HUNTER CHASE ESTATES

FINAL DRAINAGE PLAN

APPROVED JUNE 4, 2019

VANDERBURGH COUNTY DRAINAGE BOARD

Jeff Hatfield-President

Ben Shoulders-Vice President

Cheryl Musgrave-Member

Hunters Chase-Final Drainage Plan

Final Drainage plan for the condo parcel was never approved. A revised final drainage plan criteria signed by the Vanderburgh County Drainage Board was spelled out in a letter to the developer dated November 13, 2018. Those sections that required to be addressed are being addressed in this revised drainage plan review document. Design of swales submitted 1/14/2019, however this did not cover the entire parcel. A new submittal was provided on 2/1/2019 Additional information submitted 2/21/2019, 3/12/2019, 3/22/2019, 4/9/2019 and 5/31/2019 emails 2/25/2019, 5/15/2019, 5/29/2019 and 5/30/2019. The plan that is requested to be approved consists of the submitted document and revisions and emails on the respective submitted dates along with the following drawings.

Drawings

- Drawing 1 Developed Basins-Submitted April 9, 2019
- C-101-Submitted May 31, 2019

Recorded Legal Documents received by email on May 29, 2019

- *Fifty-Seventh Supplemental Declaration for Hunter Chase Estates Adding Phase 58*

Legal Documents submitted by email on May 15, 2019 that will require executing by the Developer and recording-with copies of the recorded documents to be provided and made part of the approved plan

- *Temporary Easement for ROW, Drainage Structures & Public Utilities*
- *Drainage Easement*
- *Lake Maintenance & Storm Drainage Easement*

Legal Documents submitted by email on May 15, 2019 that will require signature by the Developer and the Board and recording-with copies of the recorded document to be provided and made part of the approved plan

- *Indemnity Agreement*

RECORDER
VANDERBURGH COUNTY
DEBBIE STUCKI
2019R00011803
06/17/2019 09:06 AM
RECORDING FEES: 25.00
PAGES: 6

INDEMNITY AGREEMENT

THIS AGREEMENT is made and entered into as of the 4th day of June, 2019, by and between **Dauby Properties and Investments, LLC**, an Indiana limited liability company whose mailing address is 7432 Brycen Lane, Evansville, Indiana 47725 (hereinafter "DPI") and **The Board of Commissioners of Vanderburgh County, Indiana**, whose mailing address is Civic Center Complex, Room 305, One Martin Luther King, Jr. Blvd., Evansville, Indiana 47708 (hereinafter "County").

WHEREAS, DPI developed certain real estate in Vanderburgh County, Indiana pursuant to that certain Declaration of Horizontal Property Regime for Hunter Chase Estates Condominium, dated May 9, 2008 and recorded June 2, 2008 as Instrument Number 2008R00012133 in the Office of the Recorder of Vanderburgh County, Indiana, as amended and supplemented (the "Development");

WHEREAS, DPI will be performing certain work within the Development ("Drainage Plan Work") to implement a drainage plan according to that certain final drainage plan approved by the Vanderburgh County Drainage Board on June 4, 2019, all as set forth in the Drainage Plan attached and incorporated herein as Exhibit "A" ("Final Plan");

WHEREAS, as part of the Final Plan DPI requested from the Vanderburgh County Drainage Board ("Drainage Board), and was granted, a variance as to certain swales located in the Development, namely Swale #5 and Swale #6 depicted in the Drainage Plan (collectively "Swales"), which Swales do not conform to Section 13.04.180 of the Vanderburgh County Code ("Code");

WHEREAS, County requires that DPI indemnify County with regard to damages suffered by the County from personal injuries arising from the Swales not conforming to the Code.

NOW THEREFORE, in consideration of the premises, the mutual promises and covenants herein contained, and other good and valuable consideration, the receipt and adequacy of which are hereby acknowledged by both parties hereto, the parties agree as follows:

1. **INDEMNITY**. Developer agrees to indemnify, defend, and save County harmless with respect to all liability, claims, demands, lawsuits, actions, penalties, costs and attorney's fees for personal injury to or death of any person arising from the Swales not conforming to Section 13.04.180 of the Code.

2. **NOTICE OF CLAIMS**. County shall promptly notify DPI of the assertion, filing or service of any claim, demand, lawsuit, action or notice of any claims or other matter that is or may be covered by the indemnification provisions of this Agreement. In the event that any notice is required to be made to DPI under this Agreement , said notice shall be in writing and sent by certified mail addressed as follows:

If to DPI:
Dauby Properties and Investments, LLC
Attn: Ronald L. Dauby, Manager
4732 Brycen Lane
Evansville, Indiana 47725

Copy to:
Kahn, Dees, Donovan & Kahn, LLP
Attn: Shannon S. Frank, Esq.
501 Main St., Suite 305
P.O. Box 3646
Evansville, Indiana 47735

3. **INTERPRETATION**. This Agreement shall be governed by and construed in accordance with

Indiana law, notwithstanding the choice of law rules thereof. This instrument contains the entire agreement between the parties on the subject of the indemnification of County by DPI. This Agreement shall inure to the benefit of and be binding upon the parties and their respective heirs, successors and assigns. All headings set forth herein are included for the convenience of reference only and shall not affect the interpretation hereof, nor shall any weight or value be given to the relative position of any part or provision hereof in relation to any other provision in determining such construction. If any provision of this Agreement is contrary to, prohibited by, or deemed invalid under applicable laws or regulations of any jurisdiction in which it is sought to be enforced, then such provision shall be deemed inapplicable and deemed omitted, but shall not invalidate the remaining provisions hereof. This Agreement may be executed simultaneously in several counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument. The language in all parts of this Agreement shall in all cases be construed as a whole according to its fair meaning, strictly neither for or against any party, and without implying a presumption that the terms hereof shall be more strictly construed against one (1) party by reason of any rule of construction to the effect that a document is to be construed more strictly against the party who personally or through such party's agent prepared the same. The recitals are specifically incorporated into this Agreement as the statements and representations of the undersigned. THIS PROVISION, AND EACH AND EVERY OTHER PROVISION OF THIS AGREEMENT MAY NOT UNDER ANY CIRCUMSTANCE BE MODIFIED, CHANGED, AMENDED OR PROVISIONS HEREUNDER WAIVED VERBALLY, BUT MAY ONLY BE MODIFIED, CHANGED, AMENDED OR PROVISIONS HEREUNDER WAIVED BY AN AGREEMENT IN WRITING EXECUTED BY ALL PARTIES HERETO.

IN WITNESS WHEREOF, the parties have executed this Agreement as of the day and year first above written.

DAUBY PROPERTIES AND INVESTMENTS, LLC

By: _____
Ronald L. Dauby, Manager

BOARD OF COMMISSIONERS OF VANDERBURGH COUNTY, INDIANA

By: _____
Ben Shoulders, President

By: _____
Jeff Hatfield, Vice-President

By: _____
Cheryl Musgrave, Member

STATE OF INDIANA)
) **SS:**
COUNTY OF VANDERBURGH)

BEFORE ME, a Notary Public in and for said County and State, personally appeared **Ronald Dauby**, Manager of **Dauby Properties & Investments, LLC**, the Company which executed the foregoing instrument, who acknowledged and affirmed that he did sign said instrument as such Manager for and on behalf of said Company and by authority granted in its Articles of Organization and by its governing body, that the same is his free act and deed as said Member and the free and corporate act and deed of said Company.

WITNESS my hand and Notarial Seal this 4th day of June, 2019.

My Commission Expires:
09-14-21
My County of Residence is:
Gibson County, Indiana

Signature of Notary Public
Karen S. Creek
Printed Name of Notary

KAREN S. CREEK
Resident of Gibson County, IN
Commission Expires: September 14, 2021
Commission # 647494

STATE OF INDIANA)
) **SS:**
COUNTY OF VANDERBURGH)

BEFORE ME, a Notary Public in and for said County and State, personally appeared **Ben Shoulders,** known to me to be the President of the Board of Commissions of Vanderburgh County, Indiana, who acknowledged and affirmed that he did sign the foregoing instrument as such officer for and on behalf of the Board of Commissioners and by authority granted to him, that the same is his free act and deed and the free act and deed of the Board of Commissioners

WITNESS my hand and Notarial Seal this 4th day of June, 2019.

My Commission Expires:
10/30/21
My County of Residence is:
Vanderburgh County, Indiana

Signature of Notary Public
Kristin Nicole Comer
Printed Name of Notary

KRISTIN NICOLE COMER
Notary Public, State of Indiana
Vanderburgh County
Commission # 648733
My Commission Expires
October 30, 2021

STATE OF INDIANA)
) **SS:**
COUNTY OF VANDERBURGH)

BEFORE ME, a Notary Public in and for said County and State, personally appeared **Jeff Hatfield,** known to me to be a Member of the Board of Commissions of Vanderburgh County, Indiana, who acknowledged and affirmed that he did sign the foregoing instrument as such member for and on behalf of the Board of Commissioners and by authority granted to him, that the same is his free act and deed and the free act and deed of the Board of Commissioners

WITNESS my hand and Notarial Seal this 4th day of June, 2019.

My Commission Expires:
10/30/21
My County of Residence is:
Vanderburgh County, Indiana

Signature of Notary Public
Kristin Nicole
Printed Name of Notary

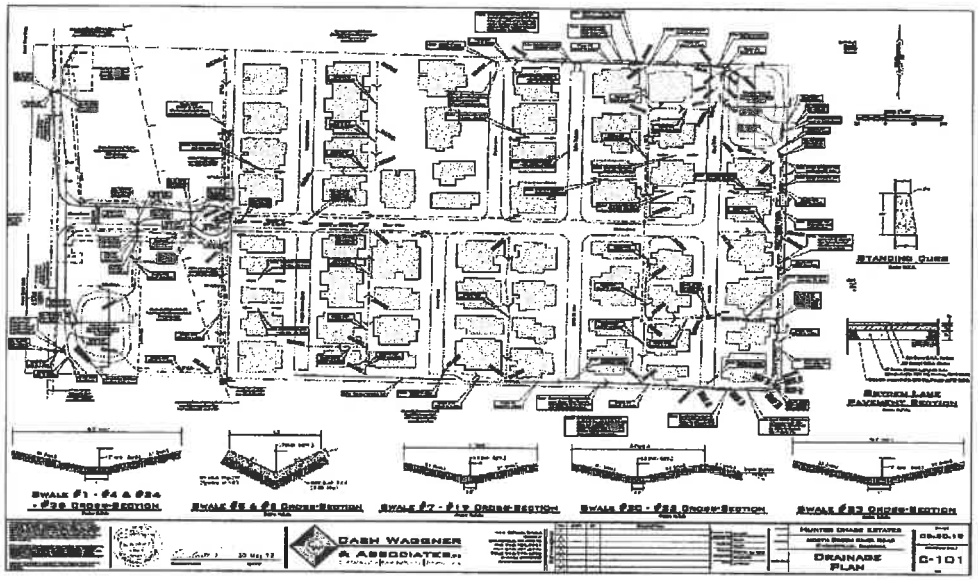
KRISTIN NICOLE COMER
Notary Public, State of Indiana
Vanderburgh County
Commission # 648733
My Commission Expires
October 30, 2021

THIS INSTRUMENT was prepared by Kahn, Dees, Donovan & Kahn, LLP, Shannon S. Frank, Attorney at Law, 501 Main Street, Suite 305, P.O. Box 3646, Evansville, Indiana 47735-3646, at the specific request of one of the parties hereto, based solely on information supplied by one or more of the parties, and without a complete examination of survey, title or abstract. The drafter assumes no liability for any errors, inaccuracy, or omissions in this instrument resulting from the information provided, the parties and their successors and assigns hereto signifying their assent to this disclaimer by the execution or the acceptance of this instrument. [KDDK:434104.3

I affirm, under the penalties for perjury, that I have taken reasonable care to redact each Social Security number in this document, unless required by law. *Shannon S. Frank*

RETURN TO: Shannon S. Frank, Esq., P.O. Box 3646, Evansville, Indiana 47735-3646.

EXHIBIT "A"



RECORDER
VANDERBURGH COUNTY
DEBBIE STUCKI
CENTER QUIT
2019R00011021
06/06/2019 10:35 AM
RECORDING FEES: 25.00
PAGES: 4

LAKE MAINTENANCE AND STORM DRAINAGE EASEMENT

Cross reference: 2007R00034128

THIS INDENTURE WITNESSETH, that Dauby Properties and Investments, LLC of Vanderburgh County, Indiana (Grantor) conveys and warrants to VANDERBURGH COUNTY, INDIANA (Grantee) for and in consideration of the sum of Ten Dollars ($10.00) and other good and valuable consideration, the receipt which is hereby acknowledged, a Lake Maintenance and Storm Drainage Easement across, under and upon certain real estate situated in the Vanderburgh County, Indiana, which is described in the legal description attached hereto and which is shown on the attached Exhibit "A" (the "Easement Real Estate").

This Lake Maintenance and Storm Drainage Easement conveys to the Grantee, their respective employees, agents, contractors, subcontractors and assigns, the right of ingress and egress across the described easement area for the purpose of constructing, inspecting, maintaining, altering, repairing and replacing drainage facilities. This, however, does not obligate Vanderburgh County, in any way to construct, maintain, alter, repair or replace drainage facilities. This Lake Maintenance and Storm Drainage Easement also conveys the right to trim, cut, clear and remove trees, limbs, branches and underbrush from the easement area which may interfere with the rights granted herein. Any ground disturbed by the Grantee will be backfilled and graded to its original elevation and seeded by the Grantee.

Subject to the rights herein granted to the Grantee, the Grantor reserves the right to use and enjoy the Easement Real Estate, but no buildings, fences, berms or other obstructions shall be located or maintained over, on or within the Lake Maintenance and Drainage Easement without the approval of the Vanderburgh County Drainage Board.

IN WITNESS WHEREOF, Dauby Properties and Investments, LLC has caused this Drainage Easement to be executed this 22 day of May, 2019.

DAUBY PROPERTIES AND INVESTMENTS, LLC

By: Ronald Lee Dauby

Ronald L. Dauby, Manager

STATE OF INDIANA)
) SS:
COUNTY OF VANDERBURGH)

Before me, a Notary Public in and for said County and State, personally appeared the within named Ronald Dauby of Dauby Properties and Investments, LLC who acknowledged the execution of the foregoing easement to be his voluntary act and deed.

DULY ENTERED FOR TAXATION SUBJECT
TO FINAL ACCEPTANCE FOR TRANSFER

Jun 06 2019

Brian Gritt TR

AUDITOR

Sales Disclosure NOT Required
Vanderburgh County Assessor
06 06 2019 - KR

WITNESS, my hand and notarial seal this 22 day of May, 2019.

Signature of Notary Public

Karen S. Creek
Printed Name of Notary Public

Gibson
County of Residence of Notary

09-14-21
My Commission Expires:

KAREN S. CREEK
Resident of Gibson County, IN
Commission Expires: September 14, 202[illegible]
Commission # 647494

I affirm, under penalty of perjury, that I have taken reasonable care to redact each Social Security Number in this document, unless required by law. Signed by Scott D. Buedel

This instrument prepared by: Cash Waggner & Associates, PC
414 Citadel Circle, Suite B
Evansville, IN 47715

Exhibit "A"

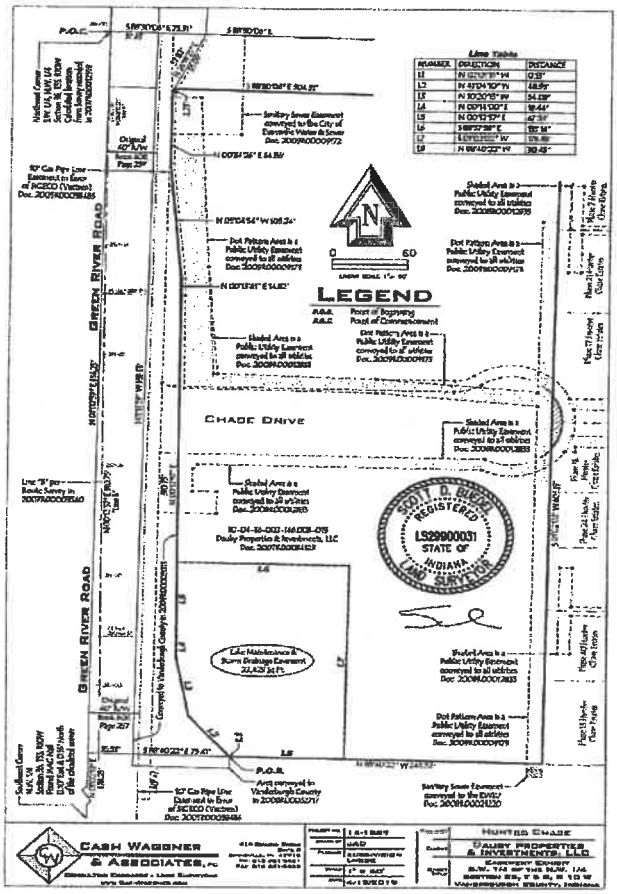
Lake Maintenance and Storm Drainage Easement

Part of the Southwest Quarter of the Northwest Quarter of Section 36, Township 5 South, Range 10 West in Center Township, Vanderburgh County, Indiana and being more particularly described as follows:

Commencing at the Northwest Corner of the Southwest Quarter of the Northwest Quarter of said Section 36; thence along the north line of said Quarter Quarter Section, South 88 degrees 30 minutes 06 seconds East 37.63 feet to the west side of a tract of land conveyed to the Board of Commissioners of Vanderburgh County, Indiana in Document 2009R00005013 in the Office of the Recorder of Vanderburgh County, Indiana; thence along the west side of said tract of land conveyed to Vanderburgh County, South 01 degree 13 minutes 59 seconds West 656.13 feet to a point on the south line of a tract of land conveyed to Dauby Properties and Investments, LLC in Document 2007R00034128 in the Office of said Recorder; thence along the south line of said tract of land conveyed to Dauby, South 88 degrees 40 minutes 22 seconds East 75.41 feet to the east boundary of said tract of land conveyed to the Board of Commissioners of Vanderburgh County, Indiana in Document 2009R00005013 and being the point of beginning; thence along said east boundary the following five (5) calls:

North 02 Degrees 01 Minute 31 Seconds West 0.13 feet; thence
North 41 Degrees 04 Minutes 10 Seconds West 48.93 feet; thence
North 10 Degrees 20 Minutes 13 Seconds West 54.08 feet; thence
North 00 Degrees 14 Minutes 00 Seconds East 19.44 feet; thence
North 00 Degrees 12 Minutes 37 Seconds East 67.53 feet; thence leaving said boundary, South 88 Degrees 57 Minutes 58 Seconds East 135.16 feet; thence South 01 Degree 02 Minutes 02 Seconds West 176.88 feet to a point on the south line of said tract of land conveyed to Dauby Properties and Investments, LLC in Document 2007R00034128; thence along said south line, North 88 Degrees 40 Minutes 22 Seconds West 90.45 feet to the point of beginning and containing a gross area of 22,429 square feet, more or less.

Subject to all easements and rights-of-ways of record.


Line Table
LEGEND
Chase Drive
Green River Road
Cash Wagoner & Associates, PC
Hunters Chase
Daley Properties & Investments, LLC

RECORDER
VANDERBURGH COUNTY
DEBBIE STUCKI
CERTIFIED COPY
06/06/2019 10:33 AM
RECORDING FEES: 25.00
PAGES: 5

DRAINAGE EASEMENT

Cross reference: 2007R00034128

THIS INDENTURE WITNESSETH, that Dauby Properties and Investments, LLC of Vanderburgh County, Indiana (Grantor) conveys and warrants to VANDERBURGH COUNTY, INDIANA (Grantee) for and in consideration of the sum of Ten Dollars ($10.00) and other good and valuable consideration, the receipt which is hereby acknowledged, a variable width Drainage Easement, across, under and upon certain real estate situated in the Vanderburgh County, Indiana, which is described in the legal descriptions attached hereto and which are shown on the attached Exhibit "A" (the "Easement Real Estate").

This Drainage Easement conveys to the Grantee, their respective employees, agents, contractors, subcontractors and assigns, the right of ingress and egress across the described easement area for the purpose of constructing, inspecting, maintaining, altering, repairing and replacing drainage facilities. This, however, does not obligate Vanderburgh County, in any way to construct, maintain, alter, repair or replace drainage facilities. This Drainage Easement also conveys the right to trim, cut, clear and remove trees, limbs, branches and underbrush from the easement area which may interfere with the rights granted herein. Any ground disturbed by the Grantee will be backfilled and graded to its original elevation and seeded by the Grantee.

Subject to the rights herein granted to the Grantee, the Grantor reserves the right to use and enjoy the Easement Real Estate, but no buildings, fences, berms or other obstructions shall be located or maintained over, on or within the Drainage Easement without the approval of the Vanderburgh County Drainage Board.

[SIGNATURE PAGE TO FOLLOW]

DULY ENTERED FOR TAXATION SUBJECT
TO FINAL ACCEPTANCE FOR TRANSFER

Jun 06 2019

Brian Greith TR

AUDITOR

Sales Disclosure NOT Required
Vanderburgh County Assessor
06 06 2019 - KR

IN WITNESS WHEREOF, Dauby Properties and Investments, LLC has hereunto caused this Easement to be executed this 22 day of May, 2019.

DAUBY PROPERTIES AND INVESTMENTS, LLC

By: Ronald Lee Dauby
Ronald L. Dauby, Manager

STATE OF INDIANA)
) SS:
COUNTY OF VANDERBURGH)

Before me, a Notary Public in and for said County and State, personally appeared the within named Ronald L. Dauby of Dauby Properties and Investments, LLC who acknowledged the execution of the foregoing easement to be his voluntary act and deed.

WITNESS, my hand and notarial seal this 22 day of May, 2019.

Signature of Notary Public

Karen S. Creek
Printed Name of Notary Public

Gibson
County of Residence of Notary

09-14-21
My Commission Expires:

KAREN S. CREEK
Resident of Gibson County, IN
Commission Expires: September 14, 2021
Commission # 647494

I affirm, under penalty of perjury, that I have taken reasonable care to redact each Social Security Number in this document, unless required by law. Signed by Scott D. Buedel

This instrument prepared by: Cash Waggner & Associates, PC
414 Citadel Circle, Suite B
Evansville, IN 47715

Exhibit "A"

Drainage Easement

Drainage Easement #1
Part of the Southwest Quarter of the Northwest Quarter of Section 36, Township 5 South, Range 10 West in Center Township, Vanderburgh County, Indiana and being more particularly described as follows:

Commencing at the Northwest Corner of the Southwest Quarter of the Northwest Quarter of said Section 36; thence along the north line of said Quarter Quarter Section, South 88 degrees 30 minutes 06 seconds East 356.29 feet; thence South 01 degree 02 minutes 02 seconds West 50.00 feet to the point of beginning; thence continue South 01 degree 02 minutes 02 seconds West 111.25 feet; thence North 88 degrees 57 Minutes 58 Seconds West 8.00 feet; thence South 01 Degree 02 Minutes 02 Seconds West 149.67 feet to the beginning of a curve to the left having a central angle of 16 Degrees 22 Minutes 57 Seconds, a radius of 40.00 feet and a chord dimension of North 60 Degrees 17 Minutes 15 Seconds West 11.40 feet; thence along the arc of said curve 11.44 feet; thence North 01 Degree 02 Minutes 02 Seconds East 255.59 feet; thence South 88 Degrees 30 Minutes 06 Seconds East 18.00 feet to the point of beginning and containing a gross area of 3,470 square feet, more or less.

Subject to all easements and rights-of-ways of record.

Drainage Easement #2
Part of the Southwest Quarter of the Northwest Quarter of Section 36, Township 5 South, Range 10 West in Center Township, Vanderburgh County, Indiana and being more particularly described as follows:

Commencing at the Northwest Corner of the Southwest Quarter of the Northwest Quarter of said Section 36; thence along the north line of said Quarter Quarter Section, South 88 degrees 30 minutes 06 seconds East 37.63 feet to the west side of a tract of land conveyed to the Board of Commissioners of Vanderburgh County, Indiana in Document 2009R00005013 in the Office of the Recorder of Vanderburgh County, Indiana; thence along the west side of said tract of land conveyed to Vanderburgh County, South 01 degree 13 minutes 59 seconds West 656.13 feet to a point on the south line of a tract of land conveyed to Dauby Properties and Investments, LLC in Document 2007R00034128 in the Office of said Recorder; thence along the south line of said tract of land conveyed to Dauby, South 88 degrees 40 minutes 22 seconds East 165.86 feet; thence North 01 Degree 02 Minutes 02 Seconds East 176.88 feet; thence North 88 Degrees 57 Minutes 58 Seconds West 3.00 feet to the point of beginning; thence
North 88 Degrees 57 Minutes 58 Seconds West 12.00 feet; thence
North 01 Degree 02 Minutes 02 Seconds East 109.60 feet; thence
South 88 Degrees 57 Minutes 58 Seconds East 93.07 feet to the beginning of a curve to the right having a central angle of 21 degrees 44 minutes 32 seconds East, a radius of 35.00 feet and a chord dimension of South 78 degrees 05 minutes 42 seconds East 13.20 feet; thence along the arc of said curve 13.28 feet; thence South 01 degree 14 minutes 10 seconds West 9.68 feet; thence North 84 degrees 21 minutes 30 seconds West 94.31 feet; thence South 01 Degree 02 Minutes 02 Seconds West 105.01 feet to the point of beginning and containing a gross area of 2,093 square feet, more or less.

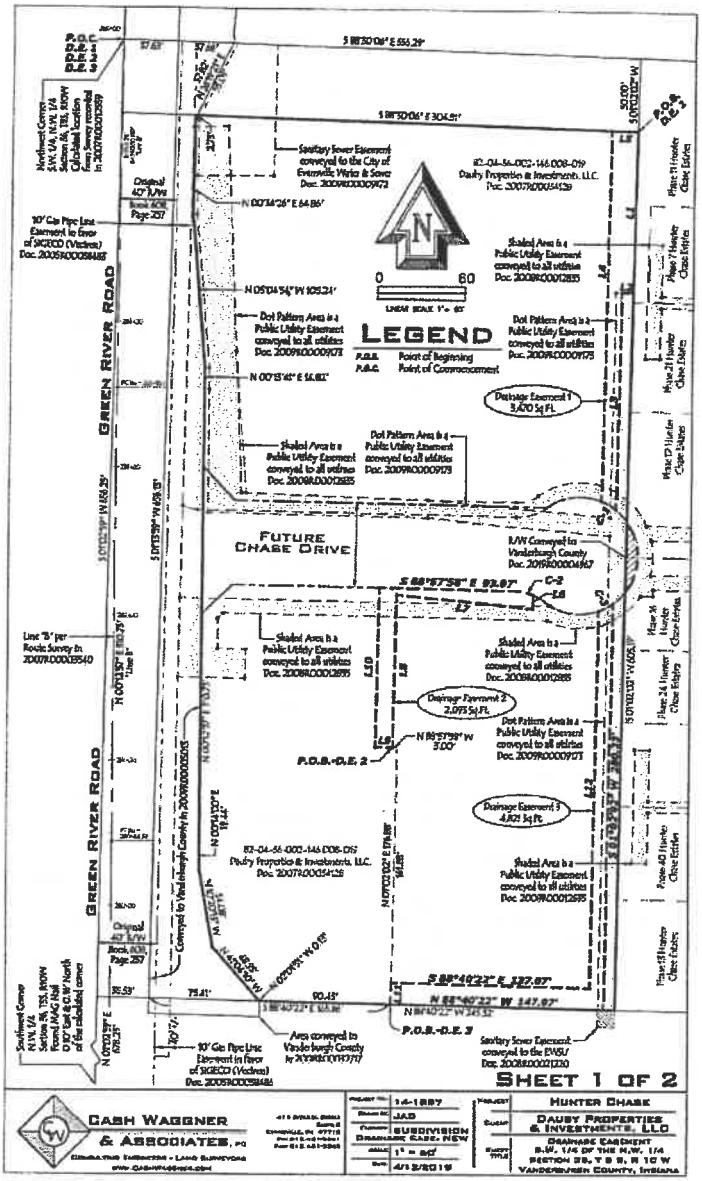
Subject to all easements and rights-of-ways of record.

Drainage Easement #3
Part of the Southwest Quarter of the Northwest Quarter of Section 36, Township 5 South, Range 10 West in Center Township, Vanderburgh County, Indiana and being more particularly described as follows:

Commencing at the Northwest Corner of the Southwest Quarter of the Northwest Quarter of said Section 36; thence along the north line of said Quarter Quarter Section, South 88 degrees 30 minutes 06 seconds East 37.63 feet to the west side of a tract of land conveyed to the Board of Commissioners of Vanderburgh County, Indiana in Document 2009R00005013 in the Office of the Recorder of Vanderburgh County, Indiana; thence along the west side of said tract of land conveyed to Vanderburgh County, South 01 degree 13 minutes 59 seconds West 656.13 feet to a point on the south line of a tract of land conveyed to Dauby Properties and Investments, LLC in

Document 2007R00034128 in the Office of said Recorder; thence along the south line of said tract of land conveyed to Dauby, South 88 degrees 40 minutes 22 seconds East 165.86 feet to the point of beginning; thence
North 01 Degree 02 Minutes 02 Seconds East 15.00 feet; thence
South 88 Degrees 40 Minutes 22 Seconds East 137.07 feet; thence
North 01 Degree 02 Minutes 02 Seconds East 259.71 feet to the beginning of a curve to the left having a central angle of 16 degrees 22 minutes 57 seconds East, a radius of 40.00 feet and a chord dimension of North 62 degrees 21 minutes 19 seconds East 11.40 feet; thence along the arc of said curve 11.44 feet; thence South 01 Degree 02 Minutes 02 Seconds West 280.23 feet to a point on the south line of a tract of land conveyed to Dauby Properties and Investments, LLC in Document 2007R00034128; thence along said south line, North 88 Degrees 40 Minutes 22 Seconds West 147.07 feet to the point of beginning and containing a gross area of 4,821 square feet, more or less.

Subject to all easements and rights-of-ways of record.


GREEN RIVER ROAD
FUTURE CHASE DRIVE
LEGEND
P.O.B. Point of Beginning
P.O.C. Point of Commencement
Drainage Easement 1 5,470 Sq.Ft.
Drainage Easement 2 2,075 Sq.Ft.
Drainage Easement 3 4,821 Sq.Ft.
P.O.B.-D.E. 2
P.O.B.-D.E. 3
SHEET 1 OF 2
CASH WAGGNER & ASSOCIATES, PC
HUNTER CHASE
DAUBY PROPERTIES & INVESTMENTS, LLC
DRAINAGE EASEMENT
VANDERBURGH COUNTY, INDIANA

Curve Table

CURVE	ARC LENGTH	RADIUS	CHORD BEARING	CHORD LENGTH	DELTA ANGLE	TANGENT
C-1	11.44'	40.00'	N 60°17'15" W	11.40'	16°22'57"	5.76'
C-2	13.28'	35.00'	S 78°05'42" E	13.20'	21°44'32"	6.72'
C-3	11.44'	40.00'	N 62°21'19" E	11.40'	16°22'57"	5.76'

Line Table

LINE	BEARING	DISTANCE
L1	S 01°02'02" W	111.25'
L2	N 88°57'58" W	8.00'
L3	S 01°02'02" W	149.67'
L4	N 01°02'02" E	255.59'
L5	S 88°30'06" E	18.00'
L6	S 01°14'10" W	9.68'
L7	N 84°21'30" W	94.31'
L8	S 01°02'02" W	105.01'
L9	N 88°57'58" W	12.00'
L10	N 01°02'02" E	109.60'
L11	N 01°02'02" E	15.00'
L12	N 01°02'02" E	259.71'

SCOTT D. BUESKE
REGISTERED
LS29900031
STATE OF
INDIANA
LAND SURVEYOR

SHEET 2 OF 2

CASH WAGGONER & ASSOCIATES, PC
CONSULTING ENGINEERS • LAND SURVEYORS

PROJECT NO.	14-1857
DRAWN BY	JAD
CHECKED BY	SUBDIVISION DRAINAGE EASE. NEW
SCALE	1" = 50'
DATE	4/12/2019

PROJECT: HUNTER CHASE
CLIENT: DAUBY PROPERTIES & INVESTMENTS, LLC
SUBJECT: DRAINAGE EASEMENT S.W. 1/4 OF THE N.W. 1/4, SECTION 26, T 5 S., R 10 W VANDERBURGH COUNTY, INDIANA

RECORDER
VANDERBURGH COUNTY
CENTER OUT
DEBBIE STUCKI
2019R00011018
06/06/2019 10:30 AM
RECORDING FEES: 25.00
PAGES: 4

TEMPORARY EASEMENT FOR RIGHT-OF-WAY, DRAINAGE STRUCTURES AND PUBLIC UTILITIES

CROSS REFERENCE: 2008R00015583, 2018R00010670, 2007R00034128

THIS INDENTURE WITNESSETH, that **Dauby Properties & Investments, LLC**, an Indiana limited liability company (**"Grantor"**) for no cash consideration and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, does hereby **GRANT and CONVEY** unto **Vanderburgh County, Indiana** (hereafter **"Grantee"**) a non-exclusive temporary right-of-way for public road purposes and a temporary easement for drainage and public utilities thereon as deemed necessary by Grantee, the real estate located in Vanderburgh County, Indiana, more particularly described on Exhibit "A" which is attached hereto and made a part hereof and more particularly shown on Exhibit "B" which is attached hereto and made a part hereof (the **"Real Estate"**).

This temporary easement for right-of-way, drainage and public utilities does not obligate Vanderburgh County, in any way to construct, maintain, alter, repair or replace the existing road or drainage facilities.

This temporary easement for right-of-way, drainage and public utilities shall remain in full force and effect until such a time as a subdivision plat for the Real Estate affecting all or a portion of these easements is approved by Vanderburgh County, Indiana and recorded in the Office of the Recorder of Vanderburgh County, Indiana.

This grant and agreement shall constitute a covenant, which runs with the land, and shall be binding upon the legal representatives, successors and assigns of Grantor and Grantee.

The undersigned individual executing this Right-of-Way Grant and Dedication on behalf of Grantor represents and certifies that he is the duly authorized Manager of Dauby Properties & Investments, LLC and is fully empowered to execute and deliver this Temporary Right-of-Way and Temporary Easement for Drainage and Public Utilities.

DULY ENTERED FOR TAXATION SUBJECT
TO FINAL ACCEPTANCE FOR TRANSFER

Jun 06 2019

Brian Guth TR

AUDITOR

Sales Disclosure NOT Required
Vanderburgh County Assessor
06 06 2019 - KR

IN WITNESS WHEREOF, the undersigned hereto have executed this Temporary Right-of-Way and Temporary Easement for Drainage and Public Utilities this 22 day of May, 2019.

Dauby Properties & Investments, LLC

By: Ronald Dauby
Ronald Dauby, Manager

STATE OF INDIANA)
) **SS:**
COUNTY OF VANDERBURGH)

BEFORE ME, a Notary Public in and for said County and State, personally appeared **Ronald Dauby**, Manager of **Dauby Properties & Investments, LLC**, the Company which executed the foregoing instrument, who acknowledged and affirmed that he did sign said instrument as such Manager for and on behalf of said Company and by authority granted in its Articles of Organization and by its governing body, that the same is his free act and deed as said Member and the free and corporate act and deed of said Company.

WITNESS my hand and Notarial Seal this 22 day of May, 2019.

My Commission Expires:
09-14-21

Signature of Notary Public

My County of Residence is:
Gibson County, Indiana

Karen S. Creek
Printed Name of Notary

NO RECORDING FEE SHALL BE CHARGED PURSUANT TO IC 8-23-23-1.

KAREN S. CREEK
Resident of Gibson County, IN
Commission Expires: September 14, 2021
Commission # 647494

THIS INSTRUMENT was prepared by Kahn, Dees, Donovan & Kahn, LLP, Shannon S. Frank, Attorney at Law, 501 Main Street, Suite 305, P.O. Box 3646, Evansville, Indiana 47735-3646, at the specific request of one of the parties hereto, based solely on information supplied by one or more of the parties, and without a complete examination of survey, title or abstract. The drafter assumes no liability for any errors, inaccuracy, or omissions in this instrument resulting from the information provided, the parties and their successors and assigns hereto signifying their assent to this disclaimer by the execution or the acceptance of this instrument. [KDDK:436011]

I affirm, under the penalties for perjury, that I have taken reasonable care to redact each Social Security number in this document, unless required by law. *Shannon S. Frank*

RETURN TO: Shannon S. Frank, Esq., P.O. Box 3646, Evansville, Indiana 47735-3646.

Exhibit "A"
Temporary Easement description for Right-of-Way,
Drainage Structures and Pubile Utilities
Chase Drive

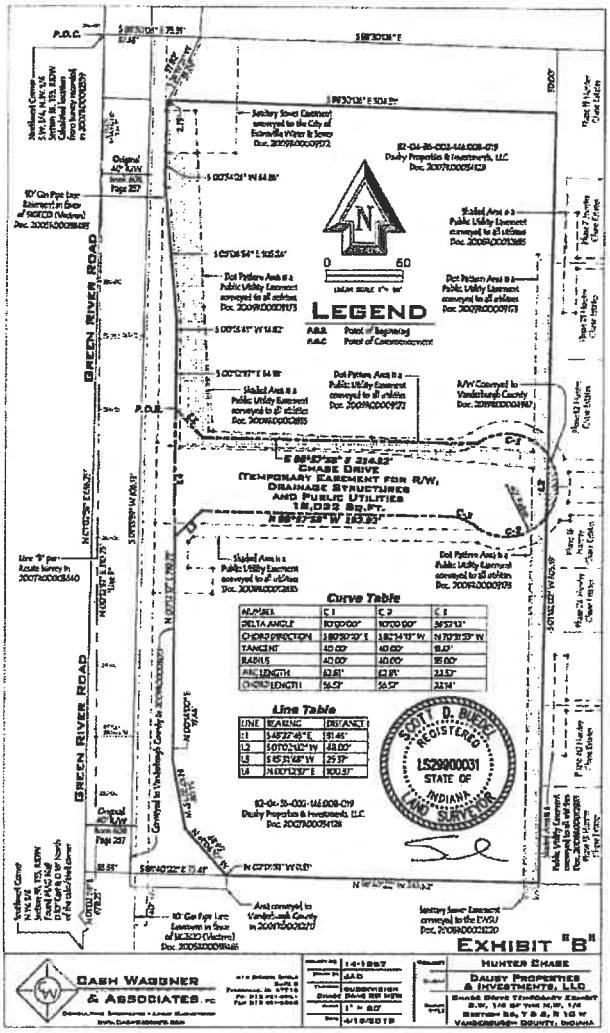
Part of the Southwest Quarter of the Northwest Quarter of Section 36, Township 5 South, Range 10 West in Center Township, Vanderburgh County, Indiana and being more particularly described as follows:

Commencing at the Northwest Corner of the Southwest Quarter of the Northwest Quarter of said Section 36; thence along the north line of said Quarter Quarter Section, South 88 degrees 30 minutes 06 seconds East 75.31 feet to the east line of a tract of land conveyed to the Board of Commissioners of Vanderburgh County, Indiana in Document 2009R00005013 in the Office of the Recorder of Vanderburgh County, Indiana; thence along the east side of said tract of land conveyed to Vanderburgh County the following five (5) calls:

South 26 degrees 19 minutes 21 seconds West 57.82 feet; thence
South 00 degrees 34 minutes 26 seconds West 64.86 feet; thence
South 05 degrees 04 minutes 54 seconds East 105.24 feet; thence
South 00 degrees 13 minutes 41 seconds West 14.82 feet; thence
South 00 degrees 12 minutes 37 seconds East 54.18 feet to the point of beginning; thence South 43 degrees 27 minutes 45 seconds East 31.43 feet; thence South 88 degrees 57 minutes 58 seconds East 214.92 feet to the beginning of a curve to the right having a central angle of 90 Degrees 00 Minutes 00 Seconds, radius of 40.00 feet and a chord dimension of South 80 degrees 50 minutes 10 seconds East 56.57 feet; thence along the arc of said curve 62.83 feet to a corner of a Right-of-Way Grant and Dedication to Vanderburgh County, Indiana in Document 2019R00004967 in the Office of said the Recorder; thence along the west side of said Right-of-Way, South 01 degree 02 minutes 02 seconds West 48.00 feet to the beginning of a curve to the right having a central angle of 90 degrees 00 Minutes 00 Seconds, radius of 40.00 feet and a chord dimension of South 82 Degrees 54 Minutes 13 Seconds West 56.57 feet; thence along the arc of said curve 62.83 feet to the beginning of a curve to the left having a central angle of 36 Degrees 52 Minutes 12 Seconds, a radius of 35.00 feet and a chord dimension of North 70 Degrees 31 Minutes 53 Seconds West 22.14 feet; thence along the arc of said curve 22.52 feet; thence North 88 degrees 57 minutes 58 seconds West 193.92 feet; thence South 45 degrees 31 minutes 48 seconds West 29.37 feet to the east line of said tract of land conveyed to the Board of Commissioners of Vanderburgh County, Indiana in Document 2009R00005013; thence along said east line, North 00 degrees 12 minutes 37 seconds East 100.37 feet to the point of beginning and containing a gross area of 18,022 square feet, more or less.

Subject to all easements and rights-of-ways of record.

Exhibit "B"


LEGEND
P.O.B. Point of Beginning
P.O.C. Point of Commencement
GREEN RIVER ROAD
S 88°12'28" E 314.82'
CHASE DRIVE
(TEMPORARY EASEMENT FOR R/W, DRAINAGE STRUCTURES AND PUBLIC UTILITIES
18,022 Sq.Ft.
N 88°12'28" W 163'
Curve Table
Line Table
SCOTT D. BUSSE
REGISTERED
LS29900031
STATE OF
INDIANA
LAND SURVEYOR
EXHIBIT "B"
CASH WAGGNER & ASSOCIATES, inc
HUNTER CHASE
DAISY PROPERTIES & INVESTMENTS, LLC

DRAINAGE BOARD
Vanderburgh County

CHERYL MUSGRAVE
BEN SHOULDERS
BRUCE UNGETHIEM

Mr. Ron Dauby
Dauby Construction, Inc
7335 Megan Brooke Lane
Evansville, IN 47725

November 13, 2018

Dear Mr. Dauby,

This letter is being sent as a summary to the Drainage Board Meeting that was held on November 13, 2018. Both the County Engineer and County Surveyor have received multiple complaints regarding the lack of completion or incorrectly constructed drainage within the Hunter Chase Condominium project located off of Green River Road. County Engineer John Stoll has sent in the past several inspections regarding erosion control and a letter dated April 28, 2017 highlighting some of the drainage issues (see attached). Upon review of the files as well as the minutes for the Vanderburgh County Drainage Board it was found that a preliminary drainage plan was submitted for a 5 lot mixed use subdivision which was approved on March 4, 2008. Since that time development has occurred on a large single parcel which would have been one of the lots based upon the preliminary plan. There is nothing in the County's files which shows that any final drainage plan was ever approved for this site. A more recent inspection in July 2018 (entitled Hunter Chase Photos) is attached which further shows issues with the development. Some of the issues are also highlighted in as built drawings that were submitted in April 2018. Based upon recommendations to the Board from the County Surveyor and Engineer, the Board is requiring that a Final Drainage Plan to meet the requirements of the County's Drainage Code be provided by the January 29, 2019 Meeting. The Final Drainage Plan shall include at a minimum the following:

- Provide under the requirements of Section 13.04.085 a signed Form 801.
- Provide under the requirements of Section 13.04.095 documentation showing that all offsite drainage facilities are within dedicated easements. Include a timeline for when the necessary easements will be provided and recorded.
- Provide necessary drawings that show the installation of all features as required under Section 13.04.170 Final Drainage Plan Layout. Highlight in the drawing any alterations from the original submittal of the Preliminary Drainage Plan including revisions to pipe sizes, locations, grade and inlets as well as changes to the proposed street system as it relates to the conveyance of storm water within the project.
- Provide as built drawings of all swales which are addressed in the preliminary drainage plan and the required information to show that the swales meet the drainage code Sections 13.04.180 and 13.04.315 with regards to slope, depth, cross sectional area and liners if required. This would include swales on the north, south and east property lines as well as swales identified in the preliminary plan that are located between the buildings and swales directing drainage to the western basin. Provide information on procedures and timelines to correct improperly constructed swales as to when they will be brought

into compliance. The plan should also address the existing sidewalks adjacent to the swales on the north and south boundaries of the site. Neither the preliminary drainage plan nor the site plans on file at the Area Plan Commission showed sidewalks along the boundaries of this site. The plan must address how these sidewalks will be incorporated in the drainage system. This plan should also address any changes to the width of the sidewalks if revisions are needed for ADA compliance. If the sidewalks had to be widened, they would encroach further into the area where the drainage swales were shown on the preliminary plan.

- Provide as built drawings of all basins showing that the basins meet the criteria as established in sections 13.04.180 and 13.04.440. If basins do not currently meet the criteria of section 13.04.440 describe procedures and timelines for when the basins will meet the criteria.
- Provide a maintenance report for the basins as required under Section 13.04.440R. Also provide information as to the ownership of the two basins and address plans regarding incorporating the east basin into the ownership of common areas and removal of this parcel as a separate tax parcel.
- Provide necessary detail regarding how the final drainage plan will address existing drainage problems as required under Section 13.04.175.
- Provide with the submittal copies of notices as required under Section 13.04.140.
- Provide a request for any variances for any features that will not meet the current code and the reason for the variance request. Variance requests should also address approval provisions by existing unit owners.

It is strongly recommended by the Board that the drainage plan be reviewed by a group of concerned unit owners in the development PRIOR to the submittal to Vanderburgh County through a series of meetings in order for the approval process to move forward in an orderly fashion.

Upon submittal and approval of the Final Drainage Plan by the Vanderburgh County Drainage Board, the Board will closely monitor the Developer's to ensure that deadlines are met and if not, will pursue enforcement action under Section 13.04.110.

Respectfully yours

Ben Shoulders-President

Bruce Ungethiem-Vice President

Cheryl Musgrave-Member

305 ADMINISTRATION BLDG. • N.W. M. L. KING JR. BLVD. • CIVIC CENTER COMPLEX • EVANSVILLE IN 47708

PHONE: 812-435-5241 FAX: 812-435-5963

FINAL DRAINAGE PLAN-Hunter Chase Condos

13.04.085 Request by applicant for plan review and approval.

A. All requests for drainage plan approval shall be made by the applicant to the drainage board through the county surveyor's office by the presentation to the surveyor of the drainage plan and the supporting data, all in duplicate, by the close of the business day two full weeks prior to the meeting at which approval of the drainage plan shall be sought. **Final Drainage plan for the condo parcel was never approved. A revised final drainage plan criteria signed by the Vanderburgh County Drainage Board was spelled out in a letter to the developer dated November 13, 2018. Those sections that required to be addressed are being addressed in this revised drainage plan review document. Design of swales submitted 1/14/2019, however this did not cover the entire parcel. A new submittal was provided on 2/1/2019 Additional information submitted 2/21/2019, 3/12/2019, 3/22/2019, 4/9/2019 and 5/31/2019 and emails 2/25/2019, 5/15/2019 and 5/29/2019 and 5/30/2019**

C. Included with the Drainage Plan shall be the following information regarding the applicant that shall be provided on FORM 801. **Provided (email) 2/4/2019**

13.04.095 Conditions of drainage plan approval.

C. The drainage plan and supporting submittals shall reflect compliance with the requirements of this chapter, and compliance with any conditions of approval applied to the plan by the drainage board. **Required Revisions are shown in red. (Blue-meets requirements on initial submittal, red need response or does not meet requirement, purple-addresses requirements upon submittal of revisions)**

D. The submitted data shall be gathered, analyzed, assembled into the drainage plan and supporting submittals; and shall be certified, and presented to the drainage board all by a civil engineer or land surveyor regularly engaged in stormwater drainage design, and registered to practice in the state of Indiana. **Provided**

E. An easement has been dedicated to house any off-site drainage facilities if such facilities are required to serve the project's stormwater drainage system. **The submittal shows proposed easements as part of a plat which was the preliminary plat for a proposed 5 lot subdivision which has expired. The Drainage Plan requirement is for the condo parcel, therefore the drainage plan should show all easements outside of the parcel as offsite and not part of a subdivision. The easement documentation needs to be supplied for swales 24, 25 and 26 as well as all piping within the access street as this is not a county road. Some of the proposed easements shown are only 6' which does not meet code requirements. Revised References to the subdivision lots should be removed. Addressed An easement document must also be supplied for Basin 1. Easement documents are still required. –Documents have been supplied but additional revisions need to be addressed per County Attorney-see County Attorney Comments to be sent under separate email which are summarized below PROVIDED AS ATTACHMENTS TO EMAIL DATED 5/15/2019 AND REVIEWED BY COUNTY ATTORNEY**

- **The easement document should be split into 3 separate easements. One would be for the lake maintenance only. The second would be a temporary easement for all drainage within the eventual road right of way. This would eliminate having to vacate this easement at a later date and would make it clear that when the road was accepted by the County then that portion of the easement would at that time then be maintained by the County. The third easement would be for the remaining ditches and piping. ADDRESSED**
- **On the easement document the language in the second paragraph infers that the County would be responsible for maintaining the easements, specifically ".. constructing, inspecting, maintaining, altering, repairing and replacing drainage facilities" which is not the case. This language needs to be revised. ADDRESSED**
- **The Third paragraph has the statement "..the Grantor reserves the right to use and enjoy the Easement Real Estate, but no buildings, fences, landscaping, berms or other obstructions shall be located or maintained over, on or within the Drainage Easement ~~which would impede or reduce the flow of water~~." This should be altered to state "..the Grantor reserves the right to use and enjoy the Easement Real Estate, but no buildings, fences, landscaping, berms or other obstructions shall be located or maintained over, on or within the Drainage Easement *without the approval of the Vanderburgh County Drainage Board*." ADDRESSED**

F. The person, persons, partnership, corporation, or other entity to whom approval of the drainage plan is granted must be the person, persons, partnership, corporation, or entity who will be responsible for accomplishing the project for which the drainage plan is developed. **Signed by Ron Dauby, Dauby Properties and Investments, LLC, 7319 Shea Drive, Evansville, IN 47725**

13.04.140 Information submittal and review schedule.

H. For all new major subdivisions as defined in Title 16 of this code, which major subdivisions are shown to discharge an amount of stormwater in addition to that which is discharged prior to new development and all minor subdivisions, C-0 Through M-3, as defined in Title 16 of this code, which minor subdivisions are zoned for commercial use, and all single parcel commercial and industrial parcels zoned C-0 through M-3 of 2 acres in size or greater that are adjacent to agriculture land use or single family homes, the applicant shall notify all adjoining landowners of the proposed drainage plan. The notification shall also be sent to any Registered Neighborhood Association within 1/4 mile of the proposed development and shall meet the criteria of notification. **Notification required as agreed in Drainage Board Dated October 2, 2018 Certificate of mailing provided with 2/21/2019, however, copy of notice was not provided Provided 3/12/2019**

13.04.160 Contents of preliminary drainage plan. (As Applicable to Final Drainage Plan)

A. The contents of the preliminary drainage plan shall include a map based on the most current county planimetric maps, or a topographic map prepared from a more recent aerial photo reconnaissance that provides more accurate data, complete with contour lines, and showing the following:

1. The extent and area of each watershed affecting the design of the drainage facilities for the project;

12. A copy of the Notice of Public Hearing as required by the Area Plan Commission and under Section 13.04.140 H of the Vanderburgh County Drainage Code with a copy of the returned receipts from all certified mailings or proof of Certificate of Mailing. ***See 13.04.140***

13.04.165 Contents of the final drainage plan.

The contents of the final Drainage Plan shall include all the items listed above for a preliminary drainage plan, plus: **Much of the data has been previously submitted or the area has been constructed and very little information is available regarding predevelopment. Therefore those sections were not included in letter.**

B. Location and Topographic Map. In addition, a location and topographic map must be provided showing the land to be developed, and such adjoining land whose location and topography may affect or be affected by the layout or drainage of the project. The map must also identify all adjoining landowners. **Maps do not show adjoining landowners shown on revised maps submitted 2/21/2019** The contour intervals shown on the topographic map shall be two and one-half feet for slopes less than four percent; and five feet for slopes four percent or greater; or best available; **1'**

13.04.170 Final drainage plan layout.

A. In addition to the requirements listed for a preliminary drainage plan, the final drainage plan shall depict the following:

1. The extent and area of each watershed tributary to the drainage facilities within the project; **Provided**

2. The final layout and design of proposed storm sewers, their inlet and outfall locations and elevations, the receiving streams or channels; all with the basis of their design; **The chart shows storm sewer AD 500 being fed by watershed A-3, however it appears, that subbasins A-1, 2 and 4 also flow into this system. Revision submitted that corrected If this is correct is the capacity for the pipe between AD 500 and 502 sufficient? Calculations show capacity is sufficient The calculations shows that the pipe capacity for the existing pipe between CI 511 and AD 512 and the proposed pipe between AD 512 and 516 do not meet design parameters. For pipe between CI 511 and AD 512, which has already been installed, is of sufficient depth that under head conditions it will carry the necessary capacity without flooding street. For pipe between CI 511 and AD 512, this pipe was proposed and has been upsized from 18" to 24" in diameter.**

3. The location and design of the proposed street system, including depressed pavements used to convey or detain overflow from storm sewers and over-the-curb runoff resulting from heavier rainstorms, and the outlets for such overflows; all with their designed elevations;
How will the water on the north side of Chase drive be diverted so it will not run into the garage on the east side of the road. Provide a drawing showing details. How is the water

being conveyed at the end of Chase Drive where it intersects with Shea Drive? An exhibit was provided showing the Chase Drive is to drain through Swale 19.

