7	@	700	=	4,900	S.F. =	0.11 Ac.	0.92	0.02
Patios	0	@	100	=	0	S.F. =	0.00 Ac.	0.92	0.02
Sidewalks				=	0	S.F. =	0.00 Ac.	0.92	0.02
Lawn (0-2			0 S.F.	=			0.00 Ac.	0.15	0.40
Lawn (2-5%)			24,103 S.F.	=			0.55 Ac.	0.25	0.40
Lawn (5-10%)			0 S.F.	=			0.00 Ac.	0.40	0.40
Lawn (>10%)			0 S.F.	=			0.00 Ac.	0.55	0.40
Water			0 S.F.	=			0.00 Ac.	1.00	0.00
Misc.			0 S.F.	=			0.00 Ac.	0.92	0.02

Weighted c =	**0.577**	
Weighted N =	0.214	
Sheet Flow		
L =	300 Ft.	
H =	5.7 Ft.	
S =	0.0191 Ft./Ft.	
t1 =	14.56 Minutes	(Min. 5 minutes)
Shallow Concentrated Flow		
L =	300 Ft.	
H =	6.1 Ft.	
S =	0.0204 Ft./Ft.	
V =	2.90 Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	1.72 Minutes	
tc=	16.29 Minutes	(Assumed 10 minutes)
I(10) =	In./Hr.	
I(25) =	4.914 In./Hr.	
I(50) =	In./Hr.	
I(100) =	6.058 In./Hr.	
Q(10) =	**0.00 CFS**	
Q(25) =	**3.07 CFS**	
Q(50) =	**0.00 CFS**	
Q(100) =	**3.78 CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 2

Total Area = 27,048 S.F.
0.62 Acres

Surface								C	N
Structures	2	@	2500	=	5,000	S.F. =	0.11 Ac.	0.92	0.02
Pavement				=	6,154	S.F. =	0.14 Ac.	0.92	0.02
Drives	4	@	700	=	2,800	S.F. =	0.06 Ac.	0.92	0.02
Patios	0	@	100	=	0	S.F. =	0.00 Ac.	0.92	0.02
Sidewalks				=	0	S.F. =	0.00 Ac.	0.92	0.02
Lawn (0-2%)			0 S.F.	=			0.00 Ac.	0.15	0.40
Lawn (2-5%)			13,094 S.F.	=			0.30 Ac.	0.25	0.40
Lawn (5-10%)			0 S.F.	=			0.00 Ac.	0.40	0.40
Lawn (>10%)			0 S.F.	=			0.00 Ac.	0.55	0.40
Woods (>10%)			0 S.F.	=			0.00 Ac.	0.48	0.60
Water			0 S.F.	=			0.00 Ac.	1.00	0.00
Misc.			0 S.F.	=			0.00 Ac.	0.92	0.02

Weighted c =	**0.596**	
Weighted N =	0.204	
Sheet Flow		
L =	300 Ft.	
H =	7.4 Ft.	
S =	0.0246 Ft./Ft.	
t1 =	13.41 Minutes	(Min. 5 minutes)
Shallow Concentrated Flow		
L =	90 Ft.	
H =	1.2 Ft.	
S =	0.0136 Ft./Ft.	
V =	2.40 Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	0.63 Minutes	
tc=	14.04 Minutes	
I(10) =	In./Hr.	
I(25) =	5.204 In./Hr.	
I(50) =	In./Hr.	
I(100) =	6.373 In./Hr.	
Q(10) =	**0.00 CFS**	
Q(25) =	**1.92 CFS**	
Q(50) =	**0.00 CFS**	
Q(100) =	**2.36 CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 3

Total Area = 29,713 S.F.
0.68 Acres

Surface								C	N
Structures	1.75	@	2500	=	4,375	S.F. =	0.10 Ac.	0.92	0.02
Pavement				=	5,528	S.F. =	0.13 Ac.	0.92	0.02
Drives	2	@	700	=	1,400	S.F. =	0.03 Ac.	0.92	0.02
Patios	1.5	@	100	=	150	S.F. =	0.00 Ac.	0.92	0.02
Sidewalks				=	0	S.F. =	0.00 Ac.	0.92	0.02
Lawn (0-2		0	S.F.	=			0.00 Ac.	0.15	0.40
Lawn (2-5%)		18,261	S.F.	=			0.42 Ac.	0.25	0.40
Lawn (5-10%)		0	S.F.	=			0.00 Ac.	0.40	0.40
Lawn (>10%)		0	S.F.	=			0.00 Ac.	0.55	0.40
Water		0	S.F.	=			0.00 Ac.	1.00	0.00
Misc.		0	S.F.	=			0.00 Ac.	0.92	0.02

Weighted c =	**0.508**	
Weighted N =	0.254	
Sheet Flow		
L =	300	Ft.
H =	4.8	Ft.
S =	0.0161	Ft./Ft.
t1 =	16.39	Minutes (Min. 5 minutes)
Shallow Concentrated Flow		
L =	49	Ft.
H =	0.4	Ft.
S =	0.0084	Ft./Ft.
v =	2.00	Ft./sec. (From HERPICC Figure 3.4.5)
t2=	0.41	Minutes
tc=	16.80	Minutes
I(10) =		In./Hr.
I(25) =	4.867	In./Hr.
I(50) =		In./Hr.
I(100) =	6.004	In./Hr.
Q(10) =	**0.00**	**CFS**
Q(25) =	**1.69**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**2.08**	**CFS**

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 4

Total Area = 5,074 S.F.
0.12 Acres

Surface								C	N
Structures	0	@	2500	=	0	S.F. =	0.00 Ac.	0.92	0.02
Pavement				=	2,384	S.F. =	0.05 Ac.	0.92	0.02
Drives	0	@	700	=	0	S.F. =	0.00 Ac.	0.92	0.02
Patios	0	@	100	=	0	S.F. =	0.00 Ac.	0.92	0.02
Sidewalks				=	0	S.F. =	0.00 Ac.	0.92	0.02
Lawn (0-2%)		0	S.F.	=			0.00 Ac.	0.15	0.40
Lawn (2-5%)		2,690	S.F.	=			0.06 Ac.	0.25	0.40
Lawn (5-10%)		0	S.F.	=			0.00 Ac.	0.40	0.40
Lawn (>10%)		0	S.F.	=			0.00 Ac.	0.55	0.40
Woods (>10%)		0	S.F.	=			0.00 Ac.	0.48	0.60
Water		0	S.F.	=			0.00 Ac.	1.00	0.00
Misc.		0	S.F.	=			0.00 Ac.	0.92	0.02

Weighted c =	**0.565**	
Weighted N =	0.221	
Sheet Flow		
L =	172	Ft.
H =	1.8	Ft.
S =	0.0104	Ft./Ft.
t1 =	13.14	Minutes (Min. 5 minutes)
Shallow Concentrated Flow		
L =	0	Ft.
H =	0.0	Ft.
S =	#DIV/0!	Ft./Ft.
v =	2.70	Ft./sec. (From HERPICC Figure 3.4.5)
t2=	0.00	Minutes
tc=	13.14	Minutes
I(10) =		In./Hr.
I(25) =	5.365	In./Hr.
I(50) =		In./Hr.
I(100) =	6.541	In./Hr.
Q(10) =	**0.00**	**CFS**
Q(25) =	**0.35**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**0.43**	**CFS**

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 5

Total Area = 37,779 S.F.
0.87 Acres

Surface								C	N
Structures	3	@	2500	=	7,500	S.F. =	0.17 Ac.	0.92	0.02
Pavement				=	5,939	S.F. =	0.14 Ac.	0.92	0.02
Drives	0	@	700	=	0	S.F. =	0.00 Ac.	0.92	0.02
Patios	6	@	100	=	600	S.F. =	0.01 Ac.	0.92	0.02
Sidewalks				=	0	S.F. =	0.00 Ac.	0.92	0.02
Lawn (0-2%)			0 S.F.	=			0.00 Ac.	0.15	0.40
Lawn (2-5%)			23,740 S.F.	=			0.54 Ac.	0.25	0.40
Lawn (5-10%)			0 S.F.	=			0.00 Ac.	0.40	0.40
Lawn (>10%)			0 S.F.	=			0.00 Ac.	0.55	0.40
Woods (>10%)			0 S.F.	=			0.00 Ac.	0.48	0.60
Water			0 S.F.	=			0.00 Ac.	1.00	0.00
Misc.			0 S.F.	=			0.00 Ac.	0.92	0.02

Weighted c =	**0.499**	
Weighted N =	0.259	
Sheet Flow		
L =	81 Ft.	
H =	1.0 Ft.	
S =	0.0123 Ft./Ft.	
t1=	9.56 Minutes	(Min. 5 minutes)
Open Channel Flow		
L =	218 Ft.	
H =	2.4 Ft.	
S =	0.0110 Ft./Ft.	
V =	1.85 Ft./sec.	
t2=	1.96 Minutes	
tc=	11.52 Minutes	
I(10) =	In./Hr.	
I(25) =	5.654 In./Hr.	
I(50) =	In./Hr.	
I(100) =	6.843 In./Hr.	
Q(10) =	**0.00 CFS**	
Q(25) =	**2.45 CFS**	
Q(50) =	**0.00 CFS**	
Q(100) =	**2.96 CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 6

