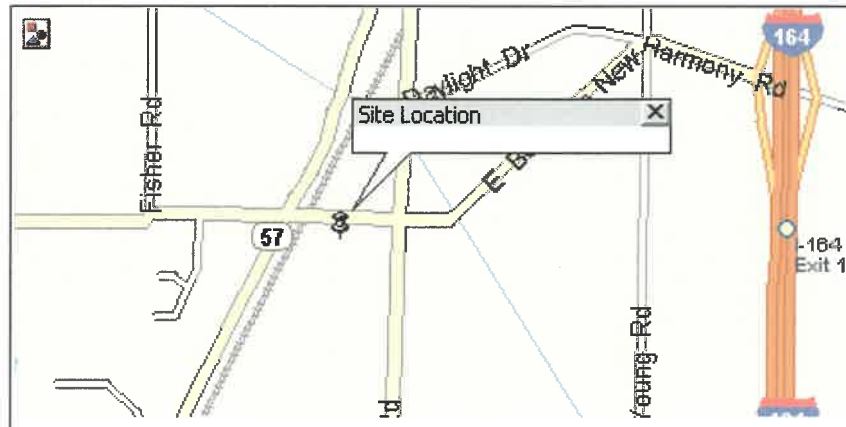


# **DAYLIGHT FARM SUPPLY**

## **DRAINAGE REPORT FOR Snyder Investments, LLC**

Site Location:  
4505 Boonville-New Harmony Road  
Evansville, IN

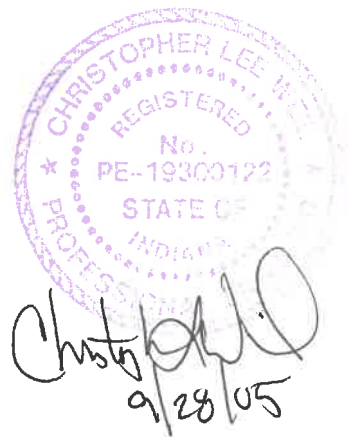


Prepared By:  
**Hinderliter Construction, LLC**  
3601 North Saint Joseph Ave  
Evansville, Indiana 47720

September 27, 2005

RECEIVED BY THE  
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SURVEYOR'S OFFICE

9/28/05 1:28 pm MJP



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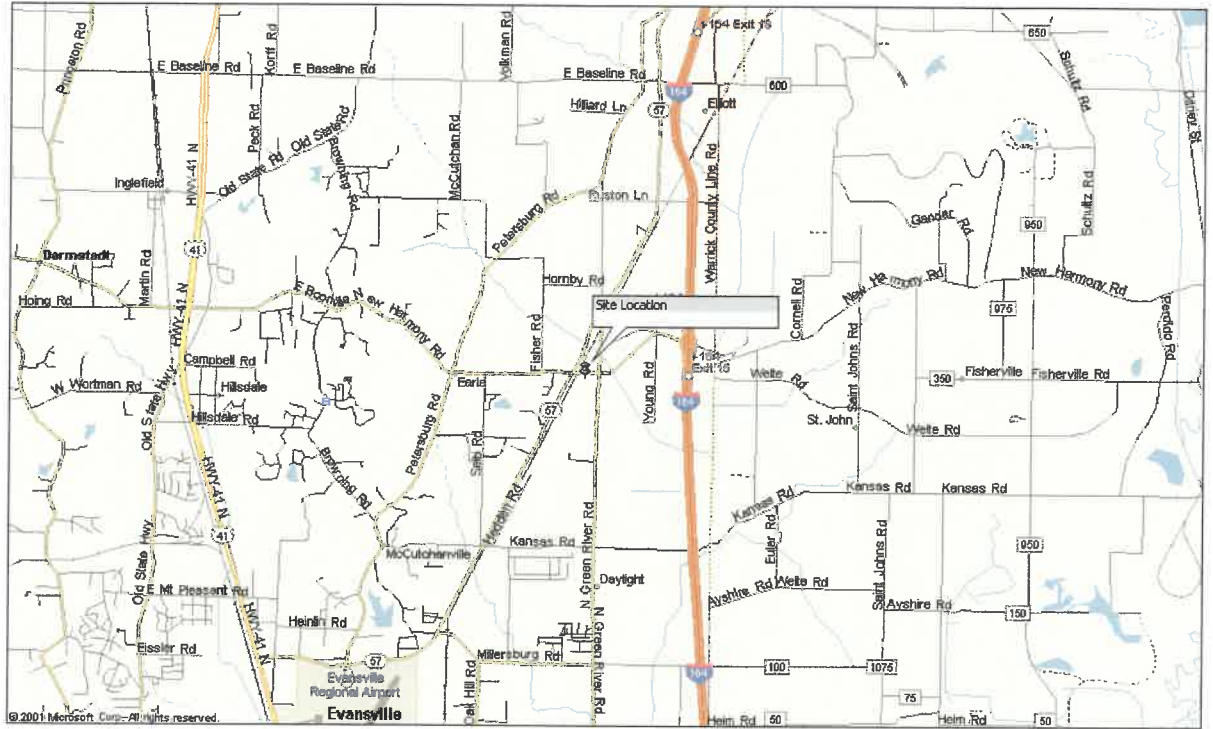
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Detention Basin .....14