A concrete turnout is proposed at the south end of Lyons Court-where is the water being taken as swale 1 is shown to the north east of the turnout. Turnout has been relocated

How is the drainage being handled at the end of the streets that empty to swales? Turnouts provided. Are the existing concrete turnouts on the south end of Kylee and Shea going to be removed? The existing turnouts currently connect to the swales, but they are not shown on the revised drainage plan. Existing turnouts are shown on the revised drawing for Kylee and Shea.

How is the water to be conveyed to Basin 2 specifically from Swale #4 and Shea and Chase Drives? Addressed in discussion and shown on exhibit provided with 3/22/2019 submittal

It is apparent that the streets were not constructed with inverted crowns as specified. How is drainage being handled in the streets, especially on watershed A-14 (Megan Brooke), Brycen Lane (A-7), Kylee Jo Lane (A-7 and A-3) and Lyons Court (A-1). Provide necessary street cross sections to show that the depressed pavements will convey the required drainage or that the sheet flow will be able to be handled within the existing streets. Will any of the existing streets be modified? Consulting Engineer has stated in revised text that streets will carry design runoff with a minimum of 1.5% inverted crown and provided calculations for flow quantities for 1-2%.

How is the water being handled at the south end of Swale 14? Where is it ultimately discharging? Per submittal of 4/9/2019 swale 14 was redrawn and 2 additional small swales were added. The water is shown to discharge between 7301 and 7313 Megan Brooke Lane and then into Megan Brooke

4. The locations, cross sections, and profiles of existing streams, floodways, and floodplains to be maintained, and the same for all new channels to be constructed. For Swales SEE 13.04.170 A8

5. The materials, elevations, waterway openings, size, and basis for design of the proposed culverts and bridges; No bridges or culverts proposed

6. Existing ponds and basins to be altered, enlarged, filled, or maintained; and new ponds, basins, swales, to be built, and the basis of their design For Swales SEE 13.04.170 A8 Two existing basins-Need final designs-designs provided see comments under 13.04.440 for any additional requirements.

7. The location and percentage of impervious surfaces existing and expected to be constructed; **Provided**

8. The material types sizes slopes grades and other details of all the stormwater drainage facilities; **Provided for all swales on drawings and on calculation sheets Homeowners comments from April 17, 2019 Is there is plan to show a detail to create some type of structure on the west end of *Swale #5* to allow water to get funneled from the 8' wide earthen *Swale #8* into the 4' wide concrete *Swale #5*? I feel some kind of structure is needed at the west end of *Swale 5* to prevent erosion around and under this swale. Addressed with rip rap channel shown on revised drawing C-101**

9. The estimated depth and amount of storage required in the new ponds or basins, the freeboard above the normal pool and highwater pool of wet basins, and details of the emergency overflows from the basins **Not provided- designs provided see comments under 13.04.440 for any additional requirements.**

10. For all controlled release basins, a plot or tabulation of the storage volumes with corresponding water surface elevations, and a plot or tabulation of the basin outflow rates for those water surface elevations; **Not provided Calculations were supplied based upon pipe running full with additional head based upon 25 year storage quantities.**

11. The location of any applicable "impacted drainage areas" or other areas designated to remain totally undisturbed, natural, or for common and/or recreational use. **Not within any impacted area.**

12. The location of Drainage Easements for retention/detention basins, drainage ditches/swales, storm sewers, junction boxes, inlets, or manholes outside of any county right of way. Easements dimensions must be shown on each individual lot to the extent that they can be recreated in the field within the lot boundaries of said lot. **Easements are shown but recordable instruments need to be provided Provided**

B. Protection of Structures From One Hundred Year Flooding. All structures to be occupied as residences or businesses shall have finished floor elevations two feet above the high water calculated to occur during a one hundred (100) year return period storm for the subject building site; and the required floor elevations shall be depicted on the plan drawings for such affected sites. **Structures have already been completed.**

13.04.175 Submittal of a written drainage design report.

The final drainage plan shall be accompanied by a written report containing the following:

A. Any significant stormwater drainage problems existing or anticipated to be associated with the project. **The Developer/Engineer needs to address the comments below from the condo owners:** **See email dated May 30, 2019 that addressed the comments below**

1. The drawing does not address the reported flooding between the following condos: 7305-7312 Kylee Jo Lane, 7408-7420 Megan Brooke Lane, 7319-7325 Shea Drive, 7405-7415 Shea Drive, 7422-7428 Shea Drive, 7402-7418 Shea Drive, and 7421-7427 Brycen Lane **Addressed in email dated 5/30/2019**

2. A 6" berm is shown on the east property line to help with erosion. Will this berm increase the drainage problem in yards between and behind condos on the east side of Shea Drive? **Addressed in email dated 5/30/2019**

3. On the drawing where the flag marks swale #8, an existing swale crosses perpendicular to proposed swale #8. This swale flows west/east from Kylee Jo to Shea between 7407-7423 Kylee Jo and 7422-7428 Shea. A photo of this swale in attached. Will the pictured swale interfere with swale #8? **Addressed in email dated 5/30/2019**

4. Four-foot wide swale #8 is planned to flow north between 7403 Kylee Jo and 7402 Shea. We understand this is a plan drawing, but we don't understand how a four-foot wide swale will fit in a six-foot space with the elevation change. Will a retaining wall be needed? A photograph is attached. This situation exists for many of the planned north south swales **Addressed in email dated 5/30/2019**

5. Swale #16 will empty onto Megan Brook Lane. It appears there is a tree and landscaping in the marked path. Will landscaping and trees be relocated when they are part of an added swale? **The relocation of the landscaping and trees is not a Drainage Board issue**

7. The drawing does not show how water will be conveyed from end of each street swale to the corresponding north/south swale. For example, water flowing north on Brycen Lane presently turns east, crossing the driveway and yard in front of 7447 Brycen Lane. Also at the south end of Lyons Court, the street swale does not connect with south swale. Should there be a gradual turn at end of each street so the water doesn't impact the north/south swales at 90 degrees? **Addressed in email dated 5/30/2019**

9. How will erosion issues at existing retaining walls be addressed? This is not a Drainage Board issue as there are no retaining walls within the drainage design

10. Please add footer to design of 16" standing curb planned at south swale. This is not a requirement of the Drainage Board

11. Due to the amount of construction dirt entering the detention basins, do they need to be dredged to restore original capacity? Do storm sewers need to be camera inspected to check for reduced capacity due to construction dirt? **Addressed in email dated 5/30/2019**

12. Detention Basin #2 bank needs to be repaired due to erosion. Also, excess soil and debris left from some of the last condos constructed has been dumped along the west side of Basin #2. It needs to have the debris removed and be graded and seeded. Also, remaining concrete form needs to be removed from the north end of the existing curb between Shea Drive and Basin #2. **Addressed in email dated 5/30/2019**

13. Would an AD to Retention Basin from the center of North Shea Drive be needed to reduce load on the North swale? **Addressed in email dated 5/30/2019**

14. We request that the plan and construction drawings show the removal of soil, grading and drainage design needed to expose weeps/wicks for the condos listed in the list shown below. **–this is a Building Code issue.**

Comments from Homeowners Received April 17, 2019

1. Will the work on the north end of Brycen Ln. solve the ponding of water on the driveway, around the mailbox and yard north of the driveway at 7447 Brycen? **Addressed in email dated 5/30/2019**

11. A new condo was constructed at 7326 Megan Brooke Ln. Following construction the yards on the north and south were not graded for proper drainage. Please add these two yards to the drainage plan. **Addressed in email dated 5/30/2019**

B. The analysis procedure used to identify and evaluate the drainage problems associated with the project; **Rational**

C. Any assumptions or special conditions associated with the use of the procedures, especially hydrologic or hydraulic methods, used to identify and evaluate drainage problems associated with the project; **Pending submittal of additional information Provided**

D. Discussion of any permits applications submitted or proposed to be submitted to state and/or federal agencies that will affect the timing and/or construction of the Drainage Plan such as but not limited to United States Corp of Engineers 404 permits (both individual and nationwide), Indiana Department of Environmental permits (401 Water Certification and others), Indiana Department of Natural Resource Permits (Construction in Floodway) and any approvals that may be required to discharge to Indiana State Highways. The report should state the status of the application of such permits. For permits that have been approved, copies of the approval document shall be included with the Drainage Design Report including any conditions on approved permits that could affect the implementation of the Drainage Plan; **Not addressed Provided-per submittal no Army Corp, IDEM or DNR permits required**

E. The proposed design of the drainage control system; **Provided**

F. The results of the analysis of the proposed drainage control system showing that it does solve the project's identified and anticipated drainage problems; **Pending additional information Provided-including comments from email dated May 30, 2019**

G. A detailed description, depiction, and log of all hydrologic and hydraulic calculations or modeling, and the results obtained thereby; together with the input and output files for all computer runs; **Provided**

H. Maps showing individual drainage areas within the project subdivided for use in the analysis thereof. **Provided**

13.04.180 Typical cross sections of the drainage facilities.
One or more typical cross sections must be provided for each existing and proposed channel, basin, pond, or other open drainage facility which cross sections:

A. For existing and proposed detention and retention basins and ponds, a minimum of two cross sections per basin with the cross sections being 90 degrees from each other. The cross sections shall show the following: **According to submittal the basins are to be regraded, but proposed cross sections per this section need to be provided. Cross sections provided in revision on 2/21/2019. Elevation of emergency spillway not shown but is noted in design sheets.**

Minimum bottom of the basin, Pool Elevation (wet basins), side slope of the basins including above and below normal pool elevation for wet basins, elevation of water at designed storm, elevation of water at 100 year storm, elevation (bottom) of emergency spillway and elevation of outflow of 100 year storm within emergency spillway, elevation of existing land immediately adjacent to the basin, proposed surrounding topography including required maintenance pathway of new basins, fencing (if provided) and any easements or obstructions that are intersected by the cross section.

B. For existing ditches and streams-sufficient typical cross sections that capture the existing channel throughout the project area. The cross sections shall show the existing configuration and existing land immediately adjacent to all drainage facilities as well as any easements, property lines or obstructions that are intersected by the cross section. For all existing ditches a bottom profile line must also be provided. The profile line shall also show any existing structures (culverts, bridges, and other crossings), location of crossing utilities or other obstructions within the ditches or streams. **No existing streams or ditches**

C. For new channels and swales-sufficient typical cross sections that capture the proposed configuration of new channels and swales throughout the project area. The cross sections shall show the proposed configuration of the channels and swales and existing land immediately adjacent to all drainage facilities as well as any easements, property lines or obstructions that are intersected by the cross section. Also a bottom profile line must also be provided. The profile line shall also show any existing structures (culverts, bridges, and other crossings), location of crossing utilities or other obstructions within the ditches or streams. **Typical cross sections have been provided. Sidewalks are to be removed in many places. The plan needs to identify what swales are in existence that will not be modified and those swales**

that are in existence but are to be modified or are to be constructed. This will aid the homeowners in understanding whether any additional work is proposed adjacent to their homes. Per conversations with design engineer, all swales are to be reconstructed.

The proposed ditches include a V ditch on the north side of the property. The ditch is to be concrete with a minimum depth of 1' and 2:1 side slopes. Per the County Attorney, as this swale in not in conformance, the County will need to be indemnified from any potential injury as a result of the V ditch not being in conformance. Provided email 5/15/2019

In order to assist the homeowners please provide a cross section showing existing and proposed topography in the area between 7402 Shea and 7403 Kylee Jo (see comment #4 under 13.04.175 A) (Provided)

D. For large projects and subdivisions which will contain multiple swales, a typical cross section of the swale may be provide combined with a swale table listing each swale. The swale table shall include the slope of each swale (in lieu of profile), depth of water at designed storm and type of erosion control to be utilized on the channel bottom and side slopes. Utilized

E. Typical Cross sections shall be provided in the following situations where proposed excavation is proposed against no controlled properties Not Applicable

13.04.315 Channel cross section and grade.

The required channel cross section and grade are determined by the design capacity, the material in which the channel is to be constructed, and the requirements for maintenance. For Swales SEE 13.04.170 A8 and 13.04.180

Any swales that do not meet the criteria of this section should be noted (Swale # and the criteria they do not meet such as depth, side slopes, width, lining) along with a variance request for all channels Noted in variance/variance provided

A. Minimum Channel Depth. A minimum channel depth of one foot is required; however, additional depth may be required to provide adequate outlets for tributary drains.

B. Minimum Bottom Width. A minimum flat bottom width of one foot is required for all open drainage channels.

C. Velocity to Prevent Siltation. The channel grade shall be such that the velocity in the channel is high enough to prevent siltation, but low enough to prevent erosion. In no case shall a channel be constructed with a grade less than three-tenths of one percent unless that is the only physical method of tying the channel to an existing channel or outflow.

D. Minimum Velocity Set. The minimum allowable velocity shall not be less than one and one-half (1.5) feet per second in order to avoid siltation.

E. The construction of French Drains within the bottom of ephemeral channels that do not require concrete liners shall be allowed. Details of the drains shall be shown on typical cross section drawings. The design of the drains shall be for the purpose of drying the channel beds and shall not be utilized to displace any of the flow capabilities of the channel.

F. Low Velocity Channel Liner Required. In cases where minimum required grade and/or velocity requirements cannot be met, the board shall require concrete channel liners, and/or other methods of maintaining channel grade and cross section integrity.

G. Minimum Grade Set for Required Ribbon Liner.

1. All channels constructed within drainage easements of projects subject to the requirements of this chapter, which channels are constructed with grades less than eight-tenths of one percent shall have, as a minimum requirement, flow line grades established with concrete ribbon liners with dimensions as follows:

a. A minimum depth of eight inches; and

b. A minimum width of sixteen (16) inches.

2. The concrete ribbon liner must be finished smooth with no irregularities. The concrete ribbon liners must be constructed on a constant grade as indicated on the approved drainage plans. Concrete ribbon construction that does not meet these requirements will have to be removed and replaced.

A footing trencher may be used to achieve dimensions.

13.04.350 – GRASS MIX MATCHED TO SITE CONDITIONS

The choice of grass mixture for stabilizing open channels shall be based upon specific site conditions such as shade and sun tolerance, velocity tolerance, and waterway maintenance requirements. The proposed seed mixture to be utilized for stabilizing open channels shall be included in the approved Drainage **Provide proposed seeding and erosion control materials. Specify anticipated seeding times and provisions for rework if seeding fails or erosion occurs after first application. See Drawing C-102 submitted on 2/21/2019. The proposed plan is for seeding with necessary erosion control matting in lieu of any sod.** ***Needs to be noted to the Board that no sod is to be used as requested by the Homeowners. As a condition it will recommend to the Board stipulations regarding remedial work should initial seeding fail.***

13.04.360 Erosion control by percentage of grade.

Comment #8 from Homeowners states "Drawing note calls for sod to be placed in swales after grading is complete. Seeding with straw erosion control mats and starter fertilizer produced good results following grading of Dauby's lot on south side of Chase Drive. If you agree, would you please make this change on the construction drawings?" **See 13.04.350**

A. The bottoms of seeded, grass-lined channels with grades from one percent to two percent shall have erosion control blankets properly installed.

B. Channels with grades greater than two percent and up to six percent shall have bottoms lined in staked sod.

C. All channels with grades greater than six percent shall have bottoms lined with six-inch riprap.

D. Side banks of grass-lined channels with a grade of two percent or greater shall be protected by erosion control blankets installed coincidental with seeding, and in accordance with manufacturer's recommendations.

Plan13.040.420 –ALLOWABLE RELEASE RATE

A. The allowable post development peak release rate of stormwater from a project during a twenty-five (25) year return period storm shall not exceed the pre-development peak release rate from the same land area during a ten (10) year return period storm. (13.04.210-Culverts shall be capable of accommodating peak runoff from a fifty (50) year return period storm when draining an area greater than one square mile, or when crossing under a road which is part of the INDOT urban or rural functional classification system, and is classified as a principal or minor arterial, major or minor collector road). **10/25**

B. Inadequate Downstream Drainage or Restrictions. **Parcel is on a high area-there do not appear to be any downstream restrictions.**

1. If the downstream channel or storm sewer system is not adequate to accommodate the release rate provided above, then the release rate shall be reduced to that rate permitted by the capacity of the receiving channel or storm sewer system; and additional detention shall be required to store that rate of runoff exceeding the capacity of the receiving stormwater drainage facilities (limiting restriction).

2. If more than one basin is involved in the development of the area upstream of the limiting restriction, the allowable release rate from any one basin shall be in direct proportion to the ratio of its drainage area to the drainage area of the entire watershed upstream of the restriction.

C. As continues development continues within Impacted Areas as defined in Section 13.04.015 the Board on a project by project basis may decrease the allowable post development controlled peak release rate of stormwater to not exceed a five (5) or two (2) year return period storm from the same land area prior to its development for those areas that lie within those impacted areas. **Not within an impacted area**

D. Certain areas within the project may be allowed to leave undetained due to the layout of a project combined with the natural topography, In order for areas to leave undetained the undetained areas must meet the criteria of the most current Vanderburgh County Technical Memorandum.

13.04.440 General detention/retention basin design requirements.

The following design principles shall be observed for detention and retention basins: **Need to provide final basin design for both basins. Basin 1 Capacity only needs to be sufficient for development of existing streets, current watershed and development from condo parcel. Any design for future**

development on the western area should be addressed at a later date. The requirements for this section will be review upon submittal of the basins designs. Designs provided. Basin 1 capacity was designed with some development considered. See comments below for any additional information requests

A. See Detention Chart Wet Basin

B. See Detention Chart Both basins meet criteria

C. See Detention Chart. Need information-the elevation of the emergency spillway for Basin #2 is 382.5. When discharging it is shown to be flowing at 383 with no freeboard. What is the finished floor elevation of 7417 Shea/will this flood when the emergency spillway is flowing? Surrounding Ground is 387 and per statement from Design Engineer will not flood.

D. Earthen Side Slopes 4:1 Maximum Steepness for Basins. All detention and retention basins with grassed, earthen side slopes shall have side slopes no steeper than four horizontal units of measurement to one vertical unit of measurement (4:1) to the base of dry basins, and to the typical low waterline of wet basins. Cross sections show that basins are to constructed to meet this requirement

E. Riprap Side Slopes 2:1 Maximum Steepness for Basins. No rip rap

F. Riprap to Extend Two Vertical Feet Below Waterline. No rip rap

G. Underwater Earthen Side Slopes 2:1 Maximum Steepness. Cross sections show that basins are to be constructed to meet this requirement

H. Safety Ledges and/or Fencing of Wet Basins. Safety fencing surrounding the basin, and/or shallow safety ledges shall be provided if deemed necessary by the design engineer or the developer. Wet Basin, no fence shown-design engineer or developer needs to state whether fence will be provided. Fences will not be provided

I. Outlet Controls to Operate Automatically. Outlet control structures shall be designed to operate as simply as possible, and shall require little or no maintenance for proper operation.

J. Designed Water Level Control Required. A controlled positive outlet shall be required to maintain the designed water level in wet basins, and provide the required detention storage above the designed low water level. The outlet pipe for basin two in the preliminary plan was designed using a nomograph which showed a 24" pipe would release at 15 cfs, which is below the calculated allowable 20.25 cfs. Final drainage plan computes allowable at essentially the same of 20.11 cfs, though proposes that the existing installed 24" pipe be choked backed to 11.73 cfs using an 18" orifice. The Drainage Code does not permit the use of an orifice unless the pipe is 12" (on the old code) or the pipe is 8" under revisions to the code. Is the orifice plate required to meet a discharge rate under 20.11 cfs? If the 24" pipe will not meet the criteria, the options would be to replace the existing pipe or to request a variance to the code. If an orifice is to be installed, provide a drawing showing the proposed design/installation. Calculations revised-no orifice plate required.

K. Emergency Spillway Requirements.

1. An emergency overflow spillway shall be provided for the release of storm runoffs exceeding the designed maximum detention volume, or all overflow volumes in emergency conditions, should the normal discharge devices become totally or partially inoperative. Width and channel design of spillway needs to be provided. Provided

2. See Detention Chart

3. The emergency overflow spillway shall be clearly marked with a defined weir, either grass, rip rap or paved. The emergency overflow spillway velocities shall be calculated and the necessary erosion control materials shall be specified and utilized in the construction of the overflow spillway and receiving stream. Energy dissipation measures must be employed where required.

L. See Detention Chart There is no freeboard on Basin #2 Spillway when it is discharging 100 year storm Addressed in submittal of 4/9/2019

M. Dry Detention Basin Criteria Wet Basin

N. Side Slopes to Remain Stable. All side slopes of a basin shall be constructed stable and shall be maintained in a stable condition by the same criteria as specified herein for open channels. See 13.04.350

O. Wet Basin Cover and Maintenance. The earthen side slopes of wet basins shall be provided with grass cover above the low water elevation, which shall be maintained equal to turfed residential lawns, and in no case shall the cover growth exceed twelve (12) inches in height, or the most current county standard. See 13.04.350

P. Maintenance Pathway for Basins. A flat pathway with a minimum width of ten (10) feet shall be constructed completely around the top of the embankment of all detention/retention basins. Provided

Q. Maintenance Easement for Basins. Drainage Easement required for basin 1. Provided

R. Maintenance Report Required for Basin. Who is responsible for the maintenance of the offsite swales, piping in the street and Basin 1? Per revised submittal Dauby is for streets and piping. Basin 1 and offsite swales was not addressed. Per revised submittal of 3/12/2019, Basin 1 to be maintained by Dauby Properties & Investments. Will all of this be transferred to the association when the project is completed? If so, the maintenance statement needs to be revised to state this. If not, who will maintain these areas if Dauby Properties and Investments LLC ceases to exist? Per revised submittal of 3/12/2019, Basin 1 to be maintained by Dauby Properties & Investments.

There are a number of locations where swales are shown to drain to or from pavement without a flume or concrete turnout. The grass in these areas will have to be maintained in a manner that will allow the runoff to flow to or from the swale without causing standing water. If the grass is

not properly maintained in these areas, it could result in standing water either in the swale or in the streets.

1. A brief and concise report shall be prepared, by the design engineer, consisting of a description of the location, intended function of all parts appurtenant to the basin, together with a description of the ways in which the basin and its appurtenances should be maintained, all worded in language easily understood by residential or commercial property owners; **Not provided Provided 3/12/2019**

S. Copy of Report Must be Submitted With the As-Builts. A copy of the maintenance report described above shall be included with the as-built plans required to be submitted hereinabove.

T. No tree limbs, trunks, refuse from legally burnt vegetation, nor construction waste, demolition materials, or other man made material may be buried within the area in which an impounding structure will be located. Notice shall be placed on construction drawings noting the prohibition to the burying of any such materials. Certain natural materials such as large rocks may be located in the bottom of wet basins in order to provide fish habitat or habitat breeding areas provided that such materials are not included within the calculations for required storage volumes and will not block outlet structures. **Basins already constructed**

U. For small sites of less than 5 acres, infiltration trenches may be utilized instead of a wet or dry basin. **Not Utilized**

V. No retention basin shall be allowed within the flowline of a Regulated Drain of Vanderburgh County. **Not within Regulated Drain**

BASIN DESIGN CHART-Review			
		Basin 1	**Basin 2**
1	Design Capacity	~~17,838~~ ~~14,801~~ 14648	~~28,280~~ 15,238
2	(Section A) Dry detention facilities designed to become a permanent part of the stormwater drainage system shall be installed with an additional ten (10) percent capacity to allow for sediment accumulation resulting from development, and to permit the pond to function for reasonable periods between cleanings; (#1 x 1.1)	**Wet Basin**	**Wet Basin**
3	Normal Pool Elevation or dry basin bottom elevation	379.58	379.38
4	Storage elevation at 25 year storm (50 year for State Highway 100 year for impacted area)	~~381.45~~ ~~381.15~~ 381.14	~~381.58~~ ~~381.08~~ 381.07

5	(Section B) Depth of Stored Water. The maximum depth of stormwater to be stored, without a permanent pool shall not exceed four feet; and the maximum depth of stormwater to be stored above a permanent pool shall not exceed four feet. (#4-#3)	~~1.87~~ ~~1.57~~ 1.56	~~2.2~~ 1.7
6	Elevation of emergency spillway	381.7	~~382.5~~ 382.0
7	Q100	41.97	47.18
8	Depth of flow through emergency spillway at 100 year storm	0.4	0.5
9	Flow line at 100 year storm #6 +#8	382.1	~~383.0~~ 382.5
10	(Section K2) A minimum freeboard of one-half foot above the calculated elevation of the design storm detention high water level to the elevation of the spillway flowline peak is required as a safety factor for all basins. ~~#9-#4~~ ≥ 0.5	~~.95~~ .96	~~1.92~~ 1.43
11	Elevation of top of bank	382.4	383
12	(Section L) Automatically Operating Emergency Spillway Required. The emergency overflow spillway shall be designed so that it operates openly, automatically, does not require manual attention, and will pass all the one hundred (100) year return period storm flow with a one-half foot vertical minimum above the one hundred (100) year return storm flow to the lowest dirt elevation in the surrounding earthwork. (#11-#9 ≥ 0.5')	0.3 *Within allowable limit*	~~0.0~~ 0.5
13	Elevation of home adjacent to basin		
	(Section C) Finished Floor Elevations Adjacent to Basins. The lowest floor of any building or structure occupied by humans must be at least two (2) feet above the one-hundred (100) year storm water elevation of detention/retention basins. (#13-#9 ≥ 2')	No homes shown for area around basin 1 at this time	Surrounding ground at 387

13.04.460 Responsibility for drainage facility maintenance.

The assignment of responsibility for the maintenance and repair of all stormwater drainage systems and facilities outside of county accepted road rights-of-way after the completion of the project, and final approval thereof by the county engineer, shall be determined before the final drainage plan is approved; and shall be documented by appropriate covenants and restrictions applied to the subdivision and to the property deeds thereof, and shall be printed clearly upon all recorded plats of the project. **Needs to be addressed. It should be noted that the entrance to the parcel is a private and not a County Road and therefore, at this time, the piping within the roadway is not eligible for maintenance by the County. This issue was brought to the attention of the Board and both attorneys at the February 26, 2019 meeting. Shannon Frank representing the Developer has stated that legal work has**

addressed some of this issue. Will a right-of-way be dedicated prior to approval of the final drainage plan and if not what is the plan and timing for addressing this issue? As previous easement documents were supplied for the roadway as well as the other offsite areas, it appears that the right-of-way for the road will not be dedicated prior to approval of the Drainage Plan.

Other Comments

A variance was submitted on the swales addressing a request for the swales to be vary from the code. The request also was made to use erosion control material instead of sod. The specifications of the erosion control blankets need to be included. Provided.

The Developer has submitted a letter outlining the timing for completion of work within the development. The letter is not signed. Signed letter provided with 2/21/2019 submittal

In conversations with engineer, Swales 24, 25 and 26 are not in existence at this time. What is the schedule for construction of these swales; will swales 24 and 26 be constructed in order to capture water flowing south and direct it to Basin 1? Swales 24 and 26 to be constructed as part of the development.

Basin 2 is on a separate tax tract. What is to keep this from ending up on the County tax sale? Addressed with Supplemental Declaration submitted by email on 5/29/2019

The plan calls for the removal of the existing sidewalk and concrete lined swale along the north boundary of the site, but the retaining wall is shown as being left alone. Can the sidewalk and concrete liner be removed without affecting the wall? Monitoring any necessary repairs/reconstruction of the wall will not be a drainage board issue since the wall is not part of the drainage plan.

The plan shows that a curb will be constructed along the south boundary of the site near the SE corner of the site. Can that curb be constructed without entering onto the property to the south of the site? Or has a temporary construction easement been obtained to allow access to the adjoining property to the south? The approval of this plan will not authorize the contractor to enter onto the adjoining property unless the developer obtains permission from the adjoining land owner.

The storm drainage system outside of the condominium site will require a complete inspection in order to generate a punch list to note any deficiencies that will need to be corrected. Based on past inspections, the deficiencies currently include missing pipes, missing end sections, ditch cross sections that do not meet drainage ordinance requirements, and sediment in pipes.

Although it is not an issue that will be resolved with the drainage plan, the submitted plan shows that the north curb of Chase Drive almost coincides with the proposed north right of way line. The approved street plan showed that there was supposed to be several feet between the curb and the right of way line. If the layout shown on the drainage plan is correct, additional right of way will have to be dedicated north of the curb. If the street layout shown on the drainage plan is

incorrect, a corrected plan will be needed. Another issue with the street is that the cross slope of Chase Drive is inadequate. Based on field measurements, the slope is as little as 0.10% instead of the 2% cross slope shown on the street plans that were approved on 6/3/08. These issues will have to be addressed when the plat is submitted for the commercial portion of this site.

CASH WAGGNER & ASSOCIATES, PC
CONSULTING ENGINEERS • LAND SURVEYORS

DATE: 05.31.19
PROJECT NO.: 14-1887
REFERENCE: Hunter Chase Estates
YOUR FILE NO.:

ATTENTION: Jeff Mueller
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	05.30.19	Revised Drainage Plan

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:

If you have any questions or comments, please give me a call. Thank you

RECEIVED BY THE VANDERBURGH COUNTY SURVEYOR'S OFFICE
5/31/2019

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

CASH WAGGNER & ASSOCIATES, PC
CONSULTING | ENGINEERING | SURVEYING

Click Here to send large files

From: Shannon S. Frank <sfrank@kddk.com>
Sent: Wednesday, May 22, 2019 5:30 PM
To: Glen Meritt <GMeritt@cashwaggner.com>; 'Ron L. Dauby' <dauby_construction@yahoo.com>
Subject: Update from Jeff Mueller

Glen – Reed Schmitt spoke to Jeff Mueller and per Reed, the only item that needs to be included in the drainage plan is #8 that is highlighted in yellow below. The items that are the Board/Unit Owner Questions (also below), you just need to comment "yes/no", etc. Is this something you think we can have ready by end of day Friday?

8. The material types sizes slopes grades and other details of all the stormwater drainage facilities; **Provided for all swales on drawings and on calculation sheets** **Homeowners comments from April 17, 2019 Is there is plan to show a detail to create some type of structure on the west end of *Swale #5* to allow water to get funneled from the 8' wide earthen *Swale #8* into the 4' wide concrete *Swale #5*? I feel some kind of structure is needed at the west end of *Swale 5* to prevent erosion around and under this swale.**

BOARD/UNIT OWNER QUESTIONS:

1. The drawing does not address the reported flooding between the following condos: 7305-7312 Kylee Jo Lane, 7408-7420 Megan Brooke Lane, 7319-7325 Shea Drive, 7405-7415 Shea Drive, 7422-7428 Shea Drive, 7402-7418 Shea Drive, and 7421-7427 Brycen Lane *A note has been added to the drainage plan to regrade these side yards to a minimum 1% slope.*

2. A 6" berm is shown on the east property line to help with erosion. Will this berm increase the drainage problem in yards between and behind condos on the east side of Shea Drive? No

3. On the drawing where the flag marks swale #8, an existing swale crosses perpendicular to proposed swale #8. This swale flows west/east from Kylee Jo to Shea between 7407-7423 Kylee Jo and 7422-7428 Shea. A photo of this swale in attached. Will the pictured swale interfere with swale #8? No. The swale from Kylee Jo will tee into swale #11.

4. Four-foot wide swale #8 is planned to flow north between 7403 Kylee Jo and 7402 Shea. We understand this is a plan drawing, but we don't understand how a four-foot wide swale will fit in a six-foot space with the elevation change. Will a retaining wall be needed? A photograph is attached. This situation exists for many of the planned north south swales The elevation change is not significant and no retaining wall will be required.

Mueller, Jeffrey

From: Glen Meritt <GMeritt@cashwaggner.com>
Sent: Thursday, May 30, 2019 3:41 PM
To: Mueller, Jeffrey
Cc: Stoll, John
Subject: FW: Update from Jeff Mueller

Jeff,

See my responses below. I will drop of the revised drainage plan tomorrow morning. Thanks

Glen Meritt Jr.
Project Engineer
CASH WAGGNER & ASSOCIATES, PC
414 Citadel Circle, Suite B
Evansville, IN 47715
Main: 812-401-5561 Cell: 812-774-2988

CASH WAGGNER & ASSOCIATES, PC
CONSULTING | ENGINEERING | SURVEYING

From: Glen Meritt <GMeritt@cashwaggner.com>
Sent: Thursday, May 30, 2019 9:30 AM
To: Schmitt, Reed S. <RSchmitt@bgdlegal.com>
Cc: Shannon S. Frank <sfrank@kddk.com>
Subject: FW: Update from Jeff Mueller

Reed,

Attached is the revised drainage plan that addresses comment #8 below. I discussed adding the rip-rap with Jeff Mueller yesterday and he said he was fine with this change. I have also answered the other remaining questions with the black text below the original comment. Let me know if you need anything else. Thanks

Glen Meritt Jr.
Project Engineer
CASH WAGGNER & ASSOCIATES, PC
414 Citadel Circle, Suite B
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7. The drawing does not show how water will be conveyed from end of each street swale to the corresponding north/south swale. For example, water flowing north on Brycen Lane presently turns east, crossing the driveway and yard in front of 7447 Brycen Lane. Also at the south end of Lyons Court, the street swale does not connect with south swale. Should there be a gradual turn at end of each street so the water doesn't impact the north/south swales at 90 degrees? The north 10' of Brycen Lane will be removed and reconstructed to correct this issue. Concrete turnouts have been added to the drainage plan at the ends of Lyons Court and Brycen Lane.

11. Due to the amount of construction dirt entering the detention basins, do they need to be dredged to restore original capacity? Do storm sewers need to be camera inspected to check for reduced capacity due to construction dirt? The detention basin dredging was addressed in a letter dated 1-30-19 from Ron Dauby. A note was added to the drainage plan stating that the storm sewer would be cleaned one time after construction is completed.

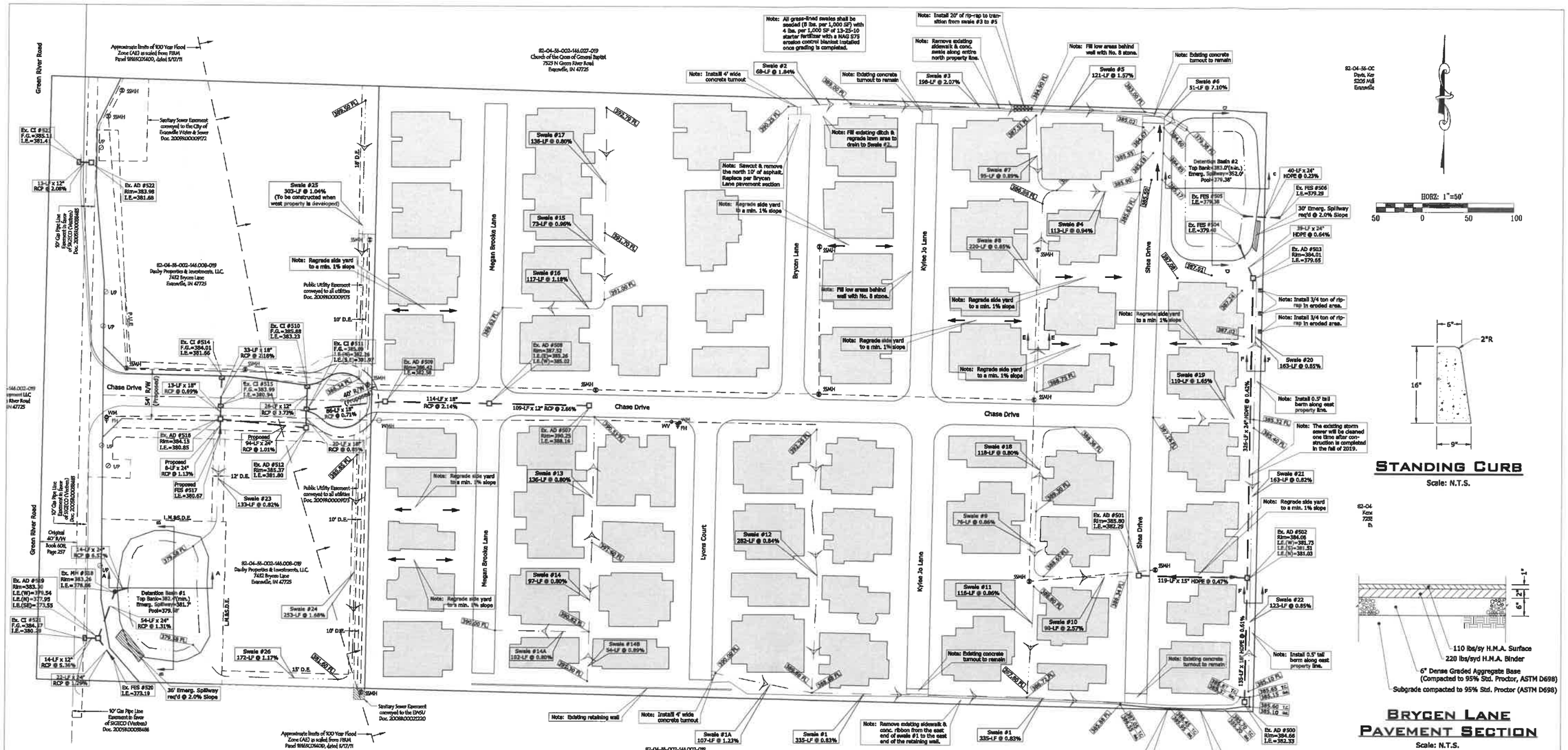
12. Detention Basin #2 bank needs to be repaired due to erosion. Also, excess soil and debris left from some of the last condos constructed has been dumped along the west side of Basin #2. It needs to have the debris removed and be graded and seeded. Also, remaining concrete form needs to be removed from the north end of the existing curb between Shea Drive and Basin #2. These items will be addressed when detention basin #2 is regraded.

13. Would an AD to Retention Basin from the center of North Shea Drive be needed to reduce load on the North swale? No

BOARD/UNIT OWNER QUESTIONS (Received April 17, 2019)

1. Will the work on the north end of Brycen Ln. solve the ponding of water on the driveway, around the mailbox and yard north of the driveway at 7447 Brycen? Yes

11. A new condo was constructed at 7326 Megan Brooke Ln. Following construction the yards on the north and south were not graded for proper drainage. Please add these two yards to the drainage plan. *A note has been added to the drainage plan to regrade these side yards to a minimum 1% slope.*

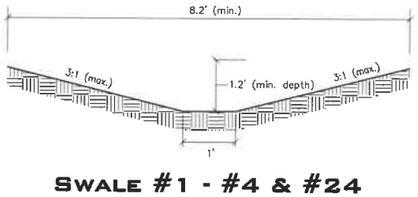


Standing Curb

Scale: N.T.S.

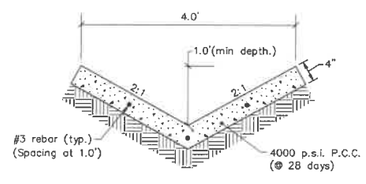
Brygen Lane Pavement Section

Scale: N.T.S.



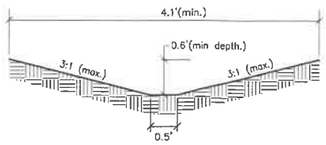
Swale #1 - #4 & #24 - #26 Cross-Section

Scale: N.T.S.



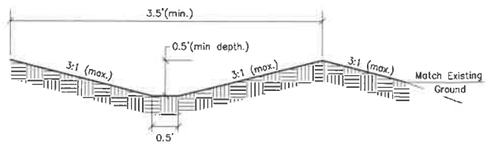
Swale #5 & #6 Cross-Section

Scale: N.T.S.



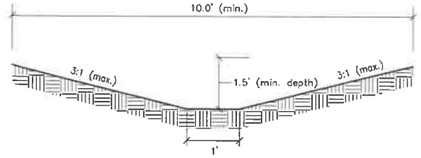
Swale #7 - #19 Cross-Section

Scale: N.T.S.



Swale #20 - #22 Cross-Section

Scale: N.T.S.



Swale #23 Cross-Section

Scale: N.T.S.

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

Signature — 30 May 19 — Date

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Revisions	No.	Date	By	Description

Project No.:	14-1887
Designed By:	G.A.M.
Drawn By:	G.A.M.
Filename:	Redesign Jan 2019
Layout Tab:	DRAINAGE
Scale:	As Shown

Project: Hunter Chase Estates
Address: North Green River Road, Evansville, Indiana
Sheet Title: **Drainage Plan**

Date: 05.30.19
Drawing No.: C-101
Of:

RECORDER
VANDERBURGH COUNTY
DEBBIE STUCKI
2019R00010130
05/24/2019 10:32 AM
RECORDING FEES: 25.00
PAGES: 15

FIFTY-SEVENTH SUPPLEMENTAL DECLARATION FOR HUNTER CHASE ESTATES ADDING PHASE 58

THIS FIFTY-SEVENTH SUPPLEMENTAL DECLARATION made this 22nd day of May 2019 by DAUBY PROPERTIES & INVESTMENTS, LLC, an Indiana limited liability company, with its office and principal place of business in Vanderburgh County, Indiana, hereinafter referred to as "Declarant".

WITNESSETH, THAT:

WHEREAS, on the 2nd day of June, 2008, Dauby Construction, Inc. executed a Declaration of Horizontal Property Regime for Hunter Chase Estates Condominium, hereafter referred to as "Hunter Chase Estates", which was recorded, with the exhibits attached thereto, on June 6, 2008 as Document No. 2008R00015583; and said Declaration was amended by the First Supplemental Declaration for Hunter Chase Estates Adding Phase 2 dated May 4, 2009 and recorded May 13, 2009 as Document No. 2009R00012133, and further amended by the Second Supplemental Declaration for Hunter Chase Estates Adding Phase 3 dated September 11, 2009 and recorded September 17, 2009 as Document No. 2009R00024956, the Third Supplemental Declaration for Hunter Chase Estates Adding Phase 4 dated December 11, 2009 and recorded December 14, 2009 as Document No. 2009R00032874, as modified by Amendment to Third Supplemental Declaration dated June 8, 2010 and recorded June 10, 2010 as Document No. 2010R00013048, the Fourth Supplemental Declaration for Hunter Chase Estates, adding Phase 5 dated June 2, 2010 and recorded June 2, 2010 as Document No. 2010R00012355, the Fifth Supplemental Declaration for Hunter Chase Estates, adding Phase 6 dated November 15, 2010 and recorded November 16, 2010 as Document No. 2010R00028133, the Sixth Supplemental Declaration for Hunter Chase Estates Adding Phase 7 dated December 8, 2010 and recorded December 20, 2010 as Document No. 2010R00031468, and modified by the Amendment to Declaration of Horizontal Property Regime for Hunter Chase Estates and Amendment to First Supplemental Declaration for Hunter Chase Estates Adding Phase 2 ("Amendment") dated January 18, 2011 and recorded January 19, 2011 as Document No. 2011R00001767, as further amended by the Seventh Supplemental Declaration for Hunter Chase Estates Adding Phase 8 dated February 2, 2011 and recorded February 7, 2011 as Document No. 2011R00003258, the Eighth Supplemental Declaration for Hunter Chase Estates, adding Phase 9 dated April 29, 2011 and recorded May 4, 2011 as Document No. 2011R00010248, the Ninth Supplemental Declaration for Hunter Chase Estates, adding Phase 10 dated July 22, 2011 and recorded July 25, 2011 as Document No. 2011R00016635, the Tenth Supplemental Declaration for Hunter Chase Estates, adding Phase 11 dated July 22, 2011 and recorded July 25, 2011 as Document No. 2011R00016336, the Eleventh Supplemental Declaration for Hunter Chase Estates, adding Phase 12 dated September 8, 2011 and recorded September 9, 2011 as Document No. 2011R00020132, the Twelfth Supplemental Declaration for Hunter Chase Estates, adding Phase 13 dated

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5/29/2019

December 16, 2011 and recorded December 16, 2011 as Document No. 2011R00029125, the Thirteenth Supplemental Declaration for Hunter Chase Estates, adding Phase 14 dated February 29, 2012 and recorded March 2, 2012 as Document No. 2012R00005457, the Fourteenth Supplemental Declaration for Hunter Chase Estates adding Phase 15 dated April 5, 2012 and recorded April 9, 2012 as Document No. 2012R00008698, as modified by the Amendment to Fourteen Supplemental Declaration for Hunter Chase Estates Adding Phase 15, dated May 10, 2019 and recorded May 14, 2019 as Document No. 2019R00009318; the Fifteenth Supplemental Declaration for Hunter Chase Estates adding Phase 16 dated July 30, 2012 and recorded August 13, 2012 as Document No. 2012R00020033, as modified by the Amended Fifteenth Supplemental Declaration for Hunter Chase Estates adding Phase 16 dated July 30, 2012 and recorded February 13, 2013 as Document No. 2013R00003916, as further amended by the Sixteenth Supplemental Declaration for Hunter Chase Estates adding Phase 17 dated January 14, 2013 and recorded February 4, 2013 as Document No. 2013R00003147 and the Seventeenth Supplemental Declaration for Hunter Chase Estates adding Phase 18 dated June 18, 2013 and recorded as Document No. 2013R00016782, as further amended by the Eighteenth Supplemental Declaration for Hunter Chase Estates adding Phase 19 dated September 16, 2013 and recorded September 17, 2013 as Document No. 2013R00025342, as further amended by the Nineteenth Supplemental Declaration for Hunter Chase Estates adding Phase 20 dated September 16, 2013 and recorded September 17, 2013 as Document No. 2013R00025343, as amended by the Twentieth Supplemental Declaration for Hunter Chase Estates adding Phase 21 dated October 29, 2013 and recorded November 1, 2013 as Document No. 2013R00029993, as amended by the Twenty-first Supplemental Declaration for Hunter Chase Estates adding Phase 22 dated December 11, 2013, and recorded December 11, 2013 as Document No. 2013R00032789, and as amended by the Twenty-second Supplemental Declaration for Hunter Chase Estates adding Phase 23 dated December 11, 2013 and recorded December 12, 2013 as Document No. 2013R00032915, and as amended by the Twenty-third Supplemental Declaration for Hunter Chase Estates adding Phase 24 dated February 6, 2014 and recorded February 11, 2014 as Document No. 2014R00003204, as amended by the Twenty-fourth Supplemental Declaration for Hunter Chase Estates adding Phase 25 dated March 25, 2014 and recorded March 26, 2014 as Document No. 2014R00006539, as amended by the Twenty-fifth Supplemental Declaration for Hunter Chase Estates adding Phase 26 dated April 25, 2014 and recorded April 25, 2014 as Document No. 2014R00009627, as amended by the Twenty-sixth Supplemental Declaration for Hunter Chase Estates adding Phase 27 dated July 21, 2014 and recorded July 22, 2014 as Document No. 2014R000016178, as amended by the Twenty-seventh Supplemental Declaration for Hunter Chase Estates adding Phase 28 dated September 23, 2014 and recorded September 23, 2014 as Document No. 2014R00021268, and as amended by the Twenty-eighth Supplemental Declaration for Hunter Chase Estates adding Phase 29 dated September 30, 2014 and recorded October 1, 2014 as Document No. 2014R00022060 and the Twenty-ninth Supplemental Declaration for Hunter Chase Estates adding Phase 30, dated December 10, 2014 and recorded December 11, 2014, as Document No. 2014R00027599 and the Thirtieth Supplemental Declaration to Hunter Chase Estates adding Phase 31, dated April 14, 2015 and recorded April 16, 2015 as Document No. 2015R00008381 and the Thirty-first Supplemental Declaration to Hunter Chase Estates adding Phase 32, dated June 2, 2015 and recorded June 4, 2015 as Document No. 2015R00012631 and the Thirty-second Supplemental Declaration to Hunter Chase Estates adding Phase 33 dated July 10, 2015 and recorded July 16, 2015 as Document No.