Total Area = 60,749 S.F.
1.39 Acres

Surface								C	N
Structures	5.25	@	2500	=	13,125	S.F. =	0.30 Ac.	0.92	0.02
Pavement				=	11,755	S.F. =	0.27 Ac.	0.92	0.02
Drives	9.5	@	700	=	6,650	S.F. =	0.15 Ac.	0.92	0.02
Patios	1	@	100	=	100	S.F. =	0.00 Ac.	0.92	0.02
Sidewalks				=	0	S.F. =	0.00 Ac.	0.92	0.02
Lawn (0-2%)			0 S.F.	=			0.00 Ac.	0.15	0.40
Lawn (2-5%)			29,119 S.F.	=			0.67 Ac.	0.25	0.40
Lawn (5-10%)			0 S.F.	=			0.00 Ac.	0.40	0.40
Lawn (>10%)			0 S.F.	=			0.00 Ac.	0.55	0.40
Woods (>10%)			0 S.F.	=			0.00 Ac.	0.48	0.60
Water			0 S.F.	=			0.00 Ac.	1.00	0.00
Misc.			0 S.F.	=			0.00 Ac.	0.92	0.02

Weighted c =	**0.599**	
Weighted N =	0.202	
Sheet Flow		
L =	300 Ft.	
H =	3.4 Ft.	
S =	0.0114 Ft./Ft.	
t1=	15.99 Minutes	(Min. 5 minutes)
Shallow Concentrated Flow		
L =	117 Ft.	
H =	1.1 Ft.	
S =	0.0094 Ft./Ft.	
V =	1.60 Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	1.22 Minutes	
tc=	17.21 Minutes	
I(10) =	In./Hr.	
I(25) =	4.829 In./Hr.	
I(50) =	In./Hr.	
I(100) =	5.960 In./Hr.	
Q(10) =	**0.00 CFS**	
Q(25) =	**4.03 CFS**	
Q(50) =	**0.00 CFS**	
Q(100) =	**4.98 CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 7

Total Area = 89,001 S.F.
2.04 Acres

Surface									C	N
Structures	3.25	@	2500	=	8,125	S.F. =	0.19	Ac.	0.92	0.02
Pavement				=	0	S.F. =	0.00	Ac.	0.92	0.02
Drives	0	@	700	=	0	S.F. =	0.00	Ac.	0.92	0.02
Patios	6.5	@	100	=	650	S.F. =	0.01	Ac.	0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.	0.92	0.02
Lawn (0-2			0 S.F.	=			0.00	Ac.	0.15	0.40
Lawn (2-5%)			62,645 S.F.	=			1.44	Ac.	0.25	0.40
Lawn (5-10%)			0 S.F.	=			0.00	Ac.	0.40	0.40
Lawn (>10%)			6,000 S.F.	=			0.14	Ac.	0.55	0.40
Water			11,583 S.F.	=			0.27	Ac.	1.00	0.00
Misc.			0 S.F.	=			0.00	Ac.	0.92	0.02

Weighted c =	**0.434**	
Weighted N =	0.310	
Sheet Flow		
L =	255	Ft.
H =	3.8	Ft.
S =	0.0267	Ft./Ft.
t1=	14.85	Minutes (Min. 5 minutes)
Open Channel Flow		
L =	455	Ft.
H =	5.0	Ft.
S =	0.0110	Ft./Ft.
v =	2.00	Ft./sec.
t2=	3.79	Minutes
tc=	18.64	Minutes
I(10) =		In./Hr.
I(25) =	4.696	In./Hr.
I(50) =		In./Hr.
I(100) =	5.809	In./Hr.
Q(10) =	**0.00**	**CFS**
Q(25) =	**4.16**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**5.15**	**CFS**

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 8

Total Area = 77,610 S.F.
1.78 Acres

Surface									C	N
Structures	3.5	@	2500	=	8,750	S.F. =	0.20	Ac.	0.92	0.02
Pavement				=	0	S.F. =	0.00	Ac.	0.92	0.02
Drives	0	@	700	=	0	S.F. =	0.00	Ac.	0.92	0.02
Patios	7	@	100	=	700	S.F. =	0.02	Ac.	0.92	0.02
Sidewalks				=	0	S.F. =	0.00	Ac.	0.92	0.02
Lawn (0-2%)			0 S.F.	=			0.00	Ac.	0.15	0.40
Lawn (2-5%)			68,160 S.F.	=			1.56	Ac.	0.25	0.40
Lawn (5-10%)			0 S.F.	=			0.00	Ac.	0.40	0.40
Lawn (>10%)			0 S.F.	=			0.00	Ac.	0.55	0.40
Woods (>10%)			0 S.F.	=			0.00	Ac.	0.48	0.60
Water			0 S.F.	=			0.00	Ac.	1.00	0.00
Misc.			0 S.F.	=			0.00	Ac.	0.92	0.02

Weighted c =	**0.332**	
Weighted N =	0.354	
Sheet Flow		
L =	128	Ft.
H =	1.4	Ft.
S =	0.0109	Ft./Ft.
t1=	14.08	Minutes (Min. 5 minutes)
Open Channel Flow		
L =	559	Ft.
H =	7.0	Ft.
S =	0.0125	Ft./Ft.
v =	2.20	Ft./sec.
t2=	4.23	Minutes
tc=	18.32	Minutes
I(10) =		In./Hr.
I(25) =	4.726	In./Hr.
I(50) =		In./Hr.
I(100) =	5.843	In./Hr.
Q(10) =	**0.00**	**CFS**
Q(25) =	**2.79**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**3.45**	**CFS**

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 9

Total Area = 38,708 S.F.
0.89 Acres

Surface								C	N
Structures	2.75	@	2500	=	6,875	S.F. =	0.16 Ac.	0.92	0.02
Pavement				=	7,388	S.F. =	0.17 Ac.	0.92	0.02
Drives	5.5	@	700	=	3,850	S.F. =	0.09 Ac.	0.92	0.02
Patios	0	@	100	=	0	S.F. =	0.00 Ac.	0.92	0.02
Sidewalks				=	0	S.F. =	0.00 Ac.	0.92	0.02
Lawn (0-2%)			0 S.F.	=			0.00 Ac.	0.15	0.40
Lawn (2-5%)			20,595 S.F.	=			0.47 Ac.	0.25	0.40
Lawn (5-10%)			0 S.F.	=			0.00 Ac.	0.40	0.40
Lawn (>10%)			0 S.F.	=			0.00 Ac.	0.55	0.40
Woods (>10%)			0 S.F.	=			0.00 Ac.	0.48	0.60
Water			0 S.F.	=			0.00 Ac.	1.00	0.00
Misc.			0 S.F.	=			0.00 Ac.	0.92	0.02

Weighted c =	**0.564**	
Weighted N =	0.222	
Sheet Flow		
L =	300 Ft.	
H =	4.0 Ft.	
S =	0.0132 Ft./Ft.	
t1=	16.15 Minutes	(Min. 5 minutes)
Shallow Concentrated Flow		
L =	219 Ft.	
H =	2.7 Ft.	
S =	0.0121 Ft./Ft.	
v =	2.20 Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	1.66 Minutes	
tc=	17.81 Minutes	
I(10) =	In./Hr.	
I(25) =	4.773 In./Hr.	
I(50) =	In./Hr.	
I(100) =	5.897 In./Hr.	
Q(10) =	**0.00 CFS**	
Q(25) =	**2.39 CFS**	
Q(50) =	**0.00 CFS**	
Q(100) =	**2.95 CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 10

Total Area = 35,004 S.F.
0.80 Acres

Surface								C	N
Structures	2.5	@	2500	=	6,250	S.F. =	0.14 Ac.	0.92	0.02
Pavement				=	6,863	S.F. =	0.16 Ac.	0.92	0.02
Drives	5	@	700	=	3,500	S.F. =	0.08 Ac.	0.92	0.02
Patios	0	@	100	=	0	S.F. =	0.00 Ac.	0.92	0.02
Sidewalks				=	0	S.F. =	0.00 Ac.	0.92	0.02
Lawn (0-2%)			0 S.F.	=			0.00 Ac.	0.15	0.40
Lawn (2-5%)			18,391 S.F.	=			0.42 Ac.	0.25	0.40
Lawn (5-10%)			0 S.F.	=			0.00 Ac.	0.40	0.40
Lawn (>10%)			0 S.F.	=			0.00 Ac.	0.55	0.40
Woods (>10%)			0 S.F.	=			0.00 Ac.	0.48	0.60
Water			0 S.F.	=			0.00 Ac.	1.00	0.00
Misc.			0 S.F.	=			0.00 Ac.	0.92	0.02