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Site Map

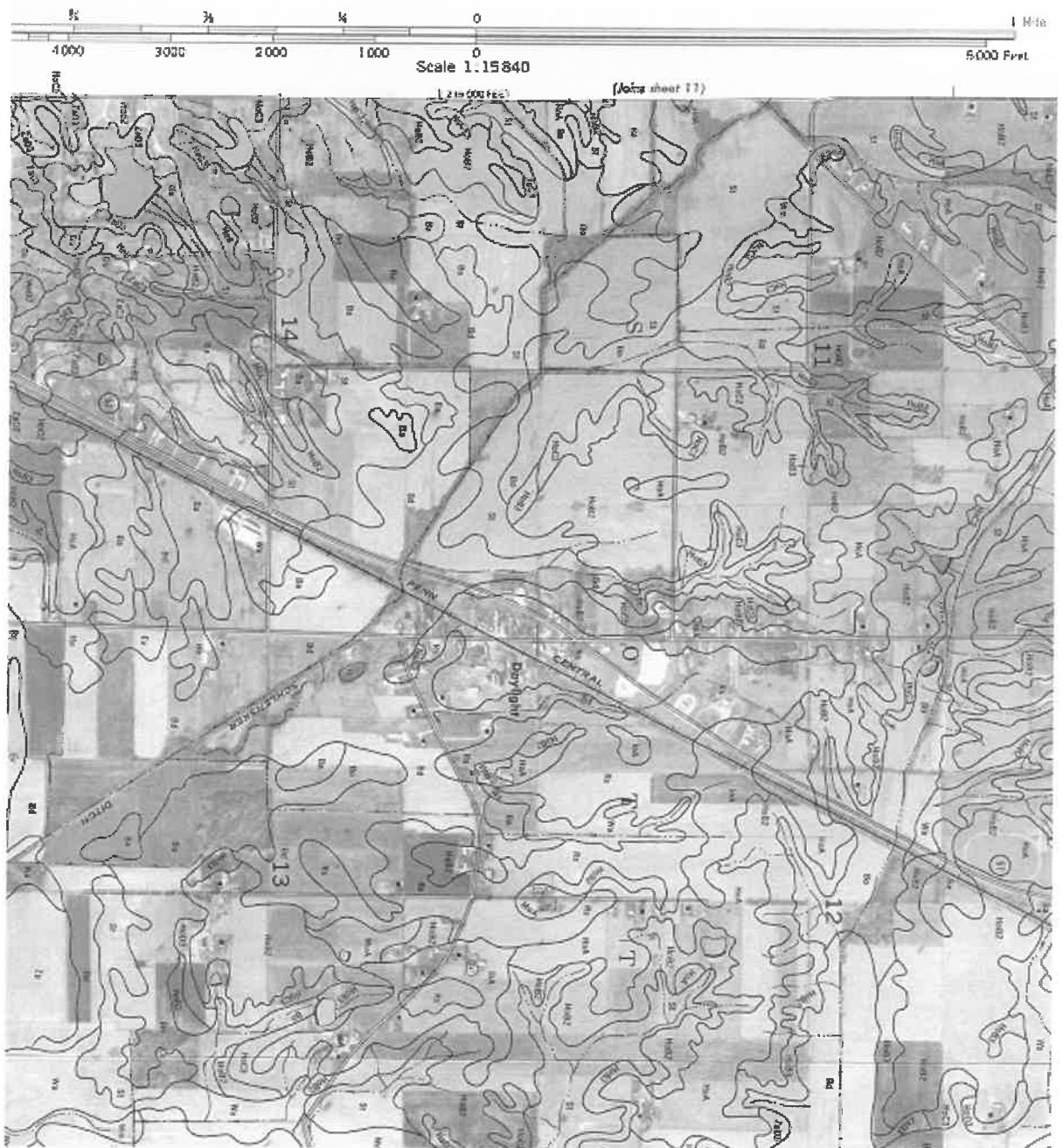
## Site Map



## Aerial Photograph



# Soils Map



## **Existing Site Conditions**

The site is located on the south side of Boonville New Harmony Road approximately 700' west of the intersection of Green River Road and Boonville New Harmony Road.