2015R00016526 and the Thirty-third Supplemental Declaration to Hunter Chase Estates adding Phase 34 dated August 12, 2015 and recorded August 13, 2015 as Document No. 2015R00019066 and the Thirty-fourth Supplemental Declaration to Hunter Chase Estates adding Phase 35 dated September 3, 2015 and recorded September 4, 2015 as Document No. 2015R00021208, the Thirty-fifth Supplemental Declaration to Hunter Chase Adding Phase 36 dated October 5, 2015 recorded October 6, 2015 as Document No. 2015R00023937, the Thirty-Sixth Supplemental Declaration to Hunter Chase Estates adding of Phase 37 dated October 16, 2015 and recorded October 19, 2015 as Document No. 2015R00024819 and subsequently re-recorded October 22, 2015 as Document No. 2015R00025196, the Thirty-Seventh Supplemental Declaration to Hunter Chase Estates adding Phase 38 dated October 27, 2015 recorded October 28, 2015 as Document No. 2015R00025784 and the Thirty-Eighth Supplemental Declaration to Hunter Chase Estates adding Phase 39 dated January 25, 2016 recorded January 25, 2016 as Document No. 2016R00001716, the Thirty-Ninth Supplemental Declaration to Hunter Chase Estates adding Phase 40 dated January 29, 2016 recorded February 1, 2016 as Document No. 2016R00002407, the Fortieth Supplemental Declaration to Hunter Chase Estates adding Phase 41 dated June 3, 2016 and recorded June 7, 2016 as Document No. 2016R00014686 and subsequently re-recorded July 1, 2016 as Document No. 2016R00017175 and rerecorded August 2, 2016 as Document No. 2016R00019818, and the Forty-First Supplemental Declaration to Hunter Chase Estates adding Phase 42 date July 11, 2016 and recorded July 11, 2016 as Document No. 2016R00017789 and rerecorded August 2, 2016 as Document No. 2016R00019819 and Forty-Second Supplemental Declaration to Hunter Chase Estates adding Phase 43 dated July 11, 2016 and recorded July 13, 2016 as Document No. 2016R00018061 and the Forty-Third Supplemental Declaration to Hunter Chase Estates adding Phase 44 dated August 25, 2016 and recorded August 30, 2016 as Document No. 2016R00022606, as modified by the Amendment to Forty-third Supplemental Declaration for Hunter Chase Estates Adding Phase 44, dated May 10, 2019 and recorded May 14, 2019 as Document No. 2019R00009319 and the Forty-Fourth Supplemental Declaration to Hunter Chase Estates adding Phase 45 dated January 9, 2017 and recorded January 9, 2017 as Document No. 2017R00000590 and the Forty-Fifth Supplemental Declaration to Hunter Chase Estates adding Phase 46 dated January 9, 2017 and recorded January 10, 2017 as Document No. 2017R00000774 and the Forty-Sixth Supplemental Declaration to Hunter Chase Estates adding Phase 47 dated January 9, 2017 and recorded January 12, 2017 as Document No. 2017R00000993 and Forty-Seventh Supplemental Declaration to Hunter Chase Estates adding Phase 48 dated April 7, 2017 and recorded April 10, 2017 as Document No. 2017R00008329, as modified by the Amendment to Forty-seventh Supplemental Declaration for Hunter Chase Estates Adding Phase 48 dated May 10, 2019 and recorded May 15, 2019 as Document No. 2019R00009434 and Forty-Eighth Supplemental Declaration to Hunter Chase Estates adding Phase 49 dated May 23, 2017 and recorded May 24, 2017 as Document No. 2017R00012263 and Forty-Ninth Supplemental Declaration to Hunter Chase Estates adding Phase 50 dated August 14, 2017 and recorded August 15, 2017 as Document No. 2017R00019949, and Fiftieth Supplemental Declaration to Hunter Chase Estates adding Phase 51 dated October 26, 2017 and recorded November 1, 2017 as Document No. 2017R00026728 and Fifty-First Supplemental Declaration to Hunter Chase Estates adding Phase 52 dated November 21, 2017 and recorded November 22, 2017 as Document No. 2017R00028512 and Fifty-Second Supplemental Declaration to Hunter Chase Estates adding Phase 53 dated December 28, 2017 and recorded December 28, 2017 as Document No. 2017R00031397and

Fifty-Third Supplemental Declaration to Hunter Chase Estates adding Phase 54 dated December 28, 2017 and recorded December 28, 2017 as Document No. 2017R00031398, Fifty-Fourth Supplemental Declaration to Hunter Chase Estates adding Phase 55 dated August 6, 2018 and recorded August 7, 2018 as Document No. 2018R00017942 and Fifty-Fifth Supplemental Declaration to Hunter Chase Estates adding Phase 56 dated August 6, 2018 and recorded August 7, 2018 as Document No. 2018R00017943 and subsequently re-recorded August 17, 2018 as Document No. 2018R00018819 and Fifty-Sixth Supplemental Declaration to Hunter Chase Estates adding Phase 57 dated December 21, 2018 and record December 26, 2018 as Document No. 2018R00028244, as modified by Amendment to Fifty-sixth Supplemental Declaration for Hunter Chase Estates Adding Phase 57 dated February 22, 2019 and recorded February 25, 2109 as Document No. 2019R00003517 and all in the Office of the Recorder of Vanderburgh County, Indiana.

WHEREAS, thereafter pursuant to a Ratification and Amendment, Declarant ratified and amended the Declaration and became the Declarant; and

WHEREAS, thereafter pursuant to Article XI of said Declaration, Dauby Properties & Investments, LLC, as the Declarant, may execute and record Supplemental Declarations adding portions of the Additional Tract described in said Declaration as additional phases to said condominium; and

WHEREAS, the Declarant desires to submit a portion of the Additional Tract to be a part of Hunter Chase Estates, which portion of said real property is more particularly described and set forth on Exhibit "A" attached hereto and made a part hereof, and which real property is hereinafter referred to as "Phase 58".

NOW THEREFORE, said Declarant for itself, and its grantees, successors and assigns, declares as follows:

I.
DECLARATION

Declarant hereby declares and submits Phase 58 as hereinabove described, together with the improvements and appurtenances thereto of every kind and nature whatsoever, and all replacements thereof, now or hereafter located upon said Phase 58, to the provisions of the Horizontal Property Law of the State of Indiana (I.C. 32-1-6-1 to 32-1-6-31, both inclusive, as amended), and the same shall become a part of and be included in Hunter Chase Estates as if the same had originally been included in the Declaration, and shall hereafter be held, transferred, sold, conveyed and occupied, subject to all of the terms, provisions, covenants, agreements, conditions, restrictions, protective covenants and regulations contained and set forth in said Declaration, First Supplemental Declaration, Second Supplemental Declaration, Third Supplemental Declaration, Fourth Supplemental Declaration, Fifth Supplemental Declaration, Sixth Supplemental Declaration, Seventh Supplemental Declaration, Eighth Supplemental Declaration, Ninth Supplemental Declaration, Tenth Supplemental Declaration, Eleventh Supplemental Declaration, Twelfth Supplemental Declaration, Thirteenth Supplemental

Declaration, Fourteenth Supplemental Declaration, Fifteenth Supplemental Declaration, Sixteenth Supplemental Declaration, Seventeenth Supplemental Declaration, Eighteenth Supplemental Declaration, Nineteenth Supplemental Declaration, Twentieth Supplemental Declaration, Twenty-first Supplemental Declaration, Twenty-second Supplemental Declaration, Twenty-third Supplemental Declaration, Twenty-fourth Supplemental Declaration, Twenty-fifth Supplemental Declaration, Twenty-sixth Supplement Declaration, Twenty-seventh Supplemental Declaration, Twenty-eighth Supplement Declaration, the Twenty-ninth Supplemental Declaration, the Thirtieth Supplemental Declaration, the Thirty-first Supplemental Declaration, the Thirty-second Supplemental Declaration, the Thirty-third Supplemental Declaration, the Thirty-fourth Supplemental Declaration, the Thirty-fifth Supplemental Declaration, the Thirty-sixth Supplemental Declaration, the Thirty-seventh Supplemental Declaration, the Thirty-eighth Supplemental Declaration, the Thirty-ninth Supplemental Declaration, the Fortieth Supplemental Declaration, the Forty-first Supplemental Declaration, Forty-second Supplemental Declaration, the Forty-third Supplemental Declaration, the Forty-fourth Supplemental Declaration, the Forty-fifth Supplemental Declaration, the Forty-sixth Supplemental Declaration, the Forty-seventh Supplemental Declaration, the Forty-eighth Supplemental Declaration, the Forty-ninth Supplemental Declaration, the Fiftieth Supplemental Declaration, the Fifty-first Supplemental Declaration, the Fifty-second Supplemental Declaration, the Fifty-third Supplemental Declaration, the Fifty-fourth Supplemental Declaration, the Fifty-fifth Supplemental Declaration, and the Fifty-sixth Supplemental Declaration and all exhibits attached thereto, and said Declaration and Supplemental Declarations, the exhibits attached thereto, and the By-Laws of Hunter Chase Estates are hereby incorporated herein and made a part hereof by reference.

II.
DEFINITIONS

The words and terms used in this Fifty-seventh Supplemental Declaration shall have the meaning stated in the Horizontal Property Law of the State of Indiana and in the Declaration unless the context otherwise requires; provided, however, Phase 58 shall for all purposes now be included in the definition of "Tract" as set forth in the Declaration.

III.
OWNERSHIP OF GENERAL AND LIMITED COMMON AREAS AND PERCENTAGE INTEREST

The percentage interest of each unit in the Tract, as now defined, with respect to the general common areas and the limited common areas shall be as follows:

Unit	Street Address	Percentage Interest
Phase 1		
Unit 8-A	7431 Megan Brooke Lane	0.923%
Unit 8-B	7435 Megan Brooke Lane	0.760%
Unit 8-C	7439 Megan Brooke Lane	0.760%
Unit 8-D	7443 Megan Brooke Lane	0.760%

Unit 8-E	7447 Megan Brooke Lane	0.923%
Phase 2		
Unit 6-A	7327 Megan Brooke Lane	0.766%
Unit 6-B	7331 Megan Brooke Lane	0.760%
Unit 6-C	7335 Megan Brooke Lane	0.760%
Unit 6-D	7339 Megan Brooke Lane	0.760%
Unit 6-E	7343 Megan Brooke Lane	0.923%
Phase 3		
Unit 9-A	5000 Chase Drive	0.923%
Unit 9-B	5004 Chase Drive	0.923%
Phase 4		
Unit 7-C	7415 Megan Brooke Lane	0.923%
Unit 7-D	7419 Megan Brooke Lane	0.839%
Phase 5		
Unit 7-A	7403 Megan Brooke Lane	0.923%
Unit 7-B	7407 Megan Brooke Lane	0.839%
Phase 6		
Unit 10-A	5001 Chase Drive	0.923%
Unit 10-B	5005 Chase Drive	0.653%
Unit 10-C	5007 Chase Drive	0.923%
Phase 7		
Unit 1-A	7430 Megan Brooke Lane	0.923%
Unit 1-B	7434 Megan Brooke Lane	0.923%
Phase 8		
Unit 10-D	7328 Lyons Court	1.232%
Phase 9		
Unit 5-B	7313 Megan Brooke Lane	0.839%
Unit 5-C	7317 Megan Brooke Lane	0.923%
Phase 10		
Unit 5-A	7301 Megan Brooke Lane	0.961%
Phase 11		
Unit 1-C	7446 Megan Brooke Lane	0.923%
Unit 1-D	7450 Megan Brooke Lane	1.040%

Phase 12		
Unit 2-A	7404 Megan Brooke Lane	0.923%
Unit 2-B	7408 Megan Brooke Lane	0.923%
Phase 13		
Unit 4-A	7300 Megan Brooke Lane	0.923%
Unit 4-B	7304 Megan Brooke Lane	0.923%
Phase 14		
Unit 11-A	7302 Lyons Court	1.040%
Phase 15		
Unit 17-A	7401 Brycen Lane	0.931%
Unit 17-B	7405 Brycen Lane	0.923%
Phase 16		
Unit 3-D	7342 Megan Brooke Lane	0.942%
Phase 17		
Unit 17-C	7417 Brycen Lane	0.952%
Unit 17-D	7421 Brycen Lane	0.923%
Phase 18		
Unit 15-A	7440 Brycen Lane	1.285%
Unit 15-B	7448 Brycen Lane	0.940%
Phase 19		
Unit 16-A	7427 Brycen Lane	0.952%
Unit 16-B	7431 Brycen Lane	0.923%
Phase 20		
Unit 16-C	7443 Brycen Lane	0.839%
Unit 16-D	7447 Brycen Lane	1.058%
Phase 21		
Unit 2-C	7420 Megan Brooke Lane	0.962%
Unit 2-D	7424 Megan Brooke Lane	1.040%
Phase 22		
Unit 14-A	7402 Brycen Lane	1.098%
Phase 23		
Unit 13-A	7325 Lyons Court	0.947%
Unit 13-B	7329 Lyons Court	0.947%

Phase 24		
Unit 3-C	7338 Megan Brooke Lane	1.075%
Phase 25		
Unit 14-B	7414 Brycen Lane	1.285%
Phase 26		
Unit 11-B	7314 Lyons Court	0.829%
Unit 11-C	7318 Lyons Court	0.947%
Phase 27		
Unit 12-A	7303 Lyons Court	1.057%
Unit 12-B	7307 Lyons Court	0.947%
Phase 28		
Unit 23-A	7429 Kylee Jo Lane	1.276%
Unit 23-B	7433 Kylee Jo Lane	1.096%
Phase 29		
Unit 23-C	7445 Kylee Jo Lane	1.098%
Unit 23-D	7449 Kylee Jo Lane	1.057%
Phase 30		
Unit 13-C	7341 Lyons Court	0.839%
Unit 13-D	7345 Lyons Court	1.070%
Phase 31		
Unit 30-C	7415 Shea Drive	1.040%
Unit 30-D	7417 Shea Drive	0.947%
Phase 32		
Unit 24-C	7444 Shea Dr.	0.923%
Unit 24-D	7448 Shea Dr.	0.947%
Phase 33		
Unit 21-D	7343 Kylee Jo Lane	1.098%
Phase 34		
Unit 30-A	7401 Shea Dr.	0.839%
Unit 30-B	7405 Shea Dr.	0.947%
Phase 35		
Unit 12-C	7315 Lyons Ct.	1.098%

Phase 36		
Unit 20-A	7301 Kylee Jo Lane	0.839%
Unit 20-B	7305 Kylee Jo Lane	1.150%
Phase 37		
Unit 22-D	7423 Kylee Jo Lane	0.942%
Phase 38		
Unit 21-A	7323 Kylee Jo Lane	1.044%
Unit 21-B	7327 Kylee Jo Lane	1.285%
Phase 39		
Unit 28-A	7303 Shea Dr.	0.839%
Unit 28-B	7307 Shea Dr.	0.919%
Phase 40		
Unit 4-C	7312 Megan Brooke Lane	0.738%
Unit 4-D	7316 Megan Brooke Lane	0.738%
Phase 41		
Unit 20-C	7317 Kylee Jo Lane	0.948%
Phase 42		
Unit 22-A	7403 Kylee Jo Lane	1.098%
Unit 22-B	7407 Kylee Jo Lane	0.947%
Phase 43		
Unit 27-A	7302 Shea Drive	0.839%
Phase 44		
Unit 19-A	7300 Kylee Jo Lane	0.879%
Unit 19-B	7304 Kylee Jo Lane	0.946%
Phase 45		
Unit 18-A	7322 Kylee Jo Lane	0.879%
Unit 18-B	7326 Kylee Jo Lane	0.947%
Phase 46		
Unit 28-C	7319 Shea Drive	1.336%
Phase 47		
Unit 25-A	7402 Shea Drive	1.104%

Phase 48		
Unit 18-C	7338 Kylee Jo Lane	1.054%
Unit 18-D	7342 Kylee Jo Lane	0.869%
Phase 49		
Unit 29-A	7325 Shea Drive	1.252%
Unit 29-B	7329 Shea Drive	1.095%
Phase 50		
Unit 24-A	7428 Shea Drive	0.856%
Unit 24-B	7432 Shea Drive	0.947%
Phase 51		
Unit 26-A	7336 Shea Drive	1.318%
Phase 52		
Unit 29-C	7341 Shea Drive	1.252%
Unit 29-D	7345 Shea Drive	0.869%
Phase 53		
Unit 26-B	7340 Shea Drive	0.947%
Unit 26-C	7344 Shea Drive	0.869%
Phase 54		
Unit 25-B	7418 Shea Drive	0.947%
Unit 25-C	7422 Shea Drive	0.738%
Phase 55		
Unit 27-B	7314 Shea Drive	1.021%
Unit 27-C	7318 Shea Drive	0.856%
Phase 56		
Unit 19-C	7312 Kylee Jo Lane	1.164%
Phase 57		
Unit 3-A	7326 Megan Brooke Lane	0.987%
		100%

*These unit numbers have been changed from the original numbers designated in the Declaration and the First Supplemental Declaration. They were changed by Amendment to Declaration of Horizontal Property Regime for Hunter Chase Estates and Amendment to First Supplemental Declaration for Hunter Chase Estates Adding Phase 2 ("Amendment") dated January 18, 2011 and recorded January 19, 2011 as Document No. 2011R00001767, in the Office of the Recorder of Vanderburgh County, Indiana.

The Declarant hereby grants and conveys to the owners of each unit in Phases 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, and 57 an undivided interest in the general and limited common areas of Phase 1, Phase 2, Phase 3, Phase 4, Phase 5, Phase 6, Phase 7, Phase 8, Phase 9, Phase 10, Phase 11, Phase 12, Phase 13, Phase 14, Phase 15, Phase 16, Phase 17, Phase 18, Phase 19, Phase 20, Phase 21, Phase 22, Phase 23, Phase 24, Phase 25, Phase 26, Phase 27, Phase 28, Phase 29, Phase 30, Phase 31, Phase 32, Phase 33, Phase 34, Phase 35, Phase 36, Phase 37, Phase 38, Phase 39, Phase 40, Phase 41, Phase 42, Phase 43, Phase 44, Phase 45, Phase 46, Phase 47, Phase 48, Phase 49, Phase 50, Phase 51, Phase 52, Phase 53, Phase 54, Phase 55, Phase 56, Phase 57 and Phase 58 equal to the percentage interest appertaining to each unit in Phases 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, and 57 as hereinabove set forth, and this grant and conveyance shall inure to the benefit of the successors and assigns of the owners of units in Phases 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57 and 58 and those claiming under them, including the holder of any mortgage on a unit in Phases 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29,4 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, and 57.

IV.
RATIFICATION

The provisions of these Supplemental Declarations, the Declaration executed May 9, 2008, the Act, the By-Laws of the Association and any rules and regulations adopted pursuant thereto, as each may be amended from time to time, are hereby ratified and all such provisions shall be covenants running with the land and shall bind any person having at any time any interest or estate in said unit as though such provisions were cited and stipulated at length in each and every deed, conveyance, mortgage or lease thereof.

V.
ADDITIONAL PHASES

It is recognized that Declarant reserves the right to add additional phases upon that portion of the Additional Tract for which phases have not been added, all pursuant to the terms of the Declaration.

Except as specifically modified herein the Fifty-Seventh supplemental is hereby ratified, approved and confirmed.

[Signature and notary to follow]

IN WITNESS WHEREOF, the said DAUBY PROPERTIES & INVESTMENTS, LLC has caused the execution hereof by and through Ronald L. Dauby, its Managing Member, as of the day and year first above written.

DAUBY PROPERTIES & INVESTMENTS, LLC

By: Ronald Lee Dauby
Ronald L. Dauby, Managing Member

STATE OF INDIANA)
) SS:
COUNTY OF VANDERBURGH)

Before me, a Notary Public, in and for said County and State, personally appeared the above-named Ronald L. Dauby, Managing Member of Dauby Properties & Investments, LLC, who acknowledged the execution of the foregoing, and who, having been duly sworn, stated that any representations therein contained are true.

WITNESS my hand and Notarial Seal this 22 day of May, 2019.

Notary Public

Karen S. Creek
Printed Name of Notary

My County of Residence is Gibson County, State of Indiana, and
My Commission Expires: 09-14-21
Commission No: 647494

KAREN S. CREEK
Resident of Gibson County, IN
Commission Expires: September 14, 2021
Commission # 647494

This instrument was prepared by Jeffrey A. Bosse, Attorney-at-Law, Bosse Law Office, P.C., 501 Main Street, Suite 101, Evansville, Indiana, 47708.

I affirm, under the penalties of perjury, that I have taken reasonable care to redact each Social Security number in this document, unless required by law. Printed Name: Teresa Fruit

EXHIBIT "A"

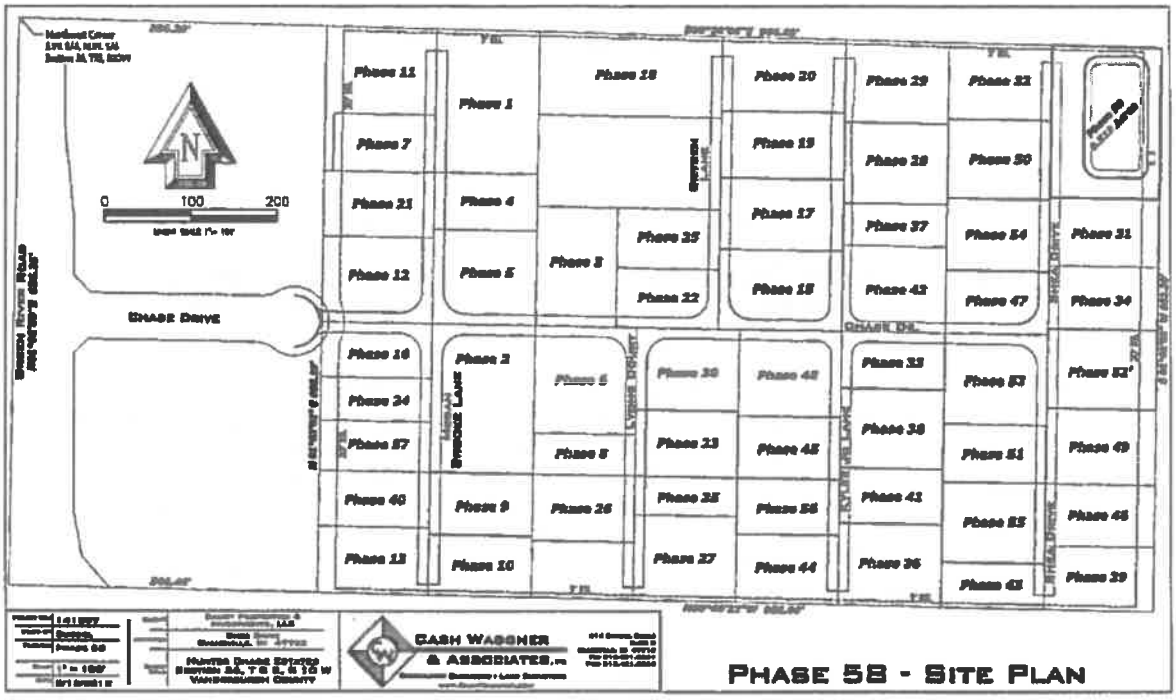
Phase 58
Legal Description
Detention Basin – Hunter Chase Estates

Part of the Southwest Quarter of the Northwest Quarter of Section 36, Township 5 South, Range 10 West, of the Second Principal Meridian, in Center Township, Vanderburgh County, Indiana, and more particularly described as follows:

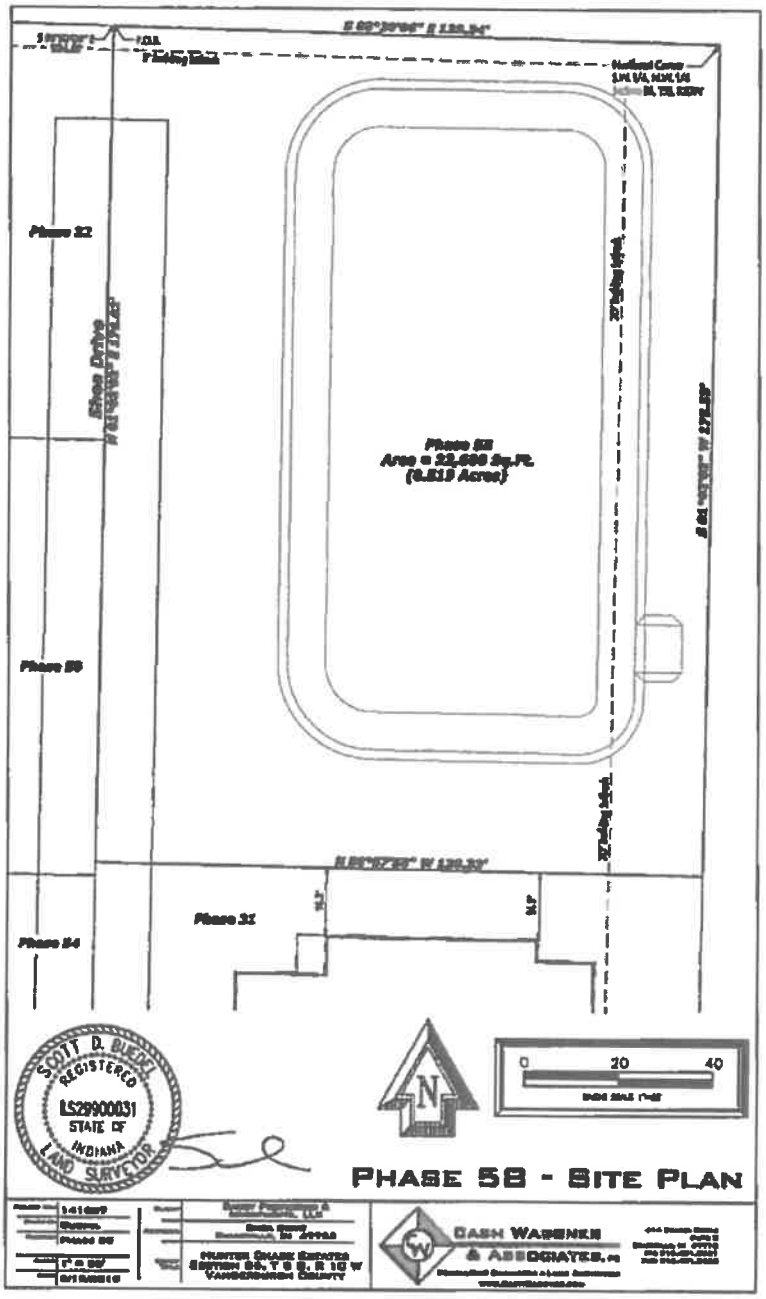
Commencing at the Northwest Corner of the Southwest Quarter of the Northwest Quarter of said Section 36; thence along the north line of said Quarter Quarter Section, South 88 degrees 30 minutes 06 seconds East (assumed bearing) a distance of 1194.63 feet to the point of beginning; thence continue along the north line of said Quarter Quarter Section, South 88 degrees 30 minutes 06 seconds East a distance of 128.34 feet to the Northeast Corner thereof; thence along the east line of said Quarter Quarter Section, South 01 degree 02 minutes 02 seconds West a distance of 175.58 feet; thence North 88 degrees 57 minutes 58 seconds West a distance of 128.33 feet; thence North 01 degree 02 minutes 02 seconds East a distance of 176.62 feet to the point of beginning and containing a gross area of 0.519 acres (22,600 Square Feet), more or less.

Subject to all easements and rights-of-ways of record.

5-15-19



PHASE 58 - SITE PLAN


Phase 32
Phase 58
Phase 34
Phase 33
0
20
40
SCOTT D. BUEKE
REGISTERED
LS29900031
STATE OF
INDIANA
LAND SURVEYOR
PHASE 5B - SITE PLAN
CASH WAGNER
& ASSOCIATES, PC

Mueller, Jeffrey

From: Shannon S. Frank <sfrank@kddk.com>
Sent: Wednesday, May 15, 2019 4:47 PM
To: Mueller, Jeffrey; 'GMeritt@cashwaggner.com'; Schmitt, Reed S.
Cc: Stoll, John; Scott Buedel; dauby_construction@yahoo.com; Craig Emig; David Jones (djones@joneswallace.com)
Subject: RE: Hunter Chase UPDATE
Attachments: Drainage Easement Hunter Chase FINAL.doc; LMSDE Easement Hunter Chase FINAL.doc; Temp ROW and Temp Easement Hunter Chase FINAL.doc; Indemnity Agreement.doc

Per the below, attached are drafts of all documents referenced.

Please review and confirm approval. Teresa Fruit with Bosse Title is in the process of finalizing the Supplemental Declaration to bring the drainage basin into the development. We will forward once recorded.

I believe these address all of the County concerns related to the drainage plan. If I have missed something, please let me know.

Once approved, I will have Ron sigh each document and we will be prepared to deliver the documents at the next drainage board meeting – assume all else is ready to move forward.

Shannon Frank

From: Shannon S. Frank
Sent: Thursday, May 9, 2019 5:47 PM
To: Mueller, Jeffrey <jmueller@vanderburghsurveyor.com>; 'GMeritt@cashwaggner.com' <GMeritt@cashwaggner.com>; Schmitt, Reed S. <RSchmitt@bgdlegal.com>
Cc: Stoll, John <JStoll@vanderburghgov.org>; Scott Buedel <SBuedel@cashwaggner.com>; dauby_construction@yahoo.com; Craig Emig <cemig@joneswallace.com>; David Jones (djones@joneswallace.com) <djones@joneswallace.com>
Subject: RE: Hunter Chase UPDATE

I wanted to touch base where we stand on the outstanding matters, per Jeff's most recent listing (condensed to the below):

1. Easement documents
   - -Basin 1 / lake maintenance (Scott is working on)
   - -Remaining ditches and piping (Scott is working on)

-Temporary road right of way and easement for drainage and utilities (*see attached – needs review of County attorney, Jeff and John, please advise*)

2. Indemnity Agreement – this has been drafted and approved by the County Attorney (with a requested revision by County attorney). Is now in final form.

3. Basin 2 – Bosse Title has been requested to prepare a Supplemental Declaration to bring this parcel into the Condo Association. Scott is providing legal description to Bosse Title. I have followed up on this with Teresa Fruit at Bosse Title and waiting to hear back from her. The document will be in format as all prior 50+ Supplemental Declarations for the development, with the legal description for Basin 2. Does someone want/need to review this?

4. Homeowner Issues – Do not believe every single item on their list is necessary for the drainage plan and defer to Glen. Glen and Ron have done a lot to the plan to address their concerns. If Glen can bring us up to speed on where things stand.

Shannon S. Frank, Partner
KAHN, DEES, DONOVAN & KAHN, LLP
(812) 423-3183 *Office* • (812) 423-3841 *Fax* • sfrank@KDDK.com
501 Main Street, Suite 305, P.O. Box 3646, Evansville, IN 47735
www.KDDK.com

Email 5/15/2019

INDEMNITY AGREEMENT

THIS AGREEMENT is made and entered into as of the _____ day of _____, 2019, by and between **Dauby Properties and Investments, LLC**, an Indiana limited liability company whose mailing address is 7432 Brycen Lane, Evansville, Indiana 47725 (hereinafter "DPI") and **The Board of Commissioners of Vanderburgh County, Indiana**, whose mailing address is Civic Center Complex, Room 305, One Martin Luther King, Jr. Blvd., Evansville, Indiana 47708 (hereinafter "County").

WHEREAS, DPI developed certain real estate in Vanderburgh County, Indiana pursuant to that certain Declaration of Horizontal Property Regime for Hunter Chase Estates Condominium, dated May 9, 2008 and recorded June 2, 2008 as Instrument Number 2008R00012133 in the Office of the Recorder of Vanderburgh County, Indiana, as amended and supplemented (the "Development");

WHEREAS, DPI will be performing certain work within the Development ("Drainage Plan Work") to implement a drainage plan according to that certain final drainage plan approved by the Vanderburgh County Drainage Board on _____, 2019, all as set forth in the Drainage Plan attached and incorporated herein as Exhibit "A" ("Final Plan");

WHEREAS, as part of the Final Plan DPI requested from the Vanderburgh County Drainage Board ("Drainage Board), and was granted, a variance as to certain swales located in the Development, namely Swale #5 and Swale #6 depicted in the Drainage Plan (collectively "Swales"), which Swales do not conform to Section 13.04.180 of the Vanderburgh County Code ("Code");

WHEREAS, County requires that DPI indemnify County with regard to damages suffered by the County from personal injuries arising from the Swales not conforming to the Code.

NOW THEREFORE, in consideration of the premises, the mutual promises and covenants herein contained, and other good and valuable consideration, the receipt and adequacy of which are hereby acknowledged by both parties hereto, the parties agree as follows:

1. **INDEMNITY**. Developer agrees to indemnify, defend, and save County harmless with respect to all liability, claims, demands, lawsuits, actions, penalties, costs and attorney's fees for personal injury to or death of any person arising from the Swales not conforming to Section 13.04.180 of the Code.

2. **NOTICE OF CLAIMS**. County shall promptly notify DPI of the assertion, filing or service of any claim, demand, lawsuit, action or notice of any claims or other matter that is or may be covered by the indemnification provisions of this Agreement. In the event that any notice is required to be made to DPI under this Agreement , said notice shall be in writing and sent by certified mail addressed as follows:

If to DPI:
Dauby Properties and Investments, LLC
Attn: Ronald L. Dauby, Manager
4732 Brycen Lane
Evansville, Indiana 47725

Copy to:
Kahn, Dees, Donovan & Kahn, LLP
Attn: Shannon S. Frank, Esq.
501 Main St., Suite 305
P.O. Box 3646
Evansville, Indiana 47735

3. **INTERPRETATION**. This Agreement shall be governed by and construed in accordance with

Indiana law, notwithstanding the choice of law rules thereof. This instrument contains the entire agreement between the parties on the subject of the indemnification of County by DPI. This Agreement shall inure to the benefit of and be binding upon the parties and their respective heirs, successors and assigns. All headings set forth herein are included for the convenience of reference only and shall not affect the interpretation hereof, nor shall any weight or value be given to the relative position of any part or provision hereof in relation to any other provision in determining such construction. If any provision of this Agreement is contrary to, prohibited by, or deemed invalid under applicable laws or regulations of any jurisdiction in which it is sought to be enforced, then such provision shall be deemed inapplicable and deemed omitted, but shall not invalidate the remaining provisions hereof. This Agreement may be executed simultaneously in several counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument. The language in all parts of this Agreement shall in all cases be construed as a whole according to its fair meaning, strictly neither for or against any party, and without implying a presumption that the terms hereof shall be more strictly construed against one (1) party by reason of any rule of construction to the effect that a document is to be construed more strictly against the party who personally or through such party's agent prepared the same. The recitals are specifically incorporated into this Agreement as the statements and representations of the undersigned. THIS PROVISION, AND EACH AND EVERY OTHER PROVISION OF THIS AGREEMENT MAY NOT UNDER ANY CIRCUMSTANCE BE MODIFIED, CHANGED, AMENDED OR PROVISIONS HEREUNDER WAIVED VERBALLY, BUT MAY ONLY BE MODIFIED, CHANGED, AMENDED OR PROVISIONS HEREUNDER WAIVED BY AN AGREEMENT IN WRITING EXECUTED BY ALL PARTIES HERETO.

IN WITNESS WHEREOF, the parties have executed this Agreement as of the day and year first above written.

DAUBY PROPERTIES AND INVESTMENTS, LLC

By: _____
Ronald L. Dauby, Manager

BOARD OF COMMISSIONERS OF VANDERBURGH COUNTY, INDIANA

By: _____
Ben Shoulders, President

By: _____
Jeff Hatfield, Vice-President

By: _____
Cheryl Musgrave, Member

EXHIBIT "A"

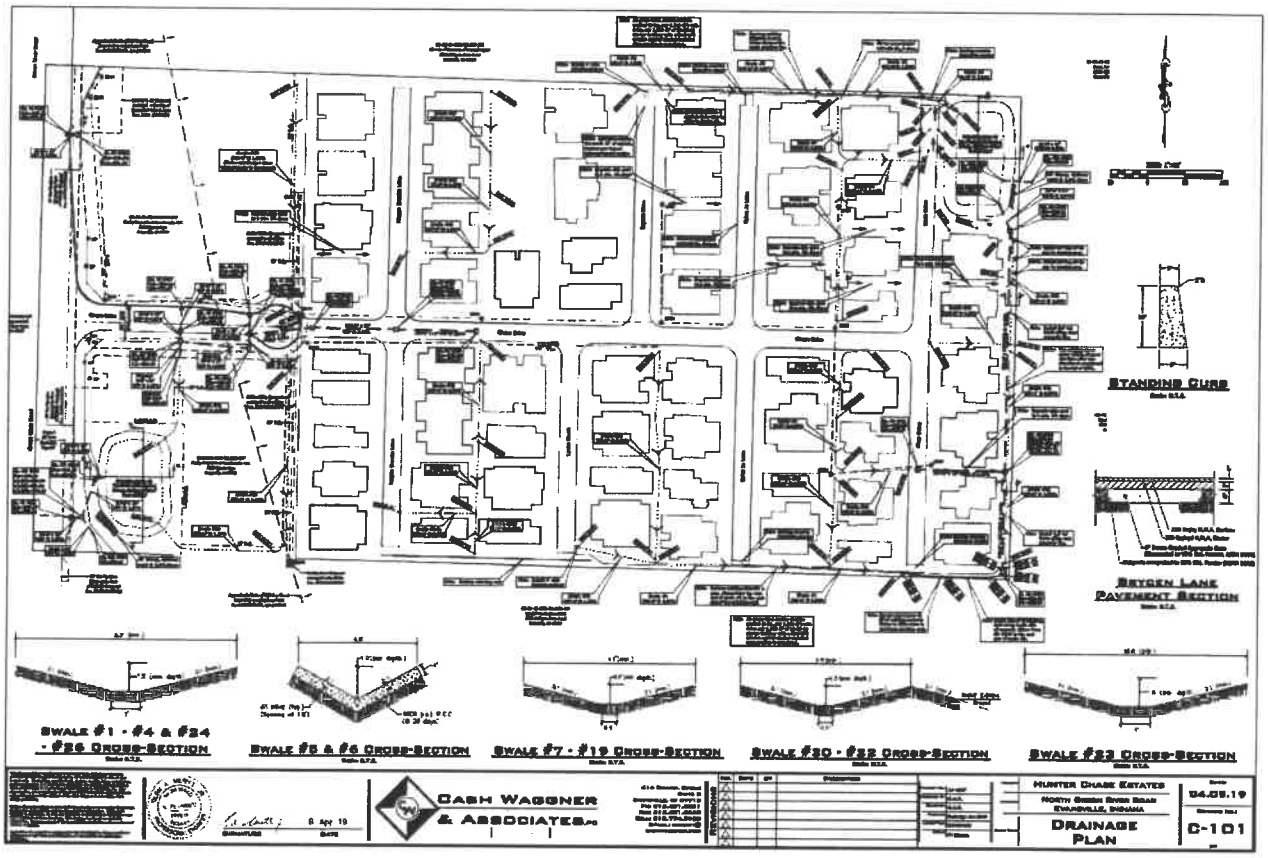

STANDING CURB
BEYGEN LANE PAVEMENT SECTION
SWALE #1 - #4 & #24 - #26 CROSS-SECTION
SWALE #5 & #6 CROSS-SECTION
SWALE #7 - #19 CROSS-SECTION
SWALE #20 - #22 CROSS-SECTION
SWALE #23 CROSS-SECTION
CASH WAGGONER & ASSOCIATES
HUNTER CHASE ESTATES
DRAINAGE PLAN
04.05.19
C-101

Exhibit 5/15/2019

TEMPORARY EASEMENT FOR RIGHT-OF-WAY, DRAINAGE STRUCTURES AND PUBLIC UTILITIES

CROSS REFERENCE: 2008R00015583, 2018R00010670, 2007R00034128

THIS INDENTURE WITNESSETH, that **Dauby Properties & Investments, LLC**, an Indiana limited liability company ("**Grantor**") for no cash consideration and for other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, does hereby **GRANT and CONVEY** unto **Vanderburgh County, Indiana** (hereafter "**Grantee**") a non-exclusive temporary right-of-way for public road purposes and a temporary easement for drainage and public utilities thereon as deemed necessary by Grantee, the real estate located in Vanderburgh County, Indiana, more particularly described on Exhibit "A" which is attached hereto and made a part hereof and more particularly shown on Exhibit "B" which is attached hereto and made a part hereof (the "**Real Estate**").

This temporary easement for right-of-way, drainage and public utilities does not obligate Vanderburgh County, in any way to construct, maintain, alter, repair or replace the existing road or drainage facilities.

This temporary easement for right-of-way, drainage and public utilities shall remain in full force and effect until such a time as a subdivision plat for the Real Estate affecting all or a portion of these easements is approved by Vanderburgh County, Indiana and recorded in the Office of the Recorder of Vanderburgh County, Indiana.

This grant and agreement shall constitute a covenant, which runs with the land, and shall be binding upon the legal representatives, successors and assigns of Grantor and Grantee.

The undersigned individual executing this Right-of-Way Grant and Dedication on behalf of Grantor represents and certifies that he is the duly authorized Manager of Dauby Properties & Investments, LLC and is fully empowered to execute and deliver this Temporary Right-of-Way and Temporary Easement for Drainage and Public Utilities.

IN WITNESS WHEREOF, the undersigned hereto have executed this Temporary Right-of-Way and Temporary Easement for Drainage and Public Utilities this _____ day of _____, 2019.

Dauby Properties & Investments, LLC

By: _____
Ronald Dauby, Manager

STATE OF INDIANA)
) **SS:**
COUNTY OF VANDERBURGH)

BEFORE ME, a Notary Public in and for said County and State, personally appeared **Ronald Dauby**, Manager of **Dauby Properties & Investments, LLC**, the Company which executed the foregoing instrument, who acknowledged and affirmed that he did sign said instrument as such Manager for and on behalf of said Company and by authority granted in its Articles of Organization and by its governing body, that the same is his free act and deed as said Member and the free and corporate act and deed of said Company.

WITNESS my hand and Notarial Seal this _____ day of _____, 2019.

My Commission Expires:
_____

_____
Signature of Notary Public

My County of Residence is:
_____County, Indiana

_____
Printed Name of Notary

NO RECORDING FEE SHALL BE CHARGED PURSUANT TO IC 8-23-23-1.

THIS INSTRUMENT was prepared by Kahn, Dees, Donovan & Kahn, LLP, Shannon S. Frank, Attorney at Law, 501 Main Street, Suite 305, P.O. Box 3646, Evansville, Indiana 47735-3646, at the specific request of one of the parties hereto, based solely on information supplied by one or more of the parties, and without a complete examination of survey, title or abstract. The drafter assumes no liability for any errors, inaccuracy, or omissions in this instrument resulting from the information provided, the parties and their successors and assigns hereto signifying their assent to this disclaimer by the execution or the acceptance of this instrument. [KDDK:436011]

I affirm, under the penalties for perjury, that I have taken reasonable care to redact each Social Security number in this document, unless required by law. *Shannon S. Frank*

RETURN TO: Shannon S. Frank, Esq., P.O. Box 3646, Evansville, Indiana 47735-3646.

Exhibit "A"
Temporary Easement description for Right-of-Way,
Drainage Structures and Pubilc Utilities
Chase Drive

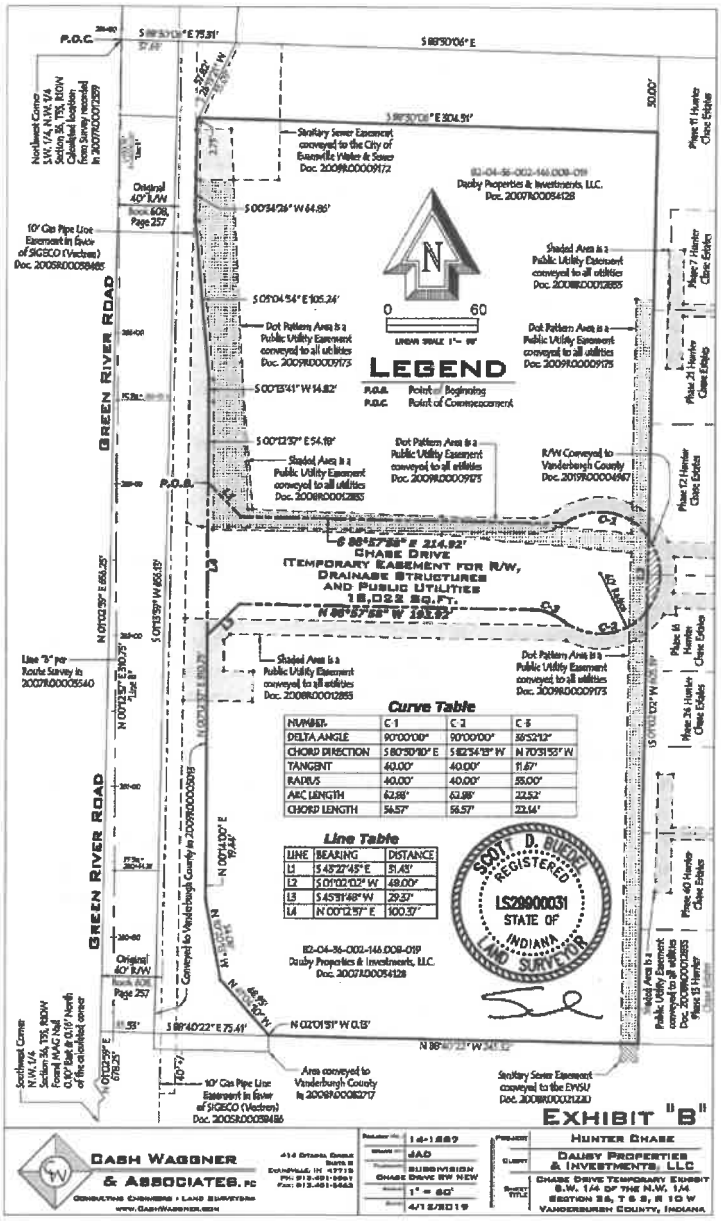
Part of the Southwest Quarter of the Northwest Quarter of Section 36, Township 5 South, Range 10 West in Center Township, Vanderburgh County, Indiana and being more particularly described as follows:

Commencing at the Northwest Corner of the Southwest Quarter of the Northwest Quarter of said Section 36; thence along the north line of said Quarter Quarter Section, South 88 degrees 30 minutes 06 seconds East 75.31 feet to the east line of a tract of land conveyed to the Board of Commissioners of Vanderburgh County, Indiana in Document 2009R00005013 in the Office of the Recorder of Vanderburgh County, Indiana; thence along the east side of said tract of land conveyed to Vanderburgh County the following five (5) calls:

South 26 degrees 19 minutes 21 seconds West 57.82 feet; thence
South 00 degrees 34 minutes 26 seconds West 64.86 feet; thence
South 05 degrees 04 minutes 54 seconds East 105.24 feet; thence
South 00 degrees 13 minutes 41 seconds West 14.82 feet; thence
South 00 degrees 12 minutes 37 seconds East 54.18 feet to the point of beginning; thence South 43 degrees 27 minutes 45 seconds East 31.43 feet; thence South 88 degrees 57 minutes 58 seconds East 214.92 feet to the beginning of a curve to the right having a central angle of 90 Degrees 00 Minutes 00 Seconds, radius of 40.00 feet and a chord dimension of South 80 degrees 50 minutes 10 seconds East 56.57 feet; thence along the arc of said curve 62.83 feet to a corner of a Right-of-Way Grant and Dedication to Vanderburgh County, Indiana in Document 2019R00004967 in the Office of said the Recorder; thence along the west side of said Right-of-Way, South 01 degree 02 minutes 02 seconds West 48.00 feet to the beginning of a curve to the right having a central angle of 90 degrees 00 Minutes 00 Seconds, radius of 40.00 feet and a chord dimension of South 82 Degrees 54 Minutes 13 Seconds West 56.57 feet; thence along the arc of said curve 62.83 feet to the beginning of a curve to the left having a central angle of 36 Degrees 52 Minutes 12 Seconds, a radius of 35.00 feet and a chord dimension of North 70 Degrees 31 Minutes 53 Seconds West 22.14 feet; thence along the arc of said curve 22.52 feet; thence North 88 degrees 57 minutes 58 seconds West 193.92 feet; thence South 45 degrees 31 minutes 48 seconds West 29.37 feet to the east line of said tract of land conveyed to the Board of Commissioners of Vanderburgh County, Indiana in Document 2009R00005013; thence along said east line, North 00 degrees 12 minutes 37 seconds East 100.37 feet to the point of beginning and containing a gross area of 18,022 square feet, more or less.

Subject to all easements and rights-of-ways of record.

Exhibit "B"


P.O.C.
S 88°30'06" E 75.31'
S 88°30'06" E
S 88°30'06" E 304.91'
Northeast Corner S.W. 1/4, N.W. 1/4 Section 36, T3S, R10W Calculated location from Survey recorded in 2007R00012599
Sanitary Sewer Easement conveyed to the City of Evansville Water & Sewer Doc. 2009R00009172
Original 40' R/W Book 608, Page 257
S 00°34'26" W 64.95'
10' Gas Pipe Line Easement in favor of SIGECO (Vectren) Doc. 2005R00058485
GREEN RIVER ROAD
S 05°04'54" E 105.24'
Dot Pattern Area is a Public Utility Easement conveyed to all utilities Doc. 2009R00009175
S 00°13'41" W 54.82'
S 00°12'57" E 54.19'
Shaded Area is a Public Utility Easement conveyed to all utilities Doc. 2006R00012855
P.O.B.
R/W Conveyed to Vanderburgh County Doc. 2019R00004967
S 88°57'28" E 214.92'
CHASE DRIVE
(TEMPORARY EASEMENT FOR R/W, DRAINAGE STRUCTURES AND PUBLIC UTILITIES
18,022 SQ.FT.
N 88°57'28" W 182.92'
Line "A" per Route Survey in 2007R00005540
N 00°12'59" E 655.25'
S 01°13'59" W 655.69'
Curve Table
Line Table
LINE | BEARING | DISTANCE
L1 | S 45°27'45" E | 51.45'
L2 | S 01°02'02" W | 48.00'
L3 | S 45°31'48" W | 29.37'
L4 | N 00°12'57" E | 100.37'
N 00°14'00" E 99.44'
Conveyed to Vanderburgh County in 2009R00005618
02-04-36-002-146.008-019 Darby Properties & Investments, LLC. Doc. 2007R00054128
SCOTT D. BUDAL REGISTERED LS20900031 STATE OF INDIANA LAND SURVEYOR
S 88°40'22" E 75.41'
N 02°01'51" W 0.13'
N 88°40'22" W 241.32'
Southwest Corner N.W. 1/4 Section 36, T3S, R10W Found MAG Nail 0.10' East & 0.15' North of the calculated corner
S 01°12'59" E 675.25'
10' Gas Pipe Line Easement in favor of SIGECO (Vectren) Doc. 2005R00058486
Area conveyed to Vanderburgh County in 2009R00082717
Sanitary Sewer Easement conveyed to the EWSU Doc. 2008R00021230
EXHIBIT "B"
CASH WAGGONER & ASSOCIATES, PC
CONSULTING ENGINEERS • LAND SURVEYORS
www.CashWaggoner.com
414 Ontario Street Suite B Evansville, IN 47713 PH: 812-401-5501 Fax: 812-401-5443
14-1669
JAD
SUBDIVISION
CHASE DRIVE RW NEW
1" = 60'
4/12/2019
HUNTER CHASE
DARBY PROPERTIES & INVESTMENTS, LLC
CHASE DRIVE TEMPORARY EXHIBIT
S.W. 1/4 OF THE N.W. 1/4 SECTION 36, T 3 S, R 10 W
VANDERBURGH COUNTY, INDIANA

EMAIL 5/15/2019

DRAINAGE EASEMENT

Cross reference: 2007R00034128

THIS INDENTURE WITNESSETH, that Dauby Properties and Investments, LLC of Vanderburgh County, Indiana (Grantor) conveys and warrants to VANDERBURGH COUNTY, INDIANA (Grantee) for and in consideration of the sum of Ten Dollars ($10.00) and other good and valuable consideration, the receipt which is hereby acknowledged, a variable width Drainage Easement, across, under and upon certain real estate situated in the Vanderburgh County, Indiana, which is described in the legal descriptions attached hereto and which are shown on the attached Exhibit "A" (the "Easement Real Estate").