Weighted c =	**0.568**	
Weighted N =	0.220	
Sheet Flow		
L =	300 Ft.	
H =	4.0 Ft.	
S =	0.0134 Ft./Ft.	
t1=	15.99 Minutes	(Min. 5 minutes)
Shallow Concentrated Flow		
L =	182 Ft.	
H =	2.3 Ft.	
S =	0.0128 Ft./Ft.	
v =	2.35 Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	1.29 Minutes	
tc=	17.29 Minutes	
I(10) =	In./Hr.	
I(25) =	4.821 In./Hr.	
I(50) =	In./Hr.	
I(100) =	5.952 In./Hr.	
Q(10) =	**0.00 CFS**	
Q(25) =	**2.20 CFS**	
Q(50) =	**0.00 CFS**	
Q(100) =	**2.72 CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 11

Total Area = 52,988 S.F.
1.22 Acres

Surface								C	N
Structures	2.5	@	2500	=	6,250	S.F. =	0.14 Ac.	0.92	0.02
Pavement				=	0	S.F. =	0.00 Ac.	0.92	0.02
Drives	0	@	700	=	0	S.F. =	0.00 Ac.	0.92	0.02
Patios	5	@	100	=	500	S.F. =	0.01 Ac.	0.92	0.02
Sidewalks				=	0	S.F. =	0.00 Ac.	0.92	0.02
Lawn (0-2%)		0	S.F.	=			0.00 Ac.	0.15	0.40
Lawn (2-5%)		46,238	S.F.	=			1.06 Ac.	0.25	0.40
Lawn (5-10%)		0	S.F.	=			0.00 Ac.	0.40	0.40
Lawn (>10%)		0	S.F.	=			0.00 Ac.	0.55	0.40
Woods (>10%)		0	S.F.	=			0.00 Ac.	0.48	0.60
Water		0	S.F.	=			0.00 Ac.	1.00	0.00
Misc.		0	S.F.	=			0.00 Ac.	0.92	0.02

Weighted c =	**0.335**	
Weighted N =	0.352	
Sheet Flow		
L =	82	Ft.
H =	1.1	Ft.
S =	0.0134	Ft./Ft.
t1=	10.88	Minutes
		(Min. 5 minutes)
Open Channel Flow		
L =	480	Ft.
H =	6.0	Ft.
S =	0.0126	Ft./Ft.
v =	2.20	Ft./sec.
t2=	3.64	Minutes
tc=	14.51	Minutes
I(10) =		In./Hr.
I(25) =	5.120	In./Hr.
I(50) =		In./Hr.
I(100) =	6.285	In./Hr.
Q(10) =	**0.00**	**CFS**
Q(25) =	**2.09**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**2.56**	**CFS**

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 12

Total Area = 31,712 S.F.
0.73 Acres

Surface								C	N
Structures	1.75	@	2500	=	4,375	S.F. =	0.10 Ac.	0.92	0.02
Pavement				=	3,311	S.F. =	0.08 Ac.	0.92	0.02
Drives	2.25	@	700	=	1,575	S.F. =	0.04 Ac.	0.92	0.02
Patios	1.25	@	100	=	125	S.F. =	0.00 Ac.	0.92	0.02
Sidewalks				=	0	S.F. =	0.00 Ac.	0.92	0.02
Lawn (0-2%)		0	S.F.	=			0.00 Ac.	0.15	0.40
Lawn (2-5%)		22,326	S.F.	=			0.51 Ac.	0.25	0.40
Lawn (5-10%)		0	S.F.	=			0.00 Ac.	0.40	0.40
Lawn (>10%)		0	S.F.	=			0.00 Ac.	0.55	0.40
Woods (>10%)		0	S.F.	=			0.00 Ac.	0.48	0.60
Water		0	S.F.	=			0.00 Ac.	1.00	0.00
Misc.		0	S.F.	=			0.00 Ac.	0.92	0.02

Weighted c =	**0.448**	
Weighted N =	0.288	
Sheet Flow		
L =	179	Ft.
H =	1.4	Ft.
S =	0.0080	Ft./Ft.
t1=	16.06	Minutes
		(Min. 5 minutes)
Shallow Concentrated Flow		
L =	0	Ft.
H =	0.0	Ft.
S =	#DIV/0!	Ft./Ft.
v =	3.00	Ft./sec.
		(From HERPICC Figure 3.4.5)
t2=	0.00	Minutes
tc=	16.06	Minutes
I(10) =		In./Hr.
I(25) =	4.935	In./Hr.
I(50) =		In./Hr.
I(100) =	6.082	In./Hr.
Q(10) =	**0.00**	**CFS**
Q(25) =	**1.61**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**1.98**	**CFS**

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 13

Total Area = 19,601 S.F.
0.45 Acres

Surface								C	N
Structures	1.25	@	2500	=	3,125	S.F. =	0.07 Ac.	0.92	0.02
Pavement				=	3,790	S.F. =	0.09 Ac.	0.92	0.02
Drives	2.5	@	700	=	1,750	S.F. =	0.04 Ac.	0.92	0.02
Patios	0	@	100	=	0	S.F. =	0.00 Ac.	0.92	0.02
Sidewalks				=	0	S.F. =	0.00 Ac.	0.92	0.02
Lawn (0-2%)			0 S.F.	=			0.00 Ac.	0.15	0.40
Lawn (2-5%)			10,936 S.F.	=			0.25 Ac.	0.25	0.40
Lawn (5-10%)			0 S.F.	=			0.00 Ac.	0.40	0.40
Lawn (>10%)			0 S.F.	=			0.00 Ac.	0.55	0.40
Woods (>10%)			0 S.F.	=			0.00 Ac.	0.48	0.60
Water			0 S.F.	=			0.00 Ac.	1.00	0.00
Misc.			0 S.F.	=			0.00 Ac.	0.92	0.02

Weighted c =	**0.546**	
Weighted N =	0.232	
Sheet Flow		
L =	209 Ft.	
H =	1.7 Ft.	
S =	0.0081 Ft./Ft.	
t1=	15.60 Minutes	(Min. 5 minutes)
Open Channel Flow		
L =	0 Ft.	
H =	0.0 Ft.	
S =	#DIV/0! Ft./Ft.	
v =	1.55 Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	0.00 Minutes	
tc=	15.60 Minutes	
I(10) =	In./Hr.	
I(25) =	4.978 In./Hr.	
I(50) =	In./Hr.	
I(100) =	6.131 In./Hr.	
Q(10) =	**0.00 CFS**	
Q(25) =	**1.22 CFS**	
Q(50) =	**0.00 CFS**	
Q(100) =	**1.51 CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 14

Total Area = 22,387 S.F.
0.51 Acres

Surface								C	N
Structures	1	@	2500	=	2,500	S.F. =	0.06 Ac.	0.92	0.02
Pavement				=	0	S.F. =	0.00 Ac.	0.92	0.02
Drives	0	@	700	=	0	S.F. =	0.00 Ac.	0.92	0.02
Patios	2	@	100	=	200	S.F. =	0.00 Ac.	0.92	0.02
Sidewalks				=	0	S.F. =	0.00 Ac.	0.92	0.02
Lawn (0-2%)			0 S.F.	=			0.00 Ac.	0.15	0.40
Lawn (2-5%)			19,687 S.F.	=			0.45 Ac.	0.25	0.40
Lawn (5-10%)			0 S.F.	=			0.00 Ac.	0.40	0.40
Lawn (>10%)			0 S.F.	=			0.00 Ac.	0.55	0.40
Woods (>10%)			0 S.F.	=			0.00 Ac.	0.48	0.60
Water			0 S.F.	=			0.00 Ac.	1.00	0.00
Misc.			0 S.F.	=			0.00 Ac.	0.92	0.02

Weighted c =	**0.331**	
Weighted N =	0.354	
Sheet Flow		
L =	106 Ft.	
H =	1.1 Ft.	
S =	0.0104 Ft./Ft.	
t1=	13.06 Minutes	(Min. 5 minutes)
Open Channel Flow		
L =	200 Ft.	
H =	2.3 Ft.	
S =	0.0113 Ft./Ft.	
v =	2.00 Ft./sec.	
t2=	1.67 Minutes	
tc=	14.73 Minutes	
I(10) =	In./Hr.	
I(25) =	5.081 In./Hr.	
I(50) =	In./Hr.	
I(100) =	6.244 In./Hr.	
Q(10) =	**0.00 CFS**	
Q(25) =	**0.86 CFS**	
Q(50) =	**0.00 CFS**	
Q(100) =	**1.06 CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 15

Total Area = 75,978 S.F.
1.74 Acres

Surface								C	N
Structures	4.5	@	2500	=	11,250	S.F. =	0.26 Ac.	0.92	0.02
Pavement				=	6,338	S.F. =	0.15 Ac.	0.92	0.02
Drives	4.75	@	700	=	3,325	S.F. =	0.08 Ac.	0.92	0.02
Patios	4.25	@	100	=	425	S.F. =	0.01 Ac.	0.92	0.02
Sidewalks				=	0	S.F. =	0.00 Ac.	0.92	0.02
Lawn (0-2%)			0 S.F.	=			0.00 Ac.	0.15	0.40
Lawn (2-5%)			54,040 S.F.	=			1.25 Ac.	0.25	0.40
Lawn (5-10%)			0 S.F.	=			0.00 Ac.	0.40	0.40
Lawn (>10%)			0 S.F.	=			0.00 Ac.	0.55	0.40
Woods (>10%)			0 S.F.	=			0.00 Ac.	0.48	0.60
Water			0 S.F.	=			0.00 Ac.	1.00	0.00
Misc.			0 S.F.	=			0.00 Ac.	0.92	0.02