The existing 5.22 acre site is comprised of generally flat terrain bounded on the north side by a roadside ditch. This ditch drains easterly to the roadside ditch at Green River Road. The site is bounded on the west by swale that drains northerly to a roadside. This ditch drains easterly to the roadside ditch at Green River. The site is bounded on the south and east by a drainage ditch that empties into the detention lake for Daylight Industrial Park.

According to the *Soil Survey of Vanderburgh County Indiana*, the site's soil is comprised of Birds Silt Loam and Wakeland Silt Loam.

Existing contours are indicated on the drawing attached. It should be noted that there were no previous structures or stone parking areas on this site. The site's current use is agricultural.

## **Proposed Improvements**

**Basin #1**, with regard to *developed* conditions, has a total area of 153,754 SF. The proposed improvements within Basin #1-Post include:

- 30,000 SF of new structure
- 22,788 SF of new concrete pavement
- 8,000 SF of water surface (when Dry Basin is full at spillway elevation)

Runoff from the building, paved drives, and parking area, will be directed via surface flow and grass swales to the dry basin structure.

## **Drainage Calculations**

The Rational Method was utilized for the pre and post development drainage calculations. Calculations for pre-developed basins 1, 2, and 3, are attached. Each calculation sheet indicates the pre-developed runoff rate (in bold at the bottom of each respective page).

All pre-developed runoff calculations were performed with respect to a 10-year storm event frequency. Post-developed runoff calculations (for detention basin calculations) were performed with respect to a 25-year storm event frequency.

### **Pre-developed Basin Information (see attached Basin drawing):**

**Basin "1"** is comprised of 153,754 SF of area. The existing contours indicate a drainage pattern northeasterly to a swale along the south side of Boonville New Harmony Road. The grade of this basin is less than 1% and is vegetated. This area has no "concentrated" outfall but would deliver approximately 2.24 CFS, under a 10 year storm event, to the roadside ditch.

**Basin "2"** is comprised of 50,062 SF of area. The existing contours indicate a drainage pattern northeasterly to a swale. The grade of this basin is less than 1% and is vegetated. This area has no "concentrated" outfall but would deliver approximately .97 CFS, under a 10 year storm event, to the drainage ditch emptying to the existing detention basin.

**Basin "3"** is comprised of 23,749 of area. The existing contours indicate a drainage pattern southeasterly to a ditch along the south property line. The grade of this basin is less than 1% and is vegetated. This area has no "concentrated" outfall but would deliver approximately 0.42 CFS, under a 10 year storm event, to the ditch.

Storm water detention will be provided within the subject site for the entire proposed improved area. All improvements in pre-developed Basin #1 and a portion of pre-developed basin #2 (where the building extends into Basin #2 4,757 SF) will be provided by constructing a dry basin feature along the north line of the property and releasing at the northeast corner of the site. The proposed basin will have a storage capacity of 8,400 CF at an average depth of 2.1'. This is 15% over the required capacity of 6,960 CF.



UNDEVELOPED CALCULATIONS FLOW FOR A 10 YEAR STORM

**Job Name:** Synder, Basin #1

**Date:** 9/27/2005

153,754 Total SF      3.53 AC

Impervious surfaces (2-5%) C=0.94

Structures	0 Total	0 SF	0 Total SF	0.00 AC
Drives	0 Total	0 SF	0 Total SF	0.00 AC
Pavement	0 Width (ft)	0 L (ft)	0 Total SF	0.00 AC
Patios	0 Total	0 SF	0 Total SF	0.00 AC
Sidewalks	0 Width (ft)	0 L (ft)	0 Total SF	0.00 AC
Gravel, C=.75	0 Total	0 SF	0 Total SF	0.00 AC
			<b>0 TOTAL</b>	<b>0.00 AC</b>