This Drainage Easement conveys to the Grantee, their respective employees, agents, contractors, subcontractors and assigns, the right of ingress and egress across the described easement area for the purpose of constructing, inspecting, maintaining, altering, repairing and replacing drainage facilities. This, however, does not obligate Vanderburgh County, in any way to construct, maintain, alter, repair or replace drainage facilities. This Drainage Easement also conveys the right to trim, cut, clear and remove trees, limbs, branches and underbrush from the easement area which may interfere with the rights granted herein. Any ground disturbed by the Grantee will be backfilled and graded to its original elevation and seeded by the Grantee.

Subject to the rights herein granted to the Grantee, the Grantor reserves the right to use and enjoy the Easement Real Estate, but no buildings, fences, berms or other obstructions shall be located or maintained over, on or within the Drainage Easement without the approval of the Vanderburgh County Drainage Board.

[SIGNATURE PAGE TO FOLLOW]

IN WITNESS WHEREOF, Dauby Properties and Investments, LLC has hereunto caused this Easement to be executed this _____ day of _____, 2019.

DAUBY PROPERTIES AND INVESTMENTS, LLC

By: _____

Ronald L. Dauby, Manager

STATE OF INDIANA)
) SS:
COUNTY OF VANDERBURGH)

Before me, a Notary Public in and for said County and State, personally appeared the within named Ronald L. Dauby of Dauby Properties and Investments, LLC who acknowledged the execution of the foregoing easement to be his voluntary act and deed.

WITNESS, my hand and notarial seal this _____ day of _____, 2019.

_____ _____
Signature of Notary Public Printed Name of Notary Public

_____ _____
County of Residence of Notary My Commission Expires:

I affirm, under penalty of perjury, that I have taken reasonable care to redact each Social Security Number in this document, unless required by law. Signed by Scott D. Buedel

This instrument prepared by: Cash Waggner & Associates, PC
414 Citadel Circle, Suite B
Evansville, IN 47715

Exhibit "A"

Drainage Easement

Drainage Easement #1
Part of the Southwest Quarter of the Northwest Quarter of Section 36, Township 5 South, Range 10 West in Center Township, Vanderburgh County, Indiana and being more particularly described as follows:

Commencing at the Northwest Corner of the Southwest Quarter of the Northwest Quarter of said Section 36; thence along the north line of said Quarter Quarter Section, South 88 degrees 30 minutes 06 seconds East 356.29 feet; thence South 01 degree 02 minutes 02 seconds West 50.00 feet to the point of beginning; thence continue South 01 degree 02 minutes 02 seconds West 111.25 feet; thence North 88 degrees 57 Minutes 58 Seconds West 8.00 feet; thence South 01 Degree 02 Minutes 02 Seconds West 149.67 feet to the beginning of a curve to the left having a central angle of 16 Degrees 22 Minutes 57 Seconds, a radius of 40.00 feet and a chord dimension of North 60 Degrees 17 Minutes 15 Seconds West 11.40 feet; thence along the arc of said curve 11.44 feet; thence North 01 Degree 02 Minutes 02 Seconds East 255.59 feet; thence South 88 Degrees 30 Minutes 06 Seconds East 18.00 feet to the point of beginning and containing a gross area of 3,470 square feet, more or less.

Subject to all easements and rights-of-ways of record.

Drainage Easement #2
Part of the Southwest Quarter of the Northwest Quarter of Section 36, Township 5 South, Range 10 West in Center Township, Vanderburgh County, Indiana and being more particularly described as follows:

Commencing at the Northwest Corner of the Southwest Quarter of the Northwest Quarter of said Section 36; thence along the north line of said Quarter Quarter Section, South 88 degrees 30 minutes 06 seconds East 37.63 feet to the west side of a tract of land conveyed to the Board of Commissioners of Vanderburgh County, Indiana in Document 2009R00005013 in the Office of the Recorder of Vanderburgh County, Indiana; thence along the west side of said tract of land conveyed to Vanderburgh County, South 01 degree 13 minutes 59 seconds West 656.13 feet to a point on the south line of a tract of land conveyed to Dauby Properties and Investments, LLC in Document 2007R00034128 in the Office of said Recorder; thence along the south line of said tract of land conveyed to Dauby, South 88 degrees 40 minutes 22 seconds East 165.86 feet; thence North 01 Degree 02 Minutes 02 Seconds East 176.88 feet; thence North 88 Degrees 57 Minutes 58 Seconds West 3.00 feet to the point of beginning; thence
North 88 Degrees 57 Minutes 58 Seconds West 12.00 feet; thence
North 01 Degree 02 Minutes 02 Seconds East 109.60 feet; thence
South 88 Degrees 57 Minutes 58 Seconds East 93.07 feet to the beginning of a curve to the right having a central angle of 21 degrees 44 minutes 32 seconds East, a radius of 35.00 feet and a chord dimension of South 78 degrees 05 minutes 42 seconds East 13.20 feet; thence along the arc of said curve 13.28 feet; thence South 01 degree 14 minutes 10 seconds West 9.68 feet; thence North 84 degrees 21 minutes 30 seconds West 94.31 feet; thence South 01 Degree 02 Minutes 02 Seconds West 105.01 feet to the point of beginning and containing a gross area of 2,093 square feet, more or less.

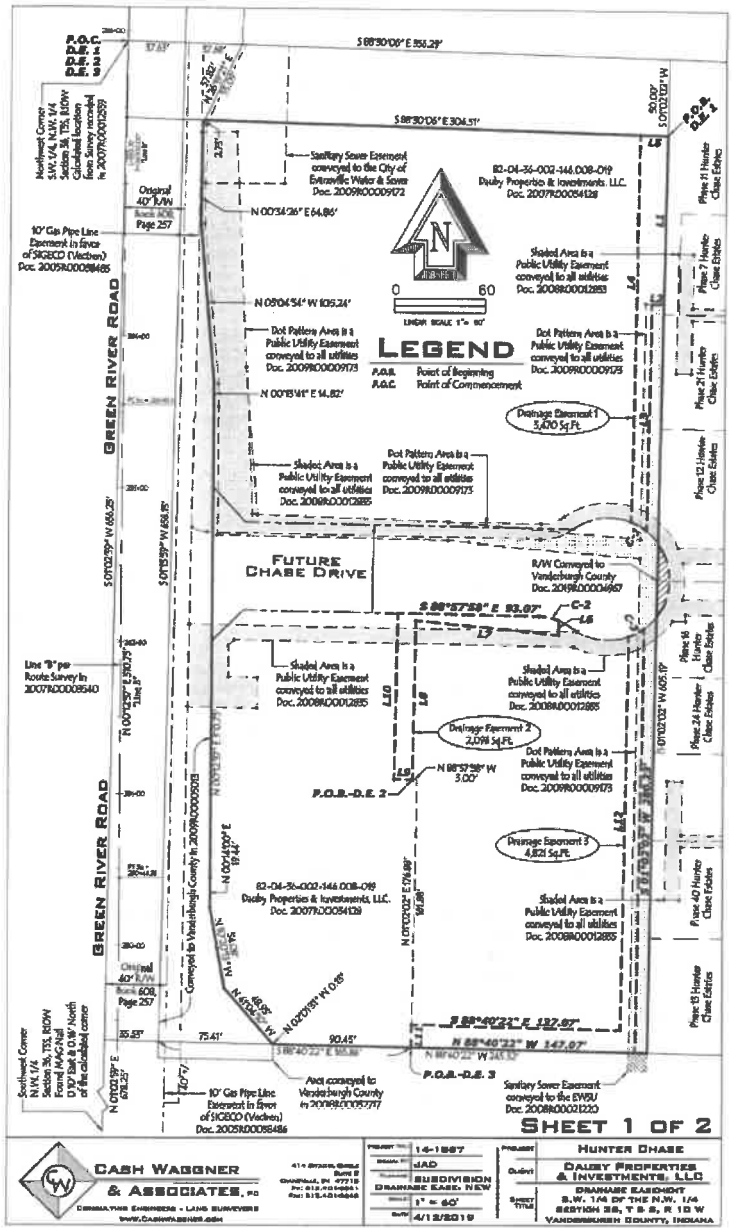
Subject to all easements and rights-of-ways of record.

Drainage Easement #3
Part of the Southwest Quarter of the Northwest Quarter of Section 36, Township 5 South, Range 10 West in Center Township, Vanderburgh County, Indiana and being more particularly described as follows:

Commencing at the Northwest Corner of the Southwest Quarter of the Northwest Quarter of said Section 36; thence along the north line of said Quarter Quarter Section, South 88 degrees 30 minutes 06 seconds East 37.63 feet to the west side of a tract of land conveyed to the Board of Commissioners of Vanderburgh County, Indiana in Document 2009R00005013 in the Office of the Recorder of Vanderburgh County, Indiana; thence along the west side of said tract of land conveyed to Vanderburgh County, South 01 degree 13 minutes 59 seconds West 656.13 feet to a point on the south line of a tract of land conveyed to Dauby Properties and Investments, LLC in

Document 2007R00034128 in the Office of said Recorder; thence along the south line of said tract of land conveyed to Dauby, South 88 degrees 40 minutes 22 seconds East 165.86 feet to the point of beginning; thence
North 01 Degree 02 Minutes 02 Seconds East 15.00 feet; thence
South 88 Degrees 40 Minutes 22 Seconds East 137.07 feet; thence
North 01 Degree 02 Minutes 02 Seconds East 259.71 feet to the beginning of a curve to the left having a central angle of 16 degrees 22 minutes 57 seconds East, a radius of 40.00 feet and a chord dimension of North 62 degrees 21 minutes 19 seconds East 11.40 feet; thence along the arc of said curve 11.44 feet; thence South 01 Degree 02 Minutes 02 Seconds West 280.23 feet to a point on the south line of a tract of land conveyed to Dauby Properties and Investments, LLC in Document 2007R00034128; thence along said south line, North 88 Degrees 40 Minutes 22 Seconds West 147.07 feet to the point of beginning and containing a gross area of 4,821 square feet, more or less.

Subject to all easements and rights-of-ways of record.



SHEET 1 OF 2

CASH WAGGNER & ASSOCIATES, PC
CONSULTING ENGINEERS - LAND SURVEYORS
www.CashWaggner.com

PROJECT No.	14-1987
DRAWN BY	JAD
CHECKED BY	SUBDIVISION DRAINAGE EASE. NEW
SCALE	1" = 60'
DATE	4/12/2019

PROJECT: HUNTER CHASE
CLIENT: DAISEY PROPERTIES & INVESTMENTS, LLC
SHEET TITLE: DRAINAGE EASEMENT S.W. 1/4 OF THE N.W. 1/4 SECTION 36, T 5 S, R 10 W VANDERBURGH COUNTY, INDIANA

Curve Table

CURVE	ARC LENGTH	RADIUS	CHORD BEARING	CHORD LENGTH	DELTA ANGLE	TANGENT
C-1	11.44'	40.00'	N 60°17'15" W	11.40'	16°22'57"	5.76'
C-2	13.28'	35.00'	S 78°05'42" E	13.20'	21°44'52"	6.72'
C-3	11.44'	40.00'	N 62°21'19" E	11.40'	16°22'57"	5.76'

Line Table

LINE	BEARING	DISTANCE
L1	S 01°02'02" W	111.25'
L2	N 88°57'58" W	8.00'
L3	S 01°02'02" W	149.67'
L4	N 01°02'02" E	255.59'
L5	S 88°30'06" E	18.00'
L6	S 01°14'10" W	9.68'
L7	N 84°21'30" W	94.31'
L8	S 01°02'02" W	105.01'
L9	N 88°57'58" W	12.00'
L10	N 01°02'02" E	109.60'
L11	N 01°02'02" E	15.00'
L12	N 01°02'02" E	259.71'

SCOTT D. BUSDAL
REGISTERED
LS29900051
STATE OF
INDIANA
LAND SURVEYOR

CASH WAGONER & ASSOCIATES, PC
CONSULTING ENGINEERS + LAND SURVEYORS
WWW.CASHWAGONER.COM
614 STUART DRIVE, SUITE C
SHEPHERDSVILLE, IN 47138
PH: 812.421-9361
FAX: 812.421-9366

PROJECT NO.	14-1287
DRAWN BY	JAD
PURPOSE	SUBDIVISION DRAINAGE EASE. NEW
SCALE	1" = 60'
DATE	4/12/2019
PROJECT	HUNTER CHASE
CLIENT	DAUBY PROPERTIES & INVESTMENTS, LLC
SHEET TITLE	DRAINAGE EASEMENT S.W. 1/4 OF THE N.W. 1/4 SECTION 36, T 5 S, R 10 W VANDERBURGH COUNTY, INDIANA

Exhibit 5/15/2019

LAKE MAINTENANCE AND STORM DRAINAGE EASEMENT

Cross reference: 2007R00034128

THIS INDENTURE WITNESSETH, that Dauby Properties and Investments, LLC of Vanderburgh County, Indiana (Grantor) conveys and warrants to VANDERBURGH COUNTY, INDIANA (Grantee) for and in consideration of the sum of Ten Dollars ($10.00) and other good and valuable consideration, the receipt which is hereby acknowledged, a Lake Maintenance and Storm Drainage Easement across, under and upon certain real estate situated in the Vanderburgh County, Indiana, which is described in the legal description attached hereto and which is shown on the attached Exhibit "A" (the "Easement Real Estate").

This Lake Maintenance and Storm Drainage Easement conveys to the Grantee, their respective employees, agents, contractors, subcontractors and assigns, the right of ingress and egress across the described easement area for the purpose of constructing, inspecting, maintaining, altering, repairing and replacing drainage facilities. This, however, does not obligate Vanderburgh County, in any way to construct, maintain, alter, repair or replace drainage facilities. This Lake Maintenance and Storm Drainage Easement also conveys the right to trim, cut, clear and remove trees, limbs, branches and underbrush from the easement area which may interfere with the rights granted herein. Any ground disturbed by the Grantee will be backfilled and graded to its original elevation and seeded by the Grantee.

Subject to the rights herein granted to the Grantee, the Grantor reserves the right to use and enjoy the Easement Real Estate, but no buildings, fences, berms or other obstructions shall be located or maintained over, on or within the Lake Maintenance and Drainage Easement without the approval of the Vanderburgh County Drainage Board.

IN WITNESS WHEREOF, Dauby Properties and Investments, LLC has caused this Drainage Easement to be executed this _____ day of _____, 2019.

DAUBY PROPERTIES AND INVESTMENTS, LLC

By:

_____

Ronald L. Dauby, Manager

STATE OF INDIANA)
) SS:
COUNTY OF VANDERBURGH)

Before me, a Notary Public in and for said County and State, personally appeared the within named Ronald Dauby of Dauby Properties and Investments, LLC who acknowledged the execution of the foregoing easement to be his voluntary act and deed.

WITNESS, my hand and notarial seal this _____ day of _____, 2019.

_____ _____

Signature of Notary Public Printed Name of Notary Public

_____ _____

County of Residence of Notary My Commission Expires:

I affirm, under penalty of perjury, that I have taken reasonable care to redact each Social Security Number in this document, unless required by law. Signed by Scott D. Buedel

This instrument prepared by: Cash Waggner & Associates, PC
414 Citadel Circle, Suite B
Evansville, IN 47715

Exhibit "A"

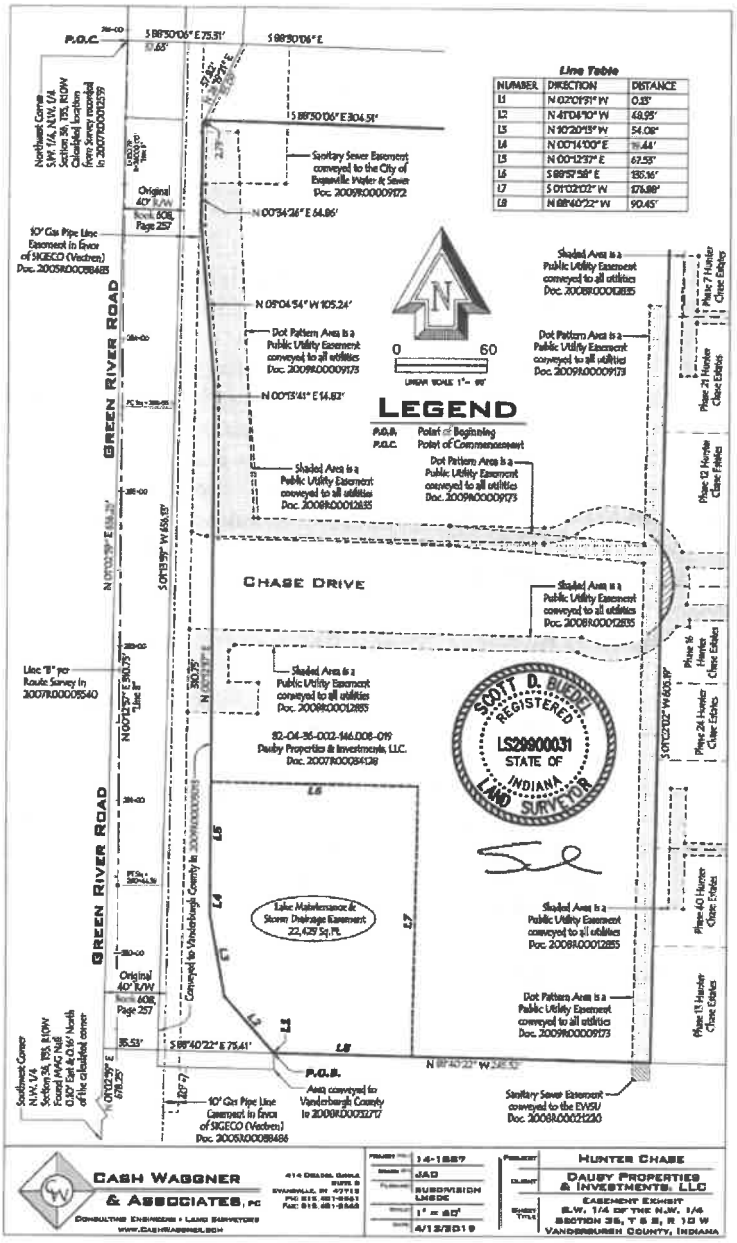
Lake Maintenance and Storm Drainage Easement

Part of the Southwest Quarter of the Northwest Quarter of Section 36, Township 5 South, Range 10 West in Center Township, Vanderburgh County, Indiana and being more particularly described as follows:

Commencing at the Northwest Corner of the Southwest Quarter of the Northwest Quarter of said Section 36; thence along the north line of said Quarter Quarter Section, South 88 degrees 30 minutes 06 seconds East 37.63 feet to the west side of a tract of land conveyed to the Board of Commissioners of Vanderburgh County, Indiana in Document 2009R00005013 in the Office of the Recorder of Vanderburgh County, Indiana; thence along the west side of said tract of land conveyed to Vanderburgh County, South 01 degree 13 minutes 59 seconds West 656.13 feet to a point on the south line of a tract of land conveyed to Dauby Properties and Investments, LLC in Document 2007R00034128 in the Office of said Recorder; thence along the south line of said tract of land conveyed to Dauby, South 88 degrees 40 minutes 22 seconds East 75.41 feet to the east boundary of said tract of land conveyed to the Board of Commissioners of Vanderburgh County, Indiana in Document 2009R00005013 and being the point of beginning; thence along said east boundary the following five (5) calls:

North 02 Degrees 01 Minute 31 Seconds West 0.13 feet; thence
North 41 Degrees 04 Minutes 10 Seconds West 48.93 feet; thence
North 10 Degrees 20 Minutes 13 Seconds West 54.08 feet; thence
North 00 Degrees 14 Minutes 00 Seconds East 19.44 feet; thence
North 00 Degrees 12 Minutes 37 Seconds East 67.53 feet; thence leaving said boundary, South 88 Degrees 57 Minutes 58 Seconds East 135.16 feet; thence South 01 Degree 02 Minutes 02 Seconds West 176.88 feet to a point on the south line of said tract of land conveyed to Dauby Properties and Investments, LLC in Document 2007R00034128; thence along said south line, North 88 Degrees 40 Minutes 22 Seconds West 90.45 feet to the point of beginning and containing a gross area of 22,429 square feet, more or less.

Subject to all easements and rights-of-ways of record.


P.O.C.
S 88°30'06" E 75.31'
S 88°30'06" E
S 88°30'06" E 304.51'
Line Table
NUMBER | DIRECTION | DISTANCE
L1 | N 03°01'51" W | 0.33'
L2 | N 41°04'10" W | 48.95'
L3 | N 10°20'13" W | 54.08'
L4 | N 00°14'00" E | 78.44'
L5 | N 00°12'37" E | 67.53'
L6 | S 88°57'58" E | 185.16'
L7 | S 01°02'02" W | 276.89'
L8 | N 88°40'22" W | 90.45'
Northwest Corner S.W. 1/4, N.W. 1/4 Section 36, T5S, R10W Calculated location from Survey recorded in 2007R00010259
Original 40' R/W Book 608, Page 257
Sanitary Sewer Easement conveyed to the City of Evansville Water & Sewer Doc. 2009R00009172
N 00°34'26" E 64.86'
10' Gas Pipe Line Easement in favor of SIGECO (Vectren) Doc. 2005R00088485
GREEN RIVER ROAD
N 09°04'54" W 105.24'
Dot Pattern Area is a Public Utility Easement conveyed to all utilities Doc. 2009R00009173
N 00°13'41" E 14.82'
Shaded Area is a Public Utility Easement conveyed to all utilities Doc. 2008R00012835
0
60
LINEAR SCALE 1" = 60'
LEGEND
P.O.B. Point of Beginning
P.O.C. Point of Commencement
Phase 21 Hunter Chase Estates
Phase 12 Hunter Chase Estates
CHASE DRIVE
Line "B" per Route Survey in 2007R00009540
Phase 16 Hunter Chase Estates
Phase 24 Hunter Chase Estates
SCOTT D. BUEDE REGISTERED LS29900031 STATE OF INDIANA LAND SURVEYOR
82-04-36-002-146.008-019 Daisy Properties & Investments, LLC. Doc. 2007R00084128
Lake Maintenance & Storm Drainage Easement 22,429 Sq. Ft.
Phase 40 Hunter Chase Estates
Phase 19 Hunter Chase Estates
Conveyed to Vanderburgh County in 2009R00009618
Original 40' R/W Book 608, Page 257
S 88°40'22" E 75.41'
P.O.B.
Area conveyed to Vanderburgh County in 2008R00032717
10' Gas Pipe Line Easement in favor of SIGECO (Vectren) Doc. 2005R00088486
Sanitary Sewer Easement conveyed to the EVWSU Doc. 2008R00021220
Southwest Corner N.W. 1/4 Section 36, T5S, R10W Found MAG Nail 0.10' East & 0.16' North of the calculated corner
CASH WAGGNER & ASSOCIATES, PC
CONSULTING ENGINEERS + LAND SURVEYORS
414 Chestnut Street, Suite B, Evansville, IN 47713
PH: 812.421.8661
FAX: 812.421.8668
WWW.CASHWAGGNER.COM
Project No. 14-1887
Drawn By JAD
Subdivision Layout
Scale 1" = 60'
4/12/2019
Project HUNTER CHASE
Client DAISY PROPERTIES & INVESTMENTS, LLC
Exhibit Title EASEMENT EXHIBIT S.W. 1/4 OF THE N.W. 1/4 SECTION 36, T 5 S, R 10 W VANDERBURGH COUNTY, INDIANA

Email 5/15/2019

INDEMNITY AGREEMENT

THIS AGREEMENT is made and entered into as of the _____ day of _____, 2019, by and between **Dauby Properties and Investments, LLC**, an Indiana limited liability company whose mailing address is 7432 Brycen Lane, Evansville, Indiana 47725 (hereinafter "DPI") and **The Board of Commissioners of Vanderburgh County, Indiana**, whose mailing address is Civic Center Complex, Room 305, One Martin Luther King, Jr. Blvd., Evansville, Indiana 47708 (hereinafter "County").

WHEREAS, DPI developed certain real estate in Vanderburgh County, Indiana pursuant to that certain Declaration of Horizontal Property Regime for Hunter Chase Estates Condominium, dated May 9, 2008 and recorded June 2, 2008 as Instrument Number 2008R00012133 in the Office of the Recorder of Vanderburgh County, Indiana, as amended and supplemented (the "Development");

WHEREAS, DPI will be performing certain work within the Development ("Drainage Plan Work") to implement a drainage plan according to that certain final drainage plan approved by the Vanderburgh County Drainage Board on _____, 2019, all as set forth in the Drainage Plan attached and incorporated herein as Exhibit "A" ("Final Plan");

WHEREAS, as part of the Final Plan DPI requested from the Vanderburgh County Drainage Board ("Drainage Board), and was granted, a variance as to certain swales located in the Development, namely Swale #5 and Swale #6 depicted in the Drainage Plan (collectively "Swales"), which Swales do not conform to Section 13.04.180 of the Vanderburgh County Code ("Code");

WHEREAS, County requires that DPI indemnify County with regard to damages suffered by the County from personal injuries arising from the Swales not conforming to the Code.

NOW THEREFORE, in consideration of the premises, the mutual promises and covenants herein contained, and other good and valuable consideration, the receipt and adequacy of which are hereby acknowledged by both parties hereto, the parties agree as follows:

1. **INDEMNITY**. Developer agrees to indemnify, defend, and save County harmless with respect to all liability, claims, demands, lawsuits, actions, penalties, costs and attorney's fees for personal injury to or death of any person arising from the Swales not conforming to Section 13.04.180 of the Code.

2. **NOTICE OF CLAIMS**. County shall promptly notify DPI of the assertion, filing or service of any claim, demand, lawsuit, action or notice of any claims or other matter that is or may be covered by the indemnification provisions of this Agreement. In the event that any notice is required to be made to DPI under this Agreement , said notice shall be in writing and sent by certified mail addressed as follows:

If to DPI:
Dauby Properties and Investments, LLC
Attn: Ronald L. Dauby, Manager
4732 Brycen Lane
Evansville, Indiana 47725

Copy to:
Kahn, Dees, Donovan & Kahn, LLP
Attn: Shannon S. Frank, Esq.
501 Main St., Suite 305
P.O. Box 3646
Evansville, Indiana 47735

3. **INTERPRETATION**. This Agreement shall be governed by and construed in accordance with

Indiana law, notwithstanding the choice of law rules thereof. This instrument contains the entire agreement between the parties on the subject of the indemnification of County by DPI. This Agreement shall inure to the benefit of and be binding upon the parties and their respective heirs, successors and assigns. All headings set forth herein are included for the convenience of reference only and shall not affect the interpretation hereof, nor shall any weight or value be given to the relative position of any part or provision hereof in relation to any other provision in determining such construction. If any provision of this Agreement is contrary to, prohibited by, or deemed invalid under applicable laws or regulations of any jurisdiction in which it is sought to be enforced, then such provision shall be deemed inapplicable and deemed omitted, but shall not invalidate the remaining provisions hereof. This Agreement may be executed simultaneously in several counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument. The language in all parts of this Agreement shall in all cases be construed as a whole according to its fair meaning, strictly neither for or against any party, and without implying a presumption that the terms hereof shall be more strictly construed against one (1) party by reason of any rule of construction to the effect that a document is to be construed more strictly against the party who personally or through such party's agent prepared the same. The recitals are specifically incorporated into this Agreement as the statements and representations of the undersigned. THIS PROVISION, AND EACH AND EVERY OTHER PROVISION OF THIS AGREEMENT MAY NOT UNDER ANY CIRCUMSTANCE BE MODIFIED, CHANGED, AMENDED OR PROVISIONS HEREUNDER WAIVED VERBALLY, BUT MAY ONLY BE MODIFIED, CHANGED, AMENDED OR PROVISIONS HEREUNDER WAIVED BY AN AGREEMENT IN WRITING EXECUTED BY ALL PARTIES HERETO.

IN WITNESS WHEREOF, the parties have executed this Agreement as of the day and year first above written.

DAUBY PROPERTIES AND INVESTMENTS, LLC

By: _____
Ronald L. Dauby, Manager

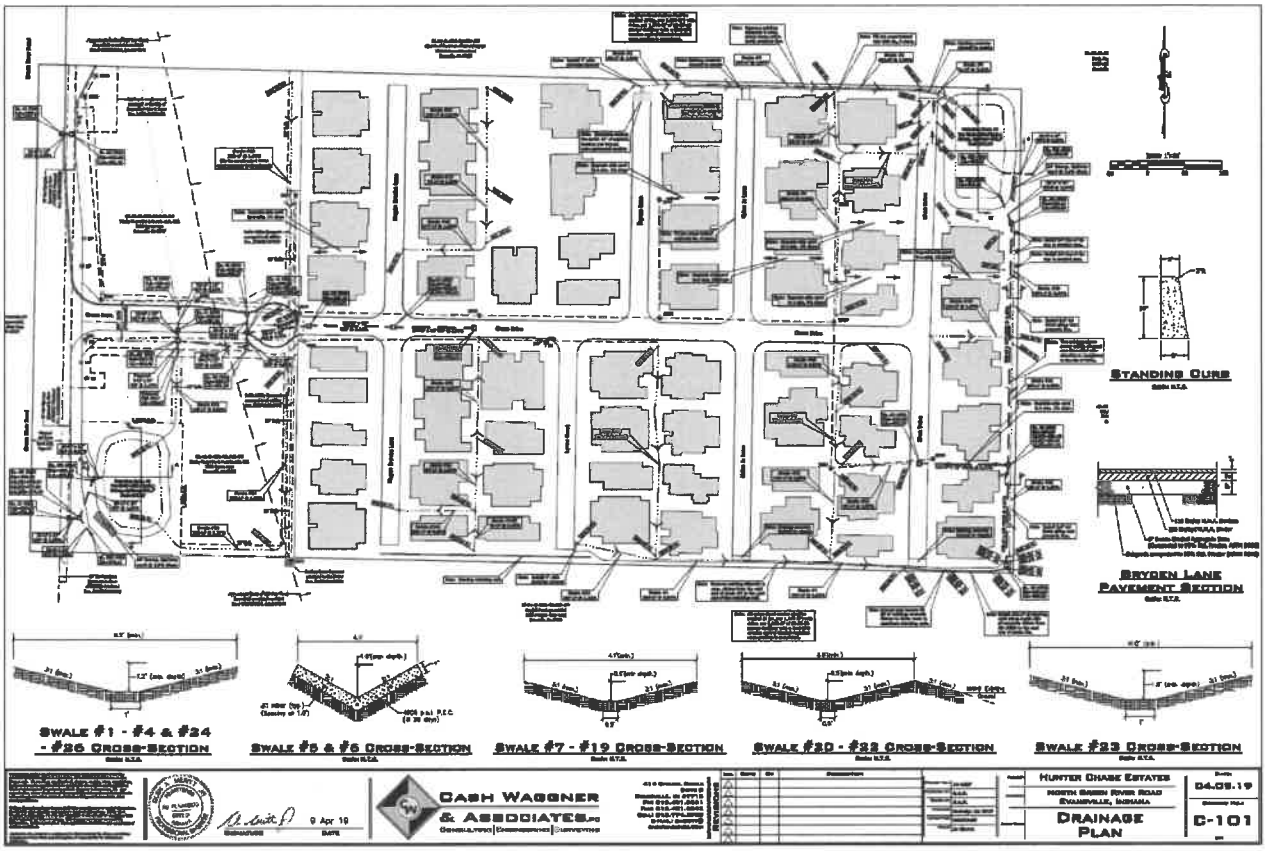
BOARD OF COMMISSIONERS OF VANDERBURGH COUNTY, INDIANA

By: _____
Ben Shoulders, President

By: _____
Jeff Hatfield, Vice-President

By: _____
Cheryl Musgrave, Member

EXHIBIT "A"


STANDING CURB
BRYDEN LANE PAVEMENT SECTION
SWALE #1 - #4 & #24 - #26 CROSS-SECTION
SWALE #5 & #6 CROSS-SECTION
SWALE #7 - #19 CROSS-SECTION
SWALE #20 - #22 CROSS-SECTION
SWALE #23 CROSS-SECTION
CASH WAGGONER & ASSOCIATES, INC
HUNTER CHASE ESTATES
NORTH GREEN RIVER ROAD
EVANSVILLE, INDIANA
DRAINAGE PLAN
04.05.19
C-101

CASH WAGGNER & ASSOCIATES, PC
CONSULTING ENGINEERS • LAND SURVEYORS

LETTER OF TRANSMITTAL

DATE: 04.09.19
PROJECT NO.: 14-1887
REFERENCE: Hunter Chase Estates
YOUR FILE NO.:

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

THE FOLLOWING ITEMS:

COPIES:	ORIG./LAST REV. DATE:	DESCRIPTION:
1	04.09.19	Revised Drainage Plan
1	04.09.19	Drainage Details
1	04.09.19	Drainage Report

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:

If you have any questions or comments, please give me a call. Thank you

RECEIVED BY THE VANDERBURGH COUNTY SURVEYOR'S OFFICE 4-9-19

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\1887 - HUNTER CHASE\DOCUMENTS\190322 MUELLER.DOC

CASH WAGGNER
& ASSOCIATES, PC
CONSULTING ENGINEERS • LAND SURVEYORS

4-9-19

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

April 9, 2019

Mr. Jeff Mueller
Vanderburgh County Surveyor
Room 325 Civic Center - 1 NW Martin Luther King Jr. Blvd.
Evansville, IN 47708

RE: Final Drainage Report
Hunter Chase Estates
North Green River Road
Our Project #: 14-1887

Mr. Mueller:

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

SITE DESCRIPTION

This development will consist of 57 condominium buildings, one clubhouse with a pool and their associated improvements (i.e. roads, utilities). This development is located on a 19.87-acre parcel that lies on the east side of Green River Road approximately 1,650 feet south of the Millersburg Road and Green River Road intersection. Chase Drive from Green River Road to the east end of the cul-de-sac (approximately 300' east of Green River Road) will be submitted to the Vanderburgh County Engineering Department to be accepted as a public street once the right-of-way has been dedicated to Vanderburgh County. Dauby Properties & Investments, LLC is currently responsible for the maintenance of this portion of the street and storm sewer improvements and will remain the responsible party until the streets and storm sewers within the right-of-way have been accepted for maintenance by Vanderburgh County. Dauby Properties & Investments, LLC will also be responsible for the maintenance of detention basin #1 and the off-site swales. The streets east of the Chase Drive cul-de-sac and within the condominium development will be privately owned and maintained by the condo association.

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No regulated drains, inlets or outfalls exist on this site. No known wells, septic tank systems or outfalls exist on this site. No seeps, springs, sinkholes, caves, shafts, faults or other such geological features are visible or of record on this site.

No Army Corps, IDEM or DNR permits will be required for this project.

The proposed sanitary sewer and water mains along the west 300' of Chase Drive (from Green River Road to the east end of the cul-de-sac) will be public and maintained by EW&SU. The remaining sanitary sewer and water facilities east of the cul-de-sac will be privately maintained by the condo association.

Upon the completion of the earthwork activities and utility construction, Tenbarge – Green Alliance seed mixture will be used for permanent seeding all green space

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EVANSVILLE, IN 47715 E-MAIL: GMERITT@CASHWAGGNER.COM
PH: 812.401.5561
FAX: 812.401.5563

areas and the earthen side slopes of detention basins #1 & #2. No tree limbs, refuse from legally burnt vegetation, nor construction waste, demolition materials or other man-made material may be buried within detention basins #1 or #2. There will not be a fence installed around the perimeter of detention basins #1 or #2.

The owner shall be responsible, including financially, for maintaining that part of the storm water system and its easements which exist on his or her property in proper working order including:

1. Mowing grass, controlling weeds and maintaining the designed cover of waterways, storage basins and easements in accordance with all applicable ordinances.
2. Keeping all parts of the storm water system operating as designed and as constructed and free of all trash, debris and obstructions to the flow of water.
3. Keeping the channels, embankments, shorelines and bottoms of waterways and basins free from erosion and sedimentation.
4. Maintaining the storm water system in accordance with the conditions described on the approved street and/or drainage plans on file in the County Surveyor's Office and/or in the County Engineer's Office and in compliance with the County Drainage Ordinance.
5. Maintaining the concrete swales and also financially responsible for repairing/replacing the paved side ditches.

DRAINAGE PATTERNS

The 25-year and 100-year flows were calculated for the entire development. This development was divided into 29 developed sub-basins. Sub-basins A-10 & A-12 – A-23 will be collected by Detention Basin #1. Sub-basins A-28 & A-29 will be allowed to run off-site undetained. The primary spillway of detention basin #1 discharges to an existing ditch located near the southwest corner of the site. Sub-basins A-1 – A-9, A-11 & A-24 – A-26 will be collected by Detention Basin #2. Sub-basin A-27 will be allowed to run off-site undetained. The primary spillway of detention basin #2 discharges east to an existing ditch located off-site. See attached Developed Sub-basin Exhibit for the locations of each sub-basin.

A drainage swale and storm sewer network will be installed within the development to capture the storm water runoff and convey it to detention basins #1 and #2. All swales, except for swale #25, will be constructed as part of the Hunter Chase Estates project. A fence will not be installed around the perimeter of either detention basin. Storm sewers will be constructed with reinforced concrete pipe and N-12 Watertight HDPE. All swales, except swale #25, identified on sheet C-101 will be regraded and modified from their existing conditions.

The storm sewer pipes from AD #509 to AD #512 are not able to carry the 25-year storm based on the rational equation. When the preliminary drainage calculations were submitted in 2008, the time of concentration calculations were determined utilizing a different method than what is acceptable per the current Drainage Code. However, by analyzing how the existing pipes operate during head conditions, it has been determined that with 1.65' and 2.4' of head respectively over the top of the

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pipe, the storm sewer pipes will carry the 25-year flows that they are receiving without ponding water in the streets.

Runoff from swale #4 drains to Shea Drive, then flows north along the east curb line of Shea Drive to swale #6. Swale #6 flows east to detention basin #2. The west edge of pavement elevation of Shea Drive is 5" higher than the west gutter line elevation.

The ground elevations around the condo at 7417 Shea Drive are 387.0 and the emergency spillway elevation of the detention basin flowing full during the 100-year storm is at 383.0. Therefore, there is no risk for the condo to flood with the detention basin at the top of bank elevation.

At the downstream end of the sub-basin watershed areas, where the largest amount of runoff will be collected, the majority of the roads have been constructed with a 1.5% to 2% inverted crown. By comparing the amount of runoff each street cross section can carry to the amount off runoff that is being collected in the corresponding watershed, all roads constructed with a 1.5% minimum inverted crown can carry the 25-year runoff.

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. The outlet structure for both detention basins were sized for the 25-year design storm event while allowing a discharge rate less than the undeveloped 10-year storm event from the system. The emergency spillways for both detention basins were designed to convey their respective 100-year storm flows.

Below is a summary of the detention basin design elements:

Detention Basin #1		**NOTES**
Detention Basin #1 Developed Q(25)	31.95 – cfs	A-10 & A-12 – A-23
Detention Basin #1 Developed Q(100)	40.71 - cfs	A-10 & A-12 – A-23
Detention Basin #1 Undeveloped Q(10)	17.95 – cfs	Undeveloped Q from Sitecon Drainage Report
Undetained Developed Q(25)	1.64 – cfs	A-28 & A-29
Off-Site Developed Q(25)	0.00 - cfs	
25-year Req'd Storage Volume	14,648 - cf	
25-year Provided Storage Volume	20,555 - cf	
Allowable Detention Basin #1 Release Rate	16.31 – cfs	Undeveloped Q(10) – Undetained Developed Q(25) + Off-Site Developed Q(25)

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EVANSVILLE, IN 47715
PH: 812.401.5561
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Proposed Detention Basin #1 Release Rate	*14.90 - cfs*	*Detention Basin #1 Primary Spillway*
Outlet Structure	*66-LF of 24" R.C.P.*	
Outlet I.E.	379.58	
25-year Storage Vol. Elev.	381.14	
HW (25-yr. elev. – I.E.)	1.559 – ft.	
Minimum Top/Bank	382.40	

Detention Basin #2		**NOTES**
Detention Basin #2 Developed Q(25)	37.03 – cfs	A-1 – A-9, A-11 & A-24 – A-26
Detention Basin #2 Developed Q(100)	47.18 - cfs	A-1 – A-9, A-11 & A-24 – A-26
Detention Basin #2 Undeveloped Q(10)	20.46 – cfs	Undeveloped Q from Sitecon Drainage Report
Undetained Developed Q(25)	0.35 – cfs	A-27
Off-Site Developed Q(25)	0.00 - cfs	
25-year Req'd Storage Volume	15,238 - cf	
25-year Provided Storage Volume	32,316 - cf	
Allowable Detention Basin #2 Release Rate	20.11 – cfs	Undeveloped Q(10) – Undetained Developed Q(25) + Off-Site Developed Q(25)
Proposed Detention Basin #2 Release Rate	*16.66 - cfs*	*Detention Basin #2 Primary Spillway*
Outlet Structure	*40-LF of 24" HDPE*	
Outlet I.E.	379.38	
25-year Storage Vol. Elev.	381.08	
HW (25-yr. elev. – I.E.)	1.70 – ft.	
Minimum Top/Bank	383.00	

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DETENTION FACILITY DESIGN VOLUME CALCULATIONS

PROJECT: **Hunter Chase Estates**
Detention Basin #1

DETENTION FACILITY DESIGN RETURN PERIOD: 25 YRS

RELEASE RATE RETURN PERIOD: 10 YRS

WATERSHED AREA: 9.40 ACRES
DEVELOPED RUNOFF COEFFICIENT (C_d): 0.625

STORM DURATION T_d (HRS)	RAINFALL INTENSITY I_d (INCH/HR)	INFLOW RATE $I(T_d)$ (C_d*I_d*A) (CFS)	OUTFLOW RATE O (C_u*I_u*A) (CFS)	STORAGE RATE ΔS $I(T_d)$-O (CFS)	REQUIRED STORAGE S_d $(I(T_d)-O)*T_d/12$ (ACRE-FT)
0.08	7.810	45.88	14.90	30.98	0.215
0.17	6.320	37.13	14.90	22.23	0.309
0.25	5.240	30.79	14.90	15.89	0.331
0.33	4.597	27.01	14.90	12.11	0.336
0.42	3.953	23.23	14.90	8.33	0.289
0.50	3.310	19.45	14.90	4.55	0.189
0.58	3.083	18.11	14.90	3.21	0.156
0.67	2.857	16.78	14.90	1.88	0.105
0.75	2.630	15.45	14.90	0.55	0.034
0.83	2.403	14.12	14.90	-0.78	-0.054
0.92	2.177	12.79	14.90	-2.11	-0.161
1.00	1.950	11.46	14.90	-3.44	-0.287
1.25	1.805	10.60	14.90	-4.30	-0.447
1.50	1.660	9.75	14.90	-5.15	-0.643
1.75	1.515	8.90	14.90	-6.00	-0.875
2.00	1.370	8.05	14.90	-6.85	-1.142
3.00	1.020	5.99	14.90	-8.91	-2.227

PEAK STORAGE (ACRE/FT):	**0.34**
PEAK STORAGE (CUBIC FT):	**14,648**

Orifice Equation: $Q = C_d A_o \sqrt{2gh_o}$

$C_d = 0.79$ $A_o = \pi r^2 = \pi(1)^2 = 3.14159$

$g = 32.2$ ft/sec²

$h_o = 0.56$ (height of water above the center line of the orifice)

$Q = (0.79)(3.14159)\sqrt{2(32.2)(0.56)}$

$Q = 14.90$ cfs

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DETENTION FACILITY DESIGN VOLUME CALCULATIONS

PROJECT: **Hunter Chase Estates**
Detention Basin #1

DETENTION FACILITY DESIGN RETURN PERIOD: 100 YRS

RELEASE RATE RETURN PERIOD: 10 YRS

WATERSHED AREA: 9.40 ACRES

DEVELOPED RUNOFF COEFFICIENT (C_d): 0.625

STORM DURATION T_d (HRS)	RAINFALL INTENSITY I_d (INCH/HR)	INFLOW RATE $I(T_d)$ (C_d*I_d*A) (CFS)	OUTFLOW RATE O (C_u*I_u*A) (CFS)	STORAGE RATE ΔS $I(T_d)$-O (CFS)	REQUIRED STORAGE S_d $(I(T_d)-O)*T_d/12$ (ACRE-FT)
0.08	9.950	58.46	17.74	40.72	0.283
0.17	8.050	47.29	17.74	29.55	0.410
0.25	6.680	39.25	17.74	21.51	0.448
0.33	5.857	34.41	17.74	16.67	0.463
0.42	5.033	29.57	17.74	11.83	0.411
0.50	4.210	24.73	17.74	6.99	0.291
0.58	3.935	23.12	17.74	5.38	0.261
0.67	3.660	21.50	17.74	3.76	0.209
0.75	3.385	19.89	17.74	2.15	0.134
0.83	3.110	18.27	17.74	0.53	0.037
0.92	2.835	16.66	17.74	-1.08	-0.083
1.00	2.560	15.04	17.74	-2.70	-0.225
1.25	2.380	13.98	17.74	-3.76	-0.391
1.50	2.200	12.93	17.74	-4.82	-0.602
1.75	2.020	11.87	17.74	-5.87	-0.856
2.00	1.840	10.81	17.74	-6.93	-1.155

PEAK STORAGE (ACRE/FT):	**0.46**
PEAK STORAGE (CUBIC FT):	**20,168**

Hunter Chase Estates

Detention Basin #1

PROPOSED 100-YR DESIGN RELEASE RATE
Primary Spillway

CALCULATIONS FOR PIPE FLOWING FULL

(Pressure Conditions)

SOLVE FOR Q

Ø=	2	FT.
h'=	1.1	IN.
h=	1.0875	FT.
Ke=	0.5	
Ko=	1	
n=	0.012	
L=	66	FT.
HW=	2.0875	FT.
Q=	**17.74**	**CFS**

Ø= diameter of orifice (pipe)
Ke= entrance coefficient
Ko= outfall coefficient
n= manning's 'n'
L= length of orifice (pipe)
Q= allowable release rate

h= h' + Ø/2
h'= ht. of water above orifice
HW= h' + Ø

Hunter Chase Estates

Detention Basin #1

PROVIDED DETENTION VOLUMES
(per ACAD)

	Elevation	Area (s.f.)	Avg. Area (s.f.)	Inc. Vol. (c.f.)	Cumulative Vol. (c.f.)
Pool	379.58	8,161			
	380.58	9,580	8,871	8,871	8,871
	381.58	11,102	10,341	10,341	19,212
E.O.S.	381.70	11,292	11,197	1,344	20,555
T.B.	382.40	12,428	11,860	8,302	28,857

Detention volume provided at Elev. 381.70 = *20,555* *c.f.*

Total, required 25-YR detention volume = 14,648 c.f.

25-YR Req'd detention volume provided @ Elev. = 381.14 ft.

Req'd HW= 1.56 ft.

Detention volume provided at Elev. 382.40 = *28,857* *c.f.*

Total, required 100-YR detention volume = 20,168 c.f.

100-YR Req'd detention volume provided @ Elev. = 381.67 ft.

Req'd HW= 2.09 ft.

Hunter Chase Estates

Detention Basin #2

PROVIDED DETENTION VOLUMES
(per ACAD)

	Elevation	Area (s.f.)	Avg. Area (s.f.)	Inc. Vol. (c.f.)	Cumulative Vol. (c.f.)
Pool	379.38	7,829			
	380.38	9,379	8,604	8,604	8,604
	381.38	11,039	10,209	10,209	18,813
E.O.S.	382.00	12,208	11,624	7,207	26,020
T.B.	383.00	13,963	13,086	13,086	39,105

Detention volume provided at Elev. 382.50 = *26,020* *c.f.*

Total, required 25-YR detention volume = 15,238 c.f.

25-YR Req'd detention volume provided @ Elev. = 381.07 ft.

Req'd HW= 1.69 ft.

Detention volume provided at Elev. 383.00 = *39,105* *c.f.*

Total, required 100-YR detention volume = 21,080 c.f.

100-YR Req'd detention volume provided @ Elev. = 381.58 ft.

Req'd HW= 2.20 ft.