Weighted c =	**0.438**	
Weighted N =	0.293	
Sheet Flow		
L =	250 Ft.	
H =	1.8 Ft.	
S =	0.0073 Ft./Ft.	
t1 =	19.37 Minutes	(Min. 5 minutes)
Shallow Concentrated Flow		
L =	0 Ft.	
H =	0.0 Ft.	
S =	#DIV/0! Ft./Ft.	
v =	3.20 Ft./sec.	(From HERPICC Figure 3.4.5)
t2 =	0.00 Minutes	
tc =	19.37 Minutes	
I(10) =	In./Hr.	
I(25) =	4.629 In./Hr.	
I(50) =	In./Hr.	
I(100) =	5.732 In./Hr.	
Q(10) =	**0.00 CFS**	
Q(25) =	**3.54 CFS**	
Q(50) =	**0.00 CFS**	
Q(100) =	**4.38 CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 16

Total Area = 33,197 S.F.
0.76 Acres

Surface								C	N
Structures	2.25	@	2500	=	5,625	S.F. =	0.13 Ac.	0.92	0.02
Pavement				=	6,285	S.F. =	0.14 Ac.	0.92	0.02
Drives	4.5	@	700	=	3,150	S.F. =	0.07 Ac.	0.92	0.02
Patios	0	@	100	=	0	S.F. =	0.00 Ac.	0.92	0.02
Sidewalks				=	0	S.F. =	0.00 Ac.	0.92	0.02
Lawn (0-2%)			0 S.F.	=			0.00 Ac.	0.15	0.40
Lawn (2-5%)			18,157 S.F.	=			0.42 Ac.	0.25	0.40
Lawn (5-10%)			0 S.F.	=			0.00 Ac.	0.40	0.40
Lawn (>10%)			0 S.F.	=			0.00 Ac.	0.55	0.40
Woods (>10%)			0 S.F.	=			0.00 Ac.	0.48	0.60
Water			0 S.F.	=			0.00 Ac.	1.00	0.00
Misc.			0 S.F.	=			0.00 Ac.	0.92	0.02

Weighted c =	**0.554**	
Weighted N =	0.228	
Sheet Flow		
L =	250 Ft.	
H =	1.8 Ft.	
S =	0.0073 Ft./Ft.	
t1 =	17.21 Minutes	(Min. 5 minutes)
Open Channel Flow		
L =	0 Ft.	
H =	0.0 Ft.	
S =	#DIV/0! Ft./Ft.	
v =	1.50 Ft./sec.	(From HERPICC Figure 3.4.5)
t2 =	0.00 Minutes	
tc =	17.21 Minutes	
I(10) =	In./Hr.	
I(25) =	4.829 In./Hr.	
I(50) =	In./Hr.	
I(100) =	5.960 In./Hr.	
Q(10) =	**0.00 CFS**	
Q(25) =	**2.04 CFS**	
Q(50) =	**0.00 CFS**	
Q(100) =	**2.52 CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 17

Total Area = 58,480 S.F.
1.34 Acres

Surface								C	N
Structures	2.25	@	2500	=	5,625	S.F. =	0.13 Ac.	0.92	0.02
Pavement				=	0	S.F. =	0.00 Ac.	0.92	0.02
Drives	0	@	700	=	0	S.F. =	0.00 Ac.	0.92	0.02
Patios	4.5	@	100	=	450	S.F. =	0.01 Ac.	0.92	0.02
Sidewalks				=	0	S.F. =	0.00 Ac.	0.92	0.02
Lawn (0-2%)			0 S.F.	=			0.00 Ac.	0.15	0.40
Lawn (2-5%)			37,746 S.F.	=			0.87 Ac.	0.25	0.40
Lawn (5-10%)			0 S.F.	=			0.00 Ac.	0.40	0.40
Lawn (>10%)			5,200 S.F.	=			0.12 Ac.	0.55	0.40
Woods (>10%)			0 S.F.	=			0.00 Ac.	0.48	0.60
Water			9,459 S.F.	=			0.22 Ac.	1.00	0.00
Misc.			0 S.F.	=			0.00 Ac.	0.92	0.02

Weighted c =	**0.468**	
Weighted N =	0.296	
Sheet Flow		
L =	105	Ft.
H =	1.9	Ft.
S =	0.0183	Ft./Ft.
t1=	10.52	Minutes (Min. 5 minutes)
Open Channel Flow		
L =	220	Ft.
H =	4.0	Ft.
S =	0.0182	Ft./Ft.
v =	2.40	Ft./sec.
t2=	1.53	Minutes
tc=	12.05	Minutes
I(10) =		In./Hr.
I(25) =	5.559	In./Hr.
I(50) =		In./Hr.
I(100) =	6.744	In./Hr.
Q(10) =	**0.00**	**CFS**
Q(25) =	**3.49**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**4.23**	**CFS**

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 18

Total Area = 15,874 S.F.
0.36 Acres

Surface								C	N
Structures	0.5	@	2500	=	1,250	S.F. =	0.03 Ac.	0.92	0.02
Pavement				=	0	S.F. =	0.00 Ac.	0.92	0.02
Drives	0	@	700	=	0	S.F. =	0.00 Ac.	0.92	0.02
Patios	1	@	100	=	100	S.F. =	0.00 Ac.	0.92	0.02
Sidewalks				=	0	S.F. =	0.00 Ac.	0.92	0.02
Lawn (0-2%)			0 S.F.	=			0.00 Ac.	0.15	0.40
Lawn (2-5%)			14,524 S.F.	=			0.33 Ac.	0.25	0.40
Lawn (5-10%)			0 S.F.	=			0.00 Ac.	0.40	0.40
Lawn (>10%)			0 S.F.	=			0.00 Ac.	0.55	0.40
Woods (>10%)			0 S.F.	=			0.00 Ac.	0.48	0.60
Water			0 S.F.	=			0.00 Ac.	1.00	0.00
Misc.			0 S.F.	=			0.00 Ac.	0.92	0.02

Weighted c =	**0.307**	
Weighted N =	0.368	
Sheet Flow		
L =	75	Ft.
H =	1.0	Ft.
S =	0.0133	Ft./Ft.
t1=	10.67	Minutes (Min. 5 minutes)
Shallow Concentrated Flow		
L =	0	Ft.
H =	0.0	Ft.
S =	#DIV/0!	Ft./Ft.
v =	3.00	Ft./sec. (From HERPICC Figure 3.4.5)
t2=	0.00	Minutes
tc=	10.67	Minutes
I(10) =		In./Hr.
I(25) =	5.805	In./Hr.
I(50) =		In./Hr.
I(100) =	7.001	In./Hr.
Q(10) =	**0.00**	**CFS**
Q(25) =	**0.65**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**0.78**	**CFS**

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 19

Total Area = 55,989 S.F.
1.29 Acres

Surface								*C*	*N*
Structures	3.5	@	2500	=	8,750	S.F. =	0.20 Ac.	0.92	0.02
Pavement				=	0	S.F. =	0.00 Ac.	0.92	0.02
Drives	0	@	700	=	0	S.F. =	0.00 Ac.	0.92	0.02
Patios	7	@	100	=	700	S.F. =	0.02 Ac.	0.92	0.02
Sidewalks				=	0	S.F. =	0.00 Ac.	0.92	0.02
Lawn (0-2%)			0 S.F.	=			0.00 Ac.	0.15	0.40
Lawn (2-5%)			46,539 S.F.	=			1.07 Ac.	0.25	0.40
Lawn (5-10%)			0 S.F.	=			0.00 Ac.	0.40	0.40
Lawn (>10%)			0 S.F.	=			0.00 Ac.	0.55	0.40
Woods (>10%)			0 S.F.	=			0.00 Ac.	0.48	0.60
Water			0 S.F.	=			0.00 Ac.	1.00	0.00
Misc.			0 S.F.	=			0.00 Ac.	0.92	0.02

Weighted c =	**0.363**	
Weighted N =	0.336	
Sheet Flow		
L =	82	Ft.
H =	1.0	Ft.
S =	0.0122	Ft./Ft.
t1 =	10.89	Minutes (Min. 5 minutes)
Open Channel Flow		
L =	608	Ft.
H =	11.6	Ft.
S =	0.0190	Ft./Ft.
V =	2.40	Ft./sec.
t2=	4.22	Minutes
tc=	15.11	Minutes
I(10) =		In./Hr.
I(25) =	5.023	In./Hr.
I(50) =		In./Hr.
I(100) =	6.182	In./Hr.