Lake (C=1.0)	0 Total	0 SF	0 Total SF	0.00 AC
			<b>0 TOTAL</b>	<b>0.00 AC</b>

For cultivated fields:

0-2% slope	C=0.20	138,379 SF	138,379 Total SF	3.18 AC
2-5% slope	C=0.35	0 SF	0 Total SF	0.00 AC
5-10% slope	C=0.50	0 SF	0 Total SF	0.00 AC
10+% slope	C=0.65	0 SF	0 Total SF	0.00 AC
			<b>138,379 TOTAL</b>	<b>3.18 AC</b>

Turf Lawns:

0-2% slope	C=0.15	15,375 SF	15,375 Total SF	0.35 AC
2-5% slope	C=0.25	0 SF	0 Total SF	0.00 AC
5-10% slope	C=0.40	0 SF	0 Total SF	0.00 AC
			<b>15,375 TOTAL</b>	<b>0.35 AC</b>

For woodland areas:

0-2% slope	C=0.12	0 SF	0 Total SF	0.00 AC
2-5% slope	C=0.24	0 SF	0 Total SF	0.00 AC
5-10% slope	C=0.36	0 SF	0 Total SF	0.00 AC
10+% slope	C=0.48	0 SF	0 Total SF	0.00 AC
			<b>0 TOTAL</b>	<b>0.00 AC</b>

CK. 153,754 GT      3.53 AC

Wt'd C = 0.20  
Wt'd N = 0.22  
High Pt El 390.00 ft  
Inlet El 386.00 ft  
Length 720.00 ft  
Slope 0.0056  
tc 29.61 min

0 1	Is 5<tc<10?	i 10= 0.00 in/hr
0 1	Is 10<tc<15?	i 10= 0.00 in/hr
1 1	Is 15<tc<30?	i 10= 3.26 in/hr
1 0	Is 30<tc<60?	i 10= 0.00 in/hr

**Q10= 2.24 cfs**

**UNDEVELOPED CALCULATIONS FLOW FOR A 10 YEAR STORM**

**Job Name:** Synder, Basin #2

**Date:** 9/27/2005

50,062 Total SF 1.15 AC

Impervious surfaces (2-5%) C=0.94

Structures	0 Total	0 SF	0 Total SF	0.00 AC
Drives	0 Total	0 SF	0 Total SF	0.00 AC
Pavement	0 Width (ft)	0 L (ft)	0 Total SF	0.00 AC
Patios	0 Total	0 SF	0 Total SF	0.00 AC
Sidewalks	0 Width (ft)	0 L (ft)	0 Total SF	0.00 AC
Gravel, C=.75	0 Total	0 SF	0 Total SF	0.00 AC
			<b>0 TOTAL</b>	<b>0.00 AC</b>

Lake (C=1.0)	0 Total	0 SF	0 Total SF	0.00 AC
			<b>0 TOTAL</b>	<b>0.00 AC</b>

For cultivated fields:

0-2% slope	C=0.20	50,062 SF	50,062 Total SF	1.15 AC
2-5% slope	C=0.35	0 SF	0 Total SF	0.00 AC
5-10% slope	C=0.50	0 SF	0 Total SF	0.00 AC
10+% slope	C=0.65	0 SF	0 Total SF	0.00 AC
			<b>50,062 TOTAL</b>	<b>1.15 AC</b>

Turf Lawns:

0-2% slope	C=0.15	0 SF	0 Total SF	0.00 AC
2-5% slope	C=0.25	0 SF	0 Total SF	0.00 AC
5-10% slope	C=0.40	0 SF	0 Total SF	0.00 AC
			<b>0 TOTAL</b>	<b>0.00 AC</b>

For woodland areas:

0-2% slope	C=0.12	0 SF	0 Total SF	0.00 AC
2-5% slope	C=0.24	0 SF	0 Total SF	0.00 AC
5-10% slope	C=0.36	0 SF	0 Total SF	0.00 AC
10+% slope	C=0.48	0 SF	0 Total SF	0.00 AC
			<b>0 TOTAL</b>	<b>0.00 AC</b>

CK. 50,062 GT 1.15 AC

Wt'd C = 0.20  
Wt'd N = 0.20  
High Pt El 389.00 ft  
Inlet El 386.00 ft  
Length 360.00 ft  
Slope 0.0083  
tc 18.64 min

0 1	Is 5<tc<10?	i 10= 0.00 in/hr
0 1	Is 10<tc<15?	i 10= 0.00 in/hr
1 1	Is 15<tc<30?	i 10= 4.20 in/hr
1 0	Is 30<tc<60?	i 10= 0.00 in/hr

**Q10= 0.97 cfs**

# UNDEVELOPED CALCULATIONS FLOW FOR A 10 YEAR STORM

**Job Name:** Synder, Basin #3

**Date:** 9/27/2005

23,769 Total SF 0.55 AC

Impervious surfaces (2-5%) C=0.94

Structures	0 Total	0 SF	0 Total SF	0.00 AC
Drives	0 Total	0 SF	0 Total SF	0.00 AC
Pavement	0 Width (ft)	0 L (ft)	0 Total SF	0.00 AC
Patios	0 Total	0 SF	0 Total SF	0.00 AC
Sidewalks	0 Width (ft)	0 L (ft)	0 Total SF	0.00 AC
Gravel, C=.75	0 Total	0 SF	0 Total SF	0.00 AC
			<b>0 TOTAL</b>	<b>0.00 AC</b>

Lake (C=1.0)	0 Total	0 SF	0 Total SF	0.00 AC
			<b>0 TOTAL</b>	<b>0.00 AC</b>

For cultivated fields:

0-2% slope	C=0.20	23,769 SF	23,769 Total SF	0.55 AC
2-5% slope	C=0.35	0 SF	0 Total SF	0.00 AC
5-10% slope	C=0.50	0 SF	0 Total SF	0.00 AC
10+% slope	C=0.65	0 SF	0 Total SF	0.00 AC
			<b>23,769 TOTAL</b>	<b>0.55 AC</b>

Turf Lawns:

0-2% slope	C=0.15	0 SF	0 Total SF	0.00 AC
2-5% slope	C=0.25	0 SF	0 Total SF	0.00 AC
5-10% slope	C=0.40	0 SF	0 Total SF	0.00 AC
			<b>0 TOTAL</b>	<b>0.00 AC</b>

For woodland areas:

0-2% slope	C=0.12	0 SF	0 Total SF	0.00 AC
2-5% slope	C=0.24	0 SF	0 Total SF	0.00 AC
5-10% slope	C=0.36	0 SF	0 Total SF	0.00 AC
10+% slope	C=0.48	0 SF	0 Total SF	0.00 AC
			<b>0 TOTAL</b>	<b>0.00 AC</b>

CK. 23,769 GT 0.55 AC

Wt'd C = 0.20  
Wt'd N = 0.20  
High Pt EI 390.00 ft  
Inlet EI 386.00 ft  
Length 530.00 ft  
Slope 0.0075  
tc 22.85 min

0 1	Is 5<tc<10?	i 10= 0.00 in/hr
0 1	Is 10<tc<15?	i 10= 0.00 in/hr
1 1	Is 15<tc<30?	i 10= 3.84 in/hr
1 0	Is 30<tc<60?	i 10= 0.00 in/hr

**Q10= 0.42 cfs**

## DEVELOPED CALCULATIONS FLOW FOR A 25 YEAR STORM

Job Name/Basin #: Snyder, Basin #1

Date: 9/27/2005

153,754 Total SF      3.53 AC

Exist. Impervious surfaces (2-5%) C=0.94

Structures	0 Total	0 SF	0 Total SF	0.00 AC
Drives	0 Total	0 SF	0 Total SF	0.00 AC
Pavement	0 Width (ft)	0 L (ft)	0 Total SF	0.00 AC
			<b>0 TOTAL</b>	<b>0.00 AC</b>

Lake (C=1.0)	0 Total	0 SF	0 Total SF	0 AC
			<b>0 TOTAL</b>	<b>0.00 AC</b>

Proposed Impervious surfaces (2-5%) C=0.94

Structures	1 Total	30,000 SF	30,000 Total SF	0.69 AC
Future Impervious	0 Total	0 SF	0 Total SF	0.00 AC
Pavement	1 Width (ft)	22,788 L (ft)	22,788 Total SF	0.52 AC
Patios	0 Total	0 SF	0 Total SF	0.00 AC
Sidewalks	0 Width (ft)	0 L (ft)	0 Total SF	0.00 AC
			<b>52,788 TOTAL</b>	<b>1.21 AC</b>

Lake (C=1.0)	1 Total	8000 SF	8000 Total SF	0.18 AC
			<b>8,000 TOTAL</b>	<b>0.18 AC</b>

Exist cultivated fields:

0-2% slope	C=0.20	0 SF	0 Total SF	0.00 AC
2-5% slope	C=0.35	0 SF	0 Total SF	0.00 AC
5-10% slope	C=0.50	0 SF	0 Total SF	0.00 AC
10+% slope	C=0.65	0 SF	0 Total SF	0.00 AC
			<b>0 TOTAL</b>	<b>0.00 AC</b>

Turf Lawns

0-2% slope	C=0.15	92,966 SF	92,966 Total SF	2.13 AC
2-5% slope	C=0.25	0 SF	0 Total SF	0.00 AC
5-10% slope	C=0.40	0 SF	0 Total SF	0.00 AC
10+% slope	C=0.55	0 SF	0 Total SF	0.00 AC
			<b>92,966 TOTAL</b>	<b>2.13 AC</b>

For woodland areas:

0-2% slope	C=0.12	0 SF	0 Total SF	0.00 AC
2-5% slope	C=0.24	0 SF	0 Total SF	0.00 AC
5-10% slope	C=0.36	0 SF	0 Total SF	0.00 AC
10+% slope	C=0.48	0 SF	0 Total SF	0.00 AC
			<b>0 TOTAL</b>	<b>0.00 AC</b>

Ck    153,754 **GT**      3.53 AC

Wt'd C =      0.47  
Wt'd N =      0.25  
High Pt El    390.00 ft  
Inlet El      383.20 ft  
Length       830.00 ft  
Slope        0.0082  
tc            30.66 min

0 1	Is 5<tc<10?	i 25=	0.00 in/hr
0 1	Is 10<tc<15?	i 25=	0.00 in/hr
0 1	Is 15<tc<30?	i 25=	0.00 in/hr
1 1	Is 30<tc<60?	i 25=	3.61 in/hr

**Q25= 5.93 cfs**

## Detention Basin

Pre-developed runoff rate (from 3.53 AC to the NE site corner) = 2.24 CFS

Post-developed runoff rate (from 3.53 AC to the NE site corner) = 5.93 CFS

The controlled post developed release rate will be at the pre-developed rate of 2.24 CFS. This will be accomplished through a 12" diameter pipe with 7.5". The orifice calculation is below:

### Orifice Calculation For Outlet Structure, Snyder Investments

#### ORIFICE CALCULATIONS

$$Q = Ca(2gh)^{.5}$$

Use 0.6 for "C"

h=Head on CL of orifice

Q10=	2.24	cfs
C=	0.6	
g=	32.2	ft/sec <sup>2</sup>
h=	2.3	ft
a=	0.30675	sf
orifice radius =	0.31	ft
Diameter =	7.5	in

The outfall "structure" will consist of a rip-rap terrace to decrease outfall water velocity to protect against erosion.

**Vanderburgh County Drainage Board  
Form 800**

**Computation Sheet for Detention Storage Using the Rational Method**

**Project:** Snyder

**Date:** 9/27/2005

Detention Facility Design Return Period

25 years

Release Rate Return Period

10 years

Watershed Area

3.53 acres

Undeveloped Time of Concentration

29.6 minutes

Undeveloped Rainfall Intensity (iu)

3.26 inches/hour

Weighted Undeveloped Runoff Coefficient (Cu)

0.20

Undeveloped Runoff Rate (O=Cu x iu x Au)

2.24 cfs

Developed Runoff Coefficient (Cd)

0.47

Storm Duration	Rainfall Intensity	Inflow Rate	Outflow Rate	Storage Rate	Required Storage
td	id	I(td) Cd x id x Ad	O Cu x iu x Au	(I x td) - O	[I(td)-O]x[td/12]
min	inches/hr	cfs	cfs	cfs	acre-ft
5	7.208	11.96	2.24	9.72	0.0675
10	5.925	9.83	2.24	7.59	0.1054
15	5.033	8.35	2.24	6.11	0.1273
20	4.571	7.58	2.24	5.34	0.1484
25	4.108	6.82	2.24	4.58	0.1589
30	3.646	6.05	2.24	3.81	0.1587
40	3.123	5.18	2.24	2.94	0.1634
50	2.601	4.32	2.24	2.08	0.1441
60	2.078	3.45	2.24	1.21	0.1006
90	1.578	2.62	2.24	0.38	0.0473

Req'd Storage = 0.1589 x 43,560 sf/ac= 6,922 cubic feet

Proposed Storage Lake Area = 8,000.00 SF

Resulting Required Storage Depth = 0.87 Ft