STORM SEWER CALCULATIONS

Design Return Period: 25 Year

Mannings 'n': 0.012

Project Name: **Hunter Chase Estates**

Project #: 14-1887

Date: 4/9/19

1 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	A-12 & A-15	AD 507		AD 508	109	0.696	0.79	0.55	0.55	14.03	14.03	5.449	3.00	12	0.0266	388.16	385.26	6.29	8.02	0.23
1	A-10 & A-14	AD 508		AD 509	114	0.603	3.34	2.01	2.56	17.40	17.40	4.921	12.64	18	0.0214	385.02	382.58	16.64	9.42	0.20
1	A-16	AD 509		CI 511	86	0.605	0.15	0.09	2.65	10.49	17.60	4.905	13.02	18	0.0071	382.58	381.97	9.59	5.43	0.26
1	A-17	CI 510		CI 511	26	0.601	0.68	0.41	0.41	11.01	11.01	6.102	2.49	12	0.0373	383.23	382.26	7.45	9.49	0.05
1	A-18	CI 511		AD 512	20	0.676	0.06	0.04	3.10	10.28	17.87	4.871	15.12	18	0.0065	381.97	381.80	10.49	5.94	0.06
1	A-19	AD 512		AD 516	94	0.623	0.16	0.10	3.20	9.77	17.92	4.864	15.58	24	0.0101	381.80	380.85	24.62	7.84	0.20
1	A-20	CI 514		CI 515	33	0.697	1.89	1.32	1.32	15.58	15.58	5.165	6.80	18	0.0218	381.66	380.94	16.80	9.51	0.06
1	A-21	CI 515		AD 516	13	0.616	0.12	0.07	1.39	12.17	15.64	5.262	7.32	18	0.0069	380.94	380.85	9.45	5.35	0.04
1	A-22	AD 516		FES 517	16	0.556	0.28	0.16	4.75	12.69	18.12	4.839	22.99	24	0.0113	380.85	380.67	26.04	8.29	0.03
2	A-1 - A-4	AD 500		AD 502	135	0.645	3.02	1.95	1.95	21.66	21.66	4.393	8.54	18	0.0061	382.33	381.51	8.88	5.03	0.45
2	A-5	AD 501		AD 502	119	0.776	1.04	0.81	0.81	12.45	12.45	5.790	4.67	15	0.0047	382.29	381.73	4.80	3.91	0.51
2	A-24	AD 502		AD 503	326	0.646	0.34	0.22	2.97	6.93	22.11	4.325	12.87	24	0.0042	381.03	379.65	15.95	5.08	1.07
2	A-25	AD 503		FES 504	39	0.565	0.18	0.10	3.08	8.36	23.18	4.188	12.88	24	0.0064	379.65	379.40	19.60	6.24	0.10

Weighted c calculations for sub-basins captured by Detention Basin #1

DEVELOPED WEIGHTED c CALCULATIONS

Total Area = 9.40 Acres

Sub-basin	Area (A)		c	c x A
A-10	0.95	Ac.	0.577	0.058
A-12	0.28	Ac.	0.737	0.022
A-14	2.39	Ac.	0.605	0.154
A-15	0.51	Ac.	0.673	0.037
A-16	0.15	Ac.	0.605	0.010
A-17	0.68	Ac.	0.601	0.043
A-18	0.06	Ac.	0.676	0.004
A-19	0.16	Ac.	0.692	0.012
A-20	1.89	Ac.	0.697	0.140
A-21	0.12	Ac.	0.616	0.008
A-22	0.28	Ac.	0.556	0.017
A-23	1.93	Ac.	0.589	0.121

Weighted c = 0.625

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: A-14

Total Area = 104,034 S.F.
2.39 Acres

Surface						C	N
Structures		=	40,490	S.F. =	0.93 Ac.	0.92	0.02
Pavement		=	17,507	S.F. =	0.40 Ac.	0.92	0.02
Drives		=	0	S.F. =	0.00 Ac.	0.92	0.02
Patios		=	1,600	S.F. =	0.04 Ac.	0.92	0.02
Sidewalks		=	0	S.F. =	0.00 Ac.	0.92	0.02
Lawn (0-2%)	30,000 S.F.	=			0.69 Ac.	0.15	0.40
Lawn (2-5%)	14,437 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
Water	0 S.F.	=			0.00 Ac.	1.00	0.00
Misc.	0 S.F.	=			0.00 Ac.	0.92	0.02

Weighted c =	**0.605**	
Weighted N =	0.182	
Sheet Flow		
L =	300 Ft.	
H =	2.4 Ft.	
S =	0.0080 Ft./Ft.	
t1=	16.55 Minutes	(Min. 5 minutes)
Shallow Concentrated Flow		
L =	102 Ft.	
H =	1.0 Ft.	
S =	0.0098 Ft./Ft.	
v =	2.00 Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	0.85 Minutes	
tc=	17.40 Minutes	
I(10) =	In./Hr.	
I(25) =	4.931 In./Hr.	
I(50) =	In./Hr.	
I(100) =	6.285 In./Hr.	
Q(10) =	**0.00 CFS**	
Q(25) =	**7.13 CFS**	
Q(50) =	**0.00 CFS**	
Q(100) =	**9.08 CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: A-15

Total Area = 22,198 S.F.
0.51 Acres

Surface						C	N
Structures		=	6,295	S.F. =	0.14 Ac.	0.92	0.02
Pavement		=	5,275	S.F. =	0.12 Ac.	0.92	0.02
Concrete		=	1,344	S.F. =	0.03 Ac.	0.92	0.02
Patios		=	1,100	S.F. =	0.03 Ac.	0.92	0.02
Sidewalks		=	0	S.F. =	0.00 Ac.	0.92	0.02
Lawn (0-2%)	S.F.	=			0.00 Ac.	0.15	0.40
Lawn (2-5%)	8,184 S.F.	=			0.19 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 =	**0.673**	
Weighted N =	0.160	
Sheet Flow		
L =	221 Ft.	
H =	2.7 Ft.	
S =	0.0121 Ft./Ft.	
t1=	12.25 Minutes	(Min. 5 minutes)
Open Channel Flow		
L =	160 Ft.	
H =	1.4 Ft.	
S =	0.0087 Ft./Ft.	
v =	1.50 Ft./sec.	
t2=	1.78 Minutes	
tc=	14.03 Minutes	
I(10) =	In./Hr.	
I(25) =	5.449 In./Hr.	
I(50) =	In./Hr.	
I(100) =	6.946 In./Hr.	
Q(10) =	**0.00 CFS**	
Q(25) =	**1.87 CFS**	
Q(50) =	**0.00 CFS**	
Q(100) =	**2.38 CFS**	

Open Channel Flow Calculations

Swale #: **14**

Side slope = 3
Bottom width = 0.5
Manning's coefficient = 0.035
Slope of channel = 0.008

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	0.50	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.13	0.08	0.07	0.07	0.05	0.65	1.1
0.2	1.76	0.22	0.12	0.13	0.21	0.95	1.2
0.3	2.08	0.31	0.15	0.16	0.34	1.08	1.3
0.4	2.71	0.54	0.20	0.21	0.71	1.30	1.4
0.5	3.35	0.83	0.25	0.26	1.25	1.51	1.5
0.6	3.98	1.18	0.30	0.31	2.01	1.70	1.6

Open Channel Flow Calculations

Swale #: **14A**

Side slope =	3
Bottom width =	0.5
Manning's coefficient =	0.035
Slope of channel =	0.008

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	0.50	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.13	0.08	0.07	0.07	0.05	0.65	1.1
0.2	1.76	0.22	0.12	0.13	0.21	0.95	1.2
0.3	2.08	0.31	0.15	0.16	0.34	1.08	1.3
0.4	2.71	0.54	0.20	0.21	0.71	1.30	1.4
0.5	3.35	0.83	0.25	0.26	1.25	1.51	1.5
0.6	3.98	1.18	0.30	0.31	2.01	1.70	1.6

Open Channel Flow Calculations

Swale #: **14B**

Side slope = 3
Bottom width = 0.5
Manning's coefficient = 0.035
Slope of channel = 0.0089

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	0.50	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.13	0.08	0.07	0.07	0.05	0.69	1.1
0.2	1.76	0.22	0.12	0.13	0.22	1.00	1.2
0.3	2.08	0.31	0.15	0.16	0.35	1.13	1.3
0.4	2.71	0.54	0.20	0.21	0.74	1.37	1.4
0.5	3.35	0.83	0.25	0.26	1.32	1.59	1.5
0.6	3.98	1.18	0.30	0.31	2.12	1.79	1.6

CASH WAGGNER & ASSOCIATES, PC
CONSULTING ENGINEERS • LAND SURVEYORS

LETTER OF TRANSMITTAL

DATE: 03.22.19
PROJECT NO.: 14-1887
REFERENCE: Hunter Chase Estates
YOUR FILE NO.:

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

THE FOLLOWING ITEMS:

COPIES:	ORIG./LAST REV. DATE:	DESCRIPTION:
1	03.21.19	Revised Drainage Plan
1	03.21.19	Drainage Details
1	03.21.19	Drainage Report
1		Street Drainage Calculations

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:

If you have any questions or comments, please give me a call. Thank you

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FROM:

GLEN MERITT, JR., P.E.

CC: File

414 CITADEL CIRCLE
SUITE B
EVANSVILLE, IN 47715
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CASH WAGGNER
& ASSOCIATES, PC
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3-21-19
GLEN A. MERITT, JR.
REGISTERED
No. PE10403870
STATE OF
INDIANA
PROFESSIONAL ENGINEER

March 21, 2019

Mr. Jeff Mueller
Vanderburgh County Surveyor
Room 325 Civic Center - 1 NW Martin Luther King Jr. Blvd.
Evansville, IN 47708

RE: Final Drainage Report
Hunter Chase Estates
North Green River Road
Our Project #: 14-1887

Mr. Mueller:

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

SITE DESCRIPTION

This development will consist of 57 condominium buildings, one clubhouse with a pool and their associated improvements (i.e. roads, utilities). This development is located on a 19.87-acre parcel that lies on the east side of Green River Road approximately 1,650 feet south of the Millersburg Road and Green River Road intersection. Chase Drive from Green River Road to the east end of the cul-de-sac (approximately 300' east of Green River Road) will be submitted to the Vanderburgh County Engineering Department to be accepted as a public street once the right-of-way has been dedicated to Vanderburgh County. Dauby Properties & Investments, LLC is currently responsible for the maintenance of this portion of the street and storm sewer improvements and will remain the responsible party until the streets and storm sewers within the right-of-way have been accepted for maintenance by Vanderburgh County. Dauby Properties & Investments, LLC will also be responsible for the maintenance of detention basin #1 and the off-site swales. The streets east of the Chase Drive cul-de-sac and within the condominium development will be privately owned and maintained by the condo association.

No regulated drains, inlets or outfalls exist on this site. No known wells, septic tank systems or outfalls exist on this site. No seeps, springs, sinkholes, caves, shafts, faults or other such geological features are visible or of record on this site.

No Army Corps, IDEM or DNR permits will be required for this project.

The proposed sanitary sewer and water mains along the west 300' of Chase Drive (from Green River Road to the east end of the cul-de-sac) will be public and maintained by EW&SU. The remaining sanitary sewer and water facilities east of the cul-de-sac will be privately maintained by the condo association.

Upon the completion of the earthwork activities and utility construction, Tenbarge Green Alliance seed mixture will be used for permanent seeding all green space

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areas and the earthen side slopes of detention basins #1 & #2. No tree limbs, refuse from legally burnt vegetation, nor construction waste, demolition materials or other man-made material may be buried within detention basins #1 or #2. There will not be a fence installed around the perimeter of detention basins #1 or #2.

The owner shall be responsible, including financially, for maintaining that part of the storm water system and its easements which exist on his or her property in proper working order including:

1. Mowing grass, controlling weeds and maintaining the designed cover of waterways, storage basins and easements in accordance with all applicable ordinances.
2. Keeping all parts of the storm water system operating as designed and as constructed and free of all trash, debris and obstructions to the flow of water.
3. Keeping the channels, embankments, shorelines and bottoms of waterways and basins free from erosion and sedimentation.
4. Maintaining the storm water system in accordance with the conditions described on the approved street and/or drainage plans on file in the County Surveyor's Office and/or in the County Engineer's Office and in compliance with the County Drainage Ordinance.
5. Maintaining the concrete swales and also financially responsible for repairing/replacing the paved side ditches.

DRAINAGE PATTERNS

The 25-year and 100-year flows were calculated for the entire development. This development was divided into 29 developed sub-basins. Sub-basins A-10 & A-12 – A-23 will be collected by Detention Basin #1. Sub-basins A-28 & A-29 will be allowed to run off-site undetained. The primary spillway of detention basin #1 discharges to an existing ditch located near the southwest corner of the site. Sub-basins A-1 – A-9, A-11 & A-24 – A-26 will be collected by Detention Basin #2. Sub-basin A-27 will be allowed to run off-site undetained. The primary spillway of detention basin #2 discharges east to an existing ditch located off-site. See attached Developed Sub-basin Exhibit for the locations of each sub-basin.

A drainage swale and storm sewer network will be installed within the development to capture the storm water runoff and convey it to detention basins #1 and #2. All swales, except for swale #25, will be constructed as part of the Hunter Chase Estates project. A fence will not be installed around the perimeter of either detention basin. Storm sewers will be constructed with reinforced concrete pipe and N-12 Watertight HDPE. All swales, except swale #25, identified on sheet C-101 will be regraded and modified from their existing conditions.

The storm sewer pipes from AD #509 to AD #512 are not able to carry the 25-year storm based on the rational equation. When the preliminary drainage calculations were submitted in 2008, the time of concentration calculations were determined utilizing a different method than what is acceptable per the current Drainage Code. However, by analyzing how the existing pipes operate during head conditions, it has been determined that with 1.65' and 2.4' of head respectively over the top of the

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pipe, the storm sewer pipes will carry the 25-year flows that they are receiving without ponding water in the streets.

Runoff from swale #4 drains to Shea Drive, then flows north along the east curb line of Shea Drive to swale #6. Swale #6 flows east to detention basin #2. The west edge of pavement elevation of Shea Drive is 5" higher than the west gutter line elevation.

The ground elevations around the condo at 7417 Shea Drive are 387.0 and the emergency spillway elevation of the detention basin flowing full during the 100-year storm is at 383.0. Therefore, there is no risk for the condo to flood with the detention basin at the top of bank elevation.

At the downstream end of the sub-basin watershed areas, where the largest amount of runoff will be collected, the majority of the roads have been constructed with a 1.5% to 2% inverted crown. By comparing the amount of runoff each street cross section can carry to the amount off runoff that is being collected in the corresponding watershed, all roads constructed with a 1.5% minimum inverted crown can carry the 25-year runoff.

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. The outlet structure for both detention basins were sized for the 25-year design storm event while allowing a discharge rate less than the undeveloped 10-year storm event from the system. The emergency spillways for both detention basins were designed to convey their respective 100-year storm flows.

Below is a summary of the detention basin design elements:

Detention Basin #1		**NOTES**
Detention Basin #1 Developed Q(25)	32.93 – cfs	A-10 & A-12 – A-23
Detention Basin #1 Developed Q(100)	41.97 - cfs	A-10 & A-12 – A-23
Detention Basin #1 Undeveloped Q(10)	17.95 – cfs	Undeveloped Q from Sitecon Drainage Report
Undetained Developed Q(25)	1.64 – cfs	A-28 & A-29
Off-Site Developed Q(25)	0.00 - cfs	
25-year Req'd Storage Volume	14,801 - cf	
25-year Provided Storage Volume	20,555 - cf	
Allowable Detention Basin #1 Release Rate	16.31 – cfs	Undeveloped Q(10) – Undetained Developed Q(25) + Off-Site Developed Q(25)

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Proposed Detention Basin #1 Release Rate	*15.09 - cfs*	*Detention Basin #1 Primary Spillway*
Outlet Structure	*66-LF of 24" R.C.P.*	
Outlet I.E.	379.58	
25-year Storage Vol. Elev.	381.15	
HW (25-yr. elev. – I.E.)	1.57 – ft.	
Minimum Top/Bank	382.40	

Detention Basin #2		**NOTES**
Detention Basin #2 Developed Q(25)	37.03 – cfs	A-1 – A-9, A-11 & A-24 – A-26
Detention Basin #2 Developed Q(100)	47.18 - cfs	A-1 – A-9, A-11 & A-24 – A-26
Detention Basin #2 Undeveloped Q(10)	20.46 – cfs	Undeveloped Q from Sitecon Drainage Report
Undetained Developed Q(25)	0.35 – cfs	A-27
Off-Site Developed Q(25)	0.00 - cfs	
25-year Req'd Storage Volume	15,238 - cf	
25-year Provided Storage Volume	32,316 - cf	
Allowable Detention Basin #2 Release Rate	20.11 – cfs	Undeveloped Q(10) – Undetained Developed Q(25) + Off-Site Developed Q(25)
Proposed Detention Basin #2 Release Rate	*16.66 - cfs*	*Detention Basin #2 Primary Spillway*
Outlet Structure	*40-LF of 24" HDPE*	
Outlet I.E.	379.38	
25-year Storage Vol. Elev.	381.08	
HW (25-yr. elev. – I.E.)	1.70 – ft.	
Minimum Top/Bank	383.00	

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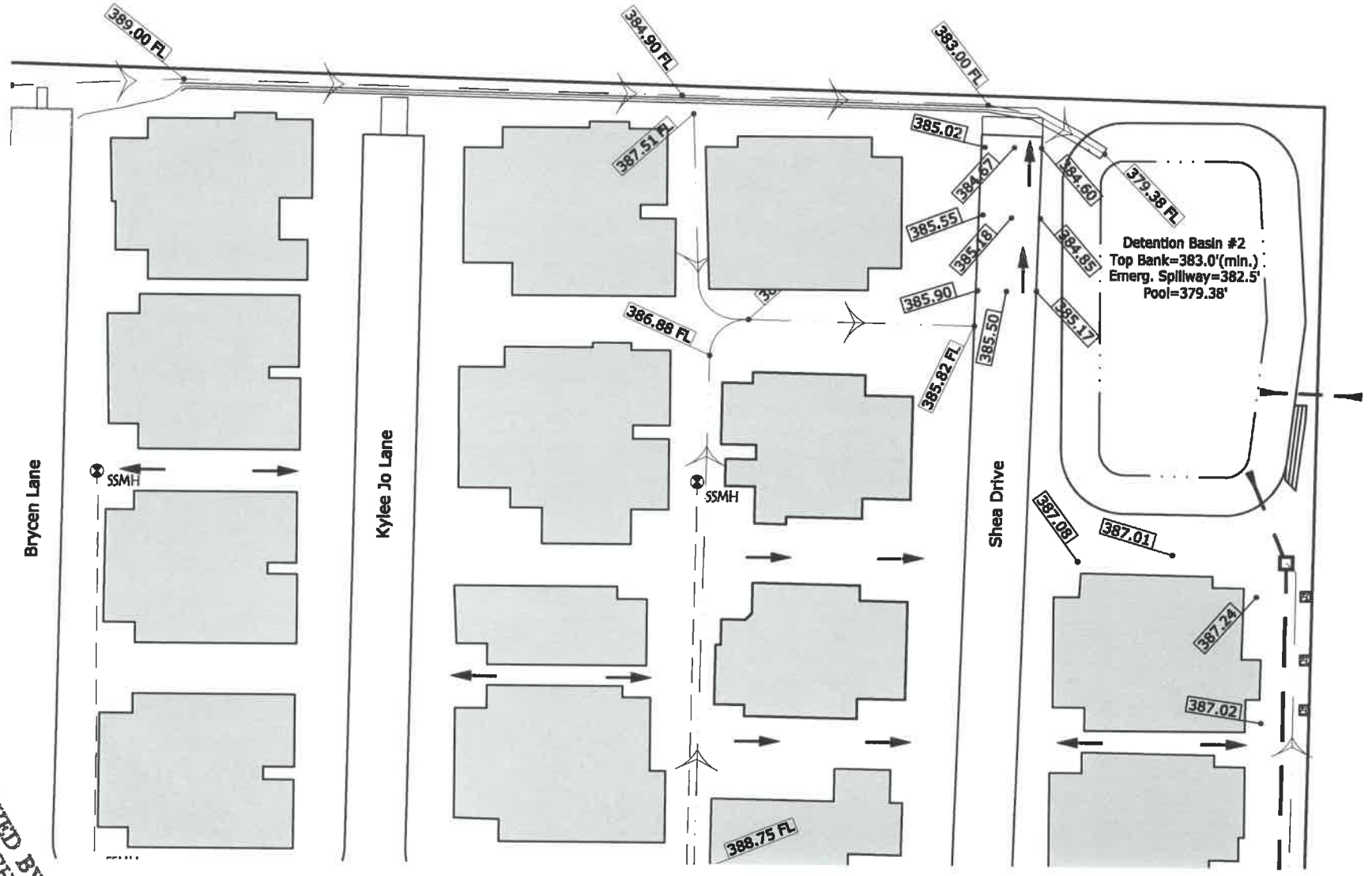
HORZ: 1"=60'



RECEIVED BY THE VANDERBURGH COUNTY SURVEYOR'S OFFICE
3-22-19

CASH WAGGNER & ASSOCIATES, PC
CONSULTING | ENGINEERING | SURVEYING
414 CITADEL CIRCLE, SUITE B, EVANSVILLE, IN 47715

SHEA DRIVE EXHIBIT
HUNTER CHASE ESTATES
NORTH GREEN RIVER ROAD
EVANSVILLE, INDIANA

SHEET NO.:	1
PROJECT NO.:	14-1887
FILENAME:	1887 BASE
DESIGNED BY:	G.A.N.
DATE:	03.21.19

Open Channel Flow Calculations

Swale #: **Chase Dr**
2%
Inverted
Crown

Side slope =	50
Bottom width =	0
Manning's coefficient =	0.013
Slope of channel =	0.0083

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.0
0.12	12.00	0.72	0.06	0.06	1.15	1.60	1.1
0.24	24.00	2.88	0.12	0.12	7.32	2.64	1.2

Open Channel Flow Calculations

Swale #: **Chase Dr**
1.50%
Inverted
Crown

Side slope =	50		
Bottom width =	0		
Manning's coefficient =	0.013		
Slope of channel =	0.0083		

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.0
0.12	12.00	0.72	0.06	0.06	1.15	1.60	1.1
0.18	18.00	1.62	0.09	0.09	3.40	2.10	1.2

Open Channel Flow Calculations

Swale #: **Chase Dr**
1%
Inverted
Crown

Side slope = 50
Bottom width = 0
Manning's coefficient = 0.013
Slope of channel = 0.0083

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.0
0.12	12.00	0.72	0.06	0.06	1.16	1.60	1.1

Open Channel Flow Calculations

Swale #: **Chase Dr**
2%
Inverted
Crown

Side slope =	50	
Bottom width =	0	
Manning's coefficient =	0.013	
Slope of channel =	0.0128	

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.0
0.12	12.00	0.72	0.06	0.06	1.43	1.99	1.1
0.24	24.00	2.88	0.12	0.12	9.08	3.15	1.2

Open Channel Flow Calculations

Swale #: **Megan North**

Side slope =	50
Bottom width =	0
Manning's coefficient =	0.013
Slope of channel =	0.0147

2%
Inverted
Crown

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.0
0.12	12.00	0.72	0.06	0.06	1.53	2.13	1.1
0.24	24.00	2.88	0.12	0.12	9.74	3.38	1.2

Open Channel Flow Calculations

Swale #: **Megan North**

Side slope =	50
Bottom width =	0
Manning's coefficient =	0.013
Slope of channel =	0.0147

1.50%
Inverted
Crown

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.0
0.12	12.00	0.72	0.06	0.06	1.53	2.13	1.1
0.18	18.00	1.62	0.09	0.09	4.52	2.79	1.2

Open Channel Flow Calculations

Swale #: **Megan North**
1%
Inverted
Crown

Side slope =	50
Bottom width =	0
Manning's coefficient =	0.013
Slope of channel =	0.0147

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.0
0.12	12.00	0.72	0.06	0.06	1.63	2.13	1.1

Open Channel Flow Calculations

Swale #: **Megan South**

Side slope =	50
Bottom width =	0
Manning's coefficient =	0.013
Slope of channel =	0.009

2%
Inverted
Crown

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.0
0.12	12.00	0.72	0.06	0.06	1.20	1.67	1.1
0.24	24.00	2.88	0.12	0.12	7.62	2.65	1.2

Open Channel Flow Calculations

Swale #: **Megan South**

Side slope =	50	1.50%
Bottom width =	0	Inverted
Manning's coefficient =	0.013	Crown
Slope of channel =	0.009	

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.0
0.12	12.00	0.72	0.06	0.06	1.20	1.67	1.1
0.18	18.00	1.62	0.09	0.09	3.54	2.18	1.2

Open Channel Flow Calculations

Swale #: **Megan South**

Side slope =	50
Bottom width =	0
Manning's coefficient =	0.013
Slope of channel =	0.009

1%
Inverted
Crown

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.0
0.12	12.00	0.72	0.06	0.06	1.20	1.67	1.1

Open Channel Flow Calculations

Swale #: **Lyons Ct**
2%
Inverted
Crown

Side slope =	50
Bottom width =	0
Manning's coefficient =	0.013
Slope of channel =	0.0076

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.0
0.12	12.00	0.72	0.06	0.06	1.10	1.53	1.1
0.24	24.00	2.88	0.12	0.12	7.00	2.43	1.2

Open Channel Flow Calculations

Swale #: **Lyons Ct**

Side slope =	50	1.50%
Bottom width =	0	Inverted
Manning's coefficient =	0.013	Crown
Slope of channel =	0.0076	

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.0
0.12	12.00	0.72	0.06	0.06	1.10	1.53	1.1
0.18	18.00	1.62	0.09	0.09	3.25	2.01	1.2

Open Channel Flow Calculations

Swale #: **Lyons Ct**

1%
Inverted
Crown

Side slope =	50
Bottom width =	0
Manning's coefficient =	0.013
Slope of channel =	0.0076

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.0
0.12	12.00	0.72	0.06	0.06	1.10	1.53	1.1

Open Channel Flow Calculations

Swale #: **Brycen** 2% Inverted Crown

Side slope =	50
Bottom width =	0
Manning's coefficient =	0.013
Slope of channel =	0.0056

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.0
0.12	12.00	0.72	0.06	0.06	0.95	1.31	1.1
0.24	24.00	2.88	0.12	0.12	6.01	2.09	1.2

Open Channel Flow Calculations

Swale #: **Brycen**
1.50%
Inverted
Crown

Side slope =	50		
Bottom width =	0		
Manning's coefficient =	0.013		
Slope of channel =	0.0056		

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.0
0.12	12.00	0.72	0.06	0.06	0.95	1.31	1.1
0.18	18.00	1.62	0.09	0.09	2.19	1.72	1.2

Open Channel Flow Calculations

Swale #: **Brycen**
1%
Inverted
Crown

Side slope = 50
Bottom width = 0
Manning's coefficient = 0.013
Slope of channel = 0.0056

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.0
0.12	12.00	0.72	0.06	0.06	0.95	1.31	1.1

Open Channel Flow Calculations

Swale #: **Kylee Jo North & South**

2%
Inverted
Crown

Side slope =	50
Bottom width =	0
Manning's coefficient =	0.013
Slope of channel =	0.0098

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.0
0.12	12.00	0.72	0.06	0.06	1.25	1.74	1.1
0.24	24.00	2.88	0.12	0.12	7.95	2.76	1.2
0.3	30.01	4.50	0.15	0.15	14.41	3.20	1.3

Open Channel Flow Calculations

Swale #: **Kylee Jo North & South**

Side slope =	50	1.50%
Bottom width =	0	Inverted
Manning's coefficient =	0.013	Crown
Slope of channel =	0.0098	

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.0
0.12	12.00	0.72	0.06	0.06	1.25	1.74	1.1
0.18	18.00	1.62	0.09	0.09	3.69	2.28	1.2

Open Channel Flow Calculations

Swale #: **Kylee Jo North & South**

Side slope =	50	1%
Bottom width =	0	Inverted
Manning's coefficient =	0.013	Crown
Slope of channel =	0.0098	

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.0
0.12	12.00	0.72	0.06	0.06	1.25	1.74	1.1

Open Channel Flow Calculations

Swale #: **Shea North**

2%
Inverted
Crown

Side slope =	50
Bottom width =	0
Manning's coefficient =	0.013
Slope of channel =	0.0082

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.0
0.12	12.00	0.72	0.06	0.06	1.15	1.59	1.1
0.24	24.00	2.88	0.12	0.12	7.27	2.52	1.2

Open Channel Flow Calculations

Swale #: **Shea North**
1.50%
Inverted
Crown

Side slope = 50
Bottom width = 0
Manning's coefficient = 0.013
Slope of channel = 0.0082

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.0
0.12	12.00	0.72	0.06	0.06	1.15	1.59	1.1
0.18	18.00	1.62	0.09	0.09	3.38	2.08	1.2

Open Channel Flow Calculations

Swale #: **Shea North**

Side slope =	50
Bottom width =	0
Manning's coefficient =	0.013
Slope of channel =	0.0082

1%
Inverted
Crown

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.0
0.12	12.00	0.72	0.06	0.06	1.15	1.59	1.1

Open Channel Flow Calculations

Swale #: **Shea South**

2%
Inverted
Crown

Side slope = 50
Bottom width = 0
Manning's coefficient = 0.013
Slope of channel = 0.0074

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.0
0.12	12.00	0.72	0.06	0.06	1.09	1.51	1.1
0.24	24.00	2.88	0.12	0.12	6.91	2.40	1.2

Open Channel Flow Calculations

Swale #: **Shea South**

Side slope =	50	1.50%
Bottom width =	0	Inverted
Manning's coefficient =	0.013	Crown
Slope of channel =	0.0074	

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.0
0.12	12.00	0.72	0.06	0.06	1.09	1.51	1.1
0.18	18.00	1.62	0.09	0.09	3.21	1.98	1.2

Open Channel Flow Calculations

Swale #: **Shea South**

Side slope =	50
Bottom width =	0
Manning's coefficient =	0.013
Slope of channel =	0.0074

1%
Inverted
Crown

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.0
0.12	12.00	0.72	0.06	0.06	1.09	1.51	1.1

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

Signature 25 Feb 19 Date

CASH WAGGNER & ASSOCIATES, PC
CONSULTING | ENGINEERING | SURVEYING
414 CITADEL CIRCLE
SUITE B
EVANSVILLE, IN 47715
PH: 812.401.5561
FAX: 812.401.5563
CELL: 812.774.2988
E-MAIL: GMERITT@CASHWAGGNER.COM

REVISIONS	No.	Date	By	Description
	1			
	2			
	3			
	4			
	5			
	6			

Project No.:	14-1887
Designed By:	G.A.M.
Drawn By:	G.A.M.
Filename:	Redesign Jan 2019
Layout Tab:	SUBBASINS
Scale:	As Shown

Project: HUNTER CHASE ESTATES
Address: NORTH GREEN RIVER ROAD EVANSVILLE, INDIANA
Sheet Title: STREET EXHIBIT

Date: 02.25.19
Drawing No.: 1
of: 1

CASH WAGGNER & ASSOCIATES, PC
CONSULTING ENGINEERS • LAND SURVEYORS

PH: 812.401.5561
FAX: 812.401.5563
GMERITT@CASHWAGGNER.COM

LETTER OF TRANSMITTAL

DATE: 03.12.19
PROJECT NO.: 14-1887
REFERENCE: Hunter Chase Estates
YOUR FILE NO.:

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

THE FOLLOWING ITEMS:

COPIES:	ORIG./LAST REV. DATE:	DESCRIPTION:
1	03.11.19	Revised Drainage Plan
1	03.11.19	Drainage Details
1	03.11.19	Swale Variance Letter
1	03.12.19	Swale #19 Sub-basin Exhibit
1		Drainage Report & Calculations
1		Adjoiner Notice

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:

If you have any questions or comments, please give me a call. Thank you

FROM:

GLEN MERITT, JR., P.E.

CC: File

RECEIVED BY THE VANDERBURGH COUNTY SURVEYOR'S OFFICE 3-12-19

414 CITADEL CIRCLE
SUITE B
EVANSVILLE, IN 47715

CASH WAGGNER
& ASSOCIATES, PC
CONSULTING ENGINEERS • LAND SURVEYORS

March 11, 2019

Vanderburgh County Drainage Board
Civic Center Complex – Room 305
Evansville, IN 47708

RE: Hunter Chase Estates
Variance Request
Project No.: 14-1887

On behalf of the owner, Dauby Properties & Investments LLC, we request a variance to allow swales in the rear and side yards of the development to vary from the typical swale cross section allowed per the current Drainage Code. This modified swale cross section has been designed to carry the 25-year developed runoff that will be collected by these swales. We also request a variance to allow all swales over a 1% slope to be armored with erosion control blankets instead of staked sod. North American Green specifications are included to show that the erosion control blankets can handle the design flows. We also request a variance to allow swales #5 and #6 to be constructed as concrete swales with a depth of 1' and 2:1 side slopes instead of grass-lined swales.

If you have any questions or require additional information, please contact our office.

Sincerely,

Glen Meritt, Jr.
Project Engineer

cc: File

Approved by the Vanderburgh County Drainage Board on this _____ day of _____, 2019.

_____
Jeff Hatfield, President

_____
Ben Shoulders, Vice President

_____
Cheryl A. W. Musgrave, Member

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3-12-19 CA

414 CITADEL CIRCLE, SUITE B
EVANSVILLE, IN 47715

PH: 812.401.5561
FAX: 812.401.5563

CASH WAGGNER
& ASSOCIATES, PC
CONSULTING ENGINEERS • LAND SURVEYORS

3-11-19

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

March 11, 2019

Mr. Jeff Mueller
Vanderburgh County Surveyor
Room 325 Civic Center - 1 NW Martin Luther King Jr. Blvd.
Evansville, IN 47708

RE: Final Drainage Report
Hunter Chase Estates
North Green River Road
Our Project #: 14-1887

Mr. Mueller:

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

SITE DESCRIPTION

This development will consist of 57 condominium buildings, one clubhouse with a pool and their associated improvements (i.e. roads, utilities). This development is located on a 19.87-acre parcel that lies on the east side of Green River Road approximately 1,650 feet south of the Millersburg Road and Green River Road intersection. Chase Drive from Green River Road to the east end of the cul-de-sac (approximately 300' east of Green River Road) will be submitted to the Vanderburgh County Engineering Department to be accepted as a public street once the right-of-way has been dedicated to Vanderburgh County. Dauby Properties & Investments, LLC is currently responsible for the maintenance of this portion of the street and storm sewer improvements and will remain the responsible party until the streets and storm sewers within the right-of-way have been accepted for maintenance by Vanderburgh County. Dauby Properties & Investments, LLC will also be responsible for the maintenance of detention basin #1 and the off-site swales. The streets east of the Chase Drive cul-de-sac and within the condominium development will be privately owned and maintained by the condo association.

REVISED 3/12/2019 SUBMITTAL

No regulated drains, inlets or outfalls exist on this site. No known wells, septic tank systems or outfalls exist on this site. No seeps, springs, sinkholes, caves, shafts, faults or other such geological features are visible or of record on this site.

No Army Corps, IDEM or DNR permits will be required for this project.

The proposed sanitary sewer and water mains along the west 300' of Chase Drive (from Green River Road to the east end of the cul-de-sac) will be public and maintained by EW&SU. The remaining sanitary sewer and water facilities east of the cul-de-sac will be privately maintained by the condo association.

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Upon the completion of the earthwork activities and utility construction, Tenbarge – Green Alliance seed mixture will be used for permanent seeding all green space

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areas and the earthen side slopes of detention basins #1 & #2. No tree limbs, refuse from legally burnt vegetation, nor construction waste, demolition materials or other man-made material may be buried within detention basins #1 or #2. There will not be a fence installed around the perimeter of detention basins #1 or #2.

The owner shall be responsible, including financially, for maintaining that part of the storm water system and its easements which exist on his or her property in proper working order including:

1. Mowing grass, controlling weeds and maintaining the designed cover of waterways, storage basins and easements in accordance with all applicable ordinances.
2. Keeping all parts of the storm water system operating as designed and as constructed and free of all trash, debris and obstructions to the flow of water.
3. Keeping the channels, embankments, shorelines and bottoms of waterways and basins free from erosion and sedimentation.
4. Maintaining the storm water system in accordance with the conditions described on the approved street and/or drainage plans on file in the County Surveyor's Office and/or in the County Engineer's Office and in compliance with the County Drainage Ordinance.
5. Maintaining the concrete swales and also financially responsible for repairing/replacing the paved side ditches.

DRAINAGE PATTERNS

The 25-year and 100-year flows were calculated for the entire development. This development was divided into 29 developed sub-basins. Sub-basins A-10 & A-12 – A-23 will be collected by Detention Basin #1. Sub-basins A-28 & A-29 will be allowed to run off-site undetained. The primary spillway of detention basin #1 discharges to an existing ditch located near the southwest corner of the site. Sub-basins A-1 – A-9, A-11 & A-24 – A-26 will be collected by Detention Basin #2. Sub-basin A-27 will be allowed to run off-site undetained. The primary spillway of detention basin #2 discharges east to an existing ditch located off-site. See attached Developed Sub-basin Exhibit for the locations of each sub-basin.

A drainage swale and storm sewer network will be installed within the development to capture the storm water runoff and convey it to detention basins #1 and #2. All swales except for swale #25 will be constructed as part of the Hunter Chase Estates project. A fence will not be installed around the perimeter of either detention basin. Storm sewers will be constructed with reinforced concrete pipe and N-12 Watertight HDPE. All swales identified on sheet C-101 will be regraded modified from the existing conditions.

The storm sewer pipes from AD #509 to AD #512 are not able to carry the 25-year storm based on the rational equation. When the preliminary drainage calculations were submitted in 2008, the time of concentration calculations were determined utilizing a different method than what is acceptable per the current Drainage Code. However, by analyzing how the existing pipes operate during head conditions, it has been determined that with 1.65' and 2.4' of head respectively over the top of the

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pipe, the storm sewer pipes will carry the 25-year flows that they are receiving without ponding water in the streets.

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. The outlet structure for both detention basins were sized for the 25-year design storm event while allowing a discharge rate less than the undeveloped 10-year storm event from the system. The emergency spillways for both detention basins were designed to convey their respective 100-year storm flows.

Below is a summary of the detention basin design elements:

Detention Basin #1		**NOTES**
Detention Basin #1 Developed Q(25)	32.93 – cfs	A-10 & A-12 – A-23
Detention Basin #1 Developed Q(100)	41.97 - cfs	A-10 & A-12 – A-23
Detention Basin #1 Undeveloped Q(10)	17.95 – cfs	Undeveloped Q from Sitecon Drainage Report
Undetained Developed Q(25)	1.64 – cfs	A-28 & A-29
Off-Site Developed Q(25)	0.00 - cfs	
25-year Req'd Storage Volume	14,801 - cf	
25-year Provided Storage Volume	20,555 - cf	
Allowable Detention Basin #1 Release Rate	16.31 – cfs	Undeveloped Q(10) – Undetained Developed Q(25) + Off-Site Developed Q(25)
Proposed Detention Basin #1 Release Rate	*15.09 - cfs*	*Detention Basin #1 Primary Spillway*
Outlet Structure	*66-LF of 24" R.C.P.*	
Outlet I.E.	379.58	
25-year Storage Vol. Elev.	381.15	
HW (25-yr. elev. – I.E.)	1.57 – ft.	
Minimum Top/Bank	382.40	

Detention Basin #2		**NOTES**
Detention Basin #2 Developed Q(25)	37.03 – cfs	A-1 – A-9, A-11 & A-24 – A-26
Detention Basin #2 Developed Q(100)	47.18 - cfs	A-1 – A-9, A-11 & A-24 – A-26
Detention Basin #2 Undeveloped Q(10)	20.46 – cfs	Undeveloped Q from Sitecon Drainage Report
Undetained Developed Q(25)	0.35 – cfs	A-27

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Off-Site Developed Q(25)	0.00 - cfs	
25-year Req'd Storage Volume	15,238 - cf	
25-year Provided Storage Volume	32,316 - cf	
Allowable Detention Basin #2 Release Rate	20.11 – cfs	Undeveloped Q(10) – Undetained Developed Q(25) + Off-Site Developed Q(25)
Proposed Detention Basin #2 Release Rate	*16.66 - cfs*	*Detention Basin #2 Primary Spillway*
Outlet Structure	*40-LF of 24" HDPE*	
Outlet I.E.	379.38	
25-year Storage Vol. Elev.	381.08	
HW (25-yr. elev. – I.E.)	1.70 – ft.	
Minimum Top/Bank	383.00	

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DETENTION FACILITY DESIGN VOLUME CALCULATIONS

PROJECT: **Hunter Chase Estates**
Detention Basin #1

DETENTION FACILITY DESIGN RETURN PERIOD: 25 YRS

RELEASE RATE RETURN PERIOD: 10 YRS

WATERSHED AREA: 9.39 ACRES

DEVELOPED RUNOFF COEFFICIENT (C_d): 0.633

STORM DURATION T_d (HRS)	RAINFALL INTENSITY I_d (INCH/HR)	INFLOW RATE $I(T_d)$ (C_d*I_d*A) (CFS)	OUTFLOW RATE O (C_u*I_u*A) (CFS)	STORAGE RATE ΔS $I(T_d)$-O (CFS)	REQUIRED STORAGE S_d $(I(T_d)-O)*T_d/12$ (ACRE-FT)
0.08	7.810	46.42	15.09	31.33	0.218
0.17	6.320	37.57	15.09	22.48	0.312
0.25	5.240	31.15	15.09	16.06	0.334
0.33	4.597	27.32	15.09	12.23	0.340
0.42	3.953	23.50	15.09	8.41	0.292
0.50	3.310	19.67	15.09	4.58	0.191
0.58	3.083	18.33	15.09	3.24	0.157
0.67	2.857	16.98	15.09	1.89	0.105
0.75	2.630	15.63	15.09	0.54	0.034
0.83	2.403	14.29	15.09	-0.80	-0.056
0.92	2.177	12.94	15.09	-2.15	-0.164
1.00	1.950	11.59	15.09	-3.50	-0.292
1.25	1.805	10.73	15.09	-4.36	-0.454
1.50	1.660	9.87	15.09	-5.22	-0.653
1.75	1.515	9.00	15.09	-6.09	-0.887
2.00	1.370	8.14	15.09	-6.95	-1.158
3.00	1.020	6.06	15.09	-9.03	-2.257

PEAK STORAGE (ACRE/FT): 0.34
PEAK STORAGE (CUBIC FT): 14,801

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Orifice Equation: $Q = C_d A_o \sqrt{2gh_o}$ $g = 32.2$ ft/sec^2

$C_d = 0.79$ $A_o = \pi r^2 = \pi (1')^2 = 3.14159$ $h_o = 0.574'$ (height of water above the center line of the orifice)

$Q = (0.79)(3.14159)\sqrt{2(32.2)(0.573)}$

$Q = 15.09$ cfs

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DETENTION FACILITY DESIGN VOLUME CALCULATIONS

PROJECT: **Hunter Chase Estates**
Detention Basin #1

DETENTION FACILITY DESIGN RETURN PERIOD: 100 YRS

RELEASE RATE RETURN PERIOD: 10 YRS

WATERSHED AREA: 9.39 ACRES

DEVELOPED RUNOFF COEFFICIENT (C_d): 0.633

STORM DURATION T_d (HRS)	RAINFALL INTENSITY I_d (INCH/HR)	INFLOW RATE $I(T_d)$ (C_d*I_d*A) (CFS)	OUTFLOW RATE O (C_u*I_u*A) (CFS)	STORAGE RATE ΔS $I(T_d)$-O (CFS)	REQUIRED STORAGE S_d $(I(T_d)-O)*T_d/12$ (ACRE-FT)
0.08	9.950	59.14	17.91	41.23	0.286
0.17	8.050	47.85	17.91	29.94	0.416
0.25	6.680	39.71	17.91	21.80	0.454
0.33	5.857	34.81	17.91	16.90	0.469
0.42	5.033	29.92	17.91	12.01	0.417
0.50	4.210	25.02	17.91	7.11	0.296
0.58	3.935	23.39	17.91	5.48	0.266
0.67	3.660	21.75	17.91	3.84	0.214
0.75	3.385	20.12	17.91	2.21	0.138
0.83	3.110	18.49	17.91	0.58	0.040
0.92	2.835	16.85	17.91	-1.06	-0.081
1.00	2.560	15.22	17.91	-2.69	-0.224
1.25	2.380	14.15	17.91	-3.76	-0.392
1.50	2.200	13.08	17.91	-4.83	-0.604
1.75	2.020	12.01	17.91	-5.90	-0.861
2.00	1.840	10.94	17.91	-6.97	-1.162

PEAK STORAGE (ACRE/FT): 0.47
PEAK STORAGE (CUBIC FT): 20,451

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Hunter Chase Estates

Detention Basin #1

PROPOSED 100-YR DESIGN RELEASE RATE
Primary Spillway

CALCULATIONS FOR PIPE FLOWING FULL

(Pressure Conditions)

SOLVE FOR Q

Ø=	2	FT.
h'=	1.3	IN.
h=	1.1083	FT.
Ke=	0.5	
Ko=	1	
n=	0.012	
L=	66	FT.
HW=	2.1083	FT.
Q=	**17.91**	**CFS**

Ø= diameter of orifice (pipe)
Ke= entrance coefficient
Ko= outfall coefficient
n= manning's 'n'
L= length of orifice (pipe)
Q= allowable release rate

h= h' + Ø/2
h'= ht. of water above orifice
HW= h' + Ø

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Hunter Chase Estates

Detention Basin #1

PROVIDED DETENTION VOLUMES
(per ACAD)

	Elevation	Area (s.f.)	Avg. Area (s.f.)	Inc. Vol. (c.f.)	Cumulative Vol. (c.f.)
Pool	379.58	8,161			
	380.58	9,580	8,871	8,871	8,871
	381.58	11,102	10,341	10,341	19,212
E.O.S.	381.70	11,292	11,197	1,344	20,555
T.B.	382.40	12,428	11,860	8,302	28,857

Detention volume provided at Elev. 381.70 = *20,555* *c.f.*

Total, required 25-YR detention volume = 14,801 c.f.

25-YR Req'd detention volume provided @ Elev. = 381.15 ft.

Req'd HW= 1.574 ft.

Detention volume provided at Elev. 382.40 = *28,857* *c.f.*

Total, required 100-YR detention volume = 20,451 c.f.

100-YR Req'd detention volume provided @ Elev. = 381.69 ft.

Req'd HW= 2.11 ft.

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Open Channel Flow Calculations

Swale #: **Emergency Spillway #1**

Side slope =	4
Bottom width =	36
Manning's coefficient =	0.035
Slope of channel =	0.02

Depth (ft)	Wetted Perimeter (ft)	Area (ft^2)	Hydraulic Radius (ft)	Hydraulic Depth (ft)	Flowrate (cfs)	Velocity (ft/s)	F value
0.0	36.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	36.82	3.64	0.10	0.10	4.69	1.29	1.1
0.2	37.65	7.36	0.20	0.20	14.93	2.03	1.2
0.3	38.06	9.25	0.24	0.24	21.69	2.34	1.3
0.4	38.89	13.09	0.34	0.34	38.14	2.91	1.4
0.5	39.71	17.01	0.43	0.43	58.19	3.42	1.5

DETENTION FACILITY DESIGN VOLUME CALCULATIONS

PROJECT: **Hunter Chase Estates**
Detention Basin #2

DETENTION FACILITY DESIGN RETURN PERIOD: 25 YRS

RELEASE RATE RETURN PERIOD: 10 YRS

WATERSHED AREA: 9.25 ACRES

DEVELOPED RUNOFF COEFFICIENT (C_d): 0.688

STORM DURATION T_d (HRS)	RAINFALL INTENSITY I_d (INCH/HR)	INFLOW RATE $I(T_d)$ (C_d*I_d*A) (CFS)	OUTFLOW RATE O (C_u*I_u*A) (CFS)	STORAGE RATE ΔS $I(T_d)$-O (CFS)	REQUIRED STORAGE S_d $(I(T_d)-O)*T_d/12$ (ACRE-FT)
0.08	7.810	49.70	16.66	33.04	0.229
0.17	6.320	40.22	16.66	23.56	0.327
0.25	5.240	33.35	16.66	16.69	0.348
0.33	4.597	29.25	16.66	12.59	0.350
0.42	3.953	25.16	16.66	8.50	0.295
0.50	3.310	21.06	16.66	4.40	0.184
0.58	3.083	19.62	16.66	2.96	0.144
0.67	2.857	18.18	16.66	1.52	0.084
0.75	2.630	16.74	16.66	0.08	0.005
0.83	2.403	15.29	16.66	-1.37	-0.095
0.92	2.177	13.85	16.66	-2.81	-0.214
1.00	1.950	12.41	16.66	-4.25	-0.354
1.25	1.805	11.49	16.66	-5.17	-0.539
1.50	1.660	10.56	16.66	-6.10	-0.762
1.75	1.515	9.64	16.66	-7.02	-1.024
2.00	1.370	8.72	16.66	-7.94	-1.324
3.00	1.020	6.49	16.66	-10.17	-2.542

PEAK STORAGE (ACRE/FT):	**0.35**
PEAK STORAGE (CUBIC FT):	**15,238**

Orifice Equation: $Q = C_d A_o \sqrt{2 g h_o}$ $g = 32.2 ft/sec^2$

$C_d = 0.79$ $A_o = \pi r^2 = \pi (1')^2 = 3.14159$ $h_o = 0.7'$ (height of water above the center line of the orifice)

$Q = (0.79)(3.14159)\sqrt{2(32.2)(0.70)}$

$Q = 16.66$ cfs

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DETENTION FACILITY DESIGN VOLUME CALCULATIONS

PROJECT: **Hunter Chase Estates**
Detention Basin #2

DETENTION FACILITY DESIGN RETURN PERIOD: 100 YRS

RELEASE RATE RETURN PERIOD: 10 YRS

WATERSHED AREA: 9.25 ACRES

DEVELOPED RUNOFF COEFFICIENT (C_d): 0.688

STORM DURATION T_d (HRS)	RAINFALL INTENSITY I_d (INCH/HR)	INFLOW RATE $I(T_d)$ (C_d*I_d*A) (CFS)	OUTFLOW RATE O (C_u*I_u*A) (CFS)	STORAGE RATE ΔS $I(T_d)$-O (CFS)	REQUIRED STORAGE S_d $(I(T_d)-O)*T_d/12$ (ACRE-FT)
0.08	9.950	63.32	19.85	43.47	0.302
0.17	8.050	51.23	19.85	31.38	0.436
0.25	6.680	42.51	19.85	22.66	0.472
0.33	5.857	37.27	19.85	17.42	0.484
0.42	5.033	32.03	19.85	12.18	0.423
0.50	4.210	26.79	19.85	6.94	0.289
0.58	3.935	25.04	19.85	5.19	0.252
0.67	3.660	23.29	19.85	3.44	0.191
0.75	3.385	21.54	19.85	1.69	0.106
0.83	3.110	19.79	19.85	-0.06	-0.004
0.92	2.835	18.04	19.85	-1.81	-0.138
1.00	2.560	16.29	19.85	-3.56	-0.297
1.25	2.380	15.15	19.85	-4.70	-0.490
1.50	2.200	14.00	19.85	-5.85	-0.731
1.75	2.020	12.86	19.85	-6.99	-1.020
2.00	1.840	11.71	19.85	-8.14	-1.357

PEAK STORAGE (ACRE/FT): 0.48
PEAK STORAGE (CUBIC FT): 21,080

Hunter Chase Estates

Detention Basin #2

PROPOSED 100-YR DESIGN RELEASE RATE
Primary Spillway

CALCULATIONS FOR PIPE FLOWING FULL

(Pressure Conditions)

SOLVE FOR Q

Ø=	2	FT.
h'=	2.3	IN.
h=	1.1917	FT.
Ke=	0.5	
Ko=	1	
n=	0.012	
L=	40	FT.
HW=	2.1917	FT.
Q=	**19.85**	**CFS**

Ø= diameter of orifice (pipe)
Ke= entrance coefficient
Ko= outfall coefficient
n= manning's 'n'
L= length of orifice (pipe)
Q= allowable release rate

h= h' + Ø/2
h'= ht. of water above orifice
HW= h' + Ø

Hunter Chase Estates

Detention Basin #2

PROVIDED DETENTION VOLUMES
(per ACAD)

	Elevation	Area (s.f.)	Avg. Area (s.f.)	Inc. Vol. (c.f.)	Cumulative Vol. (c.f.)
Pool	379.38	7,829			
	380.38	9,379	8,604	8,604	8,604
	381.38	11,039	10,209	10,209	18,813
E.O.S.	382.50	13,073	12,056	13,503	32,316
T.B.	383.00	13,963	13,518	6,759	39,075

Detention volume provided at Elev. 382.50 = *32,316* *c.f.*

Total, required 25-YR detention volume = 15,238 c.f.

25-YR Req'd detention volume provided @ Elev. = 381.08 ft.

Req'd HW= 1.70 ft.

Detention volume provided at Elev. 383.00 = *39,075* *c.f.*

Total, required 100-YR detention volume = 21,080 c.f.

100-YR Req'd detention volume provided @ Elev. = 381.57 ft.

Req'd HW= 2.19 ft.

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Open Channel Flow Calculations

Swale #: **Emergency Spillway #2**

Side slope =	4
Bottom width =	30
Manning's coefficient =	0.035
Slope of channel =	0.02

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	30.00	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	30.82	3.04	0.10	0.10	3.91	1.29	1.1
0.2	31.65	6.16	0.19	0.19	12.46	2.02	1.2
0.3	32.06	7.75	0.24	0.24	18.11	2.34	1.3
0.4	32.89	10.99	0.33	0.34	31.86	2.90	1.4
0.5	33.71	14.31	0.42	0.43	48.66	3.40	1.5

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: Swale #19

Total Area = 25,073 S.F.
0.58 Acres

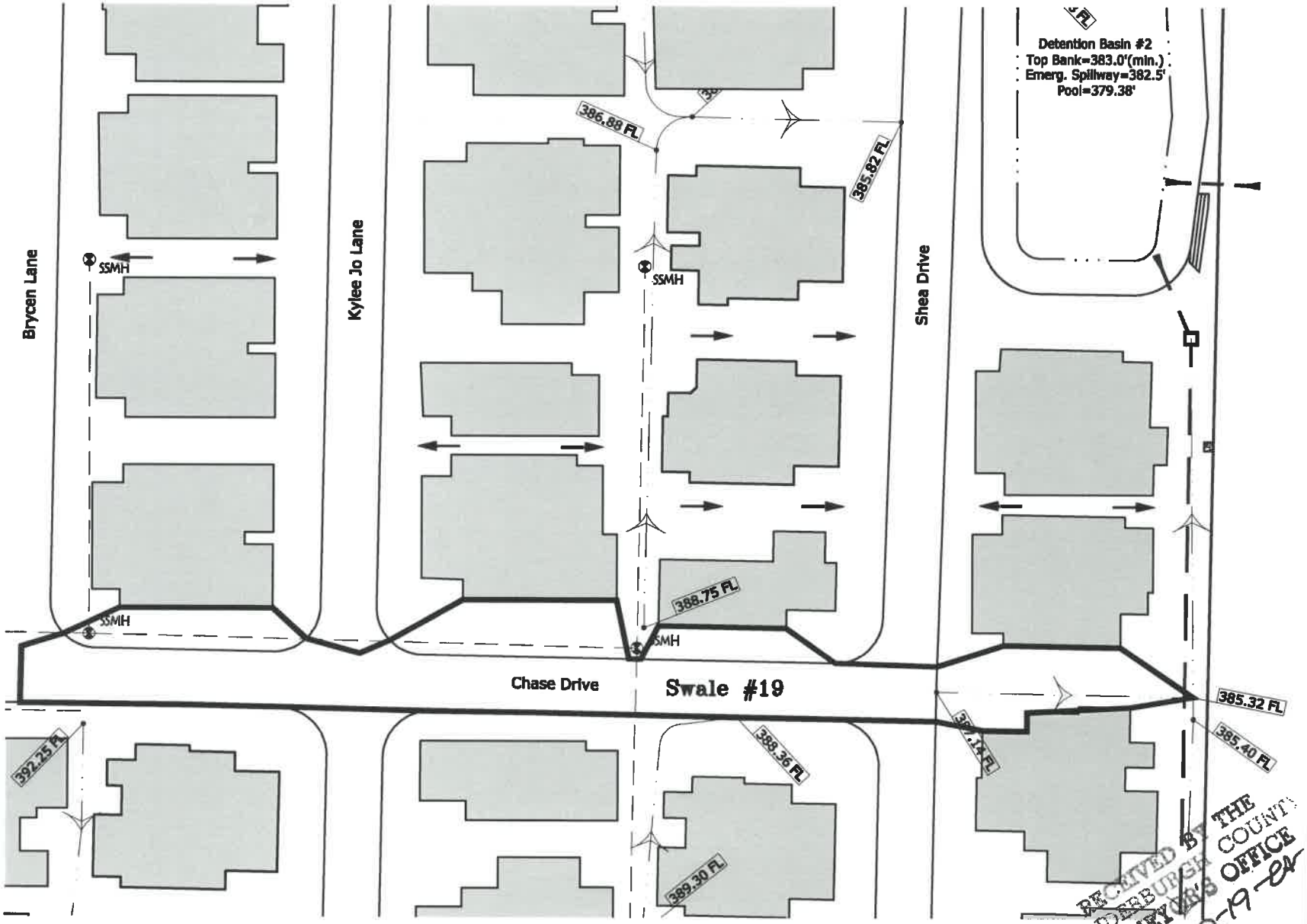
Surface							C	N
Structures		=	3,719	S.F. =	0.09	Ac.	0.92	0.02
Pavement		=	9,561	S.F. =	0.22	Ac.	0.92	0.02
Drives		=	0	S.F. =	0.00	Ac.	0.92	0.02
Patios		=	600	S.F. =	0.01	Ac.	0.92	0.02
Sidewalks		=	0	S.F. =	0.00	Ac.	0.92	0.02
Lawn (0-2%)	S.F.	=			0.00	Ac.	0.15	0.40
Lawn (2-5%)	20,754 S.F.	=			0.48	Ac.	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 =	**0.716**	
Weighted N =	0.342	
Sheet Flow		
L =	300	Ft.
H =	4.7	Ft.
S =	0.0157	Ft./Ft.
t1=	18.98	Minutes
Open Channel Flow		
L =	97	Ft.
H =	1.2	Ft.
S =	0.0120	Ft./Ft.
v =	2.20	Ft./sec.
t2=	0.73	Minutes
tc=	19.71	Minutes
I(10) =		In./Hr.
I(25) =	4.633	In./Hr.
I(50) =		In./Hr.
I(100) =	5.904	In./Hr.

(Min. 5 minutes)

Q(10) =	**0.00**	**CFS**
Q(25) =	**1.91**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**2.43**	**CFS**

HORZ: 1"=60'



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414 CITADEL CIRCLE, SUITE B, EVANSVILLE, IN 47715

SWALE #19 SUB-BASIN EXHIBIT
HUNTER CHASE ESTATES
NORTH GREEN RIVER ROAD
EVANSVILLE, INDIANA

SHEET NO.:	1
PROJECT NO.: 14-1887	FILENAME: 1887 BASIN
DESIGNED BY: C.A.M.	DATE: 03.12.19

Hunter Chase Estates
Operation and Maintenance Requirements

ROUTINE INSPECTIONS

1. Following final construction, Dauby Properties & Investments, LLC shall be responsible for the upkeep of detention basins #1 and #2. Routine inspections will dictate maintenance requirements for general items at the site including monitoring for trash, debris and other deposited pollutants. Any deficiency shall be addressed immediately following the discovery of the issue.
2. Detention basins will be observed for erosion or sediment build-up, which could result in overtopping and severe erosion down-slope.
3. Detention basin side slopes will be visually inspected for erosion and gullying.
4. If erosion occurs on the detention pond side slopes, a fill material will be added as necessary to maintain the original grade of the slope.
5. Inspect outlet control structures for damage.

MONTHLY MAINTENANCE

1. Lawn areas will require mowing from April through October as necessary. Mow only as appropriate for vegetative cover species.
2. Trees should not be allowed to grow on emergency overflows and stormwater berms that are over 4 feet high. Trees can block flows and roots can lead to berm failure. Remove any trees and tree roots (where the base of the tree is greater than 4 inches) and restore the berm.
3. Repair and seed bare areas. Repair eroded slopes when rills form, where damage is present, or there is potential for future erosion.
4. If berms show signs of settlement or sinkholes, serious problems may be occurring. Consult a licensed professional engineer to determine the cause of the settlement or sinkhole.

ANNUAL MAINTENANCE.

1. Remove accumulated sediment from the basin bottom that is clogging the infiltration layer.

NOTICE OF DRAINAGE BOARD MEETING

TO: Adjoining Property Owner

OWNER: Dauby Properties & Investments, LLC

DEVELOPER: Dauby Properties & Investments, LLC
Ron Dauby
Phone: 1-812-426-0425

ENGINEER: Cash Waggner & Associates, PC

DATE: February 12, 2019

SUBJECT: Notice of hearing on "Hunter Chase Estates"

Notice is hereby given that the Drainage Plan for Hunter Chase Estates, which is located on the east side of Green River Road approximately 1700' south of the Millersburg Road and Green River Road intersection, in Vanderburgh County, Indiana, has been submitted to the Vanderburgh County Surveyors Office, Room 325, Civic Center, Evansville, IN. The submitted Drainage Plan will be heard for approval or disapproval at the Drainage Board meeting on February 26, 2019 immediately following the County Commissioners regularly scheduled meeting at 3:00 p.m. in Room 301 of the Civic Center. A copy of the Drainage Plan is available for review in the County Surveyor's Office during normal business hours.

CASH WAGGNER & ASSOCIATES, PC
CONSULTING ENGINEERS • LAND SURVEYORS

DATE: 02.21.19
PROJECT NO.: 14-1887
REFERENCE: Hunter Chase Estates
YOUR FILE NO.:

ATTENTION: Jeff Mueller
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	02.20.19	Revised Drainage Plan
1	02.20.19	Drainage Details
1	02.20.19	Developed Sub-basin Exhibit
1		Drainage Calculations
1		Adjoiner Notices
1	01.30.19	Commitment Letter from Dauby

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:

If you have any questions or comments, please give me a call. Thank you

RECEIVED BY THE VANDERBURGH COUNTY SURVEYOR'S OFFICE
2-21-19

Cc: File

FROM:

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

GLEN MERITT, JR., P.E.

CASH WAGGNER
& ASSOCIATES, PC
CONSULTING ENGINEERS • LAND SURVEYORS

2-20-19

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

February 20, 2019

Mr. Jeff Mueller
Vanderburgh County Surveyor
Room 325 Civic Center - 1 NW Martin Luther King Jr. Blvd.
Evansville, IN 47708

RE: Final Drainage Report
Hunter Chase Estates
North Green River Road
Our Project #: 14-1887

Mr. Mueller:

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

SITE DESCRIPTION

This development will consist of 57 condominium buildings, one clubhouse with a pool and their associated improvements (i.e. roads, utilities). This development is located on a 19.87-acre parcel that lies on the east side of Green River Road approximately 1,650 feet south of the Millersburg Road and Green River Road intersection. Chase Drive from Green River Road to the east end of the cul-de-sac (approximately 300' east of Green River Road) will be submitted to the Vanderburgh County Engineering Department to be accepted as a public street once the right-of-way has been dedicated to Vanderburgh County. Dauby Properties & Investments, LLC is currently responsible for the maintenance of this portion of the street and storm sewer improvements and will remain the responsible party until the streets and storm sewers within the right-of-way have been accepted for maintenance by Vanderburgh County. The streets east of the Chase Drive cul-de-sac and within the condominium development will be privately owned and maintained by the condo association.

No regulated drains, inlets or outfalls exist on this site. No known wells, septic tank systems or outfalls exist on this site. No seeps, springs, sinkholes, caves, shafts, faults or other such geological features are visible or of record on this site.

The proposed sanitary sewer and water mains along the west 300' of Chase Drive (from Green River Road to the east end of the cul-de-sac) will be public and maintained by EW&SU. The remaining sanitary sewer and water facilities east of the cul-de-sac will be privately maintained by the condo association.

Upon the completion of the earthwork activities and utility construction, Tenbarge – Green Alliance seed mixture will be used for permanent seeding all green space areas and the earthen side slopes of detention basins #1 & #2. No tree limbs, refuse from legally burnt vegetation, nor construction waste, demolition materials or

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2-21-19

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

other man-made material may be buried within detention basins #1 or #2. There will not be a fence installed around the perimeter of detention basins #1 or #2.

DRAINAGE PATTERNS

The 25-year and 100-year flows were calculated for the entire development. This development was divided into 29 developed sub-basins. Sub-basins A-10 & A-12 – A-23 will be collected by Detention Basin #1. Sub-basins A-28 & A-29 will be allowed to run off-site undetained. The primary spillway of detention basin #1 discharges to an existing ditch located near the southwest corner of the site. Sub-basins A-1 – A-9, A-11 & A-24 – A-26 will be collected by Detention Basin #2. Sub-basin A-27 will be allowed to run off-site undetained. The primary spillway of detention basin #2 discharges east to an existing ditch located off-site. See attached Developed Sub-basin Exhibit for the locations of each sub-basin.

A drainage swale and storm sewer network will be installed within the development to capture the storm water runoff and convey it to detention basins #1 and #2. Storm sewers will be constructed with reinforced concrete pipe and N-12 Watertight HDPE. All swales identified on sheet C-101 will be regraded modified from the existing conditions.

The storm sewer pipes from AD #509 to AD #512 are not able to carry the 25-year storm based on the rational equation. When the preliminary drainage calculations were submitted in 2008, the time of concentration calculations were determined utilizing a different method than what is acceptable per the current Drainage Code. However, by analyzing how the existing pipes operate during head conditions, it has been determined that with 1.65' and 2.4' of head respectively over the top of the pipe, the storm sewer pipes will carry the 25-year flows that they are receiving without ponding water in the streets.

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. The outlet structure for both detention basins were sized for the 25-year design storm event while allowing a discharge rate less than the undeveloped 10-year storm event from the system. The emergency spillways for both detention basins were designed to convey the 100-year storm flow.

Below is a summary of the detention basin design elements:

Detention Basin #1		**NOTES**
Detention Basin #1 Developed Q(25)	32.93 – cfs	A-10 & A-12 – A-23
Detention Basin #1 Developed Q(100)	41.97 - cfs	A-10 & A-12 – A-23

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CASH WAGGNER & ASSOCIATES, PC

414 CITADEL CIRCLE, STE. B
EVANSVILLE, IN 47715

PH: 812.401.5561
FAX: 812.401.5563

Detention Basin #1 Undeveloped Q(10)	17.95 – cfs	Undeveloped Q from Sitecon Drainage Report
Undetained Developed Q(25)	1.64 – cfs	A-28 & A-29
Off-Site Developed Q(25)	0.00 - cfs	
25-year Req'd Storage Volume	17,838 - cf	
25-year Provided Storage Volume	20,555 - cf	
Allowable Detention Basin #1 Release Rate	16.31 – cfs	Undeveloped Q(10) – Undetained Developed Q(25) + Off-Site Developed Q(25)
Proposed Detention Basin #1 Release Rate	*12.58 - cfs*	*Detention Basin #1 Primary Spillway*
Outlet Structure	*66-LF of 21" R.C.P.*	
Outlet I.E.	379.58	
25-year Storage Vol. Elev.	381.45	
HW (25-yr. elev. – I.E.)	1.87 – ft.	
Minimum Top/Bank	382.40	

Detention Basin #2		**NOTES**
Detention Basin #2 Developed Q(25)	37.03 – cfs	A-1 – A-9, A-11 & A-24 – A-26
Detention Basin #2 Developed Q(100)	47.18 - cfs	A-1 – A-9, A-11 & A-24 – A-26
Detention Basin #2 Undeveloped Q(10)	20.46 – cfs	Undeveloped Q from Sitecon Drainage Report
Undetained Developed Q(25)	0.35 – cfs	A-27
Off-Site Developed Q(25)	0.00 - cfs	
25-year Req'd Storage Volume	21,203 - cf	
25-year Provided Storage Volume	32,316 - cf	
Allowable Detention Basin #2 Release Rate	20.11 – cfs	Undeveloped Q(10) – Undetained Developed Q(25) + Off-Site Developed Q(25)
Proposed Detention Basin #2 Release Rate	*11.73 - cfs*	*Detention Basin #2 Primary Spillway*
Outlet Structure	*40-LF of 24" HDPE*	*Install 18" Orifice*
Outlet I.E.	379.38	
25-year Storage Vol. Elev.	381.58	
HW (25-yr. elev. – I.E.)	2.20 – ft.	
Minimum Top/Bank	383.00	

REVISED BY 3/12/2019 AMM

VANDERBURGH COUNTY SURVEYOR'S OFFICE 2-27-19

CASH WAGGNER & ASSOCIATES, PC

414 CITADEL CIRCLE, STE. B
EVANSVILLE, IN 47715

PH: 812.401.5561
FAX: 812.401.5563

January 30, 2019

Vanderburgh County Drainage Board
Civic Center Complex – Room 305
Evansville, IN 47708

RE: Hunter Chase Estates

I am the developer of the Hunter Chase Estates condominium development located on North Green River Road. Starting in June or July of 2019, detention basins #1 and #2 will be drained to allow the slopes to be regraded to a maximum slope of 4:1 and if necessary, removal of sediment from the bottom of the basins to maintain a permanent water pool depth of 6 feet to meet the current Drainage Code. Once this work is completed, permanent seeding will be applied to the entire disturbed area.

The majority of the sidewalks along the north and south property lines will then be removed to allow swales of a larger cross section to be constructed in these locations. All swales that are approved on the final drainage plan will be regraded to the design elevations and cross sections. The concrete swale along the northeast property line and the standing curb near the southeast corner of the development will also be constructed. Once swale grading has been completed, all grass-lined swales will be seeded and armored with erosion control blankets. All work associated with the approved final drainage plan will be completed by October 31st, 2019.

Sincerely, Ronald Lee Dauby

Ron Dauby
Dauby Properties & Investments, LLC

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2-21-19

STORM SEWER CALCULATIONS

Design Return Period: 25 Year

Mannings 'n': 0.012

Project Name: **Hunter Chase Estates**

Project #: 14-1887

Date: 2/20/19

1 NO.	SUB-BASIN NO.	UPSTREAM STRUCTURE	PIPE #	DOWNSTREAM STRUCTURE	LENGTH (ft)	Ci	Ai (ac.)	CiAi	SUM CiAi	Ti (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	A-12 & A-15	AD 507		AD 508	109	0.696	0.79	0.55	0.55	14.03	14.03	5.449	3.00	12	0.0266	388.16	385.26	6.29	8.02	0.23
1	A-10 & A-14	AD 508		AD 509	114	0.617	3.02	1.86	2.41	15.91	15.91	5.123	12.36	18	0.0214	385.02	382.58	16.64	9.42	0.20
1	A-16	AD 509		CI 511	86	0.605	0.15	0.09	2.50	10.49	16.11	5.097	12.76	18	0.0071	382.58	381.97	9.59	5.43	0.26
1	A-17	CI 510		CI 511	26	0.601	0.68	0.41	0.41	11.01	11.01	6.102	2.49	12	0.0573	383.23	382.26	7.45	9.49	0.05
1	A-18	CI 511		AD 512	20	0.676	0.06	0.04	2.95	10.28	16.38	5.062	14.95	18	0.0085	381.97	381.80	10.49	5.94	0.06
1	A-19	AD 512		AD 516	94	0.623	0.16	0.10	3.05	9.77	16.43	5.056	15.44	24	0.0101	381.80	380.85	24.62	7.84	0.20
1	A-20	CI 514		CI 515	33	0.697	1.89	1.32	1.32	15.58	15.58	5.165	6.80	18	0.0218	381.66	380.94	16.80	9.51	0.06
1	A-21	CI 515		AD 516	13	0.616	0.12	0.07	1.39	12.17	15.64	5.262	7.32	18	0.0069	380.94	380.85	9.45	5.35	0.04
1	A-22	AD 516		FES 517	16	0.556	0.28	0.16	4.60	12.69	16.63	5.030	23.14	24	0.0113	380.85	380.67	26.04	8.29	0.03
2	A-1 - A-4	AD 500		AD 502	135	0.645	3.02	1.95	1.95	21.66	21.66	4.383	8.54	18	0.0061	382.33	381.51	8.88	5.03	0.45
2	A-5	AD 501		AD 502	119	0.776	1.04	0.81	0.81	12.45	12.45	5.790	4.67	15	0.0047	382.29	381.73	4.80	3.91	0.51
2	A-24	AD 502		AD 503	326	0.646	0.34	0.22	2.97	6.93	22.11	4.325	12.87	24	0.0042	381.03	379.65	15.95	5.08	1.07
2	A-25	AD 503		FES 504	39	0.565	0.18	0.10	3.08	8.36	23.18	4.188	12.88	24	0.0064	379.65	379.40	19.60	6.24	0.10

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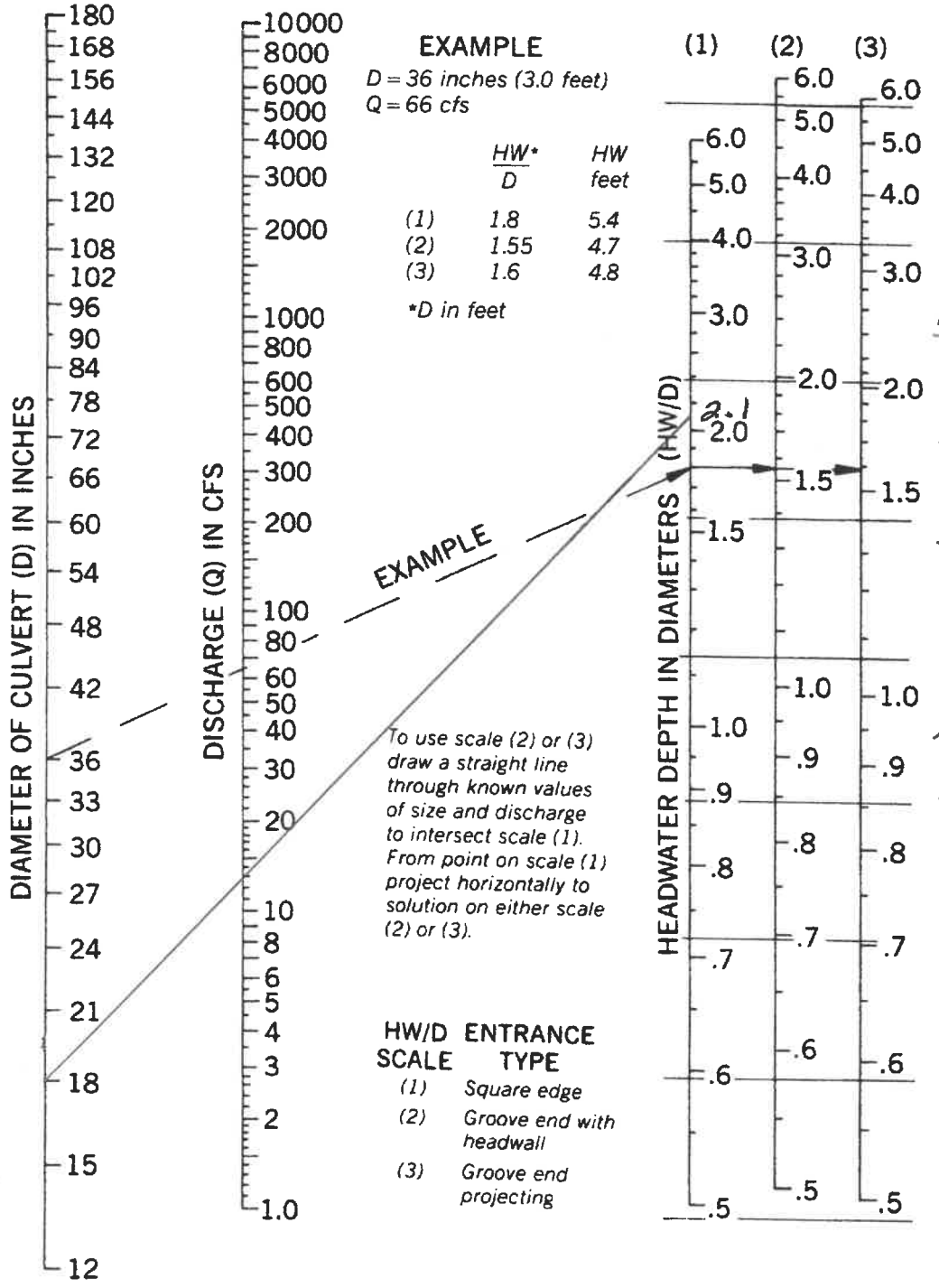
Figure 33 18" Storm Sewer between AD #509 + CI #511

HEADWATER DEPTH FOR CIRCULAR CONCRETE PIPE CULVERTS WITH INLET CONTROL



D = 1.5'

$\frac{HW}{D} = 2.1$

HW = 3.15'

Head above top of pipe

H = 3.15 - 1.5

H = 1.65'

AD #509 is 3.84' deep and has 2.34' of head available, therefore the water level would remain below the r... elev.

BUREAU OF PUBLIC ROADS JAN. 1963

HEADWATER SCALES 2 & 3 REVISED MAY 1964

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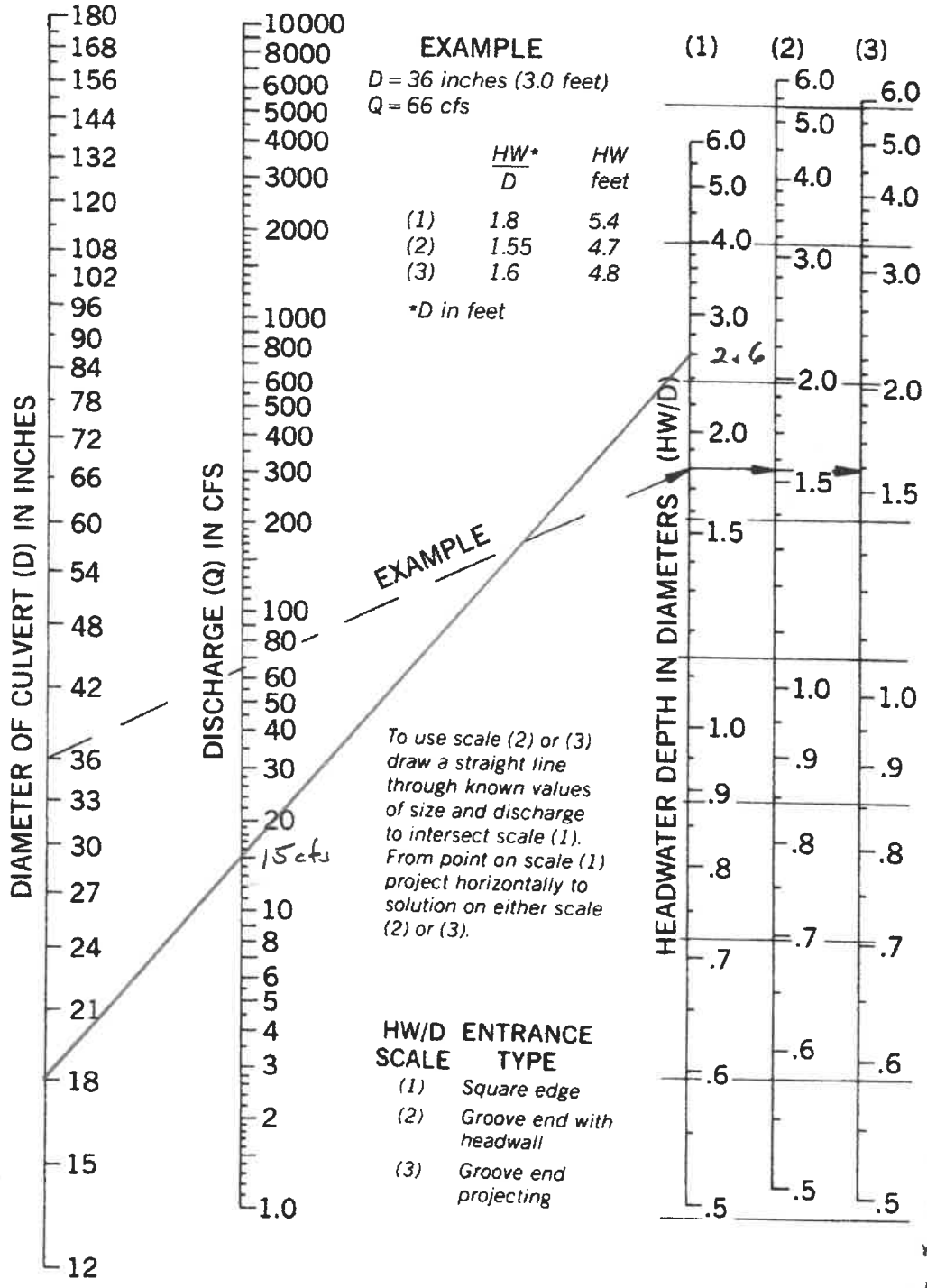
Figure 33 18" Storm Sewer between CI #511 + AD #512

HEADWATER DEPTH FOR CIRCULAR CONCRETE PIPE CULVERTS WITH INLET CONTROL



D = 1.5'

$\frac{HW}{D} = 2.60$

HW = 3.9'

Head above top of pipe

H = 3.9' - 1.5'

H = 2.4'

CI #511 is 3.92' deep and has 2.42' of head available, therefore the water level would remain below the [illegible] elev.

BUREAU OF PUBLIC ROADS JAN. 1963

HEADWATER SCALES 2 & 3 REVISED MAY 1964

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DEVELOPED CALCULATIONS FLOW FOR A 25 YEAR STORM

Sitecon, Inc. Project: 602-07-4

Job Name/Basin #:	HUNTER CHASE	Basin A-1	159,740 Total SF	3.67 AC
Exist. Impervious surfaces (2-5%) C=0.94				
Structures	0 Total	3,000 SF	0 Total SF	0.00 AC
Drives	0 Total	720 SF	0 Total SF	0.00 AC
Pavement	24 Width (ft)	0 L (ft)	0 Total SF	0.00 AC
			0 **TOTAL**	0.00 AC
Proposed Impervious surfaces (2-5%) C=0.94				
Structures	9 Total	6,235 SF	56,116 Total SF	1.29 AC
Drives	8 Total	2,745 SF	21,960 Total SF	0.50 AC
Pavement	576 L (ft)	24 Width (ft)	13,824 Total SF	0.32 AC
Patios	0 Total	0 SF	0 Total SF	0.00 AC
Sidewalks	0 Width (ft)		0 Total SF	0.00 AC
			91,900 **TOTAL**	2.11 AC
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
			0 **TOTAL**	0.00 AC
For lawn areas:				
0-2% slope	C=0.15	0 SF	0 Total SF	0.00 AC
2-5% slope	C=0.25	67,840 SF	67,840 Total SF	1.56 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
			67,840 **TOTAL**	1.56 AC
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
			0 **TOTAL**	0.00 AC

Check 159,740 **GT**

Wt'd C =	0.65
Wt'd N =	0.18
High Pt El	394.00 ft
Inlet El	385.20 ft
Length	931.00 ft
Slope	0.0095
tc	26.95 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
1 1	Is 15<tc<30?	i 25=	3.93 in/hr
1 0	Is 30<tc<60?	i 25=	0.00 in/hr

Q25= **9.32 cfs**

Date: 2/17/2008

DEVELOPED CALCULATIONS FLOW FOR A 25 YEAR STORM

Sitecon, Inc. Project: 602-07-4

Job Name/Basin #:	HUNTER CHASE	Basin A-2	48,795 Total SF	1.12 AC
Exist. Impervious surfaces (2-5%) C=0.94				
Structures	0 Total	3,000 SF	0 Total SF	0.00 AC
Drives	0 Total	720 SF	0 Total SF	0.00 AC
Pavement	24 Width (ft)	0 L (ft)	0 Total SF	0.00 AC
			0 **TOTAL**	0.00 AC
Proposed Impervious surfaces (2-5%) C=0.94				
Structures	2 Total	7,015 SF	14,029 Total SF	0.32 AC
Drives	4 Total	2,745 SF	10,980 Total SF	0.25 AC
Pavement	680 L (ft)	24 Width (ft)	16,320 Total SF	0.37 AC
Patios	0 Total	0 SF	0 Total SF	0.00 AC
Sidewalks	0 Width (ft)		0 Total SF	0.00 AC
			41,329 **TOTAL**	0.95 AC
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
			0 **TOTAL**	0.00 AC
For lawn areas:				
0-2% slope	C=0.15	0 SF	0 Total SF	0.00 AC
2-5% slope	C=0.25	7,466 SF	7,466 Total SF	0.17 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
			7,466 **TOTAL**	0.17 AC
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
			0 **TOTAL**	0.00 AC

Check 48,795 **GT**

Wt'd C =	0.83
Wt'd N =	0.08
High Pt El	393.50 ft
Inlet El	384.95 ft
Length	562.29 ft
Slope	0.0152
tc	12.86 min

0 1	Is 5<tc<10?	i 25=	0.00 in/hr
1 1	Is 10<tc<15?	i 25=	5.41 in/hr
1 0	Is 15<tc<30?	i 25=	0.00 in/hr
1 0	Is 30<tc<60?	i 25=	0.00 in/hr

Q25= 5.06 cfs

Date: 2/17/2008

DEVELOPED CALCULATIONS FLOW FOR A 25 YEAR STORM

Sitecon, Inc. Project: 602-07-4

Job Name/Basin #:	HUNTER CHASE	Basin B-1	81,966 Total SF	1.88 AC
Exist. Impervious surfaces (2-5%) C=0.94				
Structures	1 Total	3,233 SF	3,233 Total SF	0.07 AC
Drives	0 Total	720 SF	0 Total SF	0.00 AC
Pavement	24 Width (ft)	0 L (ft)	0 Total SF	0.00 AC
			3,233 **TOTAL**	0.07 AC
Proposed Impervious surfaces (2-5%) C=0.94				
Structures	18.5 Total	1,234 SF	22,829 Total SF	0.52 AC
Drives	0 Total	2,674 SF	0 Total SF	0.00 AC
Pavement	222 L (ft)	24 Width (ft)	5,328 Total SF	0.12 AC
Patios	0 Total	0 SF	0 Total SF	0.00 AC
Sidewalks	0 Width (ft)		0 Total SF	0.00 AC
			28,157 **TOTAL**	0.65 AC
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
			0 **TOTAL**	0.00 AC
For lawn areas:				
0-2% slope	C=0.15	0 SF	0 Total SF	0.00 AC
2-5% slope	C=0.25	50,576 SF	50,576 Total SF	1.16 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
			50,576 **TOTAL**	1.16 AC
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
			0 **TOTAL**	0.00 AC

Check 81,966 **GT**

Wt'd C =	0.51
Wt'd N =	0.25
High Pt El	394.00 ft
Inlet El	390.57 ft
Length	453.00 ft
Slope	0.0076
tc	23.74 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
1 1	Is 15<tc<30?	i 25=	4.22 in/hr
1 0	Is 30<tc<60?	i 25=	0.00 in/hr

Q25= **4.09 cfs**

Date: 2/17/2008

DEVELOPED CALCULATIONS FLOW FOR A 25 YEAR STORM

Sitecon, Inc. Project: 602-07-4

Job Name/Basin #:	HUNTER CHASE	Basin B-2	93,340 Total SF	2.14 AC
Exist. Impervious surfaces (2-5%) C=0.94				
Structures	0 Total	3,233 SF	0 Total SF	0.00 AC
Drives	0 Total	720 SF	0 Total SF	0.00 AC
Pavement	24 Width (ft)	0 L (ft)	0 Total SF	0.00 AC
			0 **TOTAL**	0.00 AC
Proposed Impervious surfaces (2-5%) C=0.94				
Structures	8 Total	4,336 SF	34,686 Total SF	0.80 AC
Drives	8 Total	2,819 SF	22,548 Total SF	0.52 AC
Pavement	617 L (ft)	24 Width (ft)	14,808 Total SF	0.34 AC
Patios	0 Total	0 SF	0 Total SF	0.00 AC
Sidewalks	0 Width (ft)		0 Total SF	0.00 AC
			72,042 **TOTAL**	1.65 AC
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
			0 **TOTAL**	0.00 AC
For lawn areas:				
0-2% slope	C=0.15	0 SF	0 Total SF	0.00 AC
2-5% slope	C=0.25	21,298 SF	21,298 Total SF	0.49 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
			21,298 **TOTAL**	0.49 AC
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
			0 **TOTAL**	0.00 AC

Check 93,340 **GT**

Wt'd C =	0.78
Wt'd N =	0.11
High Pt El	394.00 ft
Inlet El	387.83 ft
Length	396.00 ft
Slope	0.0156
tc	12.56 min

0 1	Is 5<tc<10?	i 25=	0.00 in/hr
1 1	Is 10<tc<15?	i 25=	5.47 in/hr
1 0	Is 15<tc<30?	i 25=	0.00 in/hr
1 0	Is 30<tc<60?	i 25=	0.00 in/hr

Q25= **9.17 cfs**

Date: 2/17/2008

RollMax Product Selection Chart

TEMPORARY

	Product Description	Longevity	Applications	Design Permissible Shear Stress lbs/ft² (Pa)	Design Permissible Velocity ft/s (m/s)
ERONET					
 D575	1.5 lb., accelerated photodegradable, polypropylene top net, 100% straw fiber matrix	45 days	Low Flow Channels 4:1 - 3:1 Slopes	Unvegetated 1.55 (74)	Unvegetated 5.0 (1.52)
 D5150	1.5 lb., photodegradable, polypropylene top & bottom net, 100% straw fiber matrix	60 days	Moderate Flow Channels 3:1 - 2:1 Slopes	Unvegetated 1.75 (84)	Unvegetated 6.0 (1.83)
 S75	1.5 lb., photodegradable, polypropylene top net, 100% straw fiber matrix	12 months	Low Flow Channels 4:1 - 3:1 Slopes	Unvegetated 1.55 (74)	Unvegetated 5.0 (1.52)
 S150	1.5 lb., photodegradable, polypropylene top & bottom net, 100% straw fiber matrix	12 months	Moderate Flow Channels 3:1 - 2:1 Slopes	Unvegetated 1.75 (84)	Unvegetated 6.0 (1.83)
 SC150	2.9 lb., UV-stable polypropylene top net, 70% straw/30% coconut fiber matrix, 1.5 lb., photodegradable polypropylene bottom net	24 months	Medium Flow Channels 2:1 - 1:1 Slopes	Unvegetated 2.0 (96)	Unvegetated 8.0 (2.44)
 C125	2.9 lb., UV stable polypropylene top & bottom nets, 100% coconut fiber matrix	36 months	High Flow Channels 1:1 and Greater Slopes	Unvegetated 2.25 (108)	Unvegetated 10.0 (3.05)
BIONET					
 S75BN	9.3 lb., leno woven biodegradable jute top net, 100% straw fiber matrix	12 months	Low Flow Channels 4:1 - 3:1 Slopes	Unvegetated 1.60 (76)	Unvegetated 5.0 (1.52)
 S150BN	9.3 lb., leno woven biodegradable jute top net, 100% straw fiber matrix, 7.7 lb., woven biodegradable jute bottom net	12 months	Moderate Flow Channels 3:1 - 2:1 Slopes	Unvegetated 1.85 (88)	Unvegetated 6.0 (1.83)
 SC150BN	9.3 lb., leno woven biodegradable jute top net, 70% straw/30% coconut fiber matrix, 7.7 lb., woven biodegradable jute bottom net	18 months	Medium Flow Channels 2:1 - 1:1 Slopes	Unvegetated 2.10 (100)	Unvegetated 8.0 (2.44)

TEMPORARY

	Product Description	Longevity	Applications	Design Permissible Shear Stress lbs/ft² (Pa)	Design Permissible Velocity ft/s (m/s)
BIONET CONT'D					
 C125BN	9.3 lb., leno woven biodegradable jute top net, 100% coconut fiber matrix, 7.7 lb., woven biodegradable jute bottom net	24 mo.	High Flow Channels 1:1 and Greater Slopes	Unvegetated 2.35 (112)	Unvegetated 10.0 (3.05)
 C700BN	143 lb., (700 g) woven biodegradable coir top net, 100% coconut fiber matrix, 7.7 lb., woven biodegrdable jute bottom net	36 mo.	High Flow Channels 1:1 and Greater Slopes	Unvegetated 2.35 (112)	Unvegetated 10.0 (3.05)
PERMANENT					
ERONET					
 P300	5.0 lb., UV-stable polypropylene top net, 100% polypropylene fiber matrix, 3.0 lb., UV-stable polypropylene bottom net	Permanent	High Flow Channels 1:1 Slopes	Unvegetated 3.0 (144) Vegetated 8.0 (383)	Unvegetated 9.0 (2.7) Vegetated 16.0 (4.9)
VMAX					
 SC250	5.0 lb., UV-stable polypropylene top & bottom nets, 24.0 lb., UV-stable polypropylene corrugated center net, 70% straw/30% coconut fiber matrix	Permanent	High Flow Channels 1:1 and Greater Slopes	Unvegetated 3.0 (144) Vegetated 10.0 (480)	Unvegetated 9.5 (2.9) Vegetated 15.0 (4.6)
 C350	8.0 lb., UV-stable polypropylene top & bottom nets, 24.0 lb., UV-stable polypropylene corrugated center net, 100% coconut fiber matrix	Permanent	High Flow Channels 1:1 and Greater Slopes	Unvegetated 3.2 (153) Vegetated 12.0 (576)	Unvegetated 10.5 (3.2) Vegetated 20.0 (6.0)
 P550	24.0 lb., UV-stable polypropylene top & bottom nets, 24.0 lb., UV-stable polypropylene corrugated center net, 100% polypropylene fiber matrix	Permanent	Extreme High Flow Channels 1:1 and Greater Slopes	Unvegetated 4.0 (191) Vegetated 14.0 (672)	Unvegetated 12.5 (3.8) Vegetated 25.0 (7.6)
 TMax	100% UV-stable polypropylene monofilament yarns, woven into a 3-D structure	Permanent	Extreme High Flow Channels 1:1 and Greater Slopes	Vegetated 15.0 (718)	Vegetated 25.0 (7.6)
 W3000	100% UV-stable polypropylene monofilament yarns, woven into a 3-D structure	Permanent	Extreme High Flow Channels 1:1 and Greater Slopes	Vegetated 16.0 (766)	Vegetated 25.0 (7.6)

DETENTION FACILITY DESIGN VOLUME CALCULATIONS

PROJECT: **Hunter Chase Estates**
Detention Basin #1

DETENTION FACILITY DESIGN RETURN PERIOD: 25 YRS

RELEASE RATE RETURN PERIOD: 10 YRS

WATERSHED AREA: 9.39 ACRES

DEVELOPED RUNOFF COEFFICIENT (C_d): 0.633

STORM DURATION T_d (HRS)	RAINFALL INTENSITY I_d (INCH/HR)	INFLOW RATE $I(T_d)$ (C_d*I_d*A) (CFS)	OUTFLOW RATE O (C_u*I_u*A) (CFS)	STORAGE RATE ΔS $I(T_d)$-O (CFS)	REQUIRED STORAGE S_d $(I(T_d)-O)*T_d/12$ (ACRE-FT)
0.08	7.810	46.42	12.58	33.84	0.235
0.17	6.320	37.57	12.58	24.99	0.347
0.25	5.240	31.15	12.58	18.57	0.387
0.33	4.597	27.32	12.58	14.74	0.409
0.42	3.953	23.50	12.58	10.92	0.379
0.50	3.310	19.67	12.58	7.09	0.296
0.58	3.083	18.33	12.58	5.75	0.279
0.67	2.857	16.98	12.58	4.40	0.244
0.75	2.630	15.63	12.58	3.05	0.191
0.83	2.403	14.29	12.58	1.71	0.118
0.92	2.177	12.94	12.58	0.36	0.027
1.00	1.950	11.59	12.58	-0.99	-0.082
1.25	1.805	10.73	12.58	-1.85	-0.193
1.50	1.660	9.87	12.58	-2.71	-0.339
1.75	1.515	9.00	12.58	-3.58	-0.521
2.00	1.370	8.14	12.58	-4.44	-0.739
3.00	1.020	6.06	12.58	-6.52	-1.629

PEAK STORAGE (ACRE/FT):	**0.41**
PEAK STORAGE (CUBIC FT):	**17,838**

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Hunter Chase Estates

Detention Basin #1

PROPOSED 25-YR DESIGN RELEASE RATE
Primary Spillway

CALCULATIONS FOR PIPE FLOWING FULL

(Pressure Conditions)

SOLVE FOR Q

Ø=	1.75	FT.
h'=	1.4	IN.
h=	0.9917	FT.
Ke=	0.5	
Ko=	1	
n=	0.012	
L=	66	FT.
HW=	1.8667	FT.
Q=	**12.58**	**CFS**

Ø= diameter of orifice (pipe)
Ke= entrance coefficient
Ko= outfall coefficient
n= manning's 'n'
L= length of orifice (pipe)
Q= allowable release rate

h= h' + Ø/2
h'= ht. of water above orifice
HW= h' + Ø

DETENTION FACILITY DESIGN VOLUME CALCULATIONS

PROJECT: **Hunter Chase Estates**
Detention Basin #1

DETENTION FACILITY DESIGN RETURN PERIOD: 100 YRS

RELEASE RATE RETURN PERIOD: 10 YRS

WATERSHED AREA: 9.39 ACRES

DEVELOPED RUNOFF COEFFICIENT (C_d): 0.633

STORM DURATION T_d (HRS)	RAINFALL INTENSITY I_d (INCH/HR)	INFLOW RATE $I(T_d)$ (C_d*I_d*A) (CFS)	OUTFLOW RATE O (C_u*I_u*A) (CFS)	STORAGE RATE ΔS $I(T_d)$-O (CFS)	REQUIRED STORAGE S_d $(I(T_d)-O)*T_d/12$ (ACRE-FT)
0.08	9.950	59.14	15.42	43.72	0.304
0.17	8.050	47.85	15.42	32.43	0.450
0.25	6.680	39.71	15.42	24.29	0.506
0.33	5.857	34.81	15.42	19.39	0.539
0.42	5.033	29.92	15.42	14.50	0.503
0.50	4.210	25.02	15.42	9.60	0.400
0.58	3.935	23.39	15.42	7.97	0.387
0.67	3.660	21.75	15.42	6.33	0.352
0.75	3.385	20.12	15.42	4.70	0.294
0.83	3.110	18.49	15.42	3.07	0.213
0.92	2.835	16.85	15.42	1.43	0.109
1.00	2.560	15.22	15.42	-0.20	-0.017
1.25	2.380	14.15	15.42	-1.27	-0.133
1.50	2.200	13.08	15.42	-2.34	-0.293
1.75	2.020	12.01	15.42	-3.41	-0.498
2.00	1.840	10.94	15.42	-4.48	-0.747

PEAK STORAGE (ACRE/FT): 0.54
PEAK STORAGE (CUBIC FT): 23,463

Hunter Chase Estates

Detention Basin #1

PROPOSED 100-YR DESIGN RELEASE RATE
Primary Spillway

CALCULATIONS FOR PIPE FLOWING FULL

(Pressure Conditions)

SOLVE FOR Q

Ø=	1.75	FT.
h'=	7.4	IN.
h=	1.4892	FT.
Ke=	0.5	
Ko=	1	
n=	0.012	
L=	66	FT.
HW=	2.3642	FT.
Q=	**15.42**	**CFS**

Ø= diameter of orifice (pipe)
Ke= entrance coefficient
Ko= outfall coefficient
n= manning's 'n'
L= length of orifice (pipe)
Q= allowable release rate

h= h' + Ø/2
h'= ht. of water above orifice
HW= h' + Ø

Hunter Chase Estates

Detention Basin #1

PROVIDED DETENTION VOLUMES
(per ACAD)

	Elevation	Area (s.f.)	Avg. Area (s.f.)	Inc. Vol. (c.f.)	Cumulative Vol. (c.f.)
Pool	379.58	8,161			
	380.58	9,580	8,871	8,871	8,871
	381.58	11,102	10,341	10,341	19,212
E.O.S.	381.70	11,292	11,197	1,344	20,555
T.B.	382.40	12,428	11,860	8,302	28,857

Detention volume provided at Elev. 381.70 = 20,555 c.f.

Total, required 25-YR detention volume = 17,838 c.f.

25-YR Req'd detention volume provided @ Elev. = 381.45 ft.

Req'd HW= 1.87 ft.

Detention volume provided at Elev. 382.40 = 28,857 c.f.

Total, required 100-YR detention volume = 23,463 c.f.

100-YR Req'd detention volume provided @ Elev. = 381.95 ft.

Req'd HW= 2.37 ft.

Weighted c calculations for sub-basins captured by Detention Basin #1

DEVELOPED WEIGHTED c CALCULATIONS

Total Area = 9.39 Acres

Sub-basin	Area (A)	c	c x A
A-10	0.95 Ac.	0.577	0.058
A-12	0.28 Ac.	0.737	0.022
A-13	0.31 Ac.	0.627	0.021
A-14	2.07 Ac.	0.635	0.140
A-15	0.51 Ac.	0.673	0.037
A-16	0.15 Ac.	0.605	0.010
A-17	0.68 Ac.	0.601	0.044
A-18	0.06 Ac.	0.676	0.004
A-19	0.16 Ac.	0.692	0.012
A-20	1.89 Ac.	0.697	0.140
A-21	0.12 Ac.	0.616	0.008
A-22	0.28 Ac.	0.556	0.017
A-23	1.93 Ac.	0.589	0.121

Weighted c = 0.633

A-13 ELIMINATED & MADE PART OF A-14

REVISED BY 4/9/2019 SUBMITTAL

RECEIVED BY THE VANDERBURGH COUNTY SURVEYOR'S OFFICE 2-21-19

DETENTION FACILITY DESIGN VOLUME CALCULATIONS

PROJECT: **Hunter Chase Estates**
Detention Basin #2

DETENTION FACILITY DESIGN RETURN PERIOD: 25 YRS

RELEASE RATE RETURN PERIOD: 10 YRS

WATERSHED AREA: 9.25 ACRES

DEVELOPED RUNOFF COEFFICIENT (C_d): 0.688

STORM DURATION T_d (HRS)	RAINFALL INTENSITY I_d (INCH/HR)	INFLOW RATE $I(T_d)$ (C_d*I_d*A) (CFS)	OUTFLOW RATE O (C_u*I_u*A) (CFS)	STORAGE RATE ΔS $I(T_d)$-O (CFS)	REQUIRED STORAGE S_d $(I(T_d)-O)*T_d/12$ (ACRE-FT)
0.08	7.810	49.70	11.73	37.97	0.264
0.17	6.320	40.22	11.73	28.49	0.396
0.25	5.240	33.35	11.73	21.62	0.450
0.33	4.597	29.25	11.73	17.52	0.487
0.42	3.953	25.16	11.73	13.43	0.466
0.50	3.310	21.06	11.73	9.33	0.389
0.58	3.083	19.62	11.73	7.89	0.384
0.67	2.857	18.18	11.73	6.45	0.358
0.75	2.630	16.74	11.73	5.01	0.313
0.83	2.403	15.29	11.73	3.56	0.248
0.92	2.177	13.85	11.73	2.12	0.162
1.00	1.950	12.41	11.73	0.68	0.057
1.25	1.805	11.49	11.73	-0.24	-0.025
1.50	1.660	10.56	11.73	-1.17	-0.146
1.75	1.515	9.64	11.73	-2.09	-0.305
2.00	1.370	8.72	11.73	-3.01	-0.502
3.00	1.020	6.49	11.73	-5.24	-1.310

PEAK STORAGE (ACRE/FT): 0.49
PEAK STORAGE (CUBIC FT): 21,203

Hunter Chase Estates

Detention Basin #2

PROPOSED 25-YR DESIGN RELEASE RATE
Primary Spillway

CALCULATIONS FOR PIPE FLOWING FULL

(Pressure Conditions)

SOLVE FOR Q

Ø=	1.5	FT.
h'=	8.4	IN.
h=	1.45	FT.
Ke=	0.5	
Ko=	1	
n=	0.012	
L=	40	FT.
HW=	2.2	FT.
Q=	**11.73**	**CFS**

Ø= diameter of orifice (pipe)
Ke= entrance coefficient
Ko= outfall coefficient
n= manning's 'n'
L= length of orifice (pipe)
Q= allowable release rate

h= h' + Ø/2
h'= ht. of water above orifice
HW= h' + Ø

DETENTION FACILITY DESIGN VOLUME CALCULATIONS

PROJECT: **Hunter Chase Estates**
Detention Basin #2

DETENTION FACILITY DESIGN RETURN PERIOD: 100 YRS

RELEASE RATE RETURN PERIOD: 10 YRS

WATERSHED AREA: 9.25 ACRES

DEVELOPED RUNOFF COEFFICIENT (C_d): 0.688

STORM DURATION T_d (HRS)	RAINFALL INTENSITY I_d (INCH/HR)	INFLOW RATE $I(T_d)$ (C_d*I_d*A) (CFS)	OUTFLOW RATE O (C_u*I_u*A) (CFS)	STORAGE RATE ΔS $I(T_d)$-O (CFS)	REQUIRED STORAGE S_d $(I(T_d)-O)*T_d/12$ (ACRE-FT)
0.08	9.950	63.32	13.90	49.42	0.343
0.17	8.050	51.23	13.90	37.33	0.518
0.25	6.680	42.51	13.90	28.61	0.596
0.33	5.857	37.27	13.90	23.37	0.649
0.42	5.033	32.03	13.90	18.13	0.630
0.50	4.210	26.79	13.90	12.89	0.537
0.58	3.935	25.04	13.90	11.14	0.542
0.67	3.660	23.29	13.90	9.39	0.522
0.75	3.385	21.54	13.90	7.64	0.478
0.83	3.110	19.79	13.90	5.89	0.409
0.92	2.835	18.04	13.90	4.14	0.316
1.00	2.560	16.29	13.90	2.39	0.199
1.25	2.380	15.15	13.90	1.25	0.130
1.50	2.200	14.00	13.90	0.10	0.013
1.75	2.020	12.86	13.90	-1.04	-0.152
2.00	1.840	11.71	13.90	-2.19	-0.365

PEAK STORAGE (ACRE/FT): 0.65
PEAK STORAGE (CUBIC FT): 28,280

Hunter Chase Estates

Detention Basin #2

PROPOSED 100-YR DESIGN RELEASE RATE
Primary Spillway

CALCULATIONS FOR PIPE FLOWING FULL

(Pressure Conditions)

SOLVE FOR Q

Ø=	1.5	FT.
h'=	15.5	IN.
h=	2.0375	FT.
Ke=	0.5	
Ko=	1	
n=	0.012	
L=	40	FT.
HW=	2.7875	FT.
Q=	**13.90**	**CFS**

Ø= diameter of orifice (pipe)
Ke= entrance coefficient
Ko= outfall coefficient
n= manning's 'n'
L= length of orifice (pipe)
Q= allowable release rate

h= h' + Ø/2
h'= ht. of water above orifice
HW= h' + Ø

Hunter Chase Estates

Detention Basin #2

PROVIDED DETENTION VOLUMES
(per ACAD)

	Elevation	Area (s.f.)	Avg. Area (s.f.)	Inc. Vol. (c.f.)	Cumulative Vol. (c.f.)
Pool	379.38	7,829			
	380.38	9,379	8,604	8,604	8,604
	381.38	11,039	10,209	10,209	18,813
E.O.S.	382.50	13,073	12,056	13,503	32,316
T.B.	383.00	13,963	13,518	6,759	39,075

Detention volume provided at Elev. 382.50 = 32,316 c.f.

Total, required 25-YR detention volume = 21,203 c.f.

25-YR Req'd detention volume provided @ Elev. = 381.58 ft.

Req'd HW= 2.20 ft.

Detention volume provided at Elev. 383.00 = 39,075 c.f.

Total, required 100-YR detention volume = 28,280 c.f.

100-YR Req'd detention volume provided @ Elev. = 382.17 ft.

Req'd HW= 2.79 ft.

Weighted c calculations for sub-basins captured by Detention Basin #2

DEVELOPED WEIGHTED c CALCULATIONS

Total Area = 9.25 Acres

Sub-basin	*Area (A)*	*c*	*c x A*
A-1	1.07 Ac.	0.633	0.073
A-2	0.58 Ac.	0.674	0.042
A-3	1.14 Ac.	0.658	0.081
A-4	0.23 Ac.	0.564	0.014
A-5	1.04 Ac.	0.776	0.087
A-6	0.17 Ac.	0.638	0.012
A-7	2.21 Ac.	0.725	0.173
A-8	0.65 Ac.	0.624	0.044
A-9	0.95 Ac.	0.743	0.076
A-11	0.25 Ac.	0.605	0.016
A-24	0.34 Ac.	0.646	0.024
A-25	0.18 Ac.	0.565	0.011
A-26	0.44 Ac.	0.712	0.034

Weighted c = 0.688

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: A-1

Total Area = 46,585 S.F.
1.07 Acres

Surface						C	N
Structures		=	15,134	S.F. =	0.35 Ac.	0.92	0.02
Pavement		=	14,076	S.F. =	0.32 Ac.	0.92	0.02
Drives		=	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
Lawn (0-2%)	17,375 S.F.	=			0.40 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%)	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 =	**0.633**	
Weighted N =	0.162	
Sheet Flow		
L =	300	Ft.
H =	1.5	Ft.
S =	0.0050	Ft./Ft.
t1=	17.46	Minutes (Min. 5 minutes)
Open Channel Flow		
L =	151	Ft.
H =	1.3	Ft.
S =	0.0085	Ft./Ft.
v =	2.10	Ft./sec.
t2=	1.20	Minutes
tc=	18.66	Minutes
I(10) =		In./Hr.
I(25) =	4.769	In./Hr.
I(50) =		In./Hr.
I(100) =	6.077	In./Hr.
Q(10) =	**0.00**	**CFS**
Q(25) =	**3.23**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**4.11**	**CFS**

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: A-2

Total Area = 25,455 S.F.
0.58 Acres

Surface						C	N
Structures		=	15,827	S.F. =	0.36 Ac.	0.92	0.02
Pavement		=	0	S.F. =	0.00 Ac.	0.92	0.02
Drives		=	0	S.F. =	0.00 Ac.	0.92	0.02
Patios		=	1,500	S.F. =	0.03 Ac.	0.92	0.02
Sidewalks		=	0	S.F. =	0.00 Ac.	0.92	0.02
Lawn (0-2%)	8,128 S.F.	=			0.19 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%)	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 =	**0.674**	
Weighted N =	0.141	
Sheet Flow		
L =	52	Ft.
H =	0.5	Ft.
S =	0.0096	Ft./Ft.
t1=	6.21	Minutes (Min. 5 minutes)
Open Channel Flow		
L =	293	Ft.
H =	4.3	Ft.
S =	0.0147	Ft./Ft.
v =	1.90	Ft./sec.
t2=	2.57	Minutes
tc=	8.78	Minutes
I(10) =		In./Hr.
I(25) =	6.684	In./Hr.
I(50) =		In./Hr.
I(100) =	8.514	In./Hr.
Q(10) =	**0.00**	**CFS**
Q(25) =	**2.63**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**3.35**	**CFS**

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: A-3

Total Area = 49,754 S.F.
1.14 Acres

Surface						C	N
Structures		=	16,883	S.F. =	0.39 Ac.	0.92	0.02
Pavement		=	15,924	S.F. =	0.37 Ac.	0.92	0.02
Drives		=	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
Lawn (0-2%)	16,947 S.F.	=			0.39 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%)	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 =	**0.658**	
Weighted N =	0.149	
Sheet Flow		
L =	300	Ft.
H =	3.6	Ft.
S =	0.0117	Ft./Ft.
t1=	13.81	Minutes (Min. 5 minutes)
Open Channel Flow		
L =	356	Ft.
H =	3.0	Ft.
S =	0.0085	Ft./Ft.
v =	2.00	Ft./sec.
t2=	2.97	Minutes
tc=	16.78	Minutes
I(10) =		In./Hr.
I(25) =	5.012	In./Hr.
I(50) =		In./Hr.
I(100) =	6.388	In./Hr.
Q(10) =	**0.00**	**CFS**
Q(25) =	**3.76**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**4.80**	**CFS**

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: A-4

Total Area = 9,867 S.F.
0.23 Acres

Surface						C	N
Structures		=	4,506	S.F. =	0.10 Ac.	0.92	0.02
Pavement		=	0	S.F. =	0.00 Ac.	0.92	0.02
Drives		=	0	S.F. =	0.00 Ac.	0.92	0.02
Patios		=	800	S.F. =	0.02 Ac.	0.92	0.02
Sidewalks		=	0	S.F. =	0.00 Ac.	0.92	0.02
Lawn (0-2%)	4,561 S.F.	=			0.10 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%)	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 =	**0.564**	
Weighted N =	0.196	
Sheet Flow		
L =	48	Ft.
H =	0.6	Ft.
S =	0.0125	Ft./Ft.
t1=	6.55	Minutes (Min. 5 minutes)
Open Channel Flow		
L =	84	Ft.
H =	0.7	Ft.
S =	0.0086	Ft./Ft.
v =	1.30	Ft./sec.
t2=	1.08	Minutes
tc=	7.63	Minutes
I(10) =		In./Hr.
I(25) =	7.028	In./Hr.
I(50) =		In./Hr.
I(100) =	8.952	In./Hr.
Q(10) =	**0.00**	**CFS**
Q(25) =	**0.90**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**1.14**	**CFS**

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: A-5

Total Area = 45,439 S.F.
1.04 Acres

Surface						C	N
Structures		=	14,293	S.F. =	0.33 Ac.	0.92	0.02
Pavement		=	22,641	S.F. =	0.52 Ac.	0.92	0.02
Drives		=	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
Lawn (0-2%)	8,505 S.F.	=			0.20 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%)	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 =	**0.776**	
Weighted N =	0.091	
Sheet Flow		
L =	300	Ft.
H =	4.0	Ft.
S =	0.0132	Ft./Ft.
t1=	10.66	Minutes (Min. 5 minutes)
Shallow Concentrated Flow		
L =	248	Ft.
H =	3.3	Ft.
S =	0.0131	Ft./Ft.
v =	2.30	Ft./sec. (From HERPICC Figure 3.4.5)
t2=	1.80	Minutes
tc=	12.45	Minutes
I(10) =		In./Hr.
I(25) =	5.790	In./Hr.
I(50) =		In./Hr.
I(100) =	7.378	In./Hr.
Q(10) =	**0.00**	**CFS**
Q(25) =	**4.69**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**5.97**	**CFS**

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: A-6

Total Area = 7,462 S.F.
0.17 Acres

Surface						C	N
Structures		=	3,719	S.F. =	0.09 Ac.	0.92	0.02
Pavement		=	0	S.F. =	0.00 Ac.	0.92	0.02
Drives		=	0	S.F. =	0.00 Ac.	0.92	0.02
Patios		=	600	S.F. =	0.01 Ac.	0.92	0.02
Sidewalks		=	0	S.F. =	0.00 Ac.	0.92	0.02
Lawn (0-2%)	S.F.	=			0.00 Ac.	0.15	0.40
Lawn (2-5%)	3,143 S.F.	=			0.07 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
Water	0 S.F.	=			0.00 Ac.	1.00	0.00
Misc.	0 S.F.	=			0.00 Ac.	0.92	0.02

Weighted c =	**0.638**	
Weighted N =	0.180	
Sheet Flow		
L =	40	Ft.
H =	0.5	Ft.
S =	0.0125	Ft./Ft.
t1=	5.79	Minutes (Min. 5 minutes)
Open Channel Flow		
L =	88	Ft.
H =	0.5	Ft.
S =	0.0060	Ft./Ft.
v =	1.40	Ft./sec.
t2=	1.05	Minutes
tc=	6.83	Minutes
I(10) =		In./Hr.
I(25) =	7.264	In./Hr.
I(50) =		In./Hr.
I(100) =	9.254	In./Hr.

Q(10) =	**0.00**	**CFS**
Q(25) =	**0.79**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**1.01**	**CFS**

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: A-7

Total Area = 96,289 S.F.
2.21 Acres

Surface							C	N
Structures			=	34,324	S.F. =	0.79 Ac.	0.92	0.02
Pavement			=	34,384	S.F. =	0.79 Ac.	0.92	0.02
Drives			=	0	S.F. =	0.00 Ac.	0.92	0.02
Patios			=	3,178	S.F. =	0.07 Ac.	0.92	0.02
Sidewalks			=	0	S.F. =	0.00 Ac.	0.92	0.02
Lawn (0-2%)	24,403	S.F.	=			0.56 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%)	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 =	**0.725**	
Weighted N =	0.116	
Sheet Flow		
L =	300	Ft.
H =	2.8	Ft.
S =	0.0092	Ft./Ft.
t1=	13.00	Minutes
Open Channel Flow		
L =	334	Ft.
H =	6.7	Ft.
S =	0.0200	Ft./Ft.
v =	6.50	Ft./sec.
t2=	0.86	Minutes
tc=	13.85	Minutes
I(10) =		In./Hr.
I(25) =	5.488	In./Hr.
I(50) =		In./Hr.
I(100) =	6.995	In./Hr.
Q(10) =	**0.00**	**CFS**
Q(25) =	**8.79**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**11.21**	**CFS**

(Min. 5 minutes)

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: A-8

Total Area = 28,280 S.F.
0.65 Acres

Surface							C	N
Structures		=	14,200	S.F. =	0.33	Ac.	0.92	0.02
Pavement		=	0	S.F. =	0.00	Ac.	0.92	0.02
Drives		=	0	S.F. =	0.00	Ac.	0.92	0.02
Patios		=	1,600	S.F. =	0.04	Ac.	0.92	0.02
Sidewalks		=	0	S.F. =	0.00	Ac.	0.92	0.02
Lawn (0-2%)	S.F.	=			0.00	Ac.	0.15	0.40
Lawn (2-5%)	12,480 S.F.	=			0.29	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 =	**0.624**	
Weighted N =	0.188	
Sheet Flow		
L =	62	Ft.
H =	1.0	Ft.
S =	0.0161	Ft./Ft.
t1=	6.82	Minutes (Min. 5 minutes)
Open Channel Flow		
L =	324	Ft.
H =	3.5	Ft.
S =	0.0109	Ft./Ft.
v =	1.90	Ft./sec.
t2=	2.84	Minutes
tc=	9.66	Minutes
I(10) =		In./Hr.
I(25) =	6.421	In./Hr.
I(50) =		In./Hr.
I(100) =	8.178	In./Hr.
Q(10) =	**0.00**	**CFS**
Q(25) =	**2.60**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**3.31**	**CFS**

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: A-9

Total Area = 41,567 S.F.
0.95 Acres

Surface						C	N
Structures		=	11,316	S.F. =	0.26 Ac.	0.92	0.02
Pavement		=	19,253	S.F. =	0.44 Ac.	0.92	0.02
Drives		=	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
Lawn (0-2%)	S.F.	=			0.00 Ac.	0.15	0.40
Lawn (2-5%)	10,998 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
Water	0 S.F.	=			0.00 Ac.	1.00	0.00
Misc.	0 S.F.	=			0.00 Ac.	0.92	0.02

Weighted c =	**0.743**	
Weighted N =	0.121	
Sheet Flow		
L =	300 Ft.	
H =	4.3 Ft.	
S =	0.0144 Ft./Ft.	
t1=	11.89 Minutes	(Min. 5 minutes)
Shallow Concentrated Flow		
L =	300 Ft.	
H =	3.2 Ft.	
S =	0.0106 Ft./Ft.	
v =	2.10 Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	2.38 Minutes	
tc=	14.27 Minutes	
I(10) =	In./Hr.	
I(25) =	5.399 In./Hr.	
I(50) =	In./Hr.	
I(100) =	6.881 In./Hr.	
Q(10) =	**0.00 CFS**	
Q(25) =	**3.83 CFS**	
Q(50) =	**0.00 CFS**	
Q(100) =	**4.88 CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: A-10

Total Area = 41,187 S.F.
0.95 Acres

Surface						C	N
Structures		=	14,381	S.F. =	0.33 Ac.	0.92	0.02
Pavement		=	0	S.F. =	0.00 Ac.	0.92	0.02
Concrete		=	3,012	S.F. =	0.07 Ac.	0.92	0.02
Patios		=	1,750	S.F. =	0.04 Ac.	0.92	0.02
Sidewalks		=	0	S.F. =	0.00 Ac.	0.92	0.02
Lawn (0-2%)	S.F.	=			0.00 Ac.	0.15	0.40
Lawn (2-5%)	21,199 S.F.	=			0.49 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	845 S.F.	=			0.02 Ac.	1.00	0.00
Misc.	0 S.F.	=			0.00 Ac.	0.92	0.02

Weighted c =	**0.577**	
Weighted N =	0.215	
Sheet Flow		
L =	112 Ft.	
H =	1.7 Ft.	
S =	0.0153 Ft./Ft.	
t1=	9.70 Minutes	(Min. 5 minutes)
Open Channel Flow		
L =	325 Ft.	
H =	3.2 Ft.	
S =	0.0097 Ft./Ft.	
v =	2.20 Ft./sec.	
t2=	2.46 Minutes	
tc=	12.17 Minutes	
I(10) =	In./Hr.	
I(25) =	5.852 In./Hr.	
I(50) =	In./Hr.	
I(100) =	7.456 In./Hr.	
Q(10) =	**0.00 CFS**	
Q(25) =	**3.19 CFS**	
Q(50) =	**0.00 CFS**	
Q(100) =	**4.07 CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: A-11

Total Area = 10,900 S.F.
0.25 Acres

Surface						C	N
Structures		=	4,635	S.F. =	0.11 Ac.	0.92	0.02
Pavement		=	639	S.F. =	0.01 Ac.	0.92	0.02
Drives		=	0	S.F. =	0.00 Ac.	0.92	0.02
Patios		=	500	S.F. =	0.01 Ac.	0.92	0.02
Sidewalks		=	0	S.F. =	0.00 Ac.	0.92	0.02
Lawn (0-2%)	S.F.	=			0.00 Ac.	0.15	0.40
Lawn (2-5%)	5,126 S.F.	=			0.12 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 =	**0.605**	
Weighted N =	0.199	
Sheet Flow		
L =	58 Ft.	
H =	2.0 Ft.	
S =	0.0345 Ft./Ft.	
t1=	5.69 Minutes	(Min. 5 minutes)
Open Channel Flow		
L =	90 Ft.	
H =	2.3 Ft.	
S =	0.0257 Ft./Ft.	
v =	2.20 Ft./sec.	
t2=	0.68 Minutes	
tc=	6.37 Minutes	
I(10) =	In./Hr.	
I(25) =	7.403 In./Hr.	
I(50) =	In./Hr.	
I(100) =	9.430 In./Hr.	
Q(10) =	**0.00 CFS**	
Q(25) =	**1.12 CFS**	
Q(50) =	**0.00 CFS**	
Q(100) =	**1.43 CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: A-12

Total Area = 12,140 S.F.
0.28 Acres

Surface						C	N
Structures		=	7,525	S.F. =	0.17 Ac.	0.92	0.02
Pavement		=	0	S.F. =	0.00 Ac.	0.92	0.02
Drives		=	0	S.F. =	0.00 Ac.	0.92	0.02
Patios		=	1,300	S.F. =	0.03 Ac.	0.92	0.02
Sidewalks		=	0	S.F. =	0.00 Ac.	0.92	0.02
Lawn (0-2%)	S.F.	=			0.00 Ac.	0.15	0.40
Lawn (2-5%)	3,315 S.F.	=			0.08 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 =	**0.737**	
Weighted N =	0.124	
Sheet Flow		
L =	45	Ft.
H =	0.8	Ft.
S =	0.0178	Ft./Ft.
t1=	5.00	Minutes (Min. 5 minutes)
Open Channel Flow		
L =	105	Ft.
H =	0.8	Ft.
S =	0.0080	Ft./Ft.
v =	1.60	Ft./sec.
t2=	1.09	Minutes
tc=	6.09	Minutes
I(10) =		In./Hr.
I(25) =	7.484	In./Hr.
I(50) =		In./Hr.
I(100) =	9.534	In./Hr.
Q(10) =	**0.00**	**CFS**
Q(25) =	**1.54**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**1.96**	**CFS**

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: A-13

Total Area = 13,715 S.F.
0.31 Acres

Surface						C	N
Structures		=	6,110	S.F. =	0.14 Ac.	0.92	0.02
Pavement		=	0	S.F. =	0.00 Ac.	0.92	0.02
Concrete		=	0	S.F. =	0.00 Ac.	0.92	0.02
Patios		=	1,600	S.F. =	0.04 Ac.	0.92	0.02
Sidewalks		=	0	S.F. =	0.00 Ac.	0.92	0.02
Lawn (0-2%)	S.F.	=			0.00 Ac.	0.15	0.40
Lawn (2-5%)	6,005 S.F.	=			0.14 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 =	**0.627**	
Weighted N =	0.186	
Sheet Flow		
L =	46	Ft.
H =	0.6	Ft.
S =	0.0130	Ft./Ft.
t1=	6.21	Minutes (Min. 5 minutes)
Open Channel Flow		
L =	160	Ft.
H =	1.4	Ft.
S =	0.0087	Ft./Ft.
v =	1.50	Ft./sec.
t2=	1.78	Minutes
tc=	7.99	Minutes
I(10) =		In./Hr.
I(25) =	6.919	In./Hr.
I(50) =		In./Hr.
I(100) =	8.813	In./Hr.
Q(10) =	**0.00**	**CFS**
Q(25) =	**1.37**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**1.74**	**CFS**

ELIMINATED & COMBINED WITH A-14 ON 4/9/2019 SUBMITTAL

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2-21-19 CA

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: A-14

Total Area = 90,319 S.F.
2.07 Acres

Surface						C	N
Structures		=	34,380	S.F. =	0.79 Ac.	0.92	0.02
Pavement		=	17,507	S.F. =	0.40 Ac.	0.92	0.02
Drives		=	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
Lawn (0-2%)	S.F.	=			0.00 Ac.	0.15	0.40
Lawn (2-5%)	38,432 S.F.	=			0.88 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 =	**0.635**	
Weighted N =	0.182	
Sheet Flow		
L =	300 Ft.	
H =	3.1 Ft.	
S =	0.0103 Ft./Ft.	
t1=	15.56 Minutes	(Min. 5 minutes)
Shallow Concentrated Flow		
L =	62 Ft.	
H =	1.4 Ft.	
S =	0.0226 Ft./Ft.	
v =	3.00 Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	0.34 Minutes	
tc=	15.91 Minutes	
I(10) =	In./Hr.	
I(25) =	5.123 In./Hr.	
I(50) =	In./Hr.	
I(100) =	6.530 In./Hr.	
Q(10) =	**0.00 CFS**	
Q(25) =	**6.74 CFS**	
Q(50) =	**0.00 CFS**	
Q(100) =	**8.60 CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: A-15

Total Area = 22,198 S.F.
0.51 Acres

Surface						C	N
Structures		=	6,295	S.F. =	0.14 Ac.	0.92	0.02
Pavement		=	5,275	S.F. =	0.12 Ac.	0.92	0.02
Concrete		=	1,344	S.F. =	0.03 Ac.	0.92	0.02
Patios		=	1,100	S.F. =	0.03 Ac.	0.92	0.02
Sidewalks		=	0	S.F. =	0.00 Ac.	0.92	0.02
Lawn (0-2%)	S.F.	=			0.00 Ac.	0.15	0.40
Lawn (2-5%)	8,184 S.F.	=			0.19 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 =	**0.673**	
Weighted N =	0.160	
Sheet Flow		
L =	221 Ft.	
H =	2.7 Ft.	
S =	0.0121 Ft./Ft.	
t1=	12.25 Minutes	(Min. 5 minutes)
Open Channel Flow		
L =	160 Ft.	
H =	1.4 Ft.	
S =	0.0087 Ft./Ft.	
v =	1.50 Ft./sec.	
t2=	1.78 Minutes	
tc=	14.03 Minutes	
I(10) =	In./Hr.	
I(25) =	5.449 In./Hr.	
I(50) =	In./Hr.	
I(100) =	6.946 In./Hr.	
Q(10) =	**0.00 CFS**	
Q(25) =	**1.87 CFS**	
Q(50) =	**0.00 CFS**	
Q(100) =	**2.38 CFS**	

REVISED BY 4/9/2019 SUBMITTAL

RECEIVED BY THE VANDERBURGH COUNTY SURVEYOR'S OFFICE 2-21-19 EA

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: A-16

Total Area = 6,373 S.F.
0.15 Acres

Surface							C	N
Structures		=	885	S.F. =	0.02	Ac.	0.92	0.02
Pavement		=	2,496	S.F. =	0.06	Ac.	0.92	0.02
Drives		=	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
Lawn (0-2%)	S.F.	=			0.00	Ac.	0.15	0.40
Lawn (2-5%)	2,992 S.F.	=			0.07	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
Water	0 S.F.	=			0.00	Ac.	1.00	0.00
Misc.	0 S.F.	=			0.00	Ac.	0.92	0.02

Weighted c =	**0.605**	
Weighted N =	0.198	
Sheet Flow		
L =	114	Ft.
H =	1.1	Ft.
S =	0.0096	Ft./Ft.
t1=	10.49	Minutes (Min. 5 minutes)
Open Channel Flow		
L =	0	Ft.
H =	0.0	Ft.
S =	#DIV/0!	Ft./Ft.
v =	1.60	Ft./sec.
t2=	0.00	Minutes
tc=	10.49	Minutes
I(10) =		In./Hr.
I(25) =	6.215	In./Hr.
I(50) =		In./Hr.
I(100) =	7.917	In./Hr.
Q(10) =	**0.00**	**CFS**
Q(25) =	**0.55**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**0.70**	**CFS**

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: A-17

Total Area = 29,412 S.F.
0.68 Acres

Surface							C	N
Structures		=	12,000	S.F. =	0.28	Ac.	0.92	0.02
Pavement		=	1,820	S.F. =	0.04	Ac.	0.92	0.02
Concrete		=	0	S.F. =	0.00	Ac.	0.92	0.02
Patios		=	1,600	S.F. =	0.04	Ac.	0.92	0.02
Sidewalks		=	0	S.F. =	0.00	Ac.	0.92	0.02
Lawn (0-2%)	S.F.	=			0.00	Ac.	0.15	0.40
Lawn (2-5%)	13,992 S.F.	=			0.32	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 =	**0.601**	
Weighted N =	0.201	
Sheet Flow		
L =	180	Ft.
H =	3.6	Ft.
S =	0.0200	Ft./Ft.
t1=	11.01	Minutes (Min. 5 minutes)
Open Channel Flow		
L =	0	Ft.
H =	0.0	Ft.
S =	#DIV/0!	Ft./Ft.
v =	2.00	Ft./sec.
t2=	0.00	Minutes
tc=	11.01	Minutes
I(10) =		In./Hr.
I(25) =	6.102	In./Hr.
I(50) =		In./Hr.
I(100) =	7.773	In./Hr.
Q(10) =	**0.00**	**CFS**
Q(25) =	**2.48**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**3.16**	**CFS**

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: A-18

Total Area = 2,803 S.F.
0.06 Acres

Surface						C	N
Structures		=	0	S.F. =	0.00 Ac.	0.92	0.02
Pavement		=	1,783	S.F. =	0.04 Ac.	0.92	0.02
Drives		=	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
Lawn (0-2%)	S.F.	=			0.00 Ac.	0.15	0.40
Lawn (2-5%)	1,020 S.F.	=			0.02 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 =	**0.676**	
Weighted N =	0.158	
Sheet Flow		
L =	101	Ft.
H =	0.5	Ft.
S =	0.0052	Ft./Ft.
t1=	10.28	Minutes (Min. 5 minutes)
Open Channel Flow		
L =	0	Ft.
H =	0.0	Ft.
S =	#DIV/0!	Ft./Ft.
v =	1.60	Ft./sec.
t2=	0.00	Minutes
tc=	10.28	Minutes
I(10) =		In./Hr.
I(25) =	6.259	In./Hr.
I(50) =		In./Hr.
I(100) =	7.973	In./Hr.
Q(10) =	**0.00**	**CFS**
Q(25) =	**0.27**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**0.35**	**CFS**

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: A-19

Total Area = 6,941 S.F.
0.16 Acres

Surface						C	N
Structures		=	4,077	S.F. =	0.09 Ac.	0.92	0.02
Pavement		=	0	S.F. =	0.00 Ac.	0.92	0.02
Concrete		=	0	S.F. =	0.00 Ac.	0.92	0.02
Patios		=	500	S.F. =	0.01 Ac.	0.92	0.02
Sidewalks		=	0	S.F. =	0.00 Ac.	0.92	0.02
Lawn (0-2%)	S.F.	=			0.00 Ac.	0.15	0.40
Lawn (2-5%)	2,364 S.F.	=			0.05 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 =	**0.692**	
Weighted N =	0.149	
Sheet Flow		
L =	130	Ft.
H =	2.0	Ft.
S =	0.0154	Ft./Ft.
t1=	8.76	Minutes (Min. 5 minutes)
Open Channel Flow		
L =	0	Ft.
H =	0.0	Ft.
S =	#DIV/0!	Ft./Ft.
v =	1.50	Ft./sec.
t2=	0.00	Minutes
tc=	8.76	Minutes
I(10) =		In./Hr.
I(25) =	6.690	In./Hr.
I(50) =		In./Hr.
I(100) =	8.521	In./Hr.
Q(10) =	**0.00**	**CFS**
Q(25) =	**0.74**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**0.94**	**CFS**

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: A-20

Total Area = 82,440 S.F.
1.89 Acres

Surface						C	N
Structures		=	49,300	S.F. =	1.13 Ac.	0.92	0.02
Pavement		=	5,736	S.F. =	0.13 Ac.	0.92	0.02
Drives		=	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
Lawn (0-2%)	S.F.	=			0.00 Ac.	0.15	0.40
Lawn (2-5%)	27,404 S.F.	=			0.63 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 =	**0.697**	
Weighted N =	0.146	
Sheet Flow		
L =	300	Ft.
H =	2.0	Ft.
S =	0.0067	Ft./Ft.
t1=	15.58	Minutes (Min. 5 minutes)
Open Channel Flow		
L =	0	Ft.
H =	0.0	Ft.
S =	#DIV/0!	Ft./Ft.
v =	1.60	Ft./sec.
t2=	0.00	Minutes
tc=	15.58	Minutes
I(10) =		In./Hr.
I(25) =	5.165	In./Hr.
I(50) =		In./Hr.
I(100) =	6.584	In./Hr.
Q(10) =	**0.00**	**CFS**
Q(25) =	**6.82**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**8.69**	**CFS**

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: A-21

Total Area = 5,394 S.F.
0.12 Acres

Surface						C	N
Structures		=	0	S.F. =	0.00 Ac.	0.92	0.02
Pavement		=	2,945	S.F. =	0.07 Ac.	0.92	0.02
Concrete		=	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
Lawn (0-2%)	S.F.	=			0.00 Ac.	0.15	0.40
Lawn (2-5%)	2,449 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 =	**0.616**	
Weighted N =	0.193	
Sheet Flow		
L =	165	Ft.
H =	1.7	Ft.
S =	0.0101	Ft./Ft.
t1=	12.17	Minutes (Min. 5 minutes)
Open Channel Flow		
L =	0	Ft.
H =	0.0	Ft.
S =	#DIV/0!	Ft./Ft.
v =	1.50	Ft./sec.
t2=	0.00	Minutes
tc=	12.17	Minutes
I(10) =		In./Hr.
I(25) =	5.851	In./Hr.
I(50) =		In./Hr.
I(100) =	7.455	In./Hr.
Q(10) =	**0.00**	**CFS**
Q(25) =	**0.45**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**0.57**	**CFS**

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: A-22

Total Area = 12,049 S.F.
0.28 Acres

Surface						C	N
Structures		=	5,500	S.F. =	0.13 Ac.	0.92	0.02
Pavement		=	0	S.F. =	0.00 Ac.	0.92	0.02
Drives		=	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
Lawn (0-2%)	S.F.	=			0.00 Ac.	0.15	0.40
Lawn (2-5%)	6,549 S.F.	=			0.15 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 =	**0.556**	
Weighted N =	0.227	
Sheet Flow		
L =	152	Ft.
H =	1.5	Ft.
S =	0.0099	Ft./Ft.
t1=	12.69	Minutes (Min. 5 minutes)
Open Channel Flow		
L =	0	Ft.
H =	0.0	Ft.
S =	#DIV/0!	Ft./Ft.
v =	1.60	Ft./sec.
t2=	0.00	Minutes
tc=	12.69	Minutes
I(10) =		In./Hr.
I(25) =	5.738	In./Hr.
I(50) =		In./Hr.
I(100) =	7.312	In./Hr.
Q(10) =	**0.00**	**CFS**
Q(25) =	**0.88**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**1.12**	**CFS**

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: A-23

Total Area = 78,396 S.F.
1.80 Acres

Surface						C	N
Structures		=	30,050	S.F. =	0.69 Ac.	0.92	0.02
Pavement		=	0	S.F. =	0.00 Ac.	0.92	0.02
Concrete		=	0	S.F. =	0.00 Ac.	0.92	0.02
Patios		=	1,400	S.F. =	0.03 Ac.	0.92	0.02
Sidewalks		=	0	S.F. =	0.00 Ac.	0.92	0.02
Lawn (0-2%)	S.F.	=			0.00 Ac.	0.15	0.40
Lawn (2-5%)	34,665 S.F.	=			0.80 Ac.	0.25	0.40
Lawn (5-10%)	0 S.F.	=			0.00 Ac.	0.40	0.40
Lawn (>10%)	4,120 S.F.	=			0.09 Ac.	0.55	0.40
Woods (>10%)	0 S.F.	=			0.00 Ac.	0.48	0.60
Water	8,161 S.F.	=			0.19 Ac.	1.00	0.00
Misc.	0 S.F.	=			0.00 Ac.	0.92	0.02

Weighted c =	**0.613**	
Weighted N =	0.206	
Sheet Flow		
L =	233	Ft.
H =	3.0	Ft.
S =	0.0129	Ft./Ft.
t1=	13.93	Minutes (Min. 5 minutes)
Open Channel Flow		
L =	0	Ft.
H =	0.0	Ft.
S =	#DIV/0!	Ft./Ft.
v =	1.50	Ft./sec.
t2=	0.00	Minutes
tc=	13.93	Minutes
I(10) =		In./Hr.
I(25) =	5.471	In./Hr.
I(50) =		In./Hr.
I(100) =	6.973	In./Hr.
Q(10) =	**0.00**	**CFS**
Q(25) =	**6.03**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**7.69**	**CFS**

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: A-24

Total Area = 14,643 S.F.
0.34 Acres

Surface						C	N
Structures		=	6,658	S.F. =	0.15 Ac.	0.92	0.02
Pavement		=	0	S.F. =	0.00 Ac.	0.92	0.02
Drives		=	0	S.F. =	0.00 Ac.	0.92	0.02
Patios		=	2,000	S.F. =	0.05 Ac.	0.92	0.02
Sidewalks		=	0	S.F. =	0.00 Ac.	0.92	0.02
Lawn (0-2%)	S.F.	=			0.00 Ac.	0.15	0.40
Lawn (2-5%)	5,985 S.F.	=			0.14 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 =	**0.646**	
Weighted N =	0.175	
Sheet Flow		
L =	46	Ft.
H =	0.5	Ft.
S =	0.0109	Ft./Ft.
t1=	6.30	Minutes (Min. 5 minutes)
Open Channel Flow		
L =	62	Ft.
H =	0.5	Ft.
S =	0.0085	Ft./Ft.
v =	1.65	Ft./sec.
t2=	0.63	Minutes
tc=	6.93	Minutes
I(10) =		In./Hr.
I(25) =	7.236	In./Hr.
I(50) =		In./Hr.
I(100) =	9.218	In./Hr.
Q(10) =	**0.00**	**CFS**
Q(25) =	**1.57**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**2.00**	**CFS**

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: A-25

Total Area = 7,932 S.F.
0.18 Acres

Surface						C	N
Structures		=	2,930	S.F. =	0.07 Ac.	0.92	0.02
Pavement		=	0	S.F. =	0.00 Ac.	0.92	0.02
Concrete		=	0	S.F. =	0.00 Ac.	0.92	0.02
Patios		=	800	S.F. =	0.02 Ac.	0.92	0.02
Sidewalks		=	0	S.F. =	0.00 Ac.	0.92	0.02
Lawn (0-2%)	S.F.	=			0.00 Ac.	0.15	0.40
Lawn (2-5%)	4,202 S.F.	=			0.10 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 =	47	Ft.
H =	0.7	Ft.
S =	0.0153	Ft./Ft.
t1=	6.55	Minutes (Min. 5 minutes)
Open Channel Flow		
L =	147	Ft.
H =	1.3	Ft.
S =	0.0085	Ft./Ft.
v =	1.35	Ft./sec.
t2=	1.81	Minutes
tc=	8.36	Minutes
I(10) =		In./Hr.
I(25) =	6.807	In./Hr.
I(50) =		In./Hr.
I(100) =	8.671	In./Hr.
Q(10) =	**0.00**	**CFS**
Q(25) =	**0.70**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**0.89**	**CFS**

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: A-26 — Total Area = 19,127 S.F. (0.44 Acres)

Surface						C	N
Structures		=	1,125	S.F. =	0.03 Ac.	0.92	0.02
Pavement		=	0	S.F. =	0.00 Ac.	0.92	0.02
Drives		=	0	S.F. =	0.00 Ac.	0.92	0.02
Patios		=	300	S.F. =	0.01 Ac.	0.92	0.02
Sidewalks		=	0	S.F. =	0.00 Ac.	0.92	0.02
Lawn (0-2%)	S.F.	=			0.00 Ac.	0.15	0.40
Lawn (2-5%)	3,701 S.F.	=			0.08 Ac.	0.25	0.40
Lawn (5-10%)	0 S.F.	=			0.00 Ac.	0.40	0.40
Lawn (>10%)	5,872 S.F.	=			0.13 Ac.	0.55	0.40
Water	8,129 S.F.	=			0.19 Ac.	1.00	0.00
Misc.	0 S.F.	=			0.00 Ac.	0.92	0.02

Weighted c =	**0.711**	
Weighted N =	0.202	
Sheet Flow		
L =	51	Ft.
H =	2.0	Ft.
S =	0.0392	Ft./Ft.
t1=	5.23	Minutes (Min. 5 minutes)
Open Channel Flow		
L =	0	Ft.
H =	0.0	Ft.
S =	#DIV/0!	Ft./Ft.
v =	1.65	Ft./sec.
t2=	0.00	Minutes
tc=	5.23	Minutes
I(10) =		In./Hr.
I(25) =	7.741	In./Hr.
I(50) =		In./Hr.
I(100) =	9.862	In./Hr.
Q(10) =	**0.00**	**CFS**
Q(25) =	**2.42**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**3.08**	**CFS**

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: A-27 — Total Area = 3,723 S.F. (0.09 Acres)

Surface						C	N
Structures		=	0	S.F. =	0.00 Ac.	0.92	0.02
Pavement		=	0	S.F. =	0.00 Ac.	0.92	0.02
Concrete		=	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
Lawn (0-2%)	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%)	3,723 S.F.	=			0.09 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 =	23	Ft.
H =	0.3	Ft.
S =	0.0130	Ft./Ft.
t1=	6.42	Minutes (Min. 5 minutes)
Open Channel Flow		
L =	0	Ft.
H =	0.0	Ft.
S =	#DIV/0!	Ft./Ft.
v =	1.35	Ft./sec.
t2=	0.00	Minutes
tc=	6.42	Minutes
I(10) =		In./Hr.
I(25) =	7.386	In./Hr.
I(50) =		In./Hr.
I(100) =	9.410	In./Hr.
Q(10) =	**0.00**	**CFS**
Q(25) =	**0.35**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**0.44**	**CFS**

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: A-28

Total Area = 15,950 S.F.
0.37 Acres

Surface						C	N
Structures		=	0	S.F. =	0.00 Ac.	0.92	0.02
Pavement		=	0	S.F. =	0.00 Ac.	0.92	0.02
Drives		=	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
Lawn (0-2%)	S.F.	=			0.00 Ac.	0.15	0.40
Lawn (2-5%)	S.F.	=			0.00 Ac.	0.25	0.40
Lawn (5-10%)	15,950 S.F.	=			0.37 Ac.	0.40	0.40
Lawn (>10%)	S.F.	=			0.00 Ac.	0.55	0.40
Water	S.F.	=			0.00 Ac.	1.00	0.00
Misc.	0 S.F.	=			0.00 Ac.	0.92	0.02

Weighted c =	**0.400**	
Weighted N =	0.400	
Sheet Flow		
L =	45	Ft.
H =	2.5	Ft.
S =	0.0556	Ft./Ft.
t1=	6.26	Minutes (Min. 5 minutes)
Open Channel Flow		
L =	0	Ft.
H =	0.0	Ft.
S =	#DIV/0!	Ft./Ft.
v =	1.65	Ft./sec.
t2=	0.00	Minutes
tc=	6.26	Minutes
I(10) =		In./Hr.
I(25) =	7.433	In./Hr.
I(50) =		In./Hr.
I(100) =	9.470	In./Hr.
Q(10) =	**0.00**	**CFS**
Q(25) =	**1.09**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**1.39**	**CFS**

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: A-29

Total Area = 5,604 S.F.
0.13 Acres

Surface						C	N
Structures		=	0	S.F. =	0.00 Ac.	0.92	0.02
Pavement		=	0	S.F. =	0.00 Ac.	0.92	0.02
Concrete		=	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
Lawn (0-2%)	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%)	5,604 S.F.	=			0.13 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 =	31	Ft.
H =	2.9	Ft.
S =	0.0935	Ft./Ft.
t1=	5.00	Minutes (Min. 5 minutes)
Open Channel Flow		
L =	0	Ft.
H =	0.0	Ft.
S =	#DIV/0!	Ft./Ft.
v =	1.35	Ft./sec.
t2=	0.00	Minutes
tc=	5.00	Minutes
I(10) =		In./Hr.
I(25) =	7.810	In./Hr.
I(50) =		In./Hr.
I(100) =	9.950	In./Hr.
Q(10) =	**0.00**	**CFS**
Q(25) =	**0.55**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**0.70**	**CFS**

Open Channel Flow Calculations

Swale #: **19**

Side slope = 3
Bottom width = 0.5
Manning's coefficient = 0.035
Slope of channel = 0.0165

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	0.50	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.13	0.08	0.07	0.07	0.07	0.93	1.1
0.2	1.76	0.22	0.12	0.13	0.30	1.36	1.2
0.3	2.08	0.31	0.15	0.16	0.48	1.54	1.3
0.4	2.71	0.54	0.20	0.21	1.01	1.87	1.4
0.5	3.35	0.83	0.25	0.26	1.80	2.16	1.5
0.6	3.98	1.18	0.30	0.31	2.88	2.44	1.6

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1.	82-04-36-002-146.027-019 Church of the Cross of General Baptist Incorporate 7525 N Green River Rd Evansville, IN 47725					
2.	82-04-35-002-145.002-019 Carla D Axton 2441 SE Browning Rd Evansville. IN 47725					
3.	82-04-36-002-837.021-019 DWJ Properties LLC 8604 Ranleight Ct Newburgh, IN 47630					
4.	82-04-36-002-837.044-019 David S & Michelle E Sullenger 7420 Megan Brooke Ln Evansville, IN 47725					
5.	82-04-36-002-837.035-019 George P & Janet G Duncan 7342 Megan Brooke Ln Evansville, IN 47725					

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1.		82-04-36-002-837.076-019 Linda A Doll Revocable Trust 7312 Megan Brooke Ln Evansville, IN 47725				
2.		82-04-36-002-837.025-019 Charlene R Tooley 7301 Megan Brooke Ln Evansville, IN 47725				
3.		82-04-36-002-837.006-019 Tyra Schroeder Trust & Kendall Martin Trustee 7327 Megan Brooke Ln Evansville, IN 47725				
4.		82-04-36-002-837.009-019 Nikki Nickens 7339 Megan Brooke Ln Evansville, IN 47725				
5.		82-04-36-002-837.016-019 Beverly A Frank 7407 Megan Brooke Ln Evansville, IN 47725				
6.		82-04-36-002-146.019-019 Kerry G & Kathy L Davis 5205 Millersburg Rd Evansville, IN 47725				

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1.		82-04-36-002-837.027-019 Benjamin J & Kathy J Burgdorf 7450 Megan Brooke Ln Evansville, IN 47725				
2.		82-04-36-002-837.020-019 Robert R SR & Karlene J Kaster 7430 Megan Brooke Ln Evansville, IN 47725				
3.		82-04-36-002-837.029-019 Donald & Rosemary Gent 7408 Megan Brooke Ln Evansville, IN 47725				
4.		82-04-36-002-837.049-019 Jeffrey L & Susan M Raber 7338 Megan Brooke Ln Evansville, IN 47725				
5.		82-04-36-002-837.031-019 Donald R Powers 7304 Megan Brooke Ln Evansville, IN 47725				
6.		82-04-36-002-837.023-019 Russel L & Dixie J Menke 7313 Megan Brooke Ln Evansville, IN 47725				

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	USPS® Tracking Number / Firm-specific Iden...	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Special Handling	Parcel Airlift
1.		82-04-36-002-837.007-019 Lillian Boehringer & Beth Schmidt & Lisa Benton 7331 Megan Brooke Ln Evansville. IN 47725				
2.		82-04-36-002-837.010-019 Ronald O & Billie J Collins 7343 Megan Brooke Ln Evansville, IN 47725				
3.		82-04-36-002-837.014-019 Harley B & Marolyn Pepmeier 7419 Megan Brooke Ln Evansville, IN 47725				
4.		82-04-36-002-146.002-019 Kendall Development LLC 7235 N Green River Rd Evansville, IN 47725				
5.		82-04-36-002-837.026-019 David L Nichols 7446 Megan Brooke Ln Evansville, IN 47725				
6.		82-04-36-002-837.045-019 Marion D & Rosalie M Mills 7424 Megan Brooke Ln Evansville, IN 47725				

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1.		82-04-36-002-837.028-019 Jacqueline M Modlin 7404 Megan Brooke Ln Unit A Evansville, IN 47725				
2.		82-04-36-002-837.077-019 Ruth A Gosnell 7316 Megan Brooke Ln Evansville, IN 47725				
3.		82-04-36-002-837.030-019 Sharon A Foster 7300 Megan Brooke Ln Unit 4A Evansville, IN 47725				
4.		82-04-36-002-837.024-019 Barbara D Niemeier 7317 Megan Brooke Ln Evansville, IN 47725				
5.		82-04-36-002-837.008-019 David C Hayes & Debra J Oldham 7335 Megan Brooke Ln Evansville, IN 47725				
6.		82-04-36-002-837.015-019 Robert T & Elizabeth A Letterman 7403 Megan Brooke Ln Evansville, IN 47725				

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1.		82-04-36-002-837.013-019 Joyce Courson 7415 Megan Brooke Ln Evansville, IN 47725				
2.		82-04-36-002-837.001-019 Howard Wong 7431 Megan Brooke Ln Evansville, IN 47725				
3.		82-04-36-002-837.004-019 Karen Rehrman 7443 Megan Brooke Ln Evansville, IN 47725				
4.		82-04-36-002-837.038-019 Steven Peak & Lucinda Norton-Peak 7440 Brycen Ln Evansville, IN 47725				
5.		82-04-36-002-837.012-019 Thelma Price & Cathy E Jurgens & David A Stalnaker Jurgens & Dale Jurgens 5004 Chase Dr Evansville, IN 47725				
6.		82-04-36-002-837.018-019 Gina J Hoffman 5005 Chase Dr Evansville, IN 47725				

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1.		82-04-36-002-837.052-019 Mary L Bass 7318 Lyons Ct Evansville, IN 47725				
2.		82-04-36-002-837.053-019 Gary M & Beth Ann Woodruff 7303 Lyons Ct Evansville, IN 47725				
3.		82-04-36-002-837.047-019 Don & Darlene Kaiser 7325 Lyons Ct Evansville, IN 47725				
4.		82-04-36-002-837.060-019 Walt & Helen L Perkins 7345 Lyons Ct Evansville, IN 47725				
5.		82-04-36-002-837.040-019 Erik W & Brenda G Strieter 7427 Brycen Ln Evansville, IN 47725				
6.		82-04-36-002-837.002-019 Robbie W Jossa 7435 Megan Brooke Ln Evansville, IN 47725				

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	USPS® Tracking Number / Firm-specific Iden	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Special Handling	Parcel Airlift
1.		82-04-36-002-837.005-019 Thomas J & Philomina Thuruthumaly 2111 Highland Blvd Pocahontas, AR 72455-1742				
2.		82-04-36-002-837.050-019 Harold R & J Carol Staggs 7414 Brycen Ln Evansville, IN 47725				
3.		82-04-36-002-837.011-019 Katherine M Gallo 5000 Chase Dr Evansville, IN 47725				
4.		82-04-36-002-837.019-019 William M & Susan A Key 5007 Chase Dr Evansville, IN 47725				
5.		82-04-36-002-837.051-019 James D & Beverly S Tremper 7314 Lyons Ct Evansville. IN 47725				
6.		82-04-36-002-837.054-019 John B Straw 7307 Lyons Ct Evansville, IN 47725				

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	USPS® Tracking Number / Firm-specific Ider	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Special Handling	Parcel Airlift
1.		82-04-36-002-837.048-019 Dennis H & Marita A Welp 7329 Lyons Ct Evansville, IN 47725				
2.		82-04-36-002-837.043-019 David M & Ruth A Willis 7447 Brycen Ln Evansville, IN 47725				
3.		82-04-36-002-837.037-019 James L & Janice E Jones 7421 Brycen Ln Evansville, IN 47725				
4.		82-04-36-002-837.003-019 Maxine L Haury 7439 Megan Brooke Ln Evansville, IN 47725				
5.		82-04-36-002-837.039-019 Freida Heuer 673 Hawk Run Dr O'Fallon, MO 63368				
6.		82-04-36-002-837.046-019 Joyce Taylor 7402 Brycen Ln Evansville, IN 47725				

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	USPS® Tracking Number Firm-specific Ide	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Special Handling	Parcel Airlift
1.		82-04-36-002-837.017-019 George L & Delores Fuhrman 5001 Chase Dr Evansville, IN 47725				
2.		82-04-36-002-837.022-019 82-04-36-002-837.041-019 Steven R & Kathleen D Sutton 7328 Lyons Ct Evansville, IN 47711				
3.		82-04-36-002-837.032-019 Donna Osmon 7302 Lyons Ct Evansville, IN 47725				
4.		82-04-36-002-837.068-019 Norma J Rich 7315 Lyons Ct Evansville, IN 47725				
5.		82-04-36-002-837.059-019 Paul & Sharon Burnes 7341 Lyons Ct Evansville, IN 47725				
6.		82-04-36-002-837.042-019 Connie Sisson 7443 Brycen Ln Evansville, IN 47725				

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PS F 30-17-000-5549

See Reverse for Instructions

UNITED STATES POSTAL SERVICE®

Certificate of Mailing — Firm

Name and Address of Sender	TOTAL NO. of Pieces Listed by Sender	TOTAL NO. of Pieces Received at Post Office™	Affix Stamp Here *Postmark with Date of Receipt.*
Cash Waggner & Associates, PC 414 Citadel Circle Suite B Evansville, IN 47715			EVANSVILLE IN 47708 FEB 13 2019 USPS
	Postmaster, per *(name of receiving employee)*		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Special Handling	Parcel Airlift
1.	82-04-36-002-837.036-019 Brenda G Marshall 7417 Brycen Ln Evansville, IN 47725				
2.	82-04-36-002-837.034-019 Daniel A & Dianna L Lovell 7405 Brycen Ln Evansville, IN 47725				
3.	82-04-36-002-837.088-019 Charles F Debord 7338 Kylee Jo Ln Evansville, IN 47725				
4.	82-04-36-002-837.103-019 Thomas P II & Christina E Mirando 7312 Kylee Jo Ln Evansville, IN 47725				
5.	82-04-36-002-837.069-019 Larry D Gates 7301 Kylee Jo Ln Evansville, IN 47725				
6.	82-04-36-002-837.072-019 Ronald O & Carol J Cates 7323 Kylee Jo Ln Evansville, IN 47725				

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	Postmaster, per *(name of receiving employee)*		

	USPS® Tracking Number / Firm-specific Identif	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Special Handling	Parcel Airlift
1.		82-04-36-002-837.079-019 Wanda L Karn 7403 Kylee Jo Ln Evansville, IN 47725				
2.		82-04-36-002-837.055-019 John W & Derethea Tevault 7429 Kylee Jo Ln Evansville, IN 47725				
3.		82-04-36-002-837.058-019 Daniel C & Linda L Oliver 7449 Kylee Jo Ln Evansville, IN 47725				
4.		82-04-36-002-837.093-019 Brenda A Anderson 7432 Shea Dr Evansville, IN 47725				
5.		82-04-36-002-837.099-019 William E & Charlotte A Robinson 7418 Shea Dr Evansville, IN 47725				
6.		82-04-36-002-837.033-019 Toni R Wade 7401 Brycen Ln Evansville, IN 47725				

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	Postmaster, per *(name of receiving employee)*		

	USPS® Tracking Number / Firm-specific Identi	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Special Handling	Parcel Airlift
1.		82-04-36-002-837.085-019 Rita Folz 7326 Kylee Jo Ln Evansville, IN 47725				
2.		82-04-36-002-837.083-019 Edward L Georges 7304 Kylee Jo Ln Evansville, IN 47725				
3.		82-04-36-002-837.070-019 Ricky A & Tracy L Taylor 7305 Kylee Jo Ln Evansville, IN 47725				
4.		82-04-36-002-837.073-019 Orrie Lee Jr & Carol Ann Claspell 7327 Kylee Jo Ln Evansville, IN 47725				
5.		82-04-36-002-837.080-019 Susan Meyer 7407 Kylee Jo Ln Evansville, IN 47725				
6.		82-04-36-002-837.056-019 Daniel & Ann Nalin 7433 Kylee Jo Ln Evansville, IN 47725				

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	Postmaster, per *(name of receiving employee)*		

	USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Special Handling	Parcel Airlift
1.		82-04-36-002-837.064-019 Donald J & Joyce E Lasher 7448 Shea Dr Evansville, IN 47725				
2.		82-04-36-002-837.092-019 Bonnie M Jamison 7428 Shea Dr Evansville, IN 47725				
3.		82-04-36-002-837.087-019 Philip K & Carol L Benefiel 7402 Shea Dr Evansville, IN 47725				
4.		82-04-36-002-837.089-019 Roger F & Lorraine Yourgans 7342 Kylee Jo Ln Evansville, IN 47725				
5.		82-04-36-002-837.084-019 Karen Schuster 7322 Kylee Jo Ln Evansville, IN 47725				
6.		82-04-36-002-837.082-019 Joseph Wayne Evans 7300 Kylee Jo Ln Evansville, IN 47725				

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	Postmaster, per *(name of receiving employee)*		

	USPS® Tracking Number Firm-specific Iden	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Special Handling	Parcel Airlift
1.		82-04-36-002-837.078-019 Lisa K Minsterketter 7317 Kylee Jo Ln Evansville, IN 47725				
2.		82-04-36-002-837.065-019 Leslie Ann Gough Revocable Living Trust 7343 Kylee Jo Ln Evansville, IN 47725				
3.		82-04-36-002-837.071-019 Theresa R & Douglas B Bassemier 7423 Kylee Jo Ln Evansville, IN 47725				
4.		82-04-36-002-837.057-019 Jerry & Judy Ashley 7445 Kylee Jo Ln Evansville, IN 47725				
5.		82-04-36-002-837.063-019 John & Mildred Vollman 7444 Shea Dr Evansville, IN 47725				
6.		82-04-36-002-837.100-019 Larry J & Debbie J Bander 7422 Shea Dr Evansville, IN 47725				

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	Postmaster, per *(name of receiving employee)*		

	USPS® Tracking Number Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Special Handling	Parcel Airlift
1.		82-04-36-002-837.098-019 David & Lisa Karges 7344 Shea Dr Evansville, IN 47725				
2.		82-04-36-002-837.097-019 Ruth M Dobbs 7340 Shea Dr Evansville, IN 47725				
3.		82-04-36-002-837.081-019 Martha Jo McDonald 7302 Shea Dr Evansville, IN 47725				
4.		82-04-36-002-837.086-019 Ronald Lee & Judith A Dauby 7319 Shea Dr Evansville, IN 47725				
5.		82-04-36-002-837.095-019 Alan R & Connie A Crab 7341 Shea Dr Evansville, IN 47725				
6.		82-04-36-002-837.067-019 James T & Karen G Barron 7405 Shea Dr Evansville, IN 47725				

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	Postmaster, per *(name of receiving employee)*		

	USPS® Tracking Number / Firm-specific Iden	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Special Handling	Parcel Airlift
1.		82-04-36-002-837.094-019 Michael W & Becky J Burdick 7336 Shea Dr Evansville, IN 47725				
2.		82-04-36-002-837.074-019 James & Jennifer F Welch & Amie S Stewart & Kiersten Hary-Camplin 7303 Shea Dr Evansville, IN 47725				
3.		82-04-36-002-837.090-019 David T & Sandra Lasher 7325 Shea Dr Evansville, IN 47725				
4.		82-04-36-002-837.096-019 Stephen G & Robin L Williams 7345 Shea Dr Evansville, IN 47725				
5.		82-04-36-002-837.061-019 William S & Brenda K McCune 7415 Shea Dr Evansville, IN 47725				
6.		82-04-36-002-837.102-019 Shane P & Tara S Carey 7318 Shea Dr Evansville, IN 47725				

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Cash Waggner & Associates, PC 414 Citadel Circle Suite B Evansville, IN 47715			EVANSVILLE IN 47708 FEB 13 2019 USPS
	Postmaster, per *(name of receiving employee)*		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Special Handling	Parcel Airlift
1. 82-04-36-002-837.075-019	Gregory A & Sonja K Schroeder 7307 Shea Dr Evansville, IN 47725				
2. 82-04-36-002-837.091-019	Deborah J Fox 7329 Shea Dr Evansville, IN 47725				
3. 82-04-36-002-837.066-019	Larry G & Marcia Blankenship 7401 Shea Dr Evansville, IN 47725				
4. 82-04-36-002-837.062-019	William G & Patricia E Hewitt 7417 Shea Dr Evansville, IN 47725				
5.					
6.					

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APPLICANT INFORMATION FORM 801

Project Name:	Hunter Chase Estates
Approximate Location:	Located on the east side of North Green River Road approximately 1700' south of Millersburg Road
Applicant Name:	Dauby Properties & Investments, LLC
Applicant is (check one)	☐Individual (s) ☒Partnership or legal LLC ☐Corporation
Applicant Address: City: State: Zip Code:	7319 Shea Drive Evansville Indiana 47725
Email:	dauby_construction@yahoo.com

For Individual (s)

I (we) do hereby certify that the Information contained on this application is to true and correct. I (we) further understand that upon completion of the project that an as built drawing or certification statement as required by the Vanderburgh County Code will be submitted as required and that failure to provide such certification could result in fines under Section 13.04.110 and/or make me (us) ineligible for future drainage plan approvals until such time as an as built drawing or certification is submitted.

Signature _____ Date Click here to enter a date.

Signature _____ Date Click here to enter a date.

For Partnership (s)

I (we) do hereby certify that the Information contained on this application is to true and correct. I (we) further understand that upon completion of the project that an as built drawing or certification statement as required by the Vanderburgh County Code will be submitted as required and that failure to provide such certification could result in fines under Section 13.04.110 and/or make me (us) ineligible for future drainage plan approvals until such time as an as built drawing or certification is submitted.

Signature of Senior or Managing Partner Ronald Lee Dawley
Printed Name RONALD Lee DAWLEY
Date 1/16/19

If partnership does not have a Senior or Managing Partner than signatures of all partners

Signature _____ Date _____
Printed Name _____

Signature _____ Date _____
Printed Name _____

Signature _____ Date _____
Printed Name _____

Signature _____ Date _____
Printed Name _____

Signature _____ Date _____
Printed Name _____

For Corporation

I do hereby certify that the Information contained on this application is to true and correct. I further understand that upon completion of the project that an as built drawing or certification statement as required by the Vanderburgh County Code will be submitted as required and that failure to provide such certification could result in fines under Section 13.04.110 and/or make the corporation ineligible for future drainage plan approvals until such time as an as built drawing or certification is submitted.

Signature Ronald Lee Dawley Date 1/16/19
Printed Name Ronald Lee Dawley
Title Man. Member (note if not a vice president or above of applicant company, than attached a Delegation of Authority)

January 30, 2019

Vanderburgh County Drainage Board
Civic Center Complex – Room 305
Evansville, IN 47708

RE: Hunter Chase Estates

I am the developer of the Hunter Chase Estates condominium development located on North Green River Road. Starting in June or July of 2019, detention basins #1 and #2 will be drained to allow the slopes to be regraded to a maximum slope of 4:1 and if necessary, removal of sediment from the bottom of the basins to maintain a permanent water pool depth of 6 feet to meet the current Drainage Code. Once this work is completed, permanent seeding will be applied to the entire disturbed area.

The majority of the sidewalks along the north and south property lines will then be removed to allow swales of a larger cross section to be constructed in these locations. All swales that are approved on the final drainage plan will be regraded to the design elevations and cross sections. The concrete swale along the northeast property line and the standing curb near the southeast corner of the development will also be constructed. Once swale grading has been completed, all grass-lined swales will be seeded and armored with erosion control blankets. All work associated with the approved final drainage plan will be completed by October 31st, 2019.

Sincerely,

Ron Dauby
Dauby Properties & Investments, LLC

CASH WAGGNER & ASSOCIATES, PC
CONSULTING ENGINEERS • LAND SURVEYORS

DATE: 02.01.19
PROJECT NO.: 14-1887
REFERENCE: Hunter Chase Estates
YOUR FILE NO.:

ATTENTION: Jeff Mueller
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	01.31.19	Revised Drainage Plan
1	01.31.19	Developed Sub-basin Exhibit
1		Drainage Calculations
1	01.31.19	Variance Letter
1	01.30.19	Commitment Letter from Dauby

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:

If you have any questions or comments, please give me a call. Thank you

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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\1887 - HUNTER CHASE\DOCUMENTS\190131 MUELLER.DOC

STORM SEWER CALCULATIONS

Design Return Period: 25 Year

Mannings 'n': 0.012

Project Name: **Hunter Chase Estates**

Project #: 14-1887

Date: 1/31/19

1 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	A-15	AD 507		AD 508	109	0.673	0.51	0.34	0.34	14.03	14.03	5.449	1.87	12	0.0266	388.16	385.26	6.29	8.02	0.23
1	A-14	AD 508		AD 509	114	0.611	2.21	1.35	1.69	17.01	17.01	4.982	8.44	18	0.0214	385.02	382.58	16.64	9.42	0.20
1	A-16	AD 509		CI 511	86	0.605	0.15	0.09	1.78	10.49	17.21	4.956	8.84	18	0.0071	382.58	381.97	9.59	5.43	0.26
1	A-17	CI 510		CI 511	26	0.580	0.72	0.42	0.42	10.22	10.22	6.271	2.62	12	0.0373	383.23	382.26	7.45	9.49	0.05
1	A-18	CI 511		AD 512	20	0.676	0.06	0.04	2.24	10.28	17.48	4.921	11.04	18	0.0065	381.97	381.80	10.49	5.94	0.06
1	A-19	AD 512		AD 516	94	0.692	0.16	0.11	2.35	8.76	17.53	4.914	11.56	18	0.0101	381.80	380.85	11.43	6.47	0.24
1	A-20	CI 514		CI 515	33	0.648	2.13	1.38	1.38	14.84	14.84	5.276	7.28	18	0.0218	381.66	380.94	16.80	9.51	0.06
1	A-21	CI 515		AD 516	13	0.616	0.12	0.07	1.45	12.17	14.90	5.262	7.65	18	0.0069	380.94	380.85	9.45	5.35	0.04
1	A-22	AD 516		FES 517	16	0.556	0.28	0.16	3.96	12.69	17.77	4.894	19.36	24	0.0113	380.85	380.67	26.04	8.29	0.03
2	A-3	AD 500		AD 502	135	0.658	1.14	0.75	0.75	16.78	16.78	5.012	3.76	18	0.0061	382.33	381.51	8.88	5.03	0.45
2	A-5	AD 501		AD 502	119	0.776	1.04	0.81	0.81	12.45	12.45	5.790	4.67	15	0.0047	382.29	381.73	4.80	3.91	0.51
2	A-24	AD 502		AD 503	326	0.646	0.34	0.22	1.78	6.93	17.23	4.953	8.80	24	0.0042	381.03	379.65	15.95	5.08	1.07
2	A-25	AD 503		FES 504	39	0.565	0.18	0.10	1.88	8.36	18.30	4.815	9.04	24	0.0044	379.65	379.40	19.60	6.24	0.10

REVISED
BY 2/21/2019
SUBMITTAL

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: A-9

Total Area = 41,567 S.F.
0.95 Acres

Surface						C	N
Structures		=	11,316	S.F. =	0.26 Ac.	0.92	0.02
Pavement		=	19,253	S.F. =	0.44 Ac.	0.92	0.02
Drives		=	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
Lawn (0-2%)	S.F.	=			0.00 Ac.	0.15	0.40
Lawn (2-5%)	10,998 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
Water	0 S.F.	=			0.00 Ac.	1.00	0.00
Misc.	0 S.F.	=			0.00 Ac.	0.92	0.02

Weighted c =	**0.743**	
Weighted N =	0.121	
Sheet Flow		
L =	300 Ft.	
H =	4.3 Ft.	
S =	0.0144 Ft./Ft.	
t1=	11.89 Minutes	(Min. 5 minutes)
Shallow Concentrated Flow		
L =	300 Ft.	
H =	3.2 Ft.	
S =	0.0106 Ft./Ft.	
v =	2.10 Ft./sec.	(From HERPICC Figure 3.4.5)
t2=	2.38 Minutes	
tc=	14.27 Minutes	
I(10) =	In./Hr.	
I(25) =	5.399 In./Hr.	
I(50) =	In./Hr.	
I(100) =	6.881 In./Hr.	
Q(10) =	**0.00 CFS**	
Q(25) =	**3.83 CFS**	
Q(50) =	**0.00 CFS**	
Q(100) =	**4.88 CFS**	

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: A-10

Total Area = 42,092 S.F.
0.97 Acres

Surface						C	N
Structures		=	14,381	S.F. =	0.33 Ac.	0.92	0.02
Pavement		=	0	S.F. =	0.00 Ac.	0.92	0.02
Concrete		=	3,012	S.F. =	0.07 Ac.	0.92	0.02
Patios		=	1,750	S.F. =	0.04 Ac.	0.92	0.02
Sidewalks		=	0	S.F. =	0.00 Ac.	0.92	0.02
Lawn (0-2%)	S.F.	=			0.00 Ac.	0.15	0.40
Lawn (2-5%)	22,104 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	845 S.F.	=			0.02 Ac.	1.00	0.00
Misc.	0 S.F.	=			0.00 Ac.	0.92	0.02

Weighted c =	**0.570**	
Weighted N =	0.219	
Sheet Flow		
L =	112 Ft.	
H =	2.0 Ft.	
S =	0.0179 Ft./Ft.	
t1=	9.44 Minutes	(Min. 5 minutes)
Open Channel Flow		
L =	325 Ft.	
H =	3.2 Ft.	
S =	0.0097 Ft./Ft.	
v =	2.20 Ft./sec.	
t2=	2.46 Minutes	
tc=	11.90 Minutes	
I(10) =	In./Hr.	
I(25) =	5.910 In./Hr.	
I(50) =	In./Hr.	
I(100) =	7.530 In./Hr.	
Q(10) =	**0.00 CFS**	
Q(25) =	**3.25 CFS**	
Q(50) =	**0.00 CFS**	
Q(100) =	**4.15 CFS**	

A-10 REVISED BY 3/21 SUBMITTAL

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: A-14

Total Area = 96,172 S.F.
2.21 Acres

Surface							C	N
Structures		=	34,380	S.F. =	0.79	Ac.	0.92	0.02
Pavement		=	17,507	S.F. =	0.40	Ac.	0.92	0.02
Drives		=	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
Lawn (0-2%)	S.F.	=			0.00	Ac.	0.15	0.40
Lawn (2-5%)	44,285 S.F.	=			1.02	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 =	**0.611**	
Weighted N =	0.195	
Sheet Flow		
L =	300	Ft.
H =	2.8	Ft.
S =	0.0094	Ft./Ft.
t1=	16.43	Minutes (Min. 5 minutes)
Shallow Concentrated Flow		
L =	69	Ft.
H =	0.7	Ft.
S =	0.0094	Ft./Ft.
V =	2.00	Ft./sec. (From HERPICC Figure 3.4.5)
t2=	0.58	Minutes
tc=	17.01	Minutes
I(10) =		In./Hr.
I(25) =	4.982	In./Hr.
I(50) =		In./Hr.
I(100) =	6.350	In./Hr.
Q(10) =	**0.00**	**CFS**
Q(25) =	**6.73**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**8.57**	**CFS**

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DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: A-15

Total Area = 22,198 S.F.
0.51 Acres

Surface							C	N
Structures		=	6,295	S.F. =	0.14	Ac.	0.92	0.02
Pavement		=	5,275	S.F. =	0.12	Ac.	0.92	0.02
Concrete		=	1,344	S.F. =	0.03	Ac.	0.92	0.02
Patios		=	1,100	S.F. =	0.03	Ac.	0.92	0.02
Sidewalks		=	0	S.F. =	0.00	Ac.	0.92	0.02
Lawn (0-2%)	S.F.	=			0.00	Ac.	0.15	0.40
Lawn (2-5%)	8,184 S.F.	=			0.19	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 =	**0.673**	
Weighted N =	0.160	
Sheet Flow		
L =	221	Ft.
H =	2.7	Ft.
S =	0.0121	Ft./Ft.
t1=	12.25	Minutes (Min. 5 minutes)
Open Channel Flow		
L =	160	Ft.
H =	1.4	Ft.
S =	0.0087	Ft./Ft.
V =	1.50	Ft./sec.
t2=	1.78	Minutes
tc=	14.03	Minutes
I(10) =		In./Hr.
I(25) =	5.449	In./Hr.
I(50) =		In./Hr.
I(100) =	6.946	In./Hr.
Q(10) =	**0.00**	**CFS**
Q(25) =	**1.87**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**2.38**	**CFS**

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: A-16

Total Area = 6,373 S.F.
0.15 Acres

Surface						C	N
Structures	=	885	S.F. =	0.02	Ac.	0.92	0.02
Pavement	=	2,496	S.F. =	0.06	Ac.	0.92	0.02
Drives	=	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
Lawn (0-2%)	S.F.	=		0.00	Ac.	0.15	0.40
Lawn (2-5%)	2,992 S.F.	=		0.07	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
Water	0 S.F.	=		0.00	Ac.	1.00	0.00
Misc.	0 S.F.	=		0.00	Ac.	0.92	0.02

Weighted c =	**0.605**	
Weighted N =	0.198	
Sheet Flow		
L =	114	Ft.
H =	1.1	Ft.
S =	0.0096	Ft./Ft.
t1 =	10.49	Minutes (Min. 5 minutes)
Open Channel Flow		
L =	0	Ft.
H =	0.0	Ft.
S =	#DIV/0!	Ft./Ft.
v =	1.60	Ft./sec.
t2=	0.00	Minutes
tc=	10.49	Minutes
I(10) =		In./Hr.
I(25) =	6.215	In./Hr.
I(50) =		In./Hr.
I(100) =	7.917	In./Hr.
Q(10) =	**0.00**	**CFS**
Q(25) =	**0.55**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**0.70**	**CFS**

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: A-17

Total Area = 31,271 S.F.
0.72 Acres

Surface						C	N
Structures	=	12,000	S.F. =	0.28	Ac.	0.92	0.02
Pavement	=	1,820	S.F. =	0.04	Ac.	0.92	0.02
Concrete	=	0	S.F. =	0.00	Ac.	0.92	0.02
Patios	=	1,600	S.F. =	0.04	Ac.	0.92	0.02
Sidewalks	=	0	S.F. =	0.00	Ac.	0.92	0.02
Lawn (0-2%)	S.F.	=		0.00	Ac.	0.15	0.40
Lawn (2-5%)	15,851 S.F.	=		0.36	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 =	**0.580**	
Weighted N =	0.213	
Sheet Flow		
L =	69	Ft.
H =	1.0	Ft.
S =	0.0145	Ft./Ft.
t1 =	7.79	Minutes (Min. 5 minutes)
Open Channel Flow		
L =	292	Ft.
H =	3.0	Ft.
S =	0.0103	Ft./Ft.
v =	2.00	Ft./sec.
t2=	2.43	Minutes
tc=	10.22	Minutes
I(10) =		In./Hr.
I(25) =	6.271	In./Hr.
I(50) =		In./Hr.
I(100) =	7.988	In./Hr.
Q(10) =	**0.00**	**CFS**
Q(25) =	**2.61**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**3.33**	**CFS**

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DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: A-20

Total Area = 92,633 S.F.
2.13 Acres

Surface						C	N
Structures	=	49,300	S.F. =	1.13	Ac.	0.92	0.02
Pavement	=	5,736	S.F. =	0.13	Ac.	0.92	0.02
Drives	=	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
Lawn (0-2%)	S.F. =			0.00	Ac.	0.15	0.40
Lawn (2-5%)	37,597 S.F. =			0.86	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 =	**0.648**
Weighted N =	0.174
Sheet Flow	
L =	300 Ft.
H =	3.5 Ft.
S =	0.0117 Ft./Ft.
t1=	14.84 Minutes
Open Channel Flow	
L =	0 Ft.
H =	0.0 Ft.
S =	#DIV/0! Ft./Ft.
V =	1.60 Ft./sec.
t2=	0.00 Minutes
tc=	14.84 Minutes
I(10) =	In./Hr.
I(25) =	5.276 In./Hr.
I(50) =	In./Hr.
I(100) =	6.725 In./Hr.

(Min. 5 minutes)

Q(10) =	**0.00**	**CFS**
Q(25) =	**7.27**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**9.27**	**CFS**

REVISED BY 8/21

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: A-21

Total Area = 5,394 S.F.
0.12 Acres

Surface						C	N
Structures	=	0	S.F. =	0.00	Ac.	0.92	0.02
Pavement	=	2,945	S.F. =	0.07	Ac.	0.92	0.02
Concrete	=	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
Lawn (0-2%)	S.F. =			0.00	Ac.	0.15	0.40
Lawn (2-5%)	2,449 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 =	**0.616**
Weighted N =	0.193
Sheet Flow	
L =	165 Ft.
H =	1.7 Ft.
S =	0.0101 Ft./Ft.
t1=	12.17 Minutes
Open Channel Flow	
L =	0 Ft.
H =	0.0 Ft.
S =	#DIV/0! Ft./Ft.
V =	1.50 Ft./sec.
t2=	0.00 Minutes
tc=	12.17 Minutes
I(10) =	In./Hr.
I(25) =	5.851 In./Hr.
I(50) =	In./Hr.
I(100) =	7.455 In./Hr.

(Min. 5 minutes)

Q(10) =	**0.00**	**CFS**
Q(25) =	**0.45**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**0.57**	**CFS**

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: A-22

Total Area = 12,049 S.F.
0.28 Acres

Surface						C	N
Structures		=	5,500	S.F. =	0.13 Ac.	0.92	0.02
Pavement		=	0	S.F. =	0.00 Ac.	0.92	0.02
Drives		=	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
Lawn (0-2%)	S.F.	=			0.00 Ac.	0.15	0.40
Lawn (2-5%)	6,549 S.F.	=			0.15 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 =	**0.556**	
Weighted N =	0.227	
Sheet Flow		
L =	152	Ft.
H =	1.5	Ft.
S =	0.0099	Ft./Ft.
t1=	12.69	Minutes (Min. 5 minutes)
Open Channel Flow		
L =	0	Ft.
H =	0.0	Ft.
S =	#DIV/0!	Ft./Ft.
v =	1.50	Ft./sec.
t2=	0.00	Minutes
tc=	12.69	Minutes
I(10) =		In./Hr.
I(25) =	5.738	In./Hr.
I(50) =		In./Hr.
I(100) =	7.312	In./Hr.
Q(10) =	**0.00**	**CFS**
Q(25) =	**0.88**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**1.12**	**CFS**

DEVELOPED DRAINAGE BASIN CALCULATIONS

Basin No.: A-23

Total Area = 83,870 S.F.
1.93 Acres

Surface						C	N
Structures		=	30,050	S.F. =	0.69 Ac.	0.92	0.02
Pavement		=	0	S.F. =	0.00 Ac.	0.92	0.02
Concrete		=	0	S.F. =	0.00 Ac.	0.92	0.02
Patios		=	1,400	S.F. =	0.03 Ac.	0.92	0.02
Sidewalks		=	0	S.F. =	0.00 Ac.	0.92	0.02
Lawn (0-2%)	S.F.	=			0.00 Ac.	0.15	0.40
Lawn (2-5%)	40,139 S.F.	=			0.92 Ac.	0.25	0.40
Lawn (5-10%)	0 S.F.	=			0.00 Ac.	0.40	0.40
Lawn (>10%)	4,120 S.F.	=			0.09 Ac.	0.55	0.40
Woods (>10%)	0 S.F.	=			0.00 Ac.	0.48	0.60
Water	8,161 S.F.	=			0.19 Ac.	1.00	0.00
Misc.	0 S.F.	=			0.00 Ac.	0.92	0.02

Weighted c =	**0.589**	
Weighted N =	0.219	
Sheet Flow		
L =	233	Ft.
H =	3.0	Ft.
S =	0.0129	Ft./Ft.
t1=	14.32	Minutes (Min. 5 minutes)
Open Channel Flow		
L =	0	Ft.
H =	0.0	Ft.
S =	#DIV/0!	Ft./Ft.
v =	1.50	Ft./sec.
t2=	0.00	Minutes
tc=	14.32	Minutes
I(10) =		In./Hr.
I(25) =	5.386	In./Hr.
I(50) =		In./Hr.
I(100) =	6.866	In./Hr.
Q(10) =	**0.00**	**CFS**
Q(25) =	**6.11**	**CFS**
Q(50) =	**0.00**	**CFS**
Q(100) =	**7.79**	**CFS**

REVISED 2/21

Open Channel Flow Calculations

Swale #: 1

Side slope = 3
Bottom width = 1
Manning's coefficient = 0.035
Slope of channel = 0.0083

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	0.72	1.1
0.2	2.26	0.32	0.14	0.15	0.34	1.05	1.2
0.3	2.58	0.44	0.17	0.18	0.52	1.19	1.3
0.4	3.21	0.72	0.22	0.23	1.02	1.43	1.4
0.5	3.85	1.06	0.27	0.29	1.73	1.64	1.5
0.6	4.48	1.46	0.33	0.34	2.67	1.84	1.6
0.7	5.11	1.92	0.38	0.39	3.87	2.02	1.7
0.8	5.74	2.44	0.42	0.44	5.34	2.19	1.8
0.9	6.38	3.02	0.47	0.49	7.11	2.36	1.9
1.0	7.01	3.66	0.52	0.55	9.20	2.51	2.0
1.1	7.64	4.36	0.57	0.60	11.62	2.67	2.1
1.2	8.27	5.12	0.62	0.65	14.41	2.82	2.2

Open Channel Flow Calculations

Swale #: 2

Side slope = 3
Bottom width = 1
Manning's coefficient = 0.035
Slope of channel = 0.0184

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	0.14	1.07	1.1
0.2	2.26	0.32	0.14	0.15	0.50	1.57	1.2
0.3	2.58	0.44	0.17	0.18	0.77	1.77	1.3
0.4	3.21	0.72	0.22	0.23	1.52	2.13	1.4
0.5	3.85	1.06	0.27	0.29	2.58	2.44	1.5
0.6	4.48	1.46	0.33	0.34	3.98	2.73	1.6
0.7	5.11	1.92	0.38	0.39	5.76	3.00	1.7
0.8	5.74	2.44	0.42	0.44	7.95	3.26	1.8
0.9	6.38	3.02	0.47	0.49	10.58	3.51	1.9
1.0	7.01	3.66	0.52	0.55	13.69	3.74	2.0
1.1	7.64	4.36	0.57	0.60	17.30	3.97	2.1
1.2	8.27	5.12	0.62	0.65	21.45	4.19	2.2

Open Channel Flow Calculations

Swale #: 3

Side slope = 3
Bottom width = 1
Manning's coefficient = 0.035
Slope of channel = 0.0207

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	0.15	1.13	1.1
0.2	2.26	0.32	0.14	0.15	0.53	1.66	1.2
0.3	2.58	0.44	0.17	0.18	0.82	1.88	1.3
0.4	3.21	0.72	0.22	0.23	1.62	2.25	1.4
0.5	3.85	1.06	0.27	0.29	2.74	2.59	1.5
0.6	4.48	1.46	0.33	0.34	4.22	2.90	1.6
0.7	5.11	1.92	0.38	0.39	6.11	3.19	1.7
0.8	5.74	2.44	0.42	0.44	8.43	3.46	1.8
0.9	6.38	3.02	0.47	0.49	11.22	3.72	1.9
1.0	7.01	3.66	0.52	0.55	14.52	3.97	2.0
1.1	7.64	4.36	0.57	0.60	18.35	4.21	2.1
1.2	8.27	5.12	0.62	0.65	22.76	4.45	2.2

Open Channel Flow Calculations

Swale #: 4

Side slope = 3
Bottom width = 1
Manning's coefficient = 0.035
Slope of channel = 0.0094

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	0.10	0.76	1.1
0.2	2.26	0.32	0.14	0.15	0.36	1.12	1.2
0.3	2.58	0.44	0.17	0.18	0.55	1.26	1.3
0.4	3.21	0.72	0.22	0.23	1.09	1.52	1.4
0.5	3.85	1.06	0.27	0.29	1.85	1.75	1.5
0.6	4.48	1.46	0.33	0.34	2.85	1.95	1.6
0.7	5.11	1.92	0.38	0.39	4.12	2.15	1.7
0.8	5.74	2.44	0.42	0.44	5.68	2.33	1.8
0.9	6.38	3.02	0.47	0.49	7.56	2.51	1.9
1.0	7.01	3.66	0.52	0.55	9.79	2.68	2.0
1.1	7.64	4.36	0.57	0.60	12.37	2.84	2.1
1.2	8.27	5.12	0.62	0.65	15.33	3.00	2.2

Open Channel Flow Calculations

Swale #: 5

Side slope = 2
Bottom width = 0
Manning's coefficient = 0.013
Slope of channel = 0.0157

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.0
0.1	0.45	0.02	0.04	0.05	0.04	1.81	1.1
0.2	0.89	0.08	0.09	0.10	0.23	2.87	1.2
0.3	1.12	0.13	0.11	0.13	0.42	3.33	1.3
0.4	1.57	0.25	0.16	0.18	1.02	4.17	1.4
0.44	1.97	0.39	0.20	0.22	1.88	4.86	1.5
0.5	2.41	0.58	0.24	0.27	3.25	5.57	1.6
0.6	2.86	0.82	0.29	0.32	5.11	6.24	1.7
0.7	3.31	1.10	0.33	0.37	7.53	6.87	1.8
0.8	3.76	1.41	0.38	0.42	10.55	7.48	1.9
0.9	4.20	1.77	0.42	0.47	14.24	8.06	2.0
1.0	4.65	2.16	0.47	0.52	18.65	8.62	2.1

Open Channel Flow Calculations

Swale #: **6**

Side slope =	2
Bottom width =	0
Manning's coefficient =	0.013
Slope of channel =	0.071

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	0.00	0.00	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	1.0
0.1	0.45	0.02	0.04	0.05	0.08	3.85	1.1
0.2	0.89	0.08	0.09	0.10	0.49	6.11	1.2
0.3	1.12	0.13	0.11	0.13	0.89	7.09	1.3
0.4	1.57	0.25	0.16	0.18	2.17	8.87	1.4
0.44	1.97	0.39	0.20	0.22	4.00	10.33	1.5
0.5	2.41	0.58	0.24	0.27	6.91	11.84	1.6
0.6	2.86	0.82	0.29	0.32	10.87	13.26	1.7
0.7	3.31	1.10	0.33	0.37	16.00	14.61	1.8
0.8	3.76	1.41	0.38	0.42	22.44	15.90	1.9
0.9	4.20	1.77	0.42	0.47	30.29	17.14	2.0
1.0	4.65	2.16	0.47	0.52	39.66	18.33	2.1

Open Channel Flow Calculations

Swale #: 7

Side slope = 3
Bottom width = 0.5
Manning's coefficient = 0.035
Slope of channel = 0.0089

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	0.50	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.13	0.08	0.07	0.07	0.05	0.69	1.1
0.2	1.76	0.22	0.12	0.13	0.22	1.00	1.2
0.3	2.08	0.31	0.15	0.16	0.35	1.13	1.3
0.4	2.71	0.54	0.20	0.21	0.74	1.37	1.4
0.5	3.35	0.83	0.25	0.26	1.32	1.59	1.5
0.6	3.98	1.18	0.30	0.31	2.12	1.79	1.6

Open Channel Flow Calculations

Swale #: **8**

Side slope =	3
Bottom width =	0.5
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	0.50	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.13	0.08	0.07	0.07	0.05	0.67	1.1
0.2	1.76	0.22	0.12	0.13	0.22	0.98	1.2
0.3	2.08	0.31	0.15	0.16	0.35	1.11	1.3
0.4	2.71	0.54	0.20	0.21	0.73	1.34	1.4
0.5	3.35	0.83	0.25	0.26	1.29	1.55	1.5
0.6	3.98	1.18	0.30	0.31	2.07	1.75	1.6

Open Channel Flow Calculations

Swale #: **9**

Side slope =	3
Bottom width =	0.5
Manning's coefficient =	0.035
Slope of channel =	0.0086

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	0.50	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.13	0.08	0.07	0.07	0.05	0.67	1.1
0.2	1.76	0.22	0.12	0.13	0.22	0.99	1.2
0.3	2.08	0.31	0.15	0.16	0.35	1.12	1.3
0.4	2.71	0.54	0.20	0.21	0.73	1.35	1.4
0.5	3.35	0.83	0.25	0.26	1.30	1.56	1.5
0.6	3.98	1.18	0.30	0.31	2.08	1.76	1.6

Open Channel Flow Calculations

Swale #: **10**

Side slope = 3
Bottom width = 0.5
Manning's coefficient = 0.035
Slope of channel = 0.0257

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	0.50	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.13	0.08	0.07	0.07	0.09	1.17	1.1
0.2	1.76	0.22	0.12	0.13	0.37	1.70	1.2
0.3	2.08	0.31	0.15	0.16	0.60	1.93	1.3
0.4	2.71	0.54	0.20	0.21	1.27	2.33	1.4
0.5	3.35	0.83	0.25	0.26	2.25	2.70	1.5
0.6	3.98	1.18	0.30	0.31	3.59	3.04	1.6

Open Channel Flow Calculations

Swale #: 11

Side slope = 3
Bottom width = 0.5
Manning's coefficient = 0.035
Slope of channel = 0.0086

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	0.50	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.13	0.08	0.07	0.07	0.05	0.67	1.1
0.2	1.76	0.22	0.12	0.13	0.22	0.99	1.2
0.3	2.08	0.31	0.15	0.16	0.35	1.12	1.3
0.4	2.71	0.54	0.20	0.21	0.73	1.35	1.4
0.5	3.35	0.83	0.25	0.26	1.30	1.56	1.5
0.6	3.98	1.18	0.30	0.31	2.08	1.76	1.6

Open Channel Flow Calculations

Swale #: **12**

Side slope = 3
Bottom width = 0.5
Manning's coefficient = 0.035
Slope of channel = 0.0084

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	0.50	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.13	0.08	0.07	0.07	0.05	0.67	1.1
0.2	1.76	0.22	0.12	0.13	0.21	0.97	1.2
0.3	2.08	0.31	0.15	0.16	0.34	1.10	1.3
0.4	2.71	0.54	0.20	0.21	0.72	1.33	1.4
0.5	3.35	0.83	0.25	0.26	1.28	1.54	1.5
0.6	3.98	1.18	0.30	0.31	2.05	1.74	1.6

Open Channel Flow Calculations

Swale #: **13**

Side slope =	3
Bottom width =	0.5
Manning's coefficient =	0.035
Slope of channel =	0.008

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	0.50	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.13	0.08	0.07	0.07	0.05	0.65	1.1
0.2	1.76	0.22	0.12	0.13	0.21	0.95	1.2
0.3	2.08	0.31	0.15	0.16	0.34	1.08	1.3
0.4	2.71	0.54	0.20	0.21	0.71	1.30	1.4
0.5	3.35	0.83	0.25	0.26	1.25	1.51	1.5
0.6	3.98	1.18	0.30	0.31	2.01	1.70	1.6

Open Channel Flow Calculations

Swale #: **14**

Side slope = 3
Bottom width = 0.5
Manning's coefficient = 0.035
Slope of channel = 0.0087

Depth (ft)	Wetted Perimeter (ft)	Area (ft^2)	Hydraulic Radius (ft)	Hydraulic Depth (ft)	Flowrate (cfs)	Velocity (ft/s)	F value
0.0	0.50	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.13	0.08	0.07	0.07	0.05	0.68	1.1
0.2	1.76	0.22	0.12	0.13	0.22	0.99	1.2
0.3	2.08	0.31	0.15	0.16	0.35	1.12	1.3
0.4	2.71	0.54	0.20	0.21	0.74	1.36	1.4
0.5	3.35	0.83	0.25	0.26	1.31	1.57	1.5
0.6	3.98	1.18	0.30	0.31	2.09	1.77	1.6

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Open Channel Flow Calculations

Swale #: **15**

Side slope =	3
Bottom width =	0.5
Manning's coefficient =	0.035
Slope of channel =	0.0096

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	0.50	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.13	0.08	0.07	0.07	0.06	0.71	1.1
0.2	1.76	0.22	0.12	0.13	0.23	1.04	1.2
0.3	2.08	0.31	0.15	0.16	0.37	1.18	1.3
0.4	2.71	0.54	0.20	0.21	0.77	1.43	1.4
0.5	3.35	0.83	0.25	0.26	1.37	1.65	1.5
0.6	3.98	1.18	0.30	0.31	2.20	1.86	1.6

Open Channel Flow Calculations

Swale #: **16**

Side slope =	3
Bottom width =	0.5
Manning's coefficient =	0.035
Slope of channel =	0.0118

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	0.50	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.13	0.08	0.07	0.07	0.06	0.79	1.1
0.2	1.76	0.22	0.12	0.13	0.25	1.15	1.2
0.3	2.08	0.31	0.15	0.16	0.41	1.31	1.3
0.4	2.71	0.54	0.20	0.21	0.86	1.58	1.4
0.5	3.35	0.83	0.25	0.26	1.52	1.83	1.5
0.6	3.98	1.18	0.30	0.31	2.44	2.06	1.6

Open Channel Flow Calculations

Swale #: **17**

Side slope =	3
Bottom width =	0.5
Manning's coefficient =	0.035
Slope of channel =	0.008

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	0.50	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.13	0.08	0.07	0.07	0.05	0.65	1.1
0.2	1.76	0.22	0.12	0.13	0.21	0.95	1.2
0.3	2.08	0.31	0.15	0.16	0.34	1.08	1.3
0.4	2.71	0.54	0.20	0.21	0.71	1.30	1.4
0.5	3.35	0.83	0.25	0.26	1.25	1.51	1.5
0.6	**3.98**	**1.18**	**0.30**	**0.31**	**2.01**	**1.70**	**1.6**

Open Channel Flow Calculations

Swale #: **18**

Side slope =	3
Bottom width =	0.5
Manning's coefficient =	0.035
Slope of channel =	0.008

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	0.50	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.13	0.08	0.07	0.07	0.05	0.65	1.1
0.2	1.76	0.22	0.12	0.13	0.21	0.95	1.2
0.3	2.08	0.31	0.15	0.16	0.34	1.08	1.3
0.4	2.71	0.54	0.20	0.21	0.71	1.30	1.4
0.5	3.35	0.83	0.25	0.26	1.25	1.51	1.5
0.6	3.98	1.18	0.30	0.31	2.01	1.70	1.6

Open Channel Flow Calculations

Swale #: **19**

Side slope = 3
Bottom width = 0.5
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	0.50	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.13	0.08	0.07	0.07	0.07	0.90	1.1
0.2	1.76	0.22	0.12	0.13	0.29	1.31	1.2
0.3	2.08	0.31	0.15	0.16	0.46	1.49	1.3
0.4	2.71	0.54	0.20	0.21	0.98	1.80	1.4
0.5	3.35	0.83	0.25	0.26	1.73	2.08	1.5
0.6	**3.98**	**1.18**	**0.30**	**0.31**	2.77	2.35	**1.6**

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Open Channel Flow Calculations

Swale #: **20**

Side slope = 3
Bottom width = 0.5
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	0.50	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.13	0.08	0.07	0.07	0.05	0.67	1.1
0.2	1.76	0.22	0.12	0.13	0.22	0.98	1.2
0.3	2.08	0.31	0.15	0.16	0.35	1.11	1.3
0.4	2.71	0.54	0.20	0.21	0.73	1.34	1.4
0.5	3.35	0.83	0.25	0.26	1.29	1.55	1.5

Open Channel Flow Calculations

Swale #: **21**

Side slope =	3
Bottom width =	0.5
Manning's coefficient =	0.035
Slope of channel =	0.0082

Depth (ft)	*Wetted Perimeter (ft)*	*Area (ft^2)*	*Hydraulic Radius (ft)*	*Hydraulic Depth (ft)*	*Flowrate (cfs)*	*Velocity (ft/s)*	*F value*
0.0	0.50	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.13	0.08	0.07	0.07	0.05	0.66	1.1
0.2	1.76	0.22	0.12	0.13	0.21	0.96	1.2
0.3	2.08	0.31	0.15	0.16	0.34	1.09	1.3
0.4	2.71	0.54	0.20	0.21	0.72	1.32	1.4
0.5	3.35	0.83	0.25	0.26	1.27	1.52	1.5

Open Channel Flow Calculations

Swale #: **22**

Side slope =	3
Bottom width =	0.5
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	0.50	0.00	0.00	0.00	0.00	#DIV/0!	1.0
0.1	1.13	0.08	0.07	0.07	0.05	0.67	1.1
0.2	1.76	0.22	0.12	0.13	0.22	0.98	1.2
0.3	2.08	0.31	0.15	0.16	0.35	1.11	1.3
0.4	2.71	0.54	0.20	0.21	0.73	1.34	1.4
0.5	**3.35**	**0.83**	**0.25**	**0.26**	1.29	1.55	**1.5**

Open Channel Flow Calculations

Swale #: **23**

Side slope = 3
Bottom width = 1
Manning's coefficient = 0.035
Slope of channel = 0.0082

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	0.71	1.1
0.2	2.26	0.32	0.14	0.15	0.33	1.05	1.2
0.3	2.58	0.44	0.17	0.18	0.52	1.18	1.3
0.4	3.21	0.72	0.22	0.23	1.02	1.42	1.4
0.5	3.85	1.06	0.27	0.29	1.72	1.63	1.5
0.6	4.48	1.46	0.33	0.34	2.66	1.82	1.6
0.7	5.11	1.92	0.38	0.39	3.85	2.01	1.7
0.8	5.74	2.44	0.42	0.44	5.31	2.18	1.8
0.9	6.38	3.02	0.47	0.49	7.06	2.34	1.9
1.0	7.01	3.66	0.52	0.55	9.14	2.50	2.0
1.1	7.64	4.36	0.57	0.60	11.55	2.65	2.1
1.2	8.27	5.12	0.62	0.65	14.32	2.80	2.2
1.3	8.91	5.94	0.67	0.70	17.47	2.94	2.3
1.4	9.54	6.82	0.71	0.75	21.01	3.08	2.4
1.5	**10.17**	**7.76**	**0.76**	**0.80**	**24.96**	**3.22**	**2.5**

Open Channel Flow Calculations

Swale #: **24**

Side slope = 3
Bottom width = 1
Manning's coefficient = 0.035
Slope of channel = 0.0168

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	1.02	1.1
0.2	2.26	0.32	0.14	0.15	0.48	1.50	1.2
0.3	2.58	0.44	0.17	0.18	0.74	1.69	1.3
0.4	3.21	0.72	0.22	0.23	1.46	2.03	1.4
0.5	3.85	1.06	0.27	0.29	2.47	2.33	1.5
0.6	4.48	1.46	0.33	0.34	3.81	2.61	1.6
0.7	5.11	1.92	0.38	0.39	5.50	2.87	1.7
0.8	5.74	2.44	0.42	0.44	7.60	3.12	1.8
0.9	6.38	3.02	0.47	0.49	10.11	3.35	1.9
1.0	7.01	3.66	0.52	0.55	13.08	3.58	2.0
1.1	7.64	4.36	0.57	0.60	16.54	3.79	2.1
1.2	8.27	5.12	0.62	0.65	20.50	4.01	2.2

Open Channel Flow Calculations

Swale #: **25**

Side slope = 3
Bottom width = 1
Manning's coefficient = 0.035
Slope of channel = 0.0104

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	0.10	0.80	1.1
0.2	2.26	0.32	0.14	0.15	0.38	1.18	1.2
0.3	2.58	0.44	0.17	0.18	0.58	1.33	1.3
0.4	3.21	0.72	0.22	0.23	1.15	1.60	1.4
0.5	3.85	1.06	0.27	0.29	1.94	1.84	1.5
0.6	4.48	1.46	0.33	0.34	2.99	2.05	1.6
0.7	5.11	1.92	0.38	0.39	4.33	2.26	1.7
0.8	5.74	2.44	0.42	0.44	5.98	2.45	1.8
0.9	6.38	3.02	0.47	0.49	7.96	2.64	1.9
1.0	7.01	3.66	0.52	0.55	10.29	2.81	2.0
1.1	7.64	4.36	0.57	0.60	13.01	2.99	2.1
1.2	8.27	5.12	0.62	0.65	16.13	3.15	2.2

Open Channel Flow Calculations

Swale #: **26**

Side slope = 3
Bottom width = 1
Manning's coefficient = 0.035
Slope of channel = 0.0117

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	0.85	1.1
0.2	2.26	0.32	0.14	0.15	0.40	1.25	1.2
0.3	2.58	0.44	0.17	0.18	0.62	1.41	1.3
0.4	3.21	0.72	0.22	0.23	1.22	1.69	1.4
0.5	3.85	1.06	0.27	0.29	2.06	1.95	1.5
0.6	4.48	1.46	0.33	0.34	3.18	2.18	1.6
0.7	5.11	1.92	0.38	0.39	4.59	2.40	1.7
0.8	5.74	2.44	0.42	0.44	6.34	2.60	1.8
0.9	6.38	3.02	0.47	0.49	8.44	2.80	1.9
1.0	7.01	3.66	0.52	0.55	10.92	2.98	2.0
1.1	7.64	4.36	0.57	0.60	13.80	3.17	2.1
1.2	8.27	5.12	0.62	0.65	17.11	3.34	2.2