Q(10) =	**0.00**	**CFS**
Q(25) =	**2.34**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**2.89**	**CFS**

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: 20

Total Area = 2,362 S.F.
0.05 Acres

Surface								C	N
Structures	0	@	2500	=	0	S.F. =	0.00 Ac.	0.92	0.02
Pavement				=	0	S.F. =	0.00 Ac.	0.92	0.02
Drives	0	@	700	=	0	S.F. =	0.00 Ac.	0.92	0.02
Patios	0	@	100	=	0	S.F. =	0.00 Ac.	0.92	0.02
Sidewalks				=	0	S.F. =	0.00 Ac.	0.92	0.02
Lawn (0-2%)			0 S.F.	=			0.00 Ac.	0.15	0.40
Lawn (2-5%)			0 S.F.	=			0.00 Ac.	0.25	0.40
Lawn (5-10%)			0 S.F.	=			0.00 Ac.	0.40	0.40
Lawn (>10%)			2,362 S.F.	=			0.05 Ac.	0.55	0.40
Woods (>10%)			0 S.F.	=			0.00 Ac.	0.48	0.60
Water			0 S.F.	=			0.00 Ac.	1.00	0.00
Misc.			0 S.F.	=			0.00 Ac.	0.92	0.02

Weighted c =	**0.550**	
Weighted N =	0.400	
Sheet Flow		
L =	20	Ft.
H =	0.5	Ft.
S =	0.0250	Ft./Ft.
t1=	5.17	Minutes
Open Channel Flow		
L =	0	Ft.
H =	0.0	Ft.
S =	#DIV/0!	Ft./Ft.
v =	2.40	Ft./sec.
t2=	0.00	Minutes
tc=	5.17	Minutes
I(10) =		In./Hr.
I(25) =	7.161	In./Hr.
I(50) =		In./Hr.
I(100) =	8.423	In./Hr.

(Min. 5 minutes)

Q(10) =	**0.00**	**CFS**
Q(25) =	**0.21**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**0.25**	**CFS**

OFF-SITE DRAINAGE BASIN CALCULATIONS

Basin No.: OS-1

Total Area = 122,480 S.F.
2.81 Acres

Surface						C	N
Structures			=	0 S.F. =	0.00 Ac.	0.92	0.02
Drives (Asphalt)			=	0 S.F. =	0.00 Ac.	0.92	0.02
Drives (Gravel)			=	0 S.F. =	0.00 Ac.	0.75	0.15
Pavement			=	0 S.F. =	0.00 Ac.	0.92	0.02
Patios			=	0 S.F. =	0.00 Ac.	0.92	0.02
Sidewalks			=	0 S.F. =	0.00 Ac.	0.92	0.02
Woods (0-2%)	0	S.F.	=		0.00 Ac.	0.12	0.60
Woods (2-5%)	122,480	S.F.	=		2.81 Ac.	0.24	0.60
Woods (5-10%)	0	S.F.	=		0.00 Ac.	0.36	0.60
Woods (>10%)	0	S.F.	=		0.00 Ac.	0.48	0.60
Water	0	S.F.	=		0.00 Ac.	1.00	0.00
Misc.		S.F.	=		0.00 Ac.	0.92	0.02

Weighted c =	**0.240**	
Weighted N =	0.600	
Sheet Flow		
L =	325 Ft.	
H =	12.0 Ft.	
S =	0.0369 Ft./Ft.	
t1 =	20.96 Minutes	(Min. 5 minutes)
Shallow Concentrated Flow		
L =	0 Ft.	
H =	0.0 Ft.	
S =	#DIV/0! Ft./Ft.	
v =	1.56 Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	0.00 Minutes	
Open Channel Flow		
L =	0 Ft.	
H =	0.0 Ft.	
S =	#DIV/0! Ft./Ft.	
v =	1.55 Ft./sec.	
t3=	0.00 Minutes	
tc =	20.96	
I(10) =	0.000 In./Hr.	
I(25) =	4.482 In./Hr.	
I(50) =	0.000 In./Hr.	
I(100) =	5.564 In./Hr.	
Q(10) =	**0.00 CFS**	
Q(25) =	**3.02 CFS**	
Q(50) =	**0.00 CFS**	
Q(100) =	**3.75 CFS**	

OFF-SITE DRAINAGE BASIN CALCULATIONS

Basin No.: OS-2

Total Area = 200,330 S.F.
4.60 Acres

Surface					C	N
Structures		=	4,406 S.F. =	0.10 Ac.	0.92	0.02
Drives (Asphalt)		=	0 S.F. =	0.00 Ac.	0.92	0.02
Drives (Gravel)		=	9,300 S.F. =	0.21 Ac.	0.92	0.15
Pavement		=	0 S.F. =	0.00 Ac.	0.92	0.02
Patios		=	0 S.F. =	0.00 Ac.	0.92	0.02
Sidewalks		=	0 S.F. =	0.00 Ac.	0.92	0.02
Cult. Field (0-2%	0 S.F.	=		0.00 Ac.	0.20	0.20
Cult. Field (2-5%)	0 S.F.	=		0.00 Ac.	0.35	0.20
Cult. Field (5-10%)	0 S.F.	=		0.00 Ac.	0.50	0.20
Water	20,000 S.F.	=		0.46 Ac.	1.00	0.00
Woods (2-5%)	166,624 S.F.	=		3.83 Ac.	0.24	0.60
Misc.	S.F.	=		0.00 Ac.	0.92	0.02

Weighted c =	**0.362**	
Weighted N =	0.506	
Sheet Flow		
L =	300 Ft.	
H =	6.0 Ft.	
S =	0.0200 Ft./Ft.	
t1 =	21.53 Minutes	(Min. 5 minutes)
Shallow Concentrated Flow		
L =	0 Ft.	
H =	0.0 Ft.	
S =	#DIV/0! Ft./Ft.	
v =	2.30 Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	0.00 Minutes	
Open Channel Flow		
L =	0 Ft.	
H =	0.0 Ft.	
S =	#DIV/0! Ft./Ft.	
v =	2.00 Ft./sec.	
t3=	0.00 Minutes	
tc =	21.53	
I(10) =	0.000 In./Hr.	
I(25) =	4.139 In./Hr.	
I(50) =	0.000 In./Hr.	
I(100) =	5.304 In./Hr.	
Q(10) =	**0.00 CFS**	
Q(25) =	**7.38 CFS**	
Q(50) =	**0.00 CFS**	
Q(100) =	**9.17 CFS**	

OFF-SITE DRAINAGE BASIN CALCULATIONS

Basin No.: OS-3

Total Area = 22,050 S.F.
0.51 Acres

Surface					C	N
Structures		=	0 S.F. =	0.00 Ac.	0.92	0.02
Drives (Asphalt)		=	0 S.F. =	0.00 Ac.	0.92	0.02
Drives (Gravel)		=	0 S.F. =	0.00 Ac.	0.92	0.15
Pavement		=	0 S.F. =	0.00 Ac.	0.92	0.02
Patios		=	0 S.F. =	0.00 Ac.	0.92	0.02
Sidewalks		=	0 S.F. =	0.00 Ac.	0.92	0.02
Cult. Field (0-2'	0 S.F.	=		0.00 Ac.	0.20	0.20
Cult. Field (2-5%)	0 S.F.	=		0.00 Ac.	0.35	0.20
Cult. Field (5-10%)	0 S.F.	=		0.00 Ac.	0.50	0.20
Cult. Field (>10%)	0 S.F.	=		0.00 Ac.	0.65	0.20
Woods (<2%)	22,050 S.F.	=		0.51 Ac.	0.12	0.60
Misc.	S.F.	=		0.00 Ac.	0.92	0.02

Weighted c =	**0.120**	
Weighted N =	0.600	
Sheet Flow		
L =	212 Ft.	
H =	4.0 Ft.	
S =	0.0189 Ft./Ft.	
t1 =	20.09 Minutes	(Min. 5 minutes)
Shallow Concentrated Flow		
L =	0 Ft.	
H =	0.0 Ft.	
S =	#DIV/0! Ft./Ft.	
v =	2.30 Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	0.00 Minutes	
Open Channel Flow		
L =	0 Ft.	
H =	0.0 Ft.	
S =	#DIV/0! Ft./Ft.	
v =	2.00 Ft./sec.	
t3=	0.00 Minutes	
tc =	20.09	
I(10) =	0.000 In./Hr.	
I(25) =	4.562 In./Hr.	
I(50) =	0.000 In./Hr.	
I(100) =	5.656 In./Hr.	
Q(10) =	**0.00 CFS**	
Q(25) =	**0.28 CFS**	
Q(50) =	**0.00 CFS**	
Q(100) =	**0.34 CFS**	

UNDEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: UN-1

Total Area = 452,920 S.F.
10.40 Acres

Surface					C	N
Structures	=	4,825	S.F. =	0.11 Ac.	0.92	0.02
Drives (Asphalt)	=	0	S.F. =	0.00 Ac.	0.92	0.02
Drives (Gravel)	=	1,300	S.F. =	0.03 Ac.	0.75	0.15
Pavement	=	0	S.F. =	0.00 Ac.	0.92	0.02
Patios	=	0	S.F. =	0.00 Ac.	0.92	0.02
Sidewalks	=	0	S.F. =	0.00 Ac.	0.92	0.02
Woods (0-2%)	113,230 S.F.	=		2.60 Ac.	0.12	0.60
Woods (2-5%)	333,565 S.F.	=		7.66 Ac.	0.24	0.60
Woods (5-10%)	0 S.F.	=		0.00 Ac.	0.36	0.60
Woods (>10%)	0 S.F.	=		0.00 Ac.	0.48	0.60
Water	0 S.F.	=		0.00 Ac.	1.00	0.00
Misc.	S.F.	=		0.00 Ac.	0.92	0.02

Weighted c =	**0.219**	
Weighted N =	0.593	
Sheet Flow		
L =	300 Ft.	
H =	8.7 Ft.	
S =	0.0290 Ft./Ft.	
t1 =	21.24 Minutes	(Min. 5 minutes)
Shallow Concentrated Flow		
L =	300 Ft.	
H =	2.8 Ft.	
S =	0.0093 Ft./Ft.	
v =	1.56 Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	3.21 Minutes	
Open Channel Flow		
L =	273 Ft.	
H =	2.5 Ft.	
S =	0.0092 Ft./Ft.	
v =	1.55 Ft./sec.	
t3=	2.94 Minutes	
tc =	27.38	
I(10) =	3.451 In./Hr.	
I(25) =	0.000 In./Hr.	
I(50) =	0.000 In./Hr.	
I(100) =	0.000 In./Hr.	
Q(10) =	**7.85 CFS**	
Q(25) =	**0.00 CFS**	
Q(50) =	**0.00 CFS**	
Q(100) =	**0.00 CFS**	

UNDEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: UD-2

Total Area = 375,538 S.F.
8.62 Acres

Surface					C	N
Structures		=	0 S.F. =	0.00 Ac.	0.92	0.02
Drives (Asphalt)		=	0 S.F. =	0.00 Ac.	0.92	0.02
Drives (Gravel)		=	0 S.F. =	0.00 Ac.	0.92	0.15
Pavement		=	0 S.F. =	0.00 Ac.	0.92	0.02
Patios		=	0 S.F. =	0.00 Ac.	0.92	0.02
Sidewalks		=	0 S.F. =	0.00 Ac.	0.92	0.02
Cult. Field (0-2'	0 S.F.	=		0.00 Ac.	0.20	0.20
Cult. Field (2-5%)	317,135 S.F.	=		7.28 Ac.	0.35	0.20
Cult. Field (5-10%)	35,000 S.F.	=		0.80 Ac.	0.50	0.20
Cult. Field (>10%)	0 S.F.	=		0.00 Ac.	0.65	0.20
Woods (2-5%)	23,513 S.F.	=		0.54 Ac.	0.24	0.60
Misc.	S.F.	=		0.00 Ac.	0.92	0.02

Weighted c =	**0.357**	
Weighted N =	0.225	
Sheet Flow		
L =	[illegible] Ft.	
H =	[illegible] Ft.	
S =	0.0333 Ft./Ft.	
t1 =	13.08 Minutes	(Min. 5 minutes)
Shallow Concentrated Flow		
L =	[illegible] Ft.	
H =	[illegible] Ft.	
S =	0.0200 Ft./Ft.	
v =	2.30 Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	2.17 Minutes	
Open Channel Flow		
L =	[illegible] Ft.	
H =	[illegible] Ft.	
S =	#DIV/0! Ft./Ft.	
v =	2.00 Ft./sec.	
t3=	0.00 Minutes	
tc =	15.25	
I(10) =	[illegible] In./Hr.	
I(25) =	[illegible] In./Hr.	
I(50) =	[illegible] In./Hr.	
I(100) =	[illegible] In./Hr.	
Q(10) =	**13.84 CFS**	
Q(25) =	**0.00 CFS**	
Q(50) =	**0.00 CFS**	
Q(100) =	**0.00 CFS**	

Open Channel Flow Calculations

Swale #: 1

Side slope = 3
Bottom width = 1
Manning's coefficient = 0.035
Slope of channel = 0.0134

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	1.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.63	0.13	0.08	0.08	0.12	0.91	1.1
0.2	2.26	0.32	0.14	0.15	0.43	1.34	1.2
0.3	2.90	0.57	0.20	0.20	0.95	1.67	1.3
0.4	3.53	0.88	0.25	0.26	1.72	1.95	1.4
0.5	4.16	1.25	0.30	0.31	2.76	2.21	1.5
0.55	4.48	1.46	0.33	0.34	3.40	2.33	1.6
0.7	5.11	1.92	0.38	0.39	4.92	2.56	1.7
0.8	5.74	2.44	0.42	0.44	6.78	2.78	1.8
0.9	6.38	3.02	0.47	0.49	9.03	2.99	1.9
1.0	7.01	3.66	0.52	0.55	11.68	3.19	2.0

Open Channel Flow Calculations

Swale #: **2**

Side slope = 3
Bottom width = 1
Manning's coefficient = 0.035
Slope of channel = 0.0301

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	1.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.63	0.13	0.08	0.08	0.18	1.37	1.1
0.2	2.26	0.32	0.14	0.15	0.64	2.00	1.2
0.3	2.90	0.57	0.20	0.20	1.42	2.50	1.3
0.32	3.02	0.63	0.21	0.21	1.62	2.59	1.4
0.4	3.53	0.88	0.25	0.26	2.57	2.93	1.4
0.5	4.16	1.25	0.30	0.31	4.14	3.31	1.5
0.6	4.79	1.68	0.35	0.37	6.17	3.67	1.6
0.7	5.43	2.17	0.40	0.42	8.70	4.01	1.7
0.8	6.06	2.72	0.45	0.47	11.78	4.33	1.8
0.9	6.69	3.33	0.50	0.52	15.44	4.64	1.9
1.0	7.32	4.00	0.55	0.57	19.74	4.93	2.0

Open Channel Flow Calculations

Swale #: 3

Side slope = 3
Bottom width = 4
Manning's coefficient = 0.035
Slope of channel = 0.0093

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	4.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	4.63	0.43	0.09	0.09	0.36	0.84	1.1
0.2	5.26	0.92	0.17	0.18	1.18	1.28	1.2
0.3	5.90	1.47	0.25	0.25	2.39	1.63	1.3
0.32	6.02	1.59	0.26	0.27	2.68	1.69	1.4
0.4	6.53	2.08	0.32	0.33	3.98	1.91	1.4
0.5	7.16	2.75	0.38	0.39	5.96	2.17	1.5
0.6	7.79	3.48	0.45	0.46	8.35	2.40	1.6
0.7	8.43	4.27	0.51	0.52	11.14	2.61	1.7
0.8	9.06	5.12	0.57	0.58	14.37	2.81	1.8
0.9	9.69	6.03	0.62	0.64	18.04	2.99	1.9
1.0	10.32	7.00	0.68	0.70	22.18	3.17	2.0

Open Channel Flow Calculations

Swale #: 4

Side slope = 3
Bottom width = 1
Manning's coefficient = 0.035
Slope of channel = 0.0153

Depth (ft)	Wetted Perimeter (ft)	Area (ft^2)	Hydraulic Radius (ft)	Hydraulic Depth (ft)	Flowrate (cfs)	Velocity (ft/s)	F value
0.0	1.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.63	0.13	0.08	0.08	0.13	0.97	1.1
0.2	2.26	0.32	0.14	0.15	0.46	1.43	1.2
0.3	2.90	0.57	0.20	0.20	1.02	1.78	1.3
0.32	3.02	0.63	0.21	0.21	1.16	1.85	1.4
0.4	3.53	0.88	0.25	0.26	1.84	2.09	1.4
0.5	4.16	1.25	0.30	0.31	2.95	2.36	1.5
0.6	4.54	1.50	0.33	0.34	3.78	2.52	1.6
0.7	5.17	1.97	0.38	0.40	5.43	2.76	1.7
0.8	5.81	2.49	0.43	0.45	7.47	3.00	1.8
0.9	6.44	3.08	0.48	0.50	9.91	3.22	1.9
1.0	7.07	3.72	0.53	0.55	12.79	3.43	2.0

Open Channel Flow Calculations

Swale #: 5

Side slope = 3
Bottom width = 1
Manning's coefficient = 0.035
Slope of channel = 0.0113

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	1.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.63	0.13	0.08	0.08	0.11	0.84	1.1
0.2	2.26	0.32	0.14	0.15	0.39	1.23	1.2
0.3	2.90	0.57	0.20	0.20	0.87	1.53	1.3
0.32	3.02	0.63	0.21	0.21	0.99	1.59	1.4
0.4	3.53	0.88	0.25	0.26	1.58	1.79	1.4
0.5	4.16	1.25	0.30	0.31	2.54	2.03	1.5
0.6	4.79	1.68	0.35	0.37	3.78	2.25	1.6
0.7	5.43	2.17	0.40	0.42	5.33	2.46	1.7
0.8	6.06	2.72	0.45	0.47	7.22	2.65	1.8
0.9	6.69	3.33	0.50	0.52	9.46	2.84	1.9
1.0	7.32	4.00	0.55	0.57	12.09	3.02	2.0

Open Channel Flow Calculations

Swale #: 6

Side slope = 3
Bottom width = 1
Manning's coefficient = 0.035
Slope of channel = 0.0144

Depth (ft)	Wetted Perimeter (ft)	Area (ft^2)	Hydraulic Radius (ft)	Hydraulic Depth (ft)	Flowrate (cfs)	Velocity (ft/s)	F value
0.0	1.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.63	0.13	0.08	0.08	0.12	0.95	1.1
0.2	2.26	0.32	0.14	0.15	0.44	1.39	1.2
0.3	2.90	0.57	0.20	0.20	0.98	1.73	1.3
0.32	3.02	0.63	0.21	0.21	1.12	1.79	1.4
0.4	3.53	0.88	0.25	0.26	1.78	2.02	1.4
0.5	4.16	1.25	0.30	0.31	2.86	2.29	1.5
0.6	4.79	1.68	0.35	0.37	4.27	2.54	1.6
0.7	5.43	2.17	0.40	0.42	6.02	2.77	1.7
0.8	6.06	2.72	0.45	0.47	8.15	2.99	1.8
0.9	6.69	3.33	0.50	0.52	10.68	3.21	1.9
1.0	7.32	4.00	0.55	0.57	13.65	3.41	2.0

Open Channel Flow Calculations

Swale #: 7

Side slope = 3
Bottom width = 1
Manning's coefficient = 0.035
Slope of channel = 0.0085

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	1.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.63	0.13	0.08	0.08	0.09	0.73	1.1
0.2	2.26	0.32	0.14	0.15	0.34	1.06	1.2
0.3	2.90	0.57	0.20	0.20	0.76	1.33	1.3
0.32	3.02	0.63	0.21	0.21	0.86	1.38	1.4
0.4	3.53	0.88	0.25	0.26	1.37	1.55	1.4
0.5	4.16	1.25	0.30	0.31	2.20	1.76	1.5
0.6	4.79	1.68	0.35	0.37	3.28	1.95	1.6
0.7	5.43	2.17	0.40	0.42	4.62	2.13	1.7
0.8	6.06	2.72	0.45	0.47	6.26	2.30	1.8
0.9	6.69	3.33	0.50	0.52	8.21	2.46	1.9
1.0	7.32	4.00	0.55	0.57	10.49	2.62	2.0

Open Channel Flow Calculations

Swale #: 8

Side slope = 3
Bottom width = 1
Manning's coefficient = 0.035
Slope of channel = 0.0125

Depth (ft)	Wetted Perimeter (ft)	Area (ft^2)	Hydraulic Radius (ft)	Hydraulic Depth (ft)	Flowrate (cfs)	Velocity (ft/s)	F value
0.0	1.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.63	0.13	0.08	0.08	0.11	0.88	1.1
0.2	2.26	0.32	0.14	0.15	0.41	1.29	1.2
0.3	2.90	0.57	0.20	0.20	0.92	1.61	1.3
0.32	3.02	0.63	0.21	0.21	1.05	1.67	1.4
0.4	3.53	0.88	0.25	0.26	1.66	1.89	1.4
0.5	4.16	1.25	0.30	0.31	2.67	2.13	1.5
0.6	4.79	1.68	0.35	0.37	3.97	2.37	1.6
0.7	5.43	2.17	0.40	0.42	5.61	2.58	1.7
0.8	6.06	2.72	0.45	0.47	7.59	2.79	1.8
0.9	6.69	3.33	0.50	0.52	9.95	2.99	1.9
1.0	7.32	4.00	0.55	0.57	12.72	3.18	2.0

Open Channel Flow Calculations

Swale #: 9

Side slope = 3
Bottom width = 1
Manning's coefficient = 0.035
Slope of channel = 0.011

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	1.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.63	0.13	0.08	0.08	0.11	0.83	1.1
0.2	2.26	0.32	0.14	0.15	0.39	1.21	1.2
0.3	2.90	0.57	0.20	0.20	0.86	1.51	1.3
0.32	3.02	0.63	0.21	0.21	0.98	1.56	1.4
0.4	3.53	0.88	0.25	0.26	1.56	1.77	1.4
0.5	4.16	1.25	0.30	0.31	2.50	2.00	1.5
0.6	4.79	1.68	0.35	0.37	3.73	2.22	1.6
0.7	5.43	2.17	0.40	0.42	5.26	2.42	1.7
0.8	6.06	2.72	0.45	0.47	7.12	2.62	1.8
0.9	6.69	3.33	0.50	0.52	9.34	2.80	1.9
1.0	7.32	4.00	0.55	0.57	11.93	2.98	2.0

Open Channel Flow Calculations

Swale #: **10**

Side slope = 3
Bottom width = 1
Manning's coefficient = 0.035
Slope of channel = 0.011

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	1.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.63	0.13	0.08	0.08	0.11	0.83	1.1
0.2	2.26	0.32	0.14	0.15	0.39	1.21	1.2
0.3	2.90	0.57	0.20	0.20	0.86	1.51	1.3
0.32	3.02	0.63	0.21	0.21	0.98	1.56	1.4
0.4	3.53	0.88	0.25	0.26	1.56	1.77	1.4
0.5	4.16	1.25	0.30	0.31	2.50	2.00	1.5
0.6	4.79	1.68	0.35	0.37	3.73	2.22	1.6
0.7	5.43	2.17	0.40	0.42	5.26	2.42	1.7
0.8	6.06	2.72	0.45	0.47	7.12	2.62	1.8
0.9	6.69	3.33	0.50	0.52	9.34	2.80	1.9
1.0	7.32	4.00	0.55	0.57	11.93	2.98	2.0

Open Channel Flow Calculations

Swale #: **11**

Side slope =	3
Bottom width =	1
Manning's coefficient =	0.035
Slope of channel =	0.1476

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	1.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.63	0.13	0.08	0.08	0.39	3.03	1.1
0.2	2.26	0.32	0.14	0.15	1.42	4.44	1.2
0.3	2.90	0.57	0.20	0.20	3.15	5.53	1.3
0.32	3.02	0.63	0.21	0.21	3.59	5.73	1.4
0.4	3.53	0.88	0.25	0.26	5.70	6.48	1.4
0.5	4.16	1.25	0.30	0.31	9.17	7.33	1.5
0.6	4.79	1.68	0.35	0.37	13.66	8.13	1.6
0.7	5.43	2.17	0.40	0.42	19.26	8.88	1.7
0.8	6.06	2.72	0.45	0.47	26.08	9.59	1.8
0.9	6.69	3.33	0.50	0.52	34.20	10.27	1.9
1.0	7.32	4.00	0.55	0.57	43.71	10.93	2.0

United States Department of Agriculture

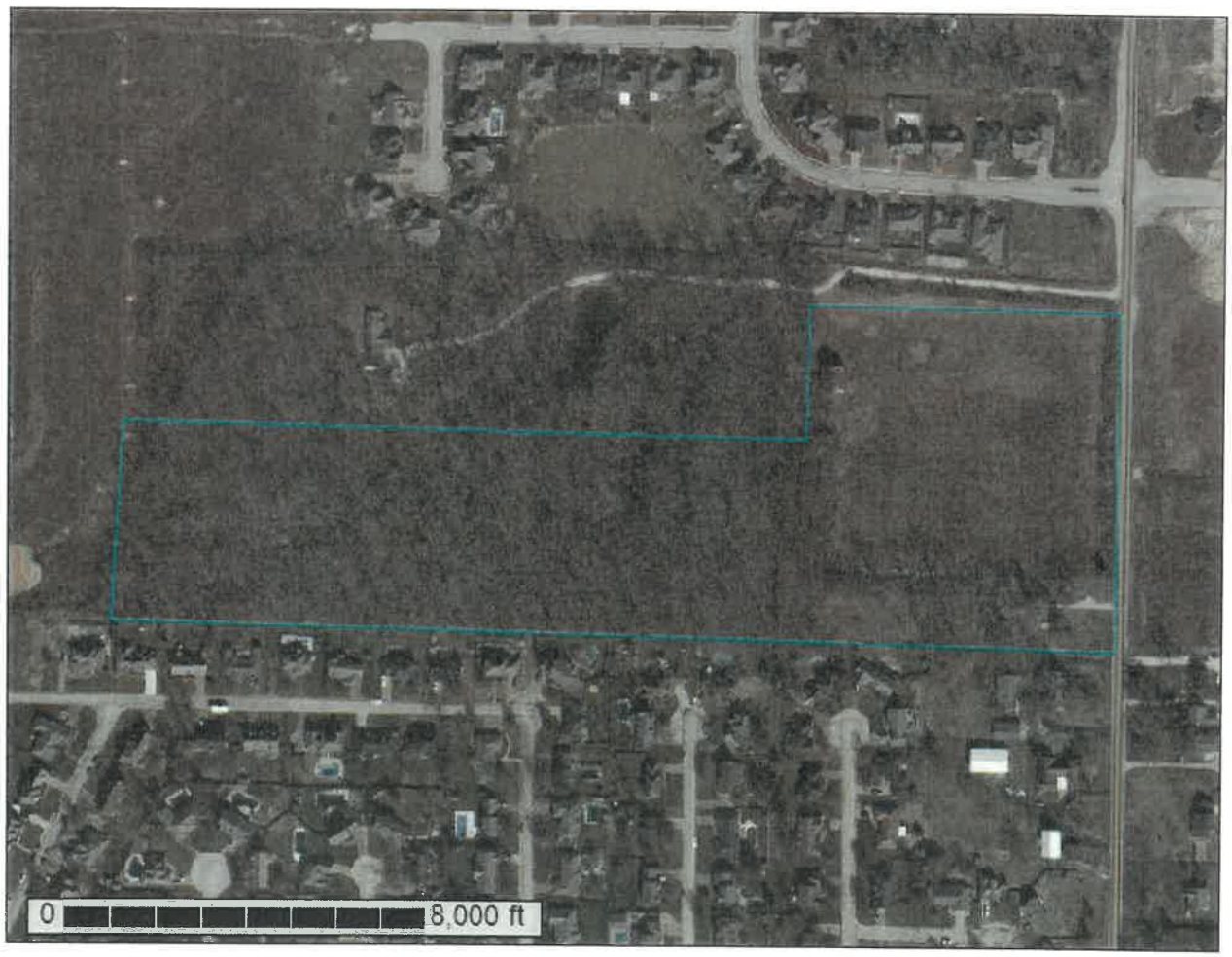
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Vanderburgh County, Indiana

Green River Meadows



October 22, 2014

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means

for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

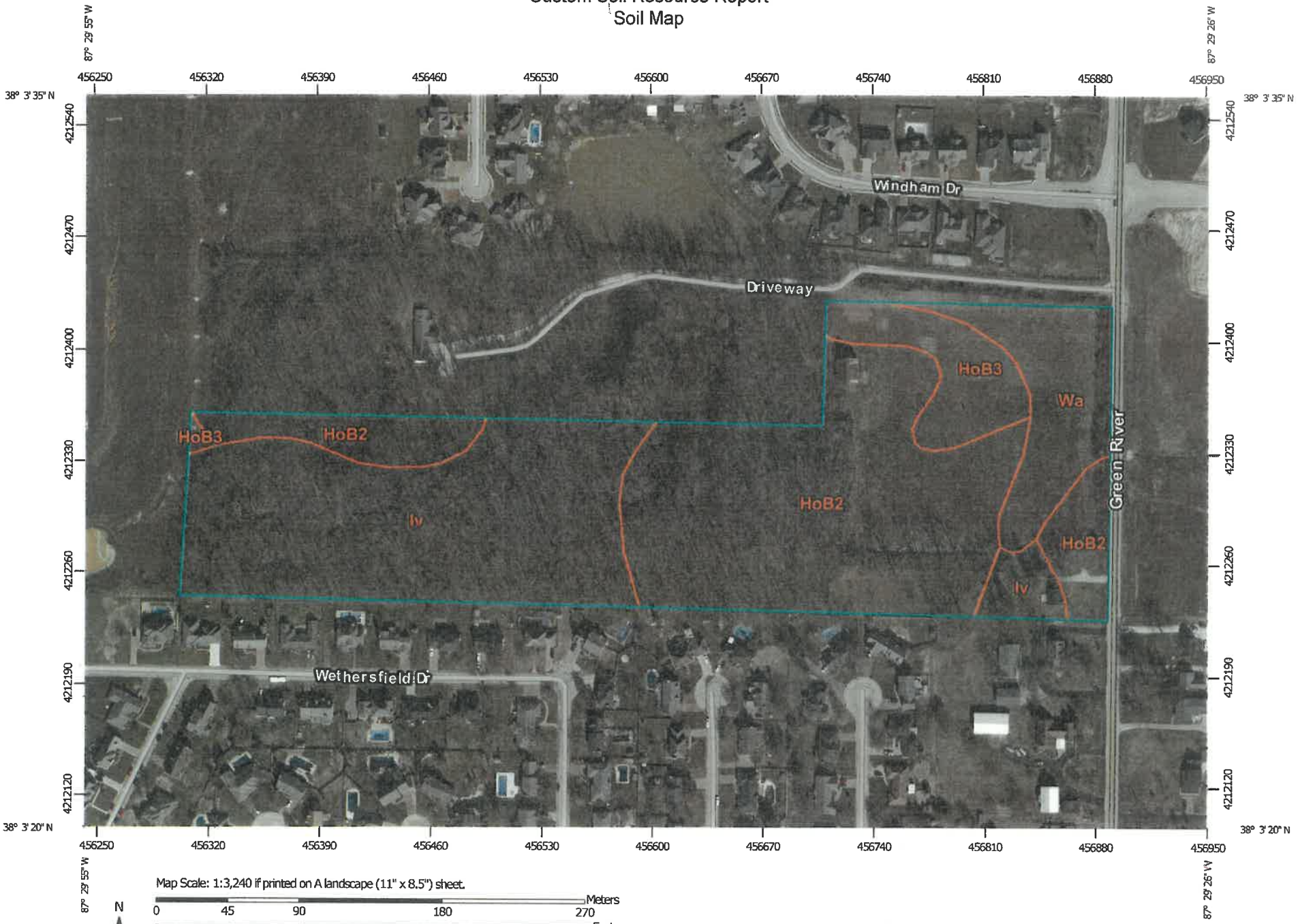
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



MAP LEGEND

Area of Interest (AOI)
- 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
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

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
Coordinate System: Web Mercator (EPSG:3857)

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: Vanderburgh County, Indiana
Survey Area Data: Version 14, Sep 15, 2014

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

Date(s) aerial images were photographed: Aug 27, 2011—Feb 12, 2012

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 Unit Legend

Vanderburgh County, Indiana (IN163)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
HoB2	Hosmer silt loam, 2 to 6 percent slopes, eroded	9.4	46.0%
HoB3	Hosmer silt loam, 2 to 6 percent slopes, severely eroded	1.5	7.3%
Iv	Iva silt loam	7.5	36.7%
Wa	Wakeland silt loam	2.1	10.1%
Totals for Area of Interest		20.5	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that

have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Vanderburgh County, Indiana

HoB2—Hosmer silt loam, 2 to 6 percent slopes, eroded

Map Unit Setting

National map unit symbol: 5gbr
Elevation: 340 to 1,000 feet
Mean annual precipitation: 40 to 46 inches
Mean annual air temperature: 52 to 57 degrees F
Frost-free period: 170 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Hosmer and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hosmer

Setting

Landform: Loess hills
Landform position (two-dimensional): Shoulder, summit
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loess

Typical profile

Ap - 0 to 8 inches: silt loam
Bt - 8 to 23 inches: silt loam
Btx - 23 to 50 inches: silt loam
2Btx - 50 to 80 inches: silt loam

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: 20 to 36 inches to fragipan
Natural drainage class: Moderately well drained
Runoff class: Medium
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 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: D
Other vegetative classification: Trees/Timber (Woody Vegetation)

HoB3—Hosmer silt loam, 2 to 6 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: 5gbs
Elevation: 340 to 700 feet
Mean annual precipitation: 40 to 46 inches
Mean annual air temperature: 52 to 57 degrees F
Frost-free period: 170 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition

Hosmer, severely eroded, and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hosmer, Severely Eroded

Setting

Landform: Loess hills
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loess

Typical profile

Ap - 0 to 8 inches: silt loam
Bt - 8 to 18 inches: silt loam
Btx - 18 to 50 inches: silt loam
2Btx - 50 to 80 inches: silt loam

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: 10 to 26 inches to fragipan
Natural drainage class: Moderately 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: About 12 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Other vegetative classification: Trees/Timber (Woody Vegetation)

Iv—Iva silt loam

Map Unit Setting

National map unit symbol: 5gc1
Elevation: 340 to 700 feet
Mean annual precipitation: 40 to 46 inches
Mean annual air temperature: 52 to 57 degrees F
Frost-free period: 170 to 210 days
Farmland classification: Prime farmland if drained

Map Unit Composition

Iva and similar soils: 94 percent
Minor components: 6 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Iva

Setting

Landform: Loess hills
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loess

Typical profile

Ap - 0 to 11 inches: silt loam
EB - 11 to 18 inches: silt loam
Bt - 18 to 49 inches: silty clay loam
C - 49 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 6 to 24 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 11.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D
Other vegetative classification: Trees/Timber (Woody Vegetation)

Minor Components

Evansville

Percent of map unit: 3 percent
Landform: Depressions
Other vegetative classification: Trees/Timber (Woody Vegetation)

Patton

Percent of map unit: 3 percent
Landform: Depressions
Other vegetative classification: Mixed/Transitional (Mixed Native Vegetation)

Wa—Wakeland silt loam

Map Unit Setting

National map unit symbol: 5gcp
Elevation: 340 to 500 feet
Mean annual precipitation: 40 to 46 inches
Mean annual air temperature: 52 to 57 degrees F
Frost-free period: 170 to 210 days
Farmland classification: Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Wakeland and similar soils: 97 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Wakeland

Setting

Landform: Flood plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty alluvium

Typical profile

Ap - 0 to 7 inches: silt loam
Cg1 - 7 to 29 inches: silt loam
Cg2 - 29 to 60 inches: stratified silt loam to loam to sandy loam to fine sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)

Depth to water table: About 6 to 24 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Available water storage in profile: Very high (about 12.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D
Other vegetative classification: Trees/Timber (Woody Vegetation)

Minor Components

Birds

Percent of map unit: 3 percent
Landform: Channels
Other vegetative classification: Trees/Timber (Woody Vegetation)

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf