MONROE COUNTY DRAINAGE BOARD
Tuesday August 13, 2024, at 8:30 AM
Location: Showers Building Room 106D
Hybrid Meeting with Virtual Attendance via Teams

AGENDA

1. Call to Order
2. Approval of Minutes for: May 14, 2024 +*
3. Public Input for Items not on the Agenda
4. Business
    a. Preliminary Drainage Plan: Cutright Boat Storage +*
    b. Residential Drainage Plan: Fry Rd. +*
    c. Enforcement Case: Burke, Ison Rd +*
5. Staff Reports
6. Adjournment
    a. Date of Next Meeting: Tuesday September 10, 2024, at 8:30 AM

+ Attachment Included
* Board Action Requested

The meeting link and packet will be available on the County Events Calendar at www.co.monroe.in.us.

Anyone who requires an auxiliary aid or service for effective communication, or a modification of policies or procedures to participate in a program, service, or activity of Monroe County, should contact Monroe County Title VI Coordinator Angie Purdie, (812)349-2550, apurdie@co.monroe.in.us, as soon as possible but no later than forty-eight (48) hours before the scheduled event.

Individuals requiring special language services should, if possible, contact the Monroe County Government Title VI Coordinator at least seventy-two (72) hours prior to the date on which the services will be needed.

The meeting is open to the public.

MEETING MINUTES
MONROE COUNTY DRAINAGE BOARD
Thursday, May 14, 2024 at 8:30 AM
Showers Building Room 106D
Hybrid Meeting with Virtual Attendance via Zoom

MEMBERS PRESENT: Robert Autio, Ginger Davis, Terry Quillman, Trohn Enright-Randolph *(ex officio)*, Lee Jones

MEMBERS ABSENT: Bill Riggert

STAFF: Kelsey Thetonia (MS4 Coordinator), Donna Barbrick (Secretary), Tina Engle (Stormwater), Tammy Behrman (Planning), David Schilling (Legal), Lisa Ridge (Highway), TSD

OTHERS: Katie Stein (Bynum Fanyo), Dillon Reynolds (Spaceco), Madeline Romeo (Spaceco)

1. Call to Order by Robert Autio.
2. Approval of Minutes for: February 1, 2024, and March 7, 2024
Motion to approve the minutes by Lee Jones; second by Terry Quillman. VOTE: AYE (unanimous). Motion carried.

3. Public Input for Items not on the Agenda: none

4. Business

a. Preliminary Drainage Plan: Bloomington Country Club Improvements +*

Kelsey Thetonia gave an overview of the site. She said the whole area drains to sinkholes no matter what direction you go. She said we are looking at critical drainage area release rates, water quality treatment and velocity dissipation. She said we will ask for drainage easements and a sinkhole conservancy area.

(Trohn Enright-Randolph arrived to the meeting.)

Thetonia said there is an active sinkhole on the site and the country club is working with a hydrogeologist on mitigation. She talked about possible methods of mitigation. Katie Stein said in 2020 they received a building permit for some site improvements. She said there was no water quality or detention provided at that time. She said they would like to do improvements to their pool area. She said the whole area that would be disturbed is less than an acre. She said the focus is on slowing down the water to provide water quality.

Quillman had a question about the drainage basin. Stein said it is a small basin and runoff rates would be reduced with the proposed plan. Thetonia said she would talk to Jason (hydrogeologist) about doing some type of swale on the east side of the parking area that can help slow the water down before it gets to the detention pond.

Autio suggested a motion to approve the preliminary drainage plan. Quillman said he would make that motion with the listed conditions; seconded by Autio. VOTE: YES (unanimous). Motion carried.

b. Preliminary Drainage Plan: U-Haul in Pinnacle Business Park +*

Thetonia said the engineer was attending virtually. She said this is the second large development in this area. She said everything drains south to regional ponds. She referenced a couple of studies that were included in the packet. She said we are requesting water quality treatment for this. She said they would be developing two lots, Lots #5 and #6. She gave an overview of the site and invited the engineers to unmute.

Dillon Reynolds said Madeline Romeo was also online. He gave a quick rundown of the project for U-Haul, with multiple buildings on site including storage space and showroom space. He said there are two lots with the drainage easement in between. He said the proposal is making this one lot and removing the drainage easement down the middle. He said we are looking at water quality. He said the proposal includes a detention pond and some hydrodynamic separators before the water goes to the pond.

Ginger Davis had a question about offsite drainage going through the site. Reynolds said we would keep it going to the west. He noted a northwest corner that would not be developed. Thetonia gave an overview of where affected soils are located and Reynolds brought up the plat showing those. Davis had a question about an outlet going into the affected area. Reynolds said we will have riprap protection.

Quillman talked about an area by the railroad track. Lisa Ridge commented said the county bought the area as a right of way because it was undeveloped.

Trohn Enright-Randolph said it is kind of tight looking at the elevations and the contours. Thetonia said we will make sure in inspection that they have followed the final drainage plan. Reynolds said the easement was placed on the lot line, but the ultimate outlet would still be the pond. He said there is no infrastructure or defined swale currently. Thetonia said I will ask that you reach out to the Highway Department to plans for Sunrise Greeting Court extensions and so that their final grades are in their plans as well as any storm sewers in that area, so that you can make sure to account for any of those changes. She said that project is currently under construction.

Thetonia said there is a drainage easement on the southside that goes to an existing driveway. She said they are proposing to fill in a portion of the drainage easement for pavement here. She said in the swales report, there is a high-water elevation that Katie modeled and there will be some fill within that, so you are losing some of that storage by filling this in. Trohn asked why they were encroaching. Reynolds said there is already a curb cut off the road, so we are trying to extend that into our site and that drainage easement goes right to the back of that curb cut. He said so if you want to make it useful, you have to fill in a little bit of this to make the grades work out. He said we are going to look at revising the grading a little bit to not lose any storage that is being used. He said we are also going to see exactly how much pavement we really need and maybe we can do something to allow this area to not be filled as much. He said there is nothing final yet, but we are looking at options.

Motion by Davis to approve with conditions listed including erosion control at the outlets and approval of removal of the drainage easement between the lot lines and conditions relative to reducing the parking area and reducing the fill requirements and reviewing Highway plans for Sunrise Greetings Court extensions. Second by Quillman. VOTE: YES (unanimous). Motion carried.

5. Stormwater Management Ordinance Discussion

Thetonia said Dave Schilling (Legal) has spent a lot of time going over this and we have set the adoption target date as June 5. Davis said I had a few feedback items on the karst presentation. There was a discussion of karst related items in the new ordinance and technical standards. There was a discussion of protected information being included in a karst overlay. Thetonia said that a karst overlay is not specifically mentioned in this ordinance. She said this is specifically talking about sinkhole watershed areas, a larger overlay that is going to include more data.

Julie Thomas joined the meeting via Teams. Penny Githens arrived at approximately 9:55 a.m.

Thetonia gave a summary of the background for why a new ordinance was necessary to keep up with state requirements. She talked about working with Christopher Burke Engineering and taking their model ordinance and making it work for Monroe County. She talked about having a way to work with loggers to make sure that they are implementing BMPs and being able to follow up to make sure that they close out the sites properly and everything is stabilized when they leave.

She said we have a chapter on stormwater permitting requirements and that includes Drainage Board (DB) procedures. She said when someone needs to take a project to the DB that should be in there. She said we can do some administrative enforcement procedures for construction sites like issuing stop work orders, penalties, withholding of permits and things like that to make sure that the requirements of this ordinance are going to be met. She talked about supporting documents including a Stormwater Technical Standards Manual, Stormwater Construction Specifications, and Indiana Logging & Forestry Best Management Practices. She said there is a version of the ordinance on Teams. She asked for comments or questions.

There was a discussion of the DB's role. Thetonia said the DB is referenced in the ordinance as the oversight. She said the DB has a lot of say in one of the major aspects of the ordinance. There was a discussion of rainfall tables and updating tables to reflect changes in climate.

The DB discussed voting to recommend approval of the ordinance with the condition that comments that were brought up today are addressed. **Davis said I'd like to make a recommendation, with the amendments and changes as discussed, barring any out of the ordinary, that we give our recommendation that it move forward to be adopted as an ordinance by the commissioners. Autio said that is a motion for approval of a positive recommendation on the new ordinance; I will second that motion. VOTE by Drainage Board members present: YES (unanimous). Motion carried.** Trohn said I hope the

commissioners will consider amending the chapter and they think it's reasonable to have some recommendation from the DB when the ordinance and technical documents are amended.

There was a discussion of wording about slopes in the planning ordinance draft. Thetonia said the ordinance itself contains the general pollution prevention standards. She said we don't call for a specific slope but rather that you use erosion and controls adequate for your site and based on soil tests. Schilling commented about the ordinance, saying this is a major code revision based a lot on state revisions that are pretty major. He said be ready for tweaks and changes. Thetonia said thank you so much, Dave, for your guidance on this; you've put countless hours into this so thank you.

7. Adjournment

a. Date of Next Meeting: Tuesday June 11, 2024, at 8:30 AM

The meeting adjourned at approximately 10:48 a.m.

Minutes approved: _____

_____

President, Drainage Board

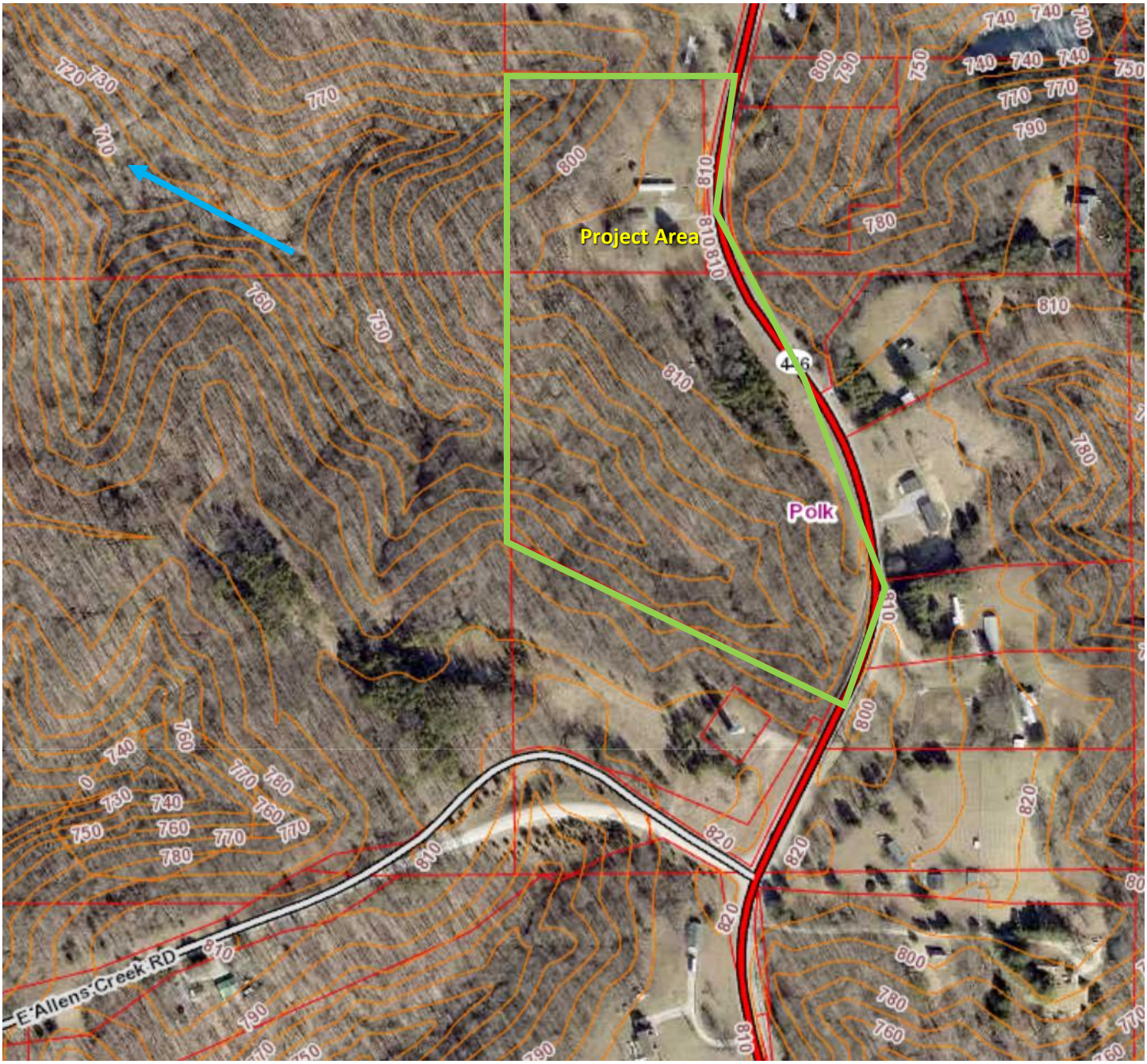
_____

Secretary, Drainage Board

Project Name:	Cutright Boat Storage PUD	**Planning Number**:	PUO-24-2
Engineer/Design Firm:	Banning Engineering	**Watershed**:	Monroe Lake
Address:	8370 S State Road 446	**Karst Report**:	Not Completed
Acres:	15.3	**Wetland Delineation**:	Not Completed

Project Summary

The Cutright Boat Storage PUD is located on the west side of SR 446 just north of E Allens Creek Road near Lake Monroe. The PUD is surrounded by properties zoned Forest Reserve. This project is proposing to subdivide the existing parcels into three lots. The north lot (4.64 acres) will contain 1.7 acres of boat storage facilities.



Project Drainage
This project is located in the Lake Monroe watershed and drains northwest towards Lake Monroe. There are no mapped floodplains and no known sinkholes on or adjacent to the property.

Cutright Boat Storage Preliminary Drainage Comments:

Detention and Water Quality Treatment:

- This project is in the Lake Monroe watershed. General County release rates will be required for detention (0.45 cfs/acre for 10% EP, 0.9 cfs/acre for 1% EP.
- Water quality treatment is required per Ch. 761. Additional water quality measures may be required due to the proposed landuse. This can be determined during development plan review.
- Grass swale with rock check dams and detention basin are proposed as water quality treatment practices.

Adequacy of Outlet:

- Detention basin will outlet to a rip rap stilling basin for velocity dissipation.

Drainage Easements:

- Drainage easements will be required per Ch. 761.

July 1, 2024

Monroe County Drainage Board
C/O Kelsey Thetonia
Monroe County Highway Department
5900 W Foster Curry Dr
Bloomington, IN 47403

RE; Greemann SR 446 Boat Storage
Preliminary Drainage Review

On behalf of our client, Thomas Greemann, we respectfully request to be placed on the agenda for the July 9th Drainage Board meeting for consideration of preliminary approval of a drainage plan for the proposed boat storage project located at 8370 S. State Road 446. Details of the project are shown on the attached conceptual development plan and in the preliminary drainage report.

Should you have any questions, concerning the materials submitted, please contact me at 317-707-3708 or via email at SBrehob@Banning-eng.com

Sincerely,

Steven A. Brehob
VP Development Services

Cc: Chad Ziegler
Michael Carmin
Tom Greeman

"Your Project is Our Priority"

PRELIMINARY DRAINAGE REPORT

FOR

GREEMAN STATE ROAD 446

LOCATED IN

MONROE COUNTY, INDIANA

Prepared for:
Thomas Greeman
PO Box 606
Seymour, IN 47274

July 1, 2024

Banning Engineering, P.C. • 853 Columbia Road, Suite 101 • Plainfield, IN 46168
Phone: (317) 707-3700 • Fax: (317) 707-3800 • E-mail: banning@BanningEngineering.com
Job #23288

TABLE OF CONTENTS

APPENDICES

Drainage Narrative for:

Greeman SR 446

I. INTRODUCTION

Greeman SR 446 is a proposed boat & trailer storage facility located on a 4.8± acre parcel on the west side of Indiana State Road 446 approximately 9.2 miles southeast of Indiana 46 in the southeast ¼ of Section 16; Township 7 North; Range 1 East; Monroe County, Indiana. This report includes the result of a preliminary drainage analysis for the project, summarizing the allowable and proposed stormwater discharges and proposed stormwater detention.

II. ADJOINING LAND CONDITIONS

North: Undeveloped/Residential
South: Undeveloped/Residential
East: Undeveloped/Residential
West: Undeveloped/Residential

III. EXISTING SOIL TYPES

Symbol	Name	Hydrologic Soil Group
BdB	Bedford silt loam, 2 to 6%	C
BkF	Brownstown-Gilwood silt loams, 25 to 75%	C
CrC	Crider silt loam, 6 to 12%	B
HaD	Hagerstown silt loam, 12 to 20%	C
TIB	Zanesville silt loam, 2 to 6%	C
WyqD	Wrays-Gilwood silt loams, 6 to 20%	C

IV. SITE DRAINAGE ANALYSIS

a. Stormwater Discharge Requirements

The project is subject to the stormwater discharge requirements found in the Monroe County Stormwater Management Ordinance Chapter 761. See **TABLE 1** below.

TABLE 1
STORMWATER DISCHARGE REQUIREMENTS
MONROE COUNTY

$Q_{10p} \leq$ 0.5 cfs per ac. of development **$Q_{100p} \leq$ 0.9 cfs per ac. of development**	Where: **Q_{10p}** = Developed 10-year peak discharge rate **Q_{100p}** = Developed 100-year peak discharge rate

b. Drainage Design

i. Existing Site Conditions

The existing site consists of mostly grass and wooded area bounded by a wooded embankment along the west side. There is a single-family home along with a mobile home and a barn located on the site. Most of the 4.8± acre site drains to the embankment into a ravine west of the site, which is considered the ultimate stormwater discharge point (BNDY) for the project.

ii. Developed Site Conditions

Approximately 2.1± acres of the site (area "DEV") will be developed. This includes the addition of a gravel parking area for storing boats & boat trailers. The existing home and barn will be removed, and the mobile home will remain as an office for the storage facility. Stormwater will be routed from east to west into a grass swale that drains to a dry bottom detention basin located in the southwest corner of the site. The detention basin will outlet to a shallow riprap basin that will function as a level spreader to reduce velocity and help convert the discharge from concentrated flow to sheet flow over the embankment. A hydrologic/hydraulic model of the developed site was completed to calculate the developed stormwater discharges and stage elevations. The total discharge from the developed project site to the boundary meets the allowable discharge found in stormwater technical standards manual. **Table 2** below provides a summary of the allowable and developed discharge rates for the project. **Table 3** provides a summary of the developed 100-year detention pond stage elevations. Complete results of the calculations can be found in the appendix.

TABLE 2
DEVELOPED SITE STORMWATER DISCHARGE

Discharge Point	Developed Onsite Discharge (CFS)		Allowable Discharge (CFS)	
BNDY	Q_{10p} = 1.1	≤	2.1 ac x 0.5 cfs/ac = 1.1	OK
	Q_{100p} = 1.9	≤	2.1 ac x 0.9 cfs/ac = 1.9	OK

TABLE 3
DEVELOPED SITE
DETENTION PONDS

Discharge Point	Outlet Control Elev.	100-year Stage Elevation
POND	796.5	800.6

The grass swale and the dry bottom pond will have a perforated subsurface drain to promote infiltration to function as a stormwater quality BMP. The swale will function as the first BMP with rock check dams that will reduce velocity and promote infiltration prior to reaching the detention basin. The detention basin will function as a second BMP with an additional infiltration function. Calculations will be provided with the final design.

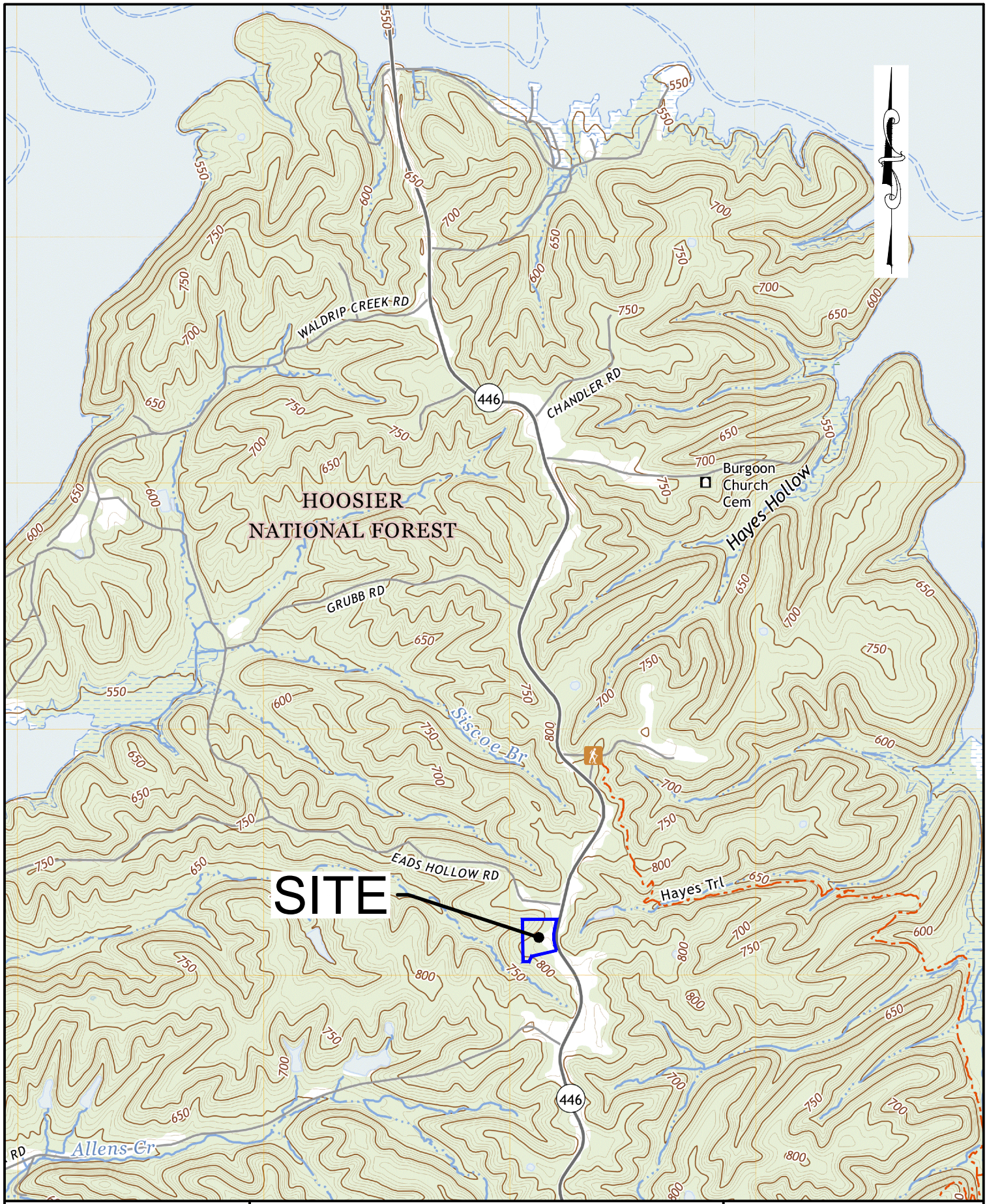
In conclusion, the calculations in this report show that drainage from the project will not cause any adverse impacts to onsite or offsite facilities. We believe the project falls within the requirements of the applicable code of ordinances.

V. REFERENCES

Design data and methods are based on the following reference materials:

1. NRCS Web Soil Survey (http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm)
2. USGS Mapping
3. FEMA Flood Mapping (https://www.fema.gov/national-flood-hazard-layer-nfhl)
4. Monroe County drainage ordinance
5. Monroe County Stormwater Technical Standards Manual

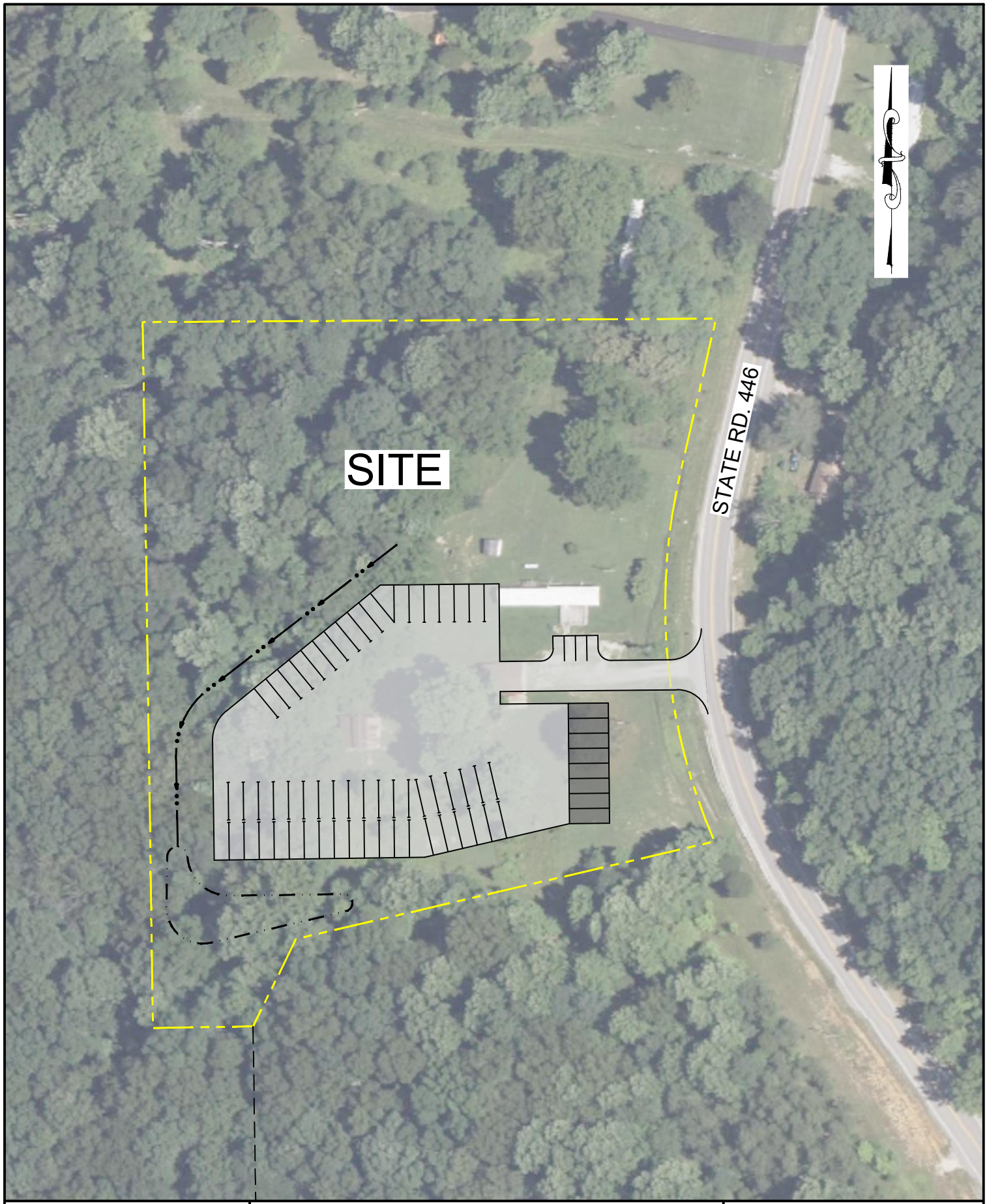
A. AREA & SITE MAPS



Drawn By: WCZ
Date: 6/27/2024
Project No.: 23288
Scale: NONE
Page: 1 of 1

AREA MAP
GREEMAN STATE ROAD 446
MONROE COUNTY
BLOOMINGTON, INDIANA

BANNING ENGINEERING
853 COLUMBIA ROAD, SUITE #101
PLAINFIELD, IN 46168
BUS: (317) 707-3700, FAX: (317) 707-3800
E-MAIL: Banning@BanningEngineering.com
WEB: www.BanningEngineering.com

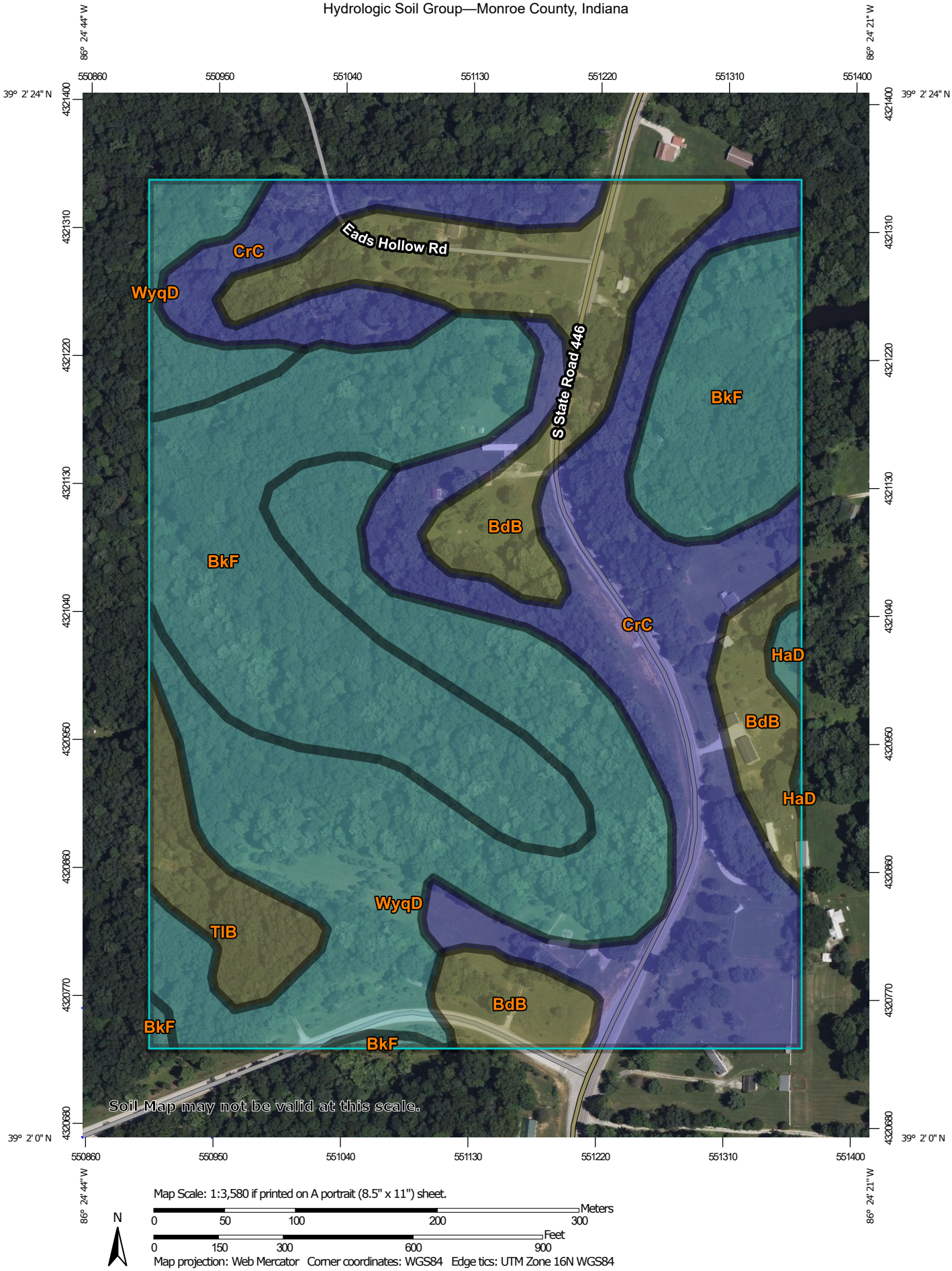


Drawn By: WCZ
Date: 6/27/2024
Project No.: 23288
Scale: NONE
Page: 1 of 1

SITE MAP
GREEMAN STATE ROAD 446
MONROE COUNTY
BLOOMINGTON, INDIANA

BANNING ENGINEERING
853 COLUMBIA ROAD, SUITE #101
PLAINFIELD, IN 46168
BUS: (317) 707-3700, FAX: (317) 707-3800
E-MAIL: Banning@BanningEngineering.com
WEB: www.BanningEngineering.com

B. SOILS MAP


86° 24' 44" W
86° 24' 21" W
550860
550950
551040
551130
551220
551310
551400
39° 2' 24" N
39° 2' 0" N
4321400
4321310
4321220
4321130
4321040
4320950
4320860
4320770
4320680
Eads Hollow Rd
S State Road 446
CrC
WyqD
BkF
BdB
HaD
TlB
Soil Map may not be valid at this scale.
Map Scale: 1:3,580 if printed on A portrait (8.5" x 11") sheet.
N
Meters
0 50 100 200 300
Feet
0 150 300 600 900
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

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

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

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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

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

Soil Survey Area: Monroe County, Indiana
Survey Area Data: Version 30, Sep 1, 2023

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

Date(s) aerial images were photographed: Jun 15, 2022—Jul 21, 2022

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
BdB	Bedford silt loam, 2 to 6 percent slopes	C/D	11.0	15.8%
BkF	Brownstown-Gilwood silt loams, 25 to 75 percent slopes	C	18.3	26.1%
CrC	Crider silt loam, 6 to 12 percent slopes	B	19.6	28.0%
HaD	Hagerstown silt loam, 12 to 20 percent slopes	C	0.3	0.5%
TlB	Zanesville silt loam, 2 to 6 percent slopes	C/D	2.5	3.6%
WyqD	Wrays-Gilwood silt loams, 6 to 20 percent slopes	C	18.1	25.9%
Totals for Area of Interest			**69.8**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

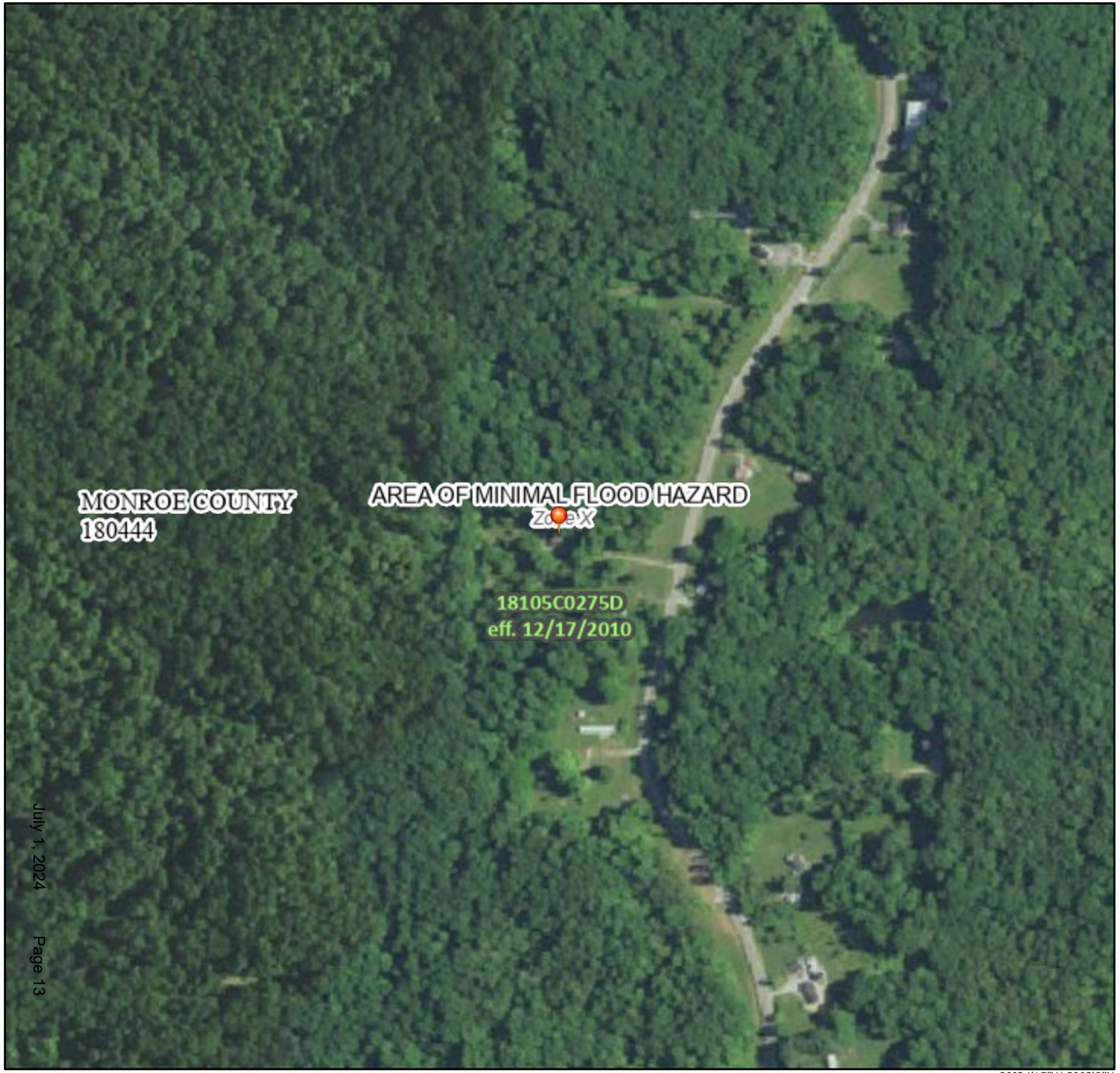
Tie-break Rule: Higher

C. FLOOD MAP

National Flood Hazard Layer FIRMette

FEMA

86°24'52"W 39°2'36"N



0 250 500 1,000 1,500 2,000 Feet

1:6,000

86°24'15"W 39°2'8"N

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

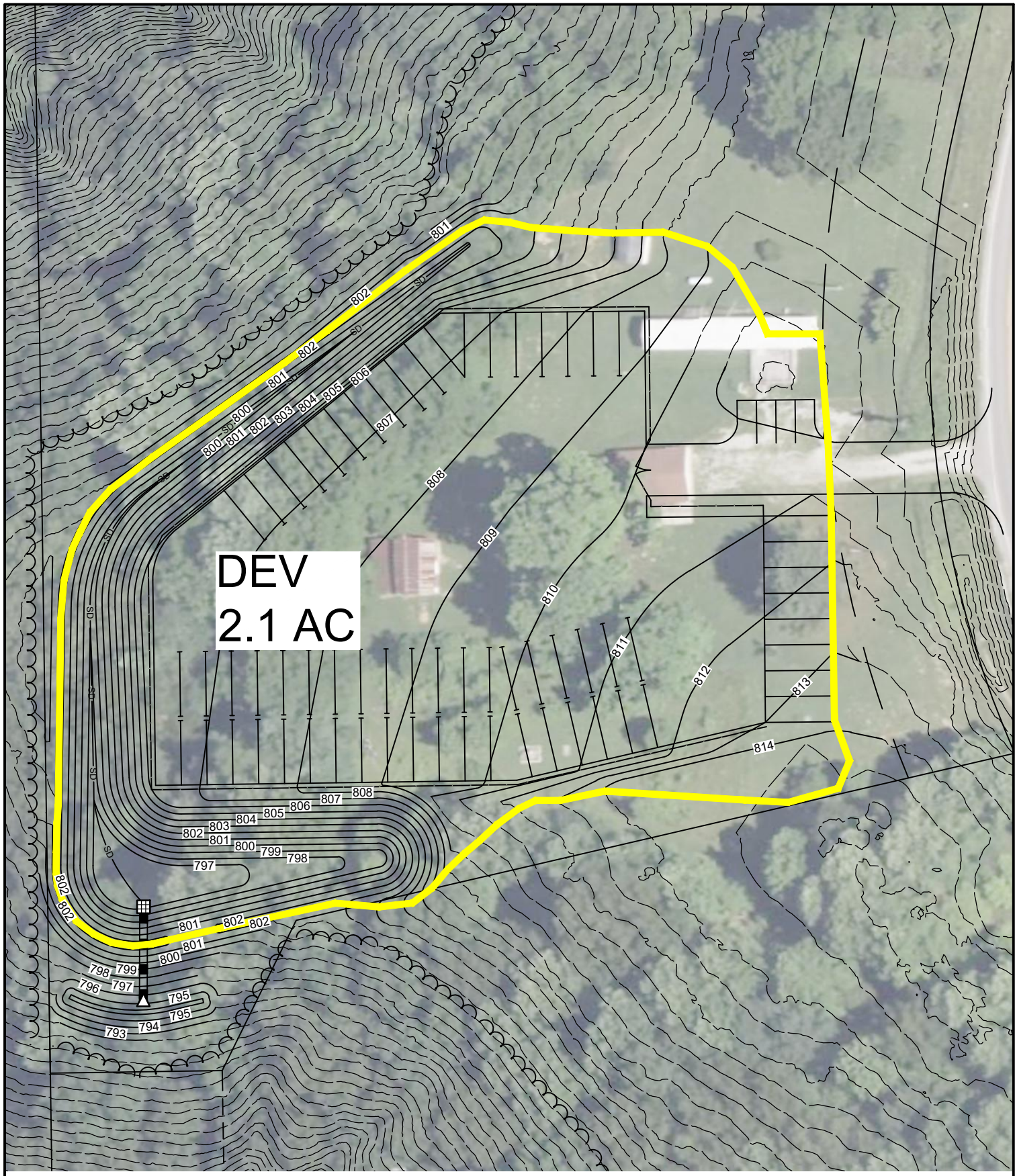
This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 6/26/2024 at 8:23 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

D. DRAINAGE DESIGN

D1. DEVELOPED CONDITION BASIN MAP



Drawn By: WCZ
Date: 6/27/2024
Project No.: 23288
Scale: AS SHOWN
Page: 1 of 1

DEVELOPED BASIN MAP
GREEMAN STATE ROAD 446
MONROE COUNTY
BLOOMINGTON, INDIANA

BANNING ENGINEERING
853 COLUMBIA ROAD, SUITE #101
PLAINFIELD, IN 46168
BUS: (317) 707-3700, FAX: (317) 707-3800
E-MAIL: Banning@BanningEngineering.com
WEB: www.BanningEngineering.com

D2. DEVELOPED CONDITION CALCULATIONS

Node Max Conditions : Multi Item | (name, sim) [Scenario1]

Node Name	Sim Name	Warning Stage [ft]	Alert Stage [ft]	Max Stage [ft]	Min/Max Delta Stage [ft]	Max Total Inflow [cfs]	Max Total Outflow [cfs]	Max Surface Area [ft2]
BNDY	010Y-24H	794.10	794.10	794.10	0.0000	1.11	0.00	0
BNDY	100Y-24H	794.10	794.10	794.10	0.0000	1.89	0.00	0
POND	010Y-24H	801.00	801.00	799.56	-0.0010	8.59	1.11	5832
POND	100Y-24H	801.00	801.00	800.62	0.0010	14.62	1.89	8859

D3. DEVELOPED CONDITION Tc AND Cn VALUES

TR-55
-COMPOSITE CN-VALUES & TIME OF CONCENTRATION-

PROJECT: Greeman
JOB #: 23288
DATE: 6/28/24
COMPUTED BY: JAR

BASINS

BASIN	Composite CN	Area (ft^2)	Area (acres)	Area (miles)	Tc
DEV	85.00	91476	2.10	0.00	6.0

Basin	Cover Description	Soil Group	Area (Acres)	CN	CN * Acres	number	Basin #	CN	Acres	CN * Acres
							DEV	85	2.1	179.3
DEV	Gravel (w/ right-of-way)	C	0.7	89	62.3	4				
DEV	Gravel (w/ right-of-way)	D	0.4	91	36.4	5				
DEV	Paved parking lots, roofs, driveways	D	0.1	98	9.8	5				
DEV	Good condition; grass cover > 75%	C	0.2	74	14.8	4				
DEV	Good condition; grass cover > 75%	D	0.7	80	56	5				

Time of Concentration Worksheet
Based on TR-55

PROJECT: Greeman
JOB #: 23288

Typical values for Manning's n

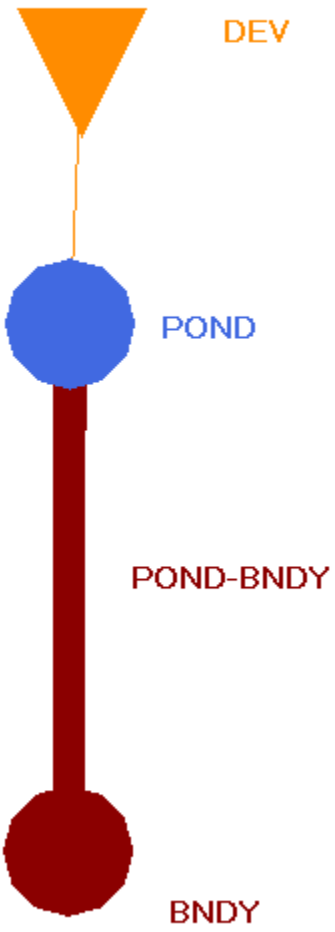
Overland Flow		Channel Flow	
short grass	0.15	grass	0.03
dense grass	0.24	concrete	0.02
pavement	0.011	rip-rap	0.04
woods light	0.4		
cultivated > 20%	0.17		

2 year, 24 hour rainfall = 3.07 inches
minimum T_c = 5 minutes

	Overland flow				Shallow Concentrated Flow (1)					Shallow Concentrated Flow (2)					Channel Flow								T_c
Basin name	Length (ft)	S %	n	T_t (min)	Length (ft)	S %	Paved/Un (P or U)	Vel. (ft/s)	T_t (min)	Length (ft)	S %	Paved/Un (P or U)	Vel. (ft/s)	T_t (min)	Length (ft)	a (s.f.)	Pw (ft)	r (ft)	S %	n	Vel. (ft/s)	T_t (min)	(min)
				0					0					0								0	
				0					0					0								0	
DEV	100	2.5	0.01	1	190	2.5	P	3.2	1	230	1	U	1.6	2	275						3.00	2	6
				0					0					0								0	
				0					0					0								0	

D4. DEVELOPED CONDITION ICPR INPUT DATA

Node Diagram



Simple Basin: DEV

Scenario:	Scenario1
Node:	POND
Hydrograph Method:	NRCS Unit Hydrograph
Infiltration Method:	Curve Number
Time of Concentration:	6.0000 min
Max Allowable Q:	9999.00 cfs
Time Shift:	0.0000 hr
Unit Hydrograph:	UH484
Peaking Factor:	484.0
Area:	2.1000 ac
Curve Number:	85.0
Ia/S:	0.00
% Impervious:	0.00
% DCIA:	0.00
% Direct:	0.00
Rainfall Name:	

Comment:

Node: BNDY

Scenario:	Scenario1
Type:	Time/Stage
Base Flow:	0.00 cfs
Initial Stage:	794.00 ft
Warning Stage:	794.10 ft
Alert Stage:	794.10 ft
Boundary Stage:	

Year	Month	Day	Hour	Stage [ft]
0	0	0	0.0000	794.10
0	0	0	24.0000	794.10

Comment:

Node: POND

Scenario:	Scenario1
Type:	Stage/Area
Base Flow:	0.00 cfs
Initial Stage:	796.50 ft
Warning Stage:	801.00 ft
Alert Stage:	801.00 ft

Stage [ft]	Area [ac]	Area [ft2]
796.50	0.0000	0
797.00	0.0300	1307
798.00	0.0620	2701
799.00	0.1000	4356
800.00	0.1600	6970
801.00	0.2300	10019

Comment:

Drop Structure Link: POND-BNDY		Upstream Pipe		Downstream Pipe	
Scenario:	Scenario1	Invert:	794.50 ft	Invert:	794.30 ft
From Node:	POND	Manning's N:	0.0130	Manning's N:	0.0130
To Node:	BNDY	Geometry: Circular		Geometry: Circular	
Link Count:	1	Max Depth:	1.00 ft	Max Depth:	1.00 ft
Pipe Flow Direction:	Both	Bottom Clip			
Solution:	Combine	Default:	0.00 ft	Default:	0.00 ft
Increments:	0	Op Table:		Op Table:	
Pipe Count:	1	Ref Node:		Ref Node:	
Damping:	0.0000 ft	Manning's N:	0.0000	Manning's N:	0.0000
Length:	50.00 ft	Top Clip			
FHWA Code:	0	Default:	0.00 ft	Default:	0.00 ft
Entr Loss Coef:	0.50	Op Table:		Op Table:	
Exit Loss Coef:	0.00	Ref Node:		Ref Node:	
Bend Loss Coef:	0.00	Manning's N:	0.0000	Manning's N:	0.0000
Bend Location:	0.00 dec				
Energy Switch:	Energy				

Pipe Comment:

Weir Component		Bottom Clip	
Weir:	1	Default:	0.00 ft
Weir Count:	1	Op Table:	
Weir Flow Direction:	Both	Ref Node:	
Damping:	0.0000 ft	Top Clip	
Weir Type:	Sharp Crested Vertical	Default:	0.00 ft
Geometry Type:	Circular	Op Table:	
Invert:	796.50 ft	Ref Node:	
Control Elevation:	796.50 ft	Discharge Coefficients	
Max Depth:	0.42 ft	Weir Default:	3.200
		Weir Table:	
		Orifice Default:	0.600
		Orifice Table:	

Weir Comment:

Weir Component		Bottom Clip	
Weir:	2	Default:	0.00 ft
Weir Count:	1	Op Table:	
Weir Flow Direction:	Both	Ref Node:	
Damping:	0.0000 ft	Top Clip	
Weir Type:	Sharp Crested Vertical	Default:	0.00 ft
Geometry Type:	Circular	Op Table:	
Invert:	799.60 ft	Ref Node:	
Control Elevation:	799.60 ft	Discharge Coefficients	
Max Depth:	0.42 ft	Weir Default:	3.200
		Weir Table:	
		Orifice Default:	0.600
		Orifice Table:	

Weir Comment:

Drop Structure Comment:

Simulation: 001Y-24H

Scenario: Scenario1
Run Date/Time: 6/20/2024 9:29:39 AM
Program Version: StormWise 4.08.00

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	24.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		30.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:
Unit Hydrograph Folder:

Lookup Tables

Boundary Stage Set:
Extern Hydrograph Set:
Curve Number Set:
Green-Ampt Set:
Vertical Layers Set:
Impervious Set:

Tolerances & Options

Time Marching: SAOR
Max Iterations: 6
Over-Relax Weight Fact: 0.5 dec
dZ Tolerance: 0.0010 ft
Max dZ: 1.0000 ft
Link Optimizer Tol: 0.0001 ft

IA Recovery Time: 24.0000 hr
Ia/S: 0.20 dec
Smp/Man Basin Rain Opt: Global
Rainfall Name: ~SCSII-24
Rainfall Amount: 2.55 in
Storm Duration: 24.0000 hr

Dflt Damping (1D):	0.0050 ft
Min Node Srf Area (1D):	100 ft2
Energy Switch (1D):	Energy

Comment:

Simulation: 010Y-24H

Scenario: Scenario1
Run Date/Time: 6/28/2024 11:56:54 AM
Program Version: StormWise 4.08.00

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	24.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		30.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:
Unit Hydrograph Folder:

Lookup Tables

Boundary Stage Set:
Extern Hydrograph Set:
Curve Number Set:
Green-Ampt Set:
Vertical Layers Set:
Impervious Set:

Tolerances & Options

Time Marching: SAOR
Max Iterations: 6
IA Recovery Time: 24.0000 hr

Over-Relax Weight Fact:	0.5 dec	Ia/S:	0.20 dec
dZ Tolerance:	0.0010 ft		
Max dZ:	1.0000 ft	Smp/Man Basin Rain Opt:	Global
Link Optimizer Tol:	0.0001 ft		
		Rainfall Name:	~SCSII-24
		Rainfall Amount:	4.44 in
		Storm Duration:	24.0000 hr
		Dflt Damping (1D):	0.0050 ft
		Min Node Srf Area (1D):	100 ft2
		Energy Switch (1D):	Energy

Comment:

Simulation: 100Y-24H

Scenario: Scenario1
Run Date/Time: 6/28/2024 11:57:02 AM
Program Version: StormWise 4.08.00

General

Run Mode: Normal

	Year	Month	Day	Hour [hr]
Start Time:	0	0	0	0.0000
End Time:	0	0	0	24.0000

	Hydrology [sec]	Surface Hydraulics [sec]
Min Calculation Time:	60.0000	0.1000
Max Calculation Time:		30.0000

Output Time Increments

Hydrology

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Surface Hydraulics

Year	Month	Day	Hour [hr]	Time Increment [min]
0	0	0	0.0000	15.0000

Restart File

Save Restart: False

Resources & Lookup Tables

Resources

Rainfall Folder:

Unit Hydrograph

Lookup Tables

Boundary Stage Set:
Extern Hydrograph Set:
Curve Number Set:

Folder:			
		Green-Ampt Set:	
		Vertical Layers Set:	
		Impervious Set:	

Tolerances & Options

Time Marching:	SAOR	IA Recovery Time:	24.0000 hr
Max Iterations:	6		
Over-Relax Weight Fact:	0.5 dec	Ia/S:	0.20 dec
dZ Tolerance:	0.0010 ft		
Max dZ:	1.0000 ft	Smp/Man Basin Rain Opt:	Global
Link Optimizer Tol:	0.0001 ft		
		Rainfall Name:	~SCSII-24
		Rainfall Amount:	6.80 in
		Storm Duration:	24.0000 hr
		Dflt Damping (1D):	0.0050 ft
		Min Node Srf Area (1D):	100 ft2
		Energy Switch (1D):	Energy

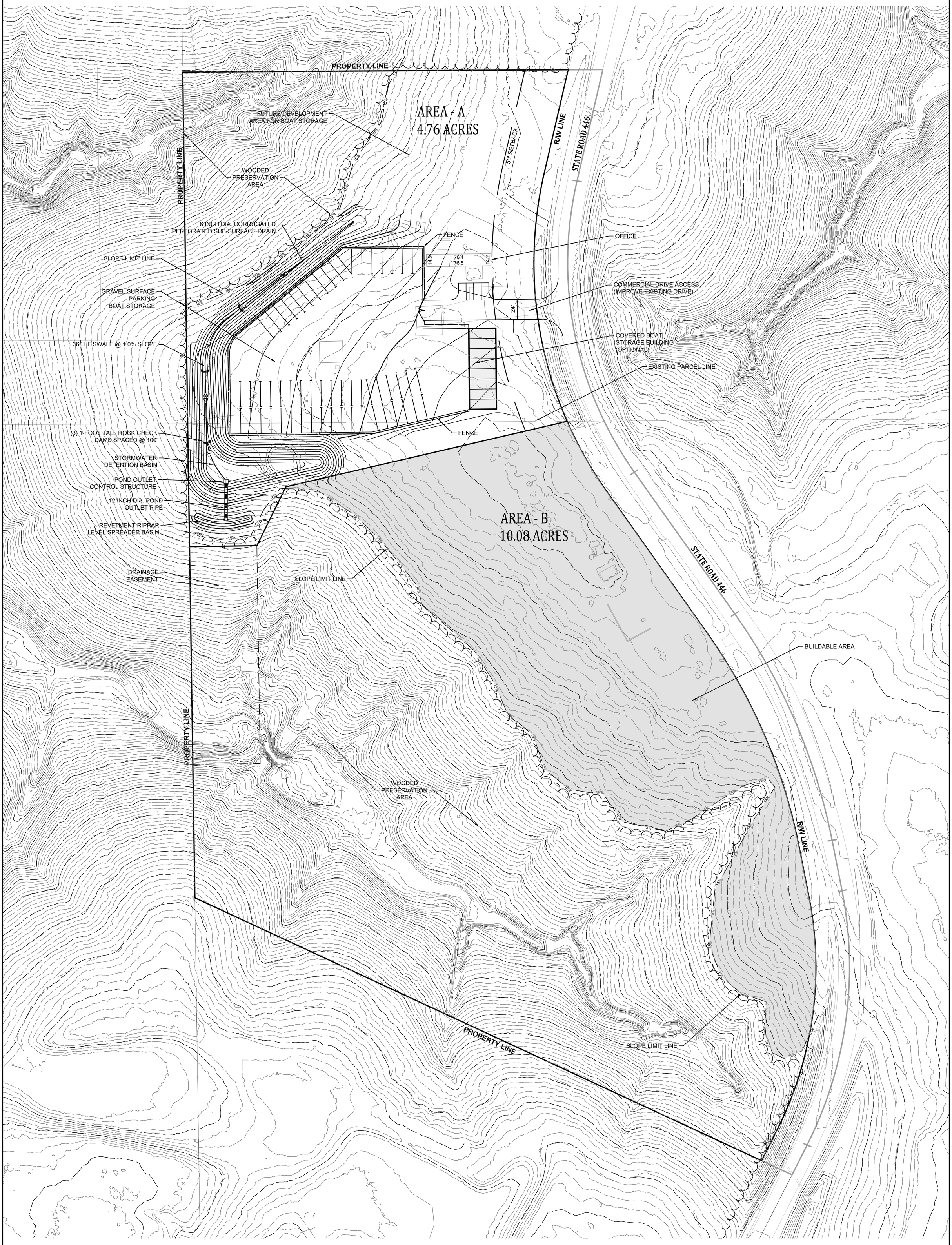
Comment:

CONCEPTUAL DEVELOPMENT PLAN

N

BANNING ENGINEERING

0 50' 100'



BANNING ENGINEERING
853 COLUMBIA ROAD, SUITE #101
PLAINFIELD, IN 46168
BUS: (317) 707-3700, FAX: (317) 707-3800
E-MAIL: Banning@BanningEngineering.com
WEB: www.BanningEngineering.com

GREEMANN STATE ROAD 446
PROPERTY
BLOOMINGTON, INDIANA

SCALE:	1"= 50'
DATE:	6-27-2024
PROJECT NO:	23288
SHEET NO:	1

MONROE COUNTY HIGHWAY DEPARTMENT

501 N Morton St. Suite 216, Bloomington IN 47404 • (812) 349-2565 • www.co.monroe.in.us

To: Monroe County Drainage Board

From: Kelsey Thetonia, MS4 Coordinator

Date: 8/9/2024

Re: Fry Rd. Residential Project Drainage Plan

I am seeking your input on a residential project on Fry Rd. The owners will be adding a large addition to the current residence on the property, as well as adding a new garage and barn. The property contains a stream with a drainage area greater than 1 square mile with unmapped floodplain. At the County's request, they have submitted a request to DNR to have this floodplain mapped and we are still awaiting those results.

The configuration of the new garage will require disturbance and relocation of two ephemeral streams on the property. Their engineer submitted a drainage plan where they are proposing rerouting these ephemeral channels. I would like your input on this proposed plan and how this works with our new ordinance.

SMITH DESIGN GROUP
CIVIL ENGINEERING - LAND SURVEYING

MEMORANDUM:

To: Kelsey Thetonia, MS4 Coordinator, Monroe County Drainage Board
From: Katie Stein, PE
Subject: 601 Fry Road
Date: July 30, 2024

Summary

The residents of 601 W Fry Road are expanding their existing home, constructing a new detached garage and new barn within their property. The homeowners would like to locate the barn and garage in specific areas based on their vision and use of the two buildings. The garage location specifically is proposed within an existing drainage swale. The owners would like to relocate the drainage swale in order to construct the garage in their desired location.

Existing Conditions

There are two drainage swales in the proposed garage location that converge just east of the proposed garage location. The upstream drainage area of the western portion is approximately 5.20 acres and the eastern area is approximately 2.27 acres. Both areas are heavily wooded and steep. The western drainage and swale are of most concern in relation to the garage.

For this project, the rational method was used to determine the approximately existing flow rates for both swales. Due to the steepness and type of flow (concentrated/channel) of the upstream drainage areas, both drainage areas had a Time of Concentration of approximately 5 minutes and below is a summary of the approximate flow rates for the Q100:

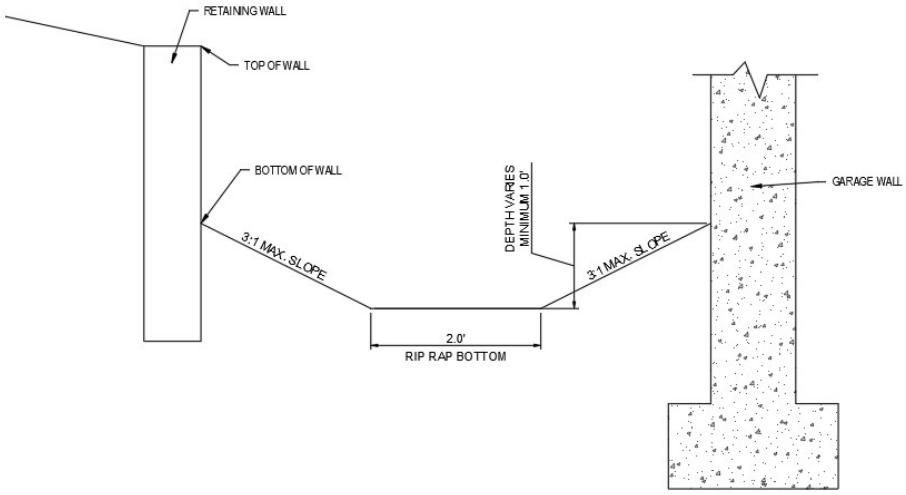
Drainage Area	Drainage Area	Runoff Coefficient*	Q100 Flow Rate
	Acre		cfs
Western	5.20	0.83	44.83
Eastern	2.27	0.83	19.57
Combined	--		64.4

*From *Table 2-2 - Woodland (Clay) Steep, Greater than 7% slope* of the Monroe County Stormwater Technical Standards Manual

1467 W Arlington Road
Bloomington, Indiana 47404
812-336-6536
smithdginc.com

Proposed Conditions

The proposed plan is for a new swale relocation to be constructed on the north side the proposed garage. Below is the typical swale geometry proposed:



TYPICAL DRAINAGE DITCH
NOT TO SCALE

The recommendation treatment for the bottom of the swale is rip rap due to the velocity (~10-14 fps) of stormwater. Due to this swale being on the north side of the garage, it may be difficult to establish vegetation within the swale and side slopes and therefore rip rap is recommended on the side slopes as well. However, if vegetation is able to be established to stabilize the side slope and even bottom of the swale without causing erosion, vegetation could be used.

Attachments

Schematic Drainage Plan (Separate)
Drainage Area Calculations
Hydraflow Hydrographs Results
Swale Capacity Calculations

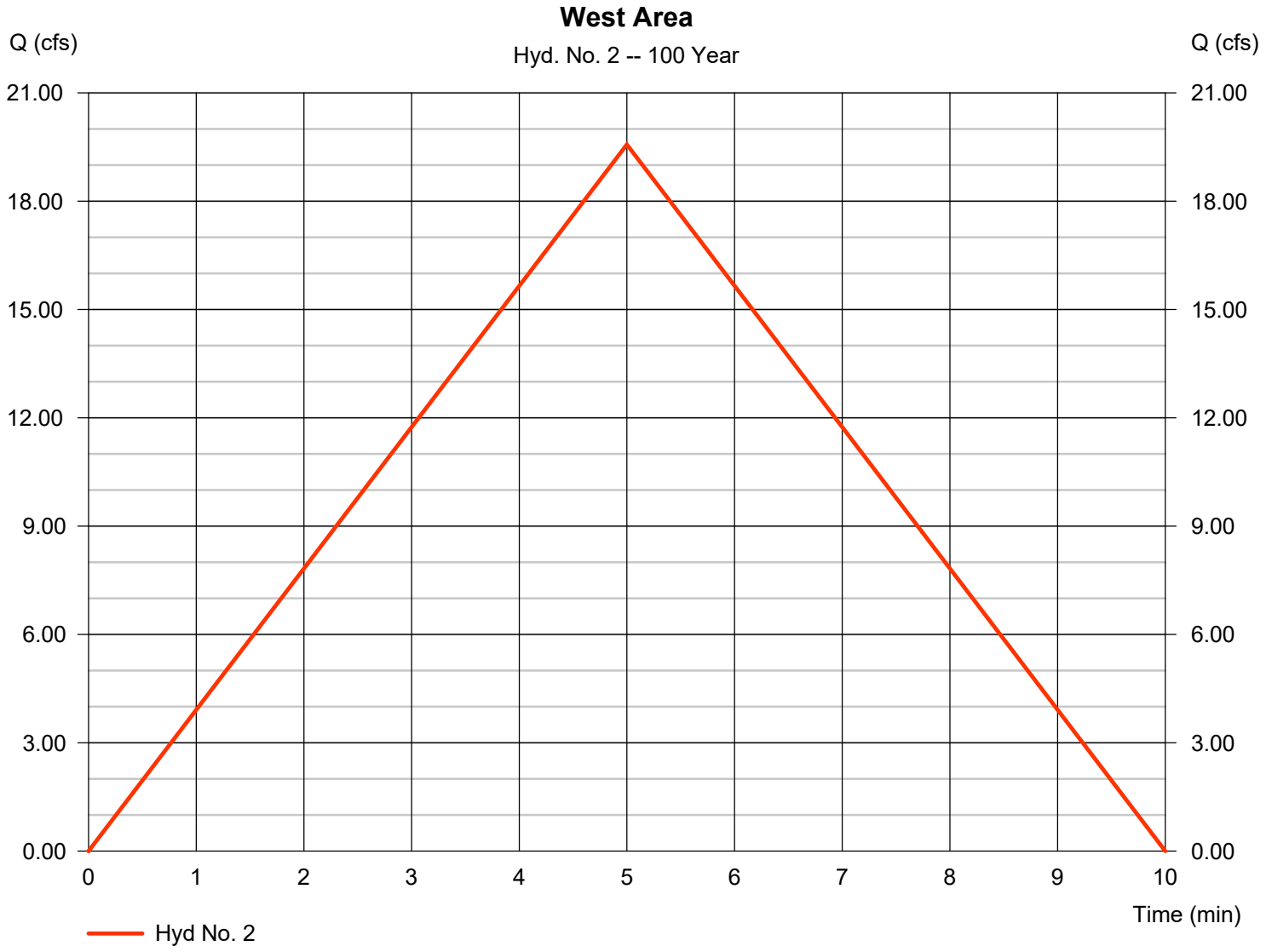
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Tuesday, 07 / 30 / 2024

Hyd. No. 2

West Area

Hydrograph type	=	Rational	Peak discharge	=	19.57 cfs
Storm frequency	=	100 yrs	Time to peak	=	5 min
Time interval	=	1 min	Hyd. volume	=	5,871 cuft
Drainage area	=	2.270 ac	Runoff coeff.	=	0.83
Intensity	=	10.387 in/hr	Tc by TR55	=	5.00 min
IDF Curve	=	Monroe County.IDF	Asc/Rec limb fact	=	1/1



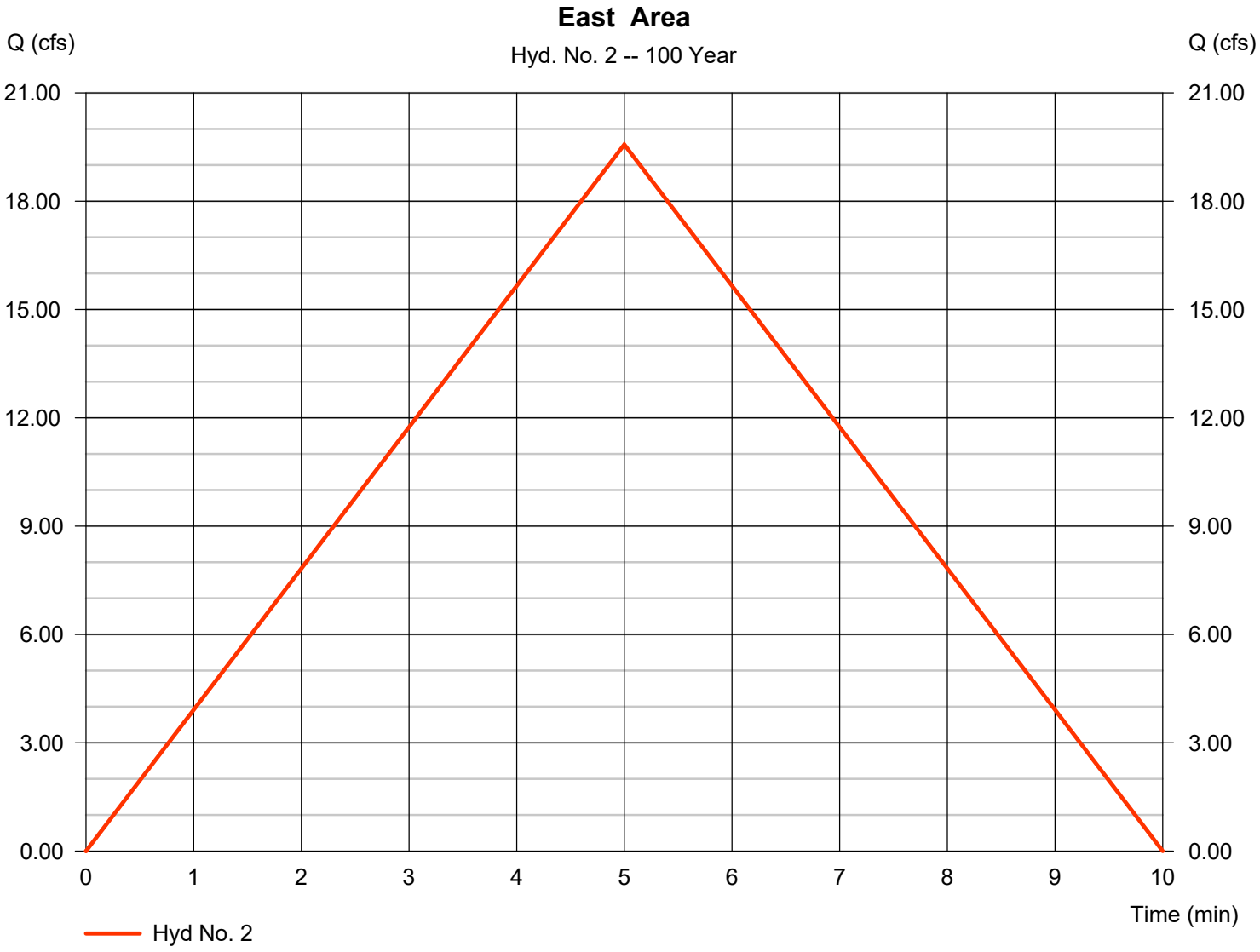
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Tuesday, 07 / 30 / 2024

Hyd. No. 2

East Area

Hydrograph type	= Rational	Peak discharge	= 19.57 cfs
Storm frequency	= 100 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 5,871 cuft
Drainage area	= 2.270 ac	Runoff coeff.	= 0.83
Intensity	= 10.387 in/hr	Tc by TR55	= 5.00 min
IDF Curve	= Monroe County.IDF	Asc/Rec limb fact	= 1/1



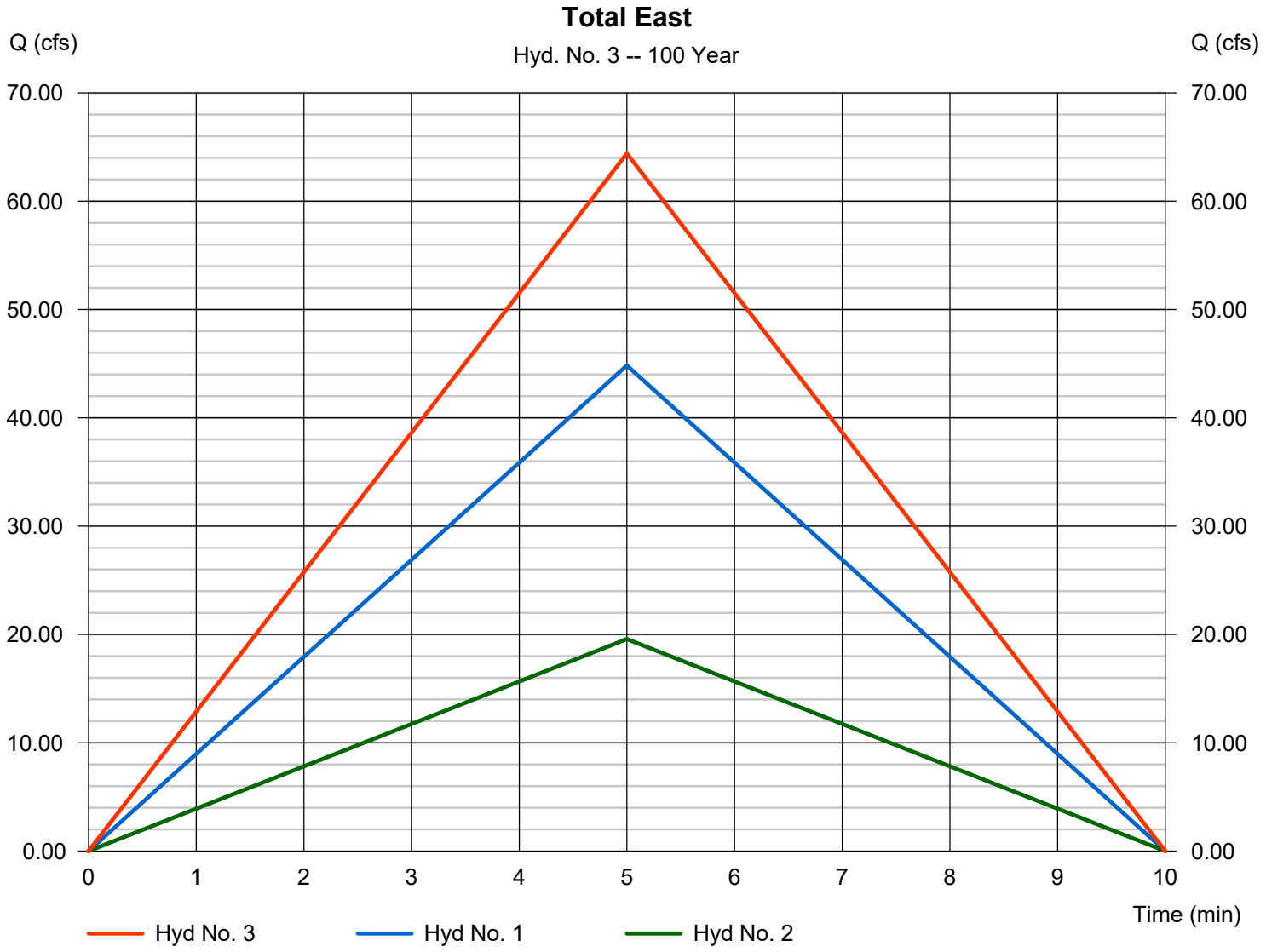
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2023 Tuesday, 07 / 30 / 2024

Hyd. No. 3

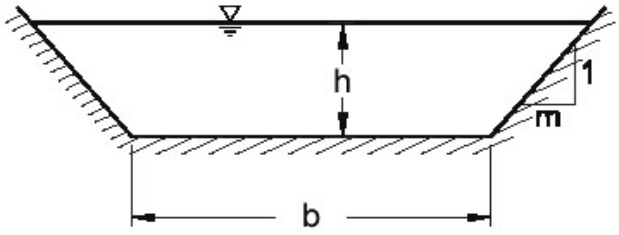
Total East

Hydrograph type	= Combine	Peak discharge	= 64.40 cfs
Storm frequency	= 100 yrs	Time to peak	= 5 min
Time interval	= 1 min	Hyd. volume	= 19,320 cuft
Inflow hyds.	= 1, 2	Contrib. drain. area	= 7.470 ac



Western Drainage Area

Shape Trapezoidal



Given:

Q100=	44.83	CFS
Bottom Width, b=	2	FT.
Depth, h=	1	FT.
Side Slope, m=	3	:1
Mannings, n=	0.022	
Slope, s=	0.045	FT/FT

$$Q = VA$$

$$V = \left(\frac{1.49}{n}\right) R^{2/3} S^{1/2}$$

Calculated:

Area, A=	5	SF	
Wetted Perm., P=	8.32	FT.	
Velocity, V=	10.23	FT/S	
Flow Rate, Q=	51.14	CFS	OK

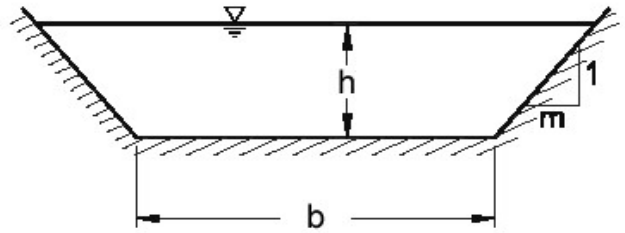
$$P = b + 2h\left(1 + m^2\right)^{1/2}$$

$$A = h(b + mh)$$

$$R = \frac{A}{P}$$

Eastern Drainage Area

Shape Trapezoidal



Given:

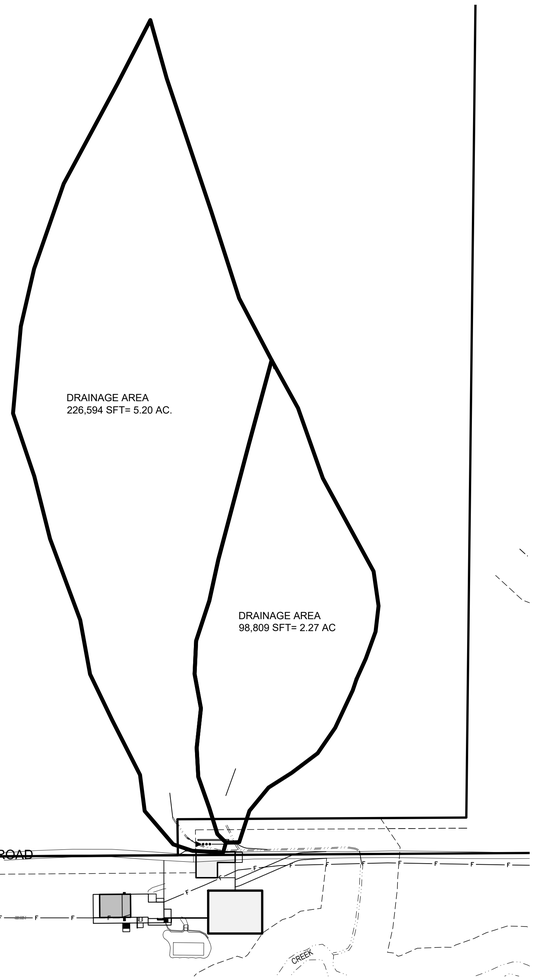
Q100=	64.40	CFS
Bottom Width, b=	2	FT.
Depth, h=	1	FT.
Side Slope, m=	3	:1
Mannings, n=	0.022	
Slope, s=	0.090	FT/FT

$$Q = VA$$
$$V = \left(\frac{1.49}{n}\right) R^{2/3} S^{1/2}$$

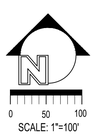
Calculated:

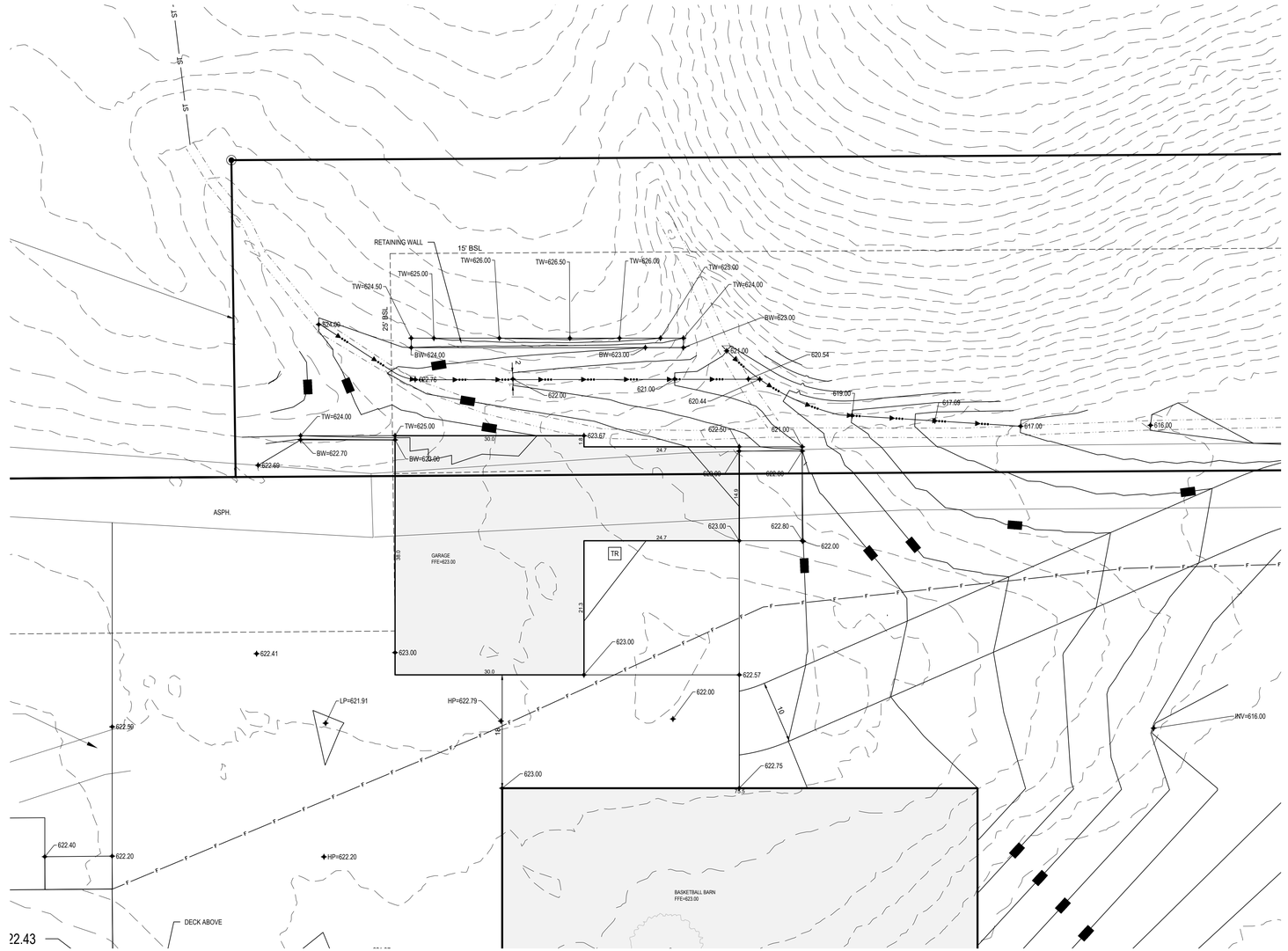
Area, A=	5	SF	
Wetted Perm., P=	8.32	FT.	
Velocity, V=	14.46	FT/S	
Flow Rate, Q=	72.32	CFS	OK

$$P = b + 2h\left(1 + m^2\right)^{1/2}$$
$$A = h(b + mh)$$
$$R = \frac{A}{P}$$



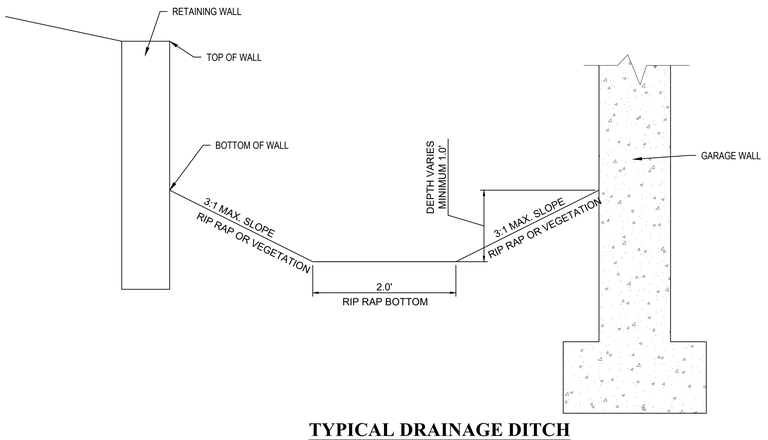
DRAINAGE AREA





DETAILED SITE/GRADING

0
5
10
SCALE: 1"=10'



TYPICAL DRAINAGE DITCH

NOT TO SCALE

LEGEND

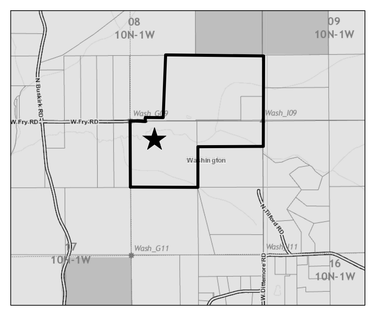
- RR SPIKE
- STONE
- REBAR
- IRON PIPE
- MAG NAIL
- UTILITY POLE
- FENCE POST
- ELECTRIC TRANSFORMER
- ELECTRIC METER
- WATER METER
- CLEANOUT
- SEPTIC RISER LID
- AIR CONDITIONER
- CABLE TV RISER
- DECIDUAS TREE
- CONIFEROUS TREE
- FENCE
- FEMA FLOOD ZONE
- EXISTING DITCH BOTTOM
- STORM PIPE
- DRAINAGE DITCH/SWALE FLOW

M	MEASURED
P	PLATTED
R	RECORD
FRB	FOUND REBAR
SRB	SET REBAR
FIP	FOUND IRON PIPE
FRS	FOUND RAILROAD SPIKE
FMAG	FOUND MAG NAIL
SMAG	SET MAG NAIL
B/C	BUILDING CORNER
FND	FOUND
BW	BOTTOM OF WALL
TW	TOP OF WALL
FFE	FINISH FLOOR ELEVATION
BFE	BASEMENT FLOOR ELEVATION
HP	HIGH POINT
LP	LOW POINT

ZONING

ZONED: FR
FRONT - 25' FROM RIGHT OF WAY LINE (LOCAL)
50' IF NO DIRECT ACCESS TO ROAD
SIDE - 15' FOR RESIDENTIAL
50' FOR AGRICULTURAL
REAR - 35' FOR RESIDENTIAL
50' FOR AGRICULTURAL

BASIS OF BEARINGS:
INDIANA STATE PLANE, WEST ZONE
VERTICAL DATUM: NAVD 88



VICINITY MAP

★ PROJECT LOCATION

NOTES

THIS EXHIBIT WAS PREPARED BASED UPON DOCUMENTS OBTAINED FROM THE OFFICE OF THE RECORDER OF MONROE COUNTY, AND OTHER SOURCES AND IS NOT INTENDED TO BE REPRESENTED AS A RETRACEMENT OR ORIGINAL BOUNDARY SURVEY, A ROUTE SURVEY OR A SURVEYOR LOCATION REPORT.

BUILDER/DEVELOPER
LAUREN WOOD BUILDERS
900 S WALNUT ST.
BLOOMINGTON, IN 47401
ALEX MINOR
(812) 287-7575

SMITH DESIGN GROUP
CIVIL ENGINEERING - LAND SURVEYING
1467 W Arlington Rd Bloomington, IN 47404
(812) 336-6536 - smithdginc.com

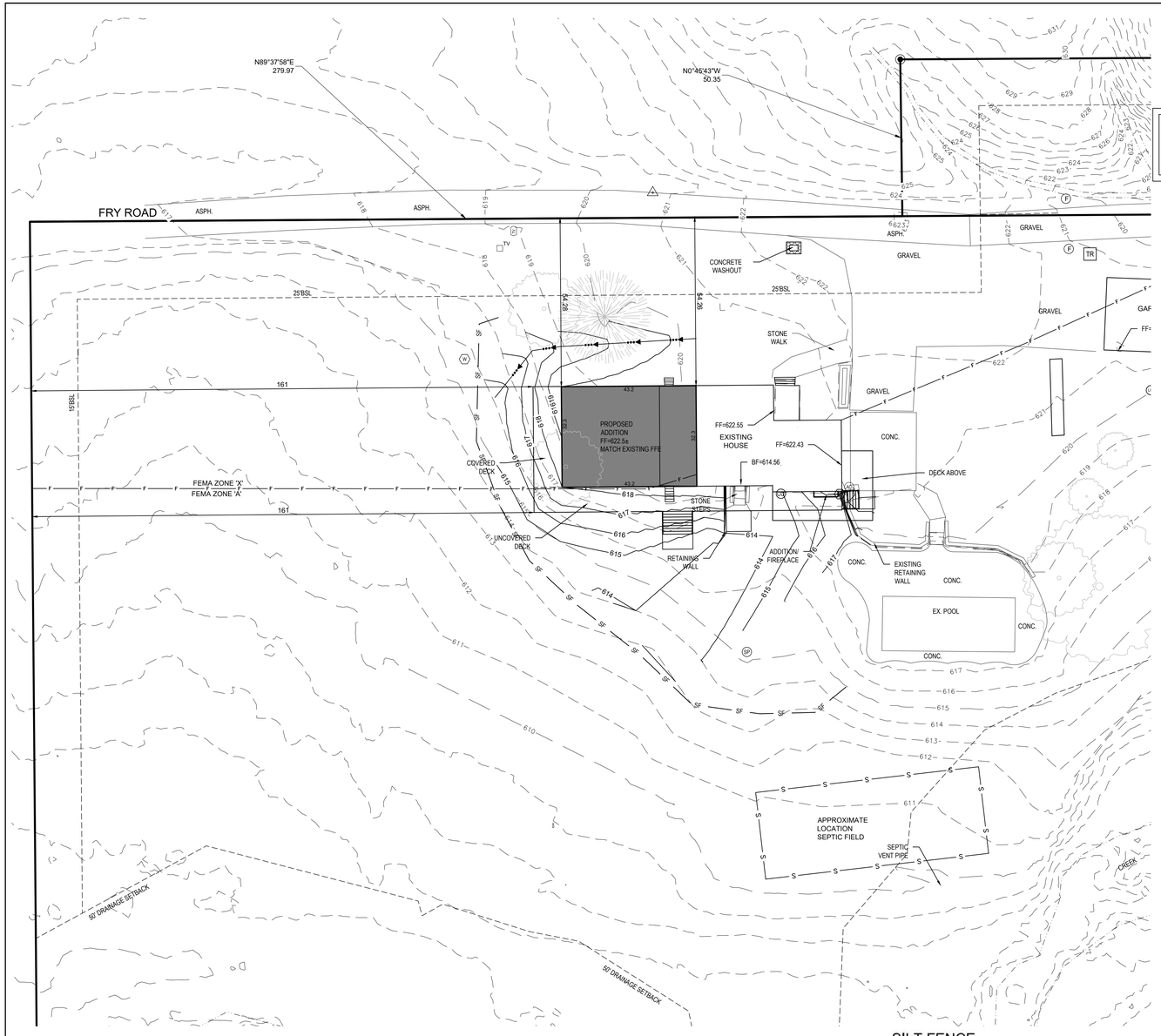
JOB TITLE
FRANK RESIDENCE
601W FRY ROAD
GOSPORT, INDIANA
SEC 17 & 8-T10N-R1W

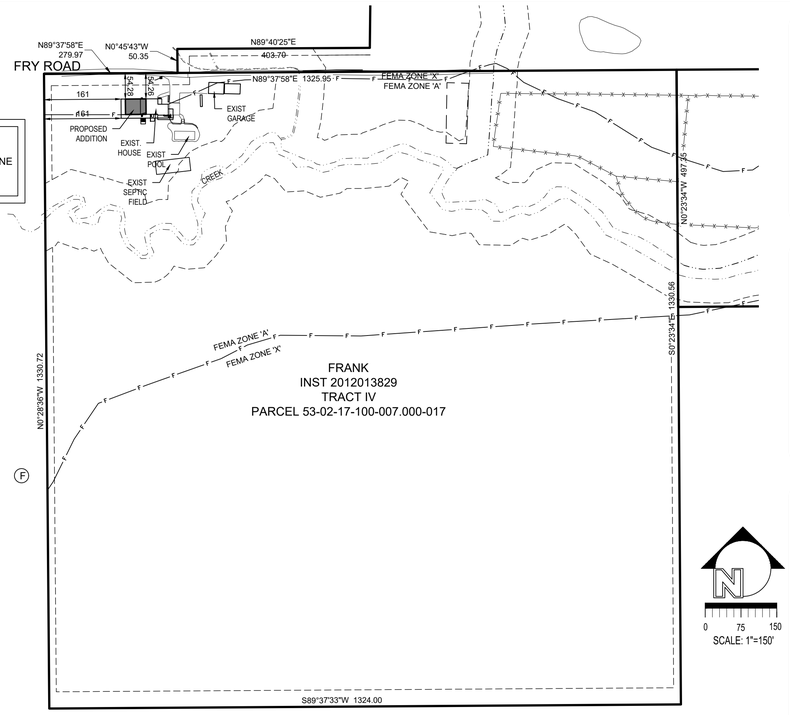
REVISIONS

BY	DATE

FIELD	DRAFTED	CHECKED
TS	SPP	SPP

JOB NUMBER 6769
SHEET 1 OF 1
DATE 07/30/24
DRAINAGE EXHIBIT





BASIS OF BEARINGS:
INDIANA STATE PLANE, WEST ZONE
VERTICAL DATUM: NAVD 88

LEGEND

- RR SPIKE
- STONE
- REBAR
- IRON PIPE
- MAG NAIL
- UTILITY POLE
- (F) FENCE POST
- (TR) ELECTRIC TRANSFORMER
- (E) ELECTRIC METER
- (W) WATER METER
- (CO) CLEANOUT
- (SP) SEPTIC RISER LID
- (AC) AIR CONDITIONER
- TV CABLE TV RISER
- DECIDUAS TREE
- CONIFEROUS TREE
- FENCE
- FEMA FLOOD ZONE

M	MEASURED
P	PLATTED
R	RECORD
FRB	FOUND REBAR
SRB	SET REBAR
FIP	FOUND IRON PIPE
FRS	FOUND RAILROAD SPIKE
FMAG	FOUND MAG NAIL
SMAG	SET MAG NAIL
B/C	BUILDING CORNER
FND	FOUND

OVERALL SITE

0 75 150
SCALE: 1"=150'

ZONING

ZONED: FR
FRONT - 25' FROM RIGHT OF WAY LINE (LOCAL)
50' IF NO DIRECT ACCESS TO ROAD
SIDE - 15' FOR RESIDENTIAL
50' FOR AGRICULTURAL
REAR - 35' FOR RESIDENTIAL
50' FOR AGRICULTURAL

NOTES

1. BUILDER/CONTRACTOR SHALL VERIFY THE DIMENSIONS OF THE BUILDING PRIOR TO CONSTRUCTION.
2. BUILDER TO GRADE LOT TO PROVIDE ADEQUATE DRAINAGE AWAY FROM BUILDING.
3. BUILDER TO GRADE LOT TO PROVIDE ADEQUATE DRAINAGE AWAY FROM NEIGHBORING LOTS UNLESS THERE IS AN EXISTING DRAINAGE EASEMENT.
4. SEDIMENT DISCHARGE AND TRACKING FROM LOT WILL BE MINIMIZED THROUGHOUT LAND DISTURBING ACTIVITIES UNTIL PERMANENT STABILIZATION HAS BEEN ACHIEVED.
5. ADJACENT LOTS DISTURBED BY AN INDIVIDUAL LOT OPERATOR MUST BE REPAIRED AND STABILIZED WITH TEMPORARY OR PERMANENT SURFACE STABILIZATION.
6. SEDIMENT TRACKED OR WASHED ONTO ROADS SHALL BE CLEANED UP.
7. THE SILT FENCE AND APPROPRIATE EROSION CONTROL SHALL BE INSTALLED PRIOR TO ANY CONSTRUCTION. LOCATION OF SILT FENCE TO BE APPROVED BY THE COUNTY.
8. ANY DISTURBED AREAS TO REMAIN IDLE FOR MORE THAN 7 DAYS SHALL BE TEMPORARY MULCH SEEDED.
9. STOCKPILING ON-SITE IS NOT PROPOSED. MATERIALS WILL BE HAULED OFF-SITE. SHOULD A STOCKPILE BE NECESSARY, CONTRACTOR SHALL USE APPROPRIATE EROSION CONTROL METHODS.
10. IF NOT ALREADY INSTALLED, INSTALL TREE PROTECTION FENCE AROUND TREE PRESERVATION AREA.
11. FEMA ZONE 'A' /ZONE 'X' LINES ARE BASED UPON A SCALED INTERPRETATION OF THE FLOOD INSURANCE RATE MAP 18105C0045D FOR MONROE COUNTY, INDIANA, DATED DECEMBER 17, 2010.
12. A BASE FLOOD ELEVATION IS NOT SHOWN AT THIS TIME, APPLIED FOR AND AWAITING INDIANA DEPARTMENT OF NATURAL RESOURCES FLOOD STUDY.

BUILDER/DEVELOPER
LAUREN WOOD BUILDERS
900 S WALNUT ST.
BLOOMINGTON, IN 47401
ALEX MINOR
(812) 287-7575

NOTES

THIS EXHIBIT WAS PREPARED BASED UPON DOCUMENTS OBTAINED FROM THE OFFICE OF THE RECORDER OF MONROE COUNTY, AND OTHER SOURCES AND IS NOT INTENDED TO BE REPRESENTED AS A RETRACEMENT OR ORIGINAL BOUNDARY SURVEY, A ROUTE SURVEY OR A SURVEYOR LOCATION REPORT.

LEGAL DESCRIPTION

TRACT IV:

THE NORTHWEST CORNER OF THE NORTHEAST QUARTER OF SECTION SEVENTEEN (17), TOWNSHIP TEN (10) NORTH, RANGE ONE (1) WEST, MONROE COUNTY, INDIANA AND MORE PARTICULARLY DESCRIBED AS FOLLOWS: BEGINNING AT A REBAR SET MARKING THE NORTHEAST CORNER OF SAID QUARTER QUARTER SECTION, THENCE SOUTH ZERO (00) DEGREES, SIXTEEN (16) MINUTES, NINETEEN (19) SECONDS EAST 1329.65 FEET TO A STEEL POST FOUND MARKING THE SOUTHEAST CORNER OF SAID QUARTER QUARTER SECTION, THENCE SOUTH EIGHTY-NINE (89) DEGREES, FORTY-FOUR (44) MINUTES, FORTY-NINE (49) SECONDS WEST 1324.19 FEET TO A REBAR SET MARKING THE SOUTHWEST CORNER OF SAID QUARTER QUARTER SECTION, THENCE NORTH ZERO (00) DEGREES, TWENTY-ONE (21) MINUTES, TWENTY-THREE (23) SECONDS WEST 1329.61 FEET TO A SPIKE SET MARKING THE NORTHWEST CORNER OF SAID QUARTER QUARTER SECTION, THENCE NORTH EIGHTY-NINE (89) DEGREES, FORTY-FOUR (44) MINUTES, FIFTY-FIVE (55) SECONDS EAST 1326.15 FEET TO THE POINT OF BEGINNING, CONTAINING 40.45 ACRES, MORE OR LESS.

PARCEL 53-02-17-100-007.000-017

SURVEYOR'S CERTIFICATE

THIS PROPOSED STRUCTURE MEETS ALL DESIGN STANDARDS AND INCLUDES ALL NECESSARY INFORMATION LISTED IN CHAPTER 815 OF THE MONROE COUNTY ZONING ORDINANCE.

FIELD WORK FOR EXISTING TOPOGRAPHY WAS COMPLETED ON APRIL 04, 2024.

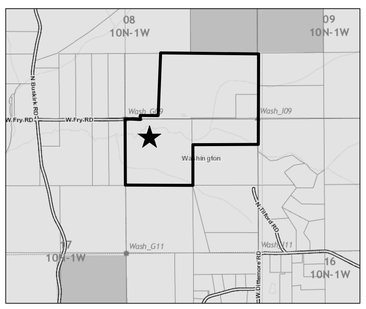
POSITIVE DRAINAGE AWAY FROM STRUCTURES WILL BE COMPLIED WITH

DATED JUNE 28, 2024

Scott P. Pardue

SCOTT P. PARDUE
REGISTERED LAND SURVEYOR NO. 22300016
STATE OF INDIANA

SCOTT P. PARDUE REGISTERED No. LS22300016 STATE OF INDIANA LAND SURVEYOR



VICINITY MAP
★ PROJECT LOCATION

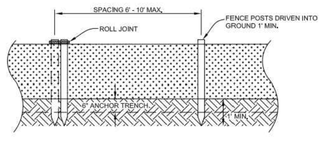
DETAILED SITE/GRADING

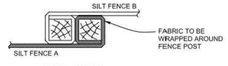
0 20 20
SCALE: 1"=20'

NOTICE, PERMITS, and NOTES

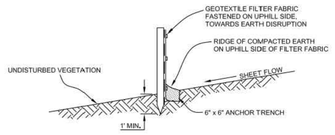
1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING OR VERIFYING THAT ALL PERMITS AND APPROVALS ARE OBTAINED FROM THE RESPECTIVE CITY, COUNTY AND STATE AGENCIES PRIOR TO STARTING CONSTRUCTION.
2. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES IN THE VICINITY OF THE CONSTRUCTION AREA PRIOR TO STARTING ANY CONSTRUCTION.
3. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY FOR NOTIFICATION AND COORDINATION OF ALL CONSTRUCTION WITH THE RESPECTIVE UTILITY COMPANIES, PRIOR TO STARTING ANY CONSTRUCTION.
4. ALL CONSTRUCTION ACTIVITY ON THIS SITE SHALL BE PERFORMED IN COMPLIANCE WITH APPLICABLE O.S.H.A. STANDARDS FOR WORKER SAFETY.
5. ALL CONTRACTORS SHALL BE RESPONSIBLE FOR OBTAINING THE MOST UPDATED SET OF CONSTRUCTION PLANS PRIOR TO COMMENCING CONSTRUCTION.
6. ALL CONTRACTORS SHALL BE RESPONSIBLE FOR PROVIDING AS-BUILT INFORMATION TO THE ENGINEERING/SURVEYING COMPANY UPON COMPLETION OF CONSTRUCTION.

SILT FENCE





ROLL JOINTS



SMITH DESIGN GROUP
CIVIL ENGINEERING - LAND SURVEYING
1467 W Arlington Rd Bloomington, IN 47404
(812) 334-8936 - smithegінc.com

JOB TITLE
FRANK RESIDENCE
601W FRY ROAD
GOSPORT, INDIANA
SEC 17 & 8-T10N-R1W

REVISIONS	BY	DATE
ADDED APPROX. SEPTIC FIELD		

FIELD	DRAFTED	CHECKED
TS	SPP	SPP

JOB NUMBER 6769
SHEET 1 OF 1
DATE 06/28/24
SITE PLAN

MONROE COUNTY HIGHWAY DEPARTMENT

501 N Morton St. Suite 216, Bloomington IN 47404 • (812) 349-2565 • www.co.monroe.in.us

To: Monroe County Drainage Board

From: Kelsey Thetonia, MS4 Coordinator

Date: 8/9/2024

Re: 6251 W Ison Rd. Enforcement Case

I am seeking your input on an ongoing enforcement case we received from the Planning Department. The owner of the property at 6251 W Ison Rd. has constructed a parking lot for storage of trucks, materials, and equipment. The parking area and additional fill is located within a sinkhole and Karst Conservancy Area.

I am asking the Drainage Board to determine if the parking area/fill should be removed and restored to vegetation, or left in place with no further grading or impact to the sinkhole.

hydrogeology inc.
1211 S Walnut St
Bloomington, IN 47401

Brian Burke
6251 W Ison Rd
Bloomington, IN 47404

Date: June 3, 2024

Contact:
Jason Krothe

Phone:
812-219-0210

Email: jnkrothe@hydrogeologyinc.com

Subject:
6251 W Ison Rd – Karst Survey
Bloomington, IN

Mr. Burke,

Hydrogeology Inc. (HGI) respectfully submits this summary report for the karst survey conducted at 6251 W Ison Rd in Bloomington, IN (the Site, Figure 1).

1 – Overview

The Site is located at 6251 W Ison Rd in Bloomington, Indiana and is approximately 12-acres (Figure 2). The purpose of this survey was to identify karst features at the Site. The Site consists of mostly grassland with a gravel driveway and parking area.

2 - Geology / Physiography

The Site is in the Crawford Upland physiographic region, which is one of the primary karst forming areas in Indiana. The bedrock at the Site is the Ste. Genevieve Limestone (Hasenmueller, Estell, Keith, and Thompson, 2008). The Ste. Genevieve Limestone is composed of primarily limestone with small amounts of shale, dolomite, sandstone, and chert (Carr, Leininger, and Golde, 1978).

3 – Sinkholes & Springs

Sinkholes are surface depressions that form in a variety of ways in karst areas (Figure 3). Sinkholes will often time have a swallow hole, which is an opening in the ground where water infiltrates. Groundwater flow in karst areas is predominantly fracture flow, meaning the bedrock itself has low permeability while the fractures in the bedrock are open conduits that allow water, soil, and other materials to travel quickly through the subsurface. Water that drains into a sinkhole can eventually discharge at a karst spring (Figure 4).

hydrogeology inc.
1211 S Walnut St
Bloomington, IN 47401

4 – Karst Desktop Review

A review of available karst resources was conducted prior to the field survey. Those resources include United State Geological Survey (USGS) topographic maps, Indiana Map 2011 1-ft LIDAR, karst spring maps, and private cave databases. Three sinkholes were identified from LIDAR data and topographic maps (Figure 5).

5 – Karst Field Survey

HGI conducted a field review of the Site on May 24, 2024. No new karst features were located at the Site during the field survey. Field photographs can be seen in Appendix A. The three sinkholes identified in the desktop review are described below:

SH-01 – SH-01 is approximately 1000 feet long, 870 feet wide, and 12 feet deep. It encompasses 15 acres although only approximately 4.5 acres fall within the property boundary of the Site. The sinkhole has well developed grass and wildflowers within it. No bedrock or surface openings were observed within the portion of the sinkhole on the Site.

SH-01 Mitigation – SH-01 should receive a sinkhole conservancy area (SCA) in accordance with Monroe County Planning guidelines. The location of the SCA should be based on a Site survey. The gravel driveway and parking area at the Site encroach on approximately 0.10 acres of the sinkhole. No impacts from the driveway or parking area to the sinkhole were observed during the field review. SH-01 should be protected with erosion and sediment control measures during any future development near the sinkhole.

SH-02 – SH-02 is approximately 2000 feet long, 1400 feet wide, and 21 feet deep. It encompasses 39 acres although only approximately 1.2 acres fall within the property boundary of the Site. The sinkhole has well developed grass and wildflowers within it. No bedrock or surface openings were observed within the portion of the sinkhole on the Site.

SH-02 Mitigation – SH-02 should receive an SCA in accordance with Monroe County Planning guidelines. The location of the SCA should be based on a Site survey. SH-02 should be protected with erosion and sediment control measures during any future development near the sinkhole.

SH-03 – SH-03 is approximately 200 feet in diameter and 4 feet deep. SH-03 encompasses 0.7 acres and has well-developed grass within it. No bedrock or surface openings were observed within the sinkhole. Some areas of disturbed soil and mounded bare soil are present within the sinkhole. The parking area at the Site encroaches on approximately 0.01 acres of the sinkhole. No impacts from the parking

area to the sinkhole were observed during the field review. An earthen mound has been installed on the east side of the sinkhole. There are no obvious signs this mound has impacted the sinkhole or the adjacent property.

SH-03 Mitigation – SH-03 should receive an SCA in accordance with Monroe County Planning guidelines. The location of the SCA should be based on a Site survey. The parking area at the Site encroaches on approximately 0.01acres of the sinkhole. No impacts from the parking area to the sinkhole were observed during the field review. The areas of disturbed soil within SH-03 should be graded and seeded to prevent impacts to the sinkhole. SH-03 should be protected with erosion and sediment control measures during any future development near the sinkhole.

6 – Study Limitations

The identification of karst features at the Site was limited to surface inspection. No subsurface investigations were conducted. Undocumented karst features are possible in the subsurface.

7 – Summary

A desktop review and field survey were conducted at the Site to identify karst features. Three sinkholes are present at the Site. All three sinkholes should receive an SCA and should be protected with erosion and sediment control measures during future development. There are no visible impacts from the existing driveway or parking area on any of the sinkholes. The field survey was limited to surface inspection with no subsurface investigation. Unknown karst features are possibly present in the subsurface at the Site. If a previously unknown karst feature is discovered during construction activities the feature should be protected with erosion and sediment control measures and inspected by a karst specialist.

hydrogeology inc.
1211 S Walnut St
Bloomington, IN 47401

HGI appreciates the opportunity to provide this summary report. If you have any questions, concerns, or comments please do not hesitate to contact me directly at (812) 219-0210.

Sincerely,

Hydrogeology Inc.

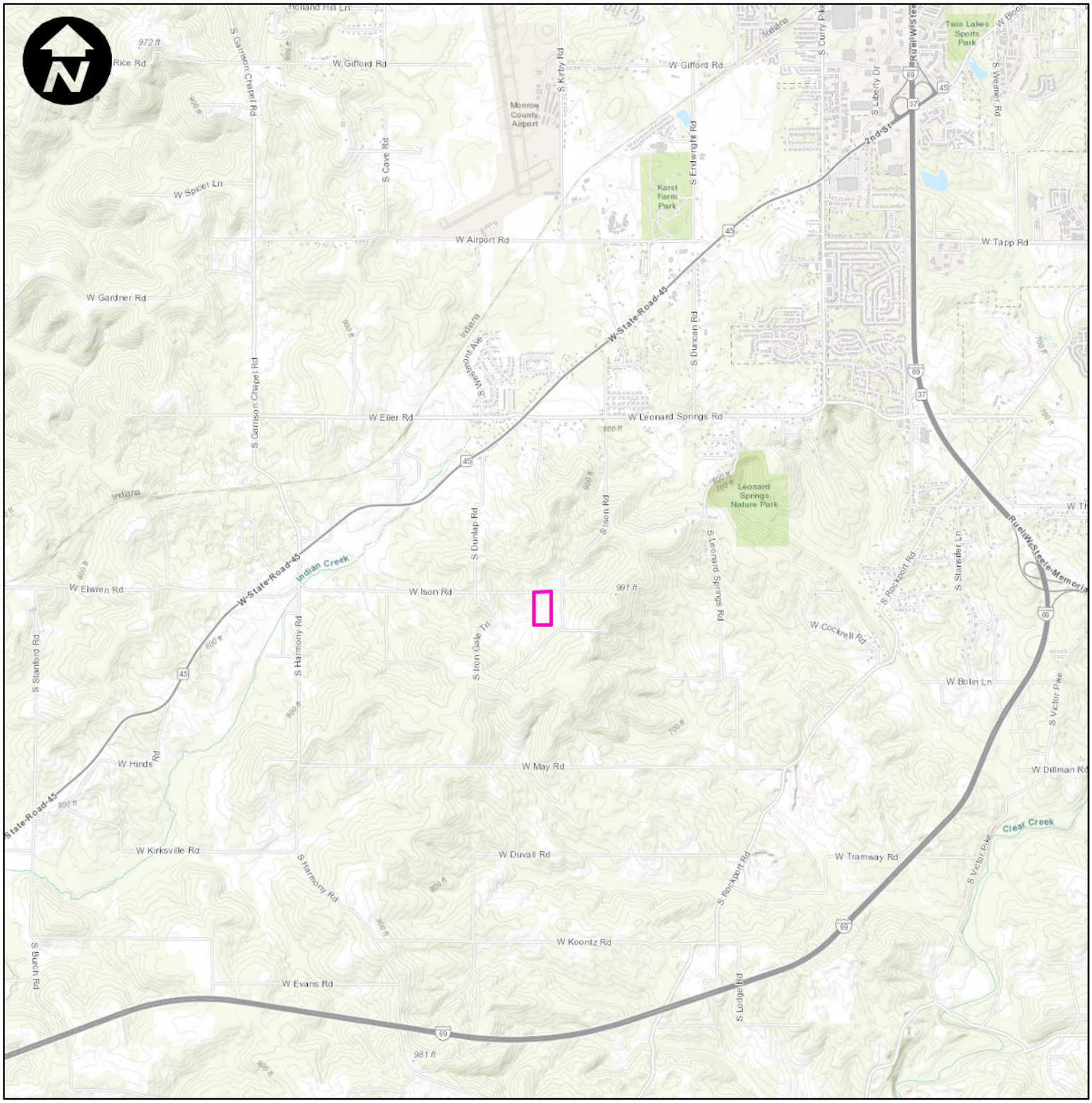
Jason N. Krothe, LPG IN-2511
President

hydrogeology inc.
1211 S Walnut St
Bloomington, IN 47401

References

Carr, D. D., Leininger, R. K., and Golde, M. V., 1978, Crushed stone resources of the Blue River Group (Mississippian) of Indiana: Indiana Geological Survey Bulletin 52, 225 p.

Hasenmueller, W. A., Estell, C. M., Keith, B., and Thompson, T. A., 2009, Bedrock geologic map of Monroe County, Indiana: Indiana Geological Survey Miscellaneous Map 73, scale 1:48,000.



LEGEND

Site

0 0.5 1 Miles

Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

6251 W ISON RD BLOOMINGTON, IN KARST SURVEY

SITE LOCATION

hydrogeology inc.

FIGURE 1

LEGEND

Site

0 50 100 200 Feet

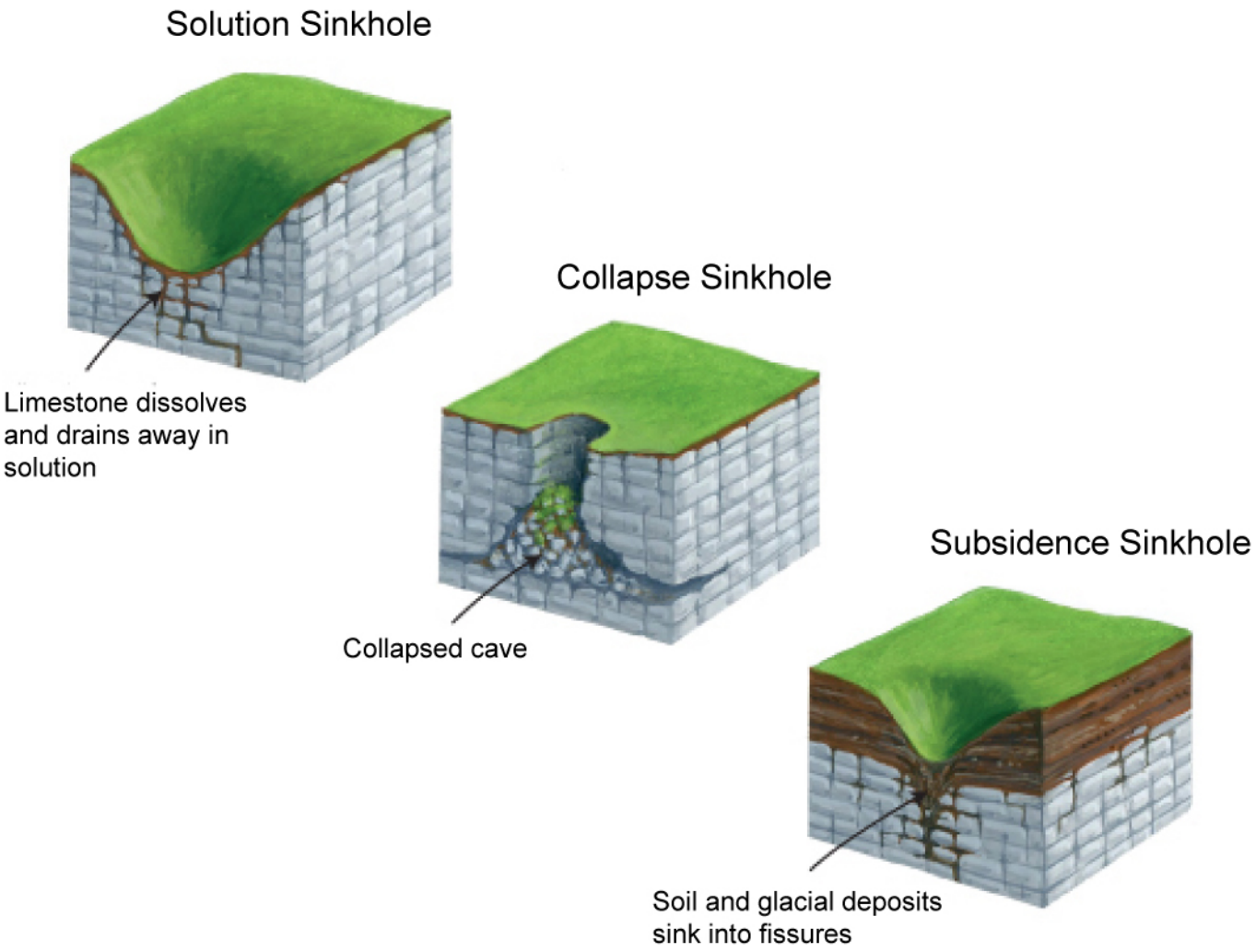
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

6251 W ISON RD
BLOOMINGTON, IN
KARST SURVEY

SITE

hydrogeology inc.

FIGURE
2

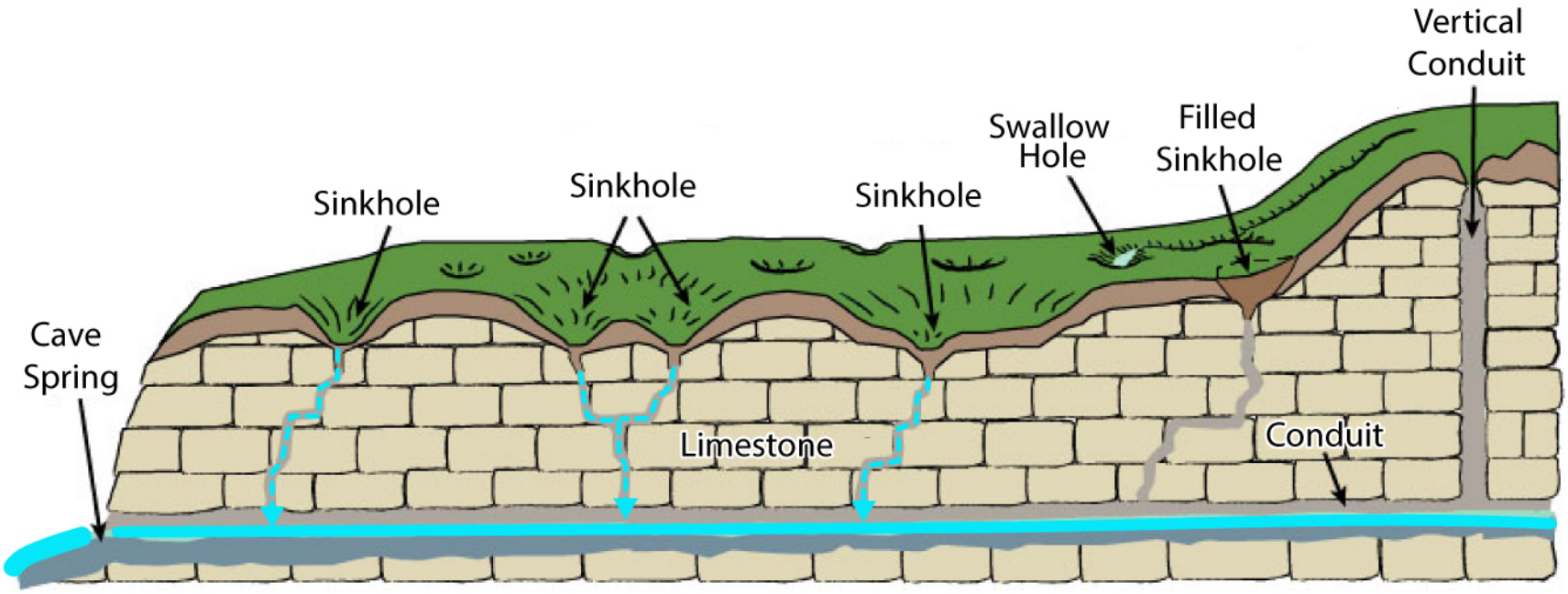


6251 W ISON RD
BLOOMINGTON, IN
KARST SURVEY

SINKHOLE TYPES

hydrogeology inc.

FIGURE
3

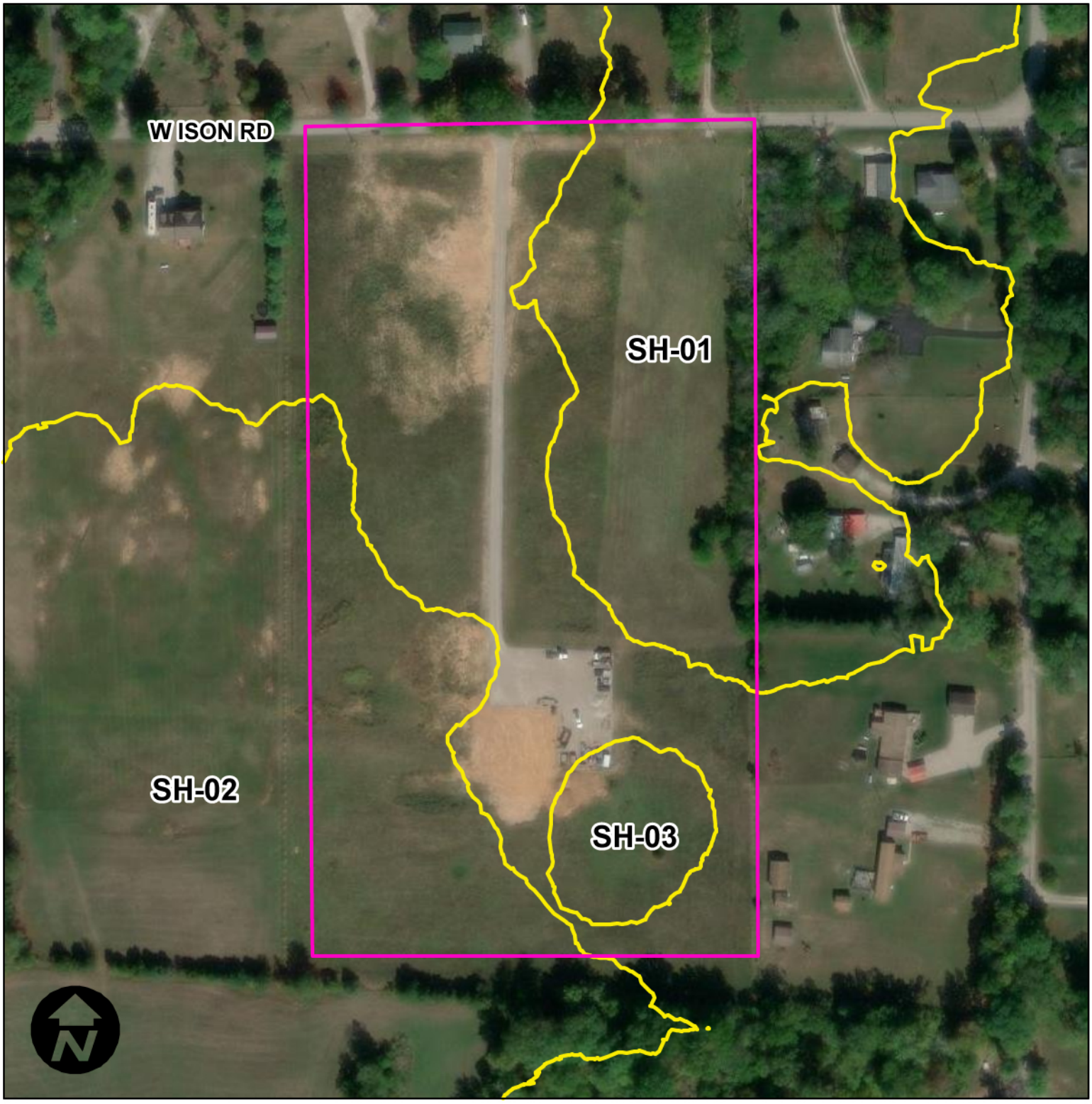


6251 W ISON RD
BLOOMINGTON, IN
KARST SURVEY

CONCEPTUAL KARST CROSS SECTION

hydrogeology inc.

FIGURE
4



LEGEND

Site

0 50 100 200 Feet

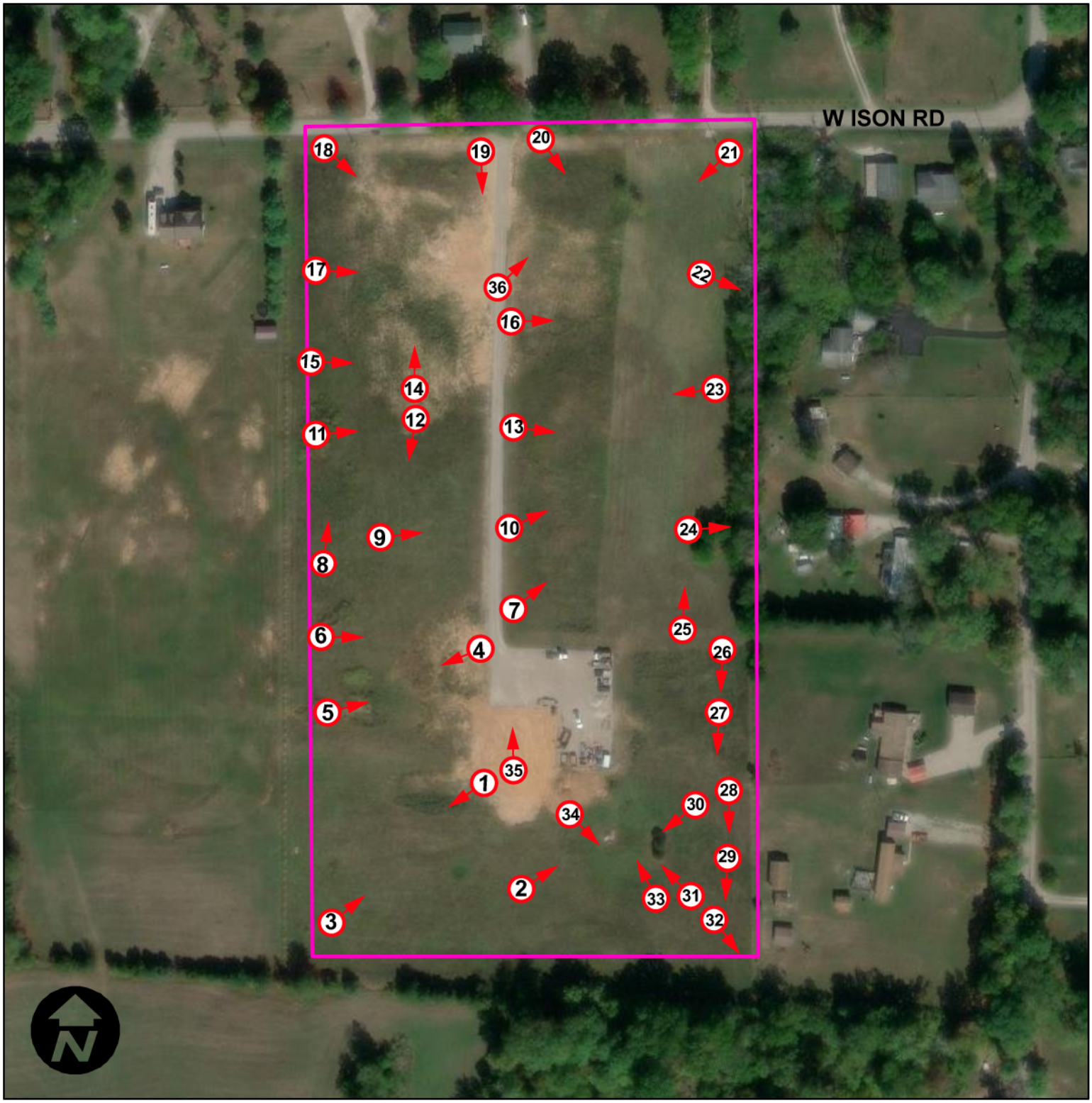
Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

6251 W ISON RD
BLOOMINGTON, IN
KARST SURVEY

SINKHOLES

hydrogeology inc.

FIGURE
5



LEGEND

Site

0 50 100 200 Feet

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

6251 W ISON RD
BLOOMINGTON, IN
KARST SURVEY

PHOTOGRAPH ORIENTATION

hydrogeology inc.

FIGURE
A1

Photograph Number: 1 **Coordinates (UTM Meters)** NA **Photograph Date:** 5-24-24 **Comments:** Southwest corner of the Site looking at SH-02. Recommended treatment: NA	

Photograph Number: 2 **Coordinates (UTM Meters)** NA **Photograph Date:** 5-24-24 **Comments:** South side of the Site looking at SH-03. Recommended treatment: NA	

Photograph Number: 3 **Coordinates (UTM Meters)** NA **Photograph Date:** 5-24-24 **Comments:** Southwest corner of the Site looking northeast. Recommended treatment: NA	

Photograph Number: 4 **Coordinates (UTM Meters)** NA **Photograph Date:** 5-24-24 **Comments:** Center of the Site looking west. Recommended treatment: NA	

Photograph Number: 5 **Coordinates (UTM Meters)** NA **Photograph Date:** 5-24-24 **Comments:** West side of the Site looking east. Recommended treatment: NA	

Photograph Number: 6 **Coordinates (UTM Meters)** NA **Photograph Date:** 5-24-24 **Comments:** West side of the Site looking east. Recommended treatment: NA	

Photograph Number: 7 **Coordinates (UTM Meters)** NA **Photograph Date:** 5-24-24 **Comments:** Center of the Site looking at SH-01. Recommended treatment: NA	

Photograph Number: 8 **Coordinates (UTM Meters)** NA **Photograph Date: 5**-24-24 **Comments:** West side of the Site looking north. Recommended treatment: NA	

Photograph Number: 9 **Coordinates (UTM Meters)** NA **Photograph Date:** 5-24-24 **Comments:** West side of the Site looking southeast. Recommended treatment: NA	

Photograph Number: 10 **Coordinates (UTM Meters)** NA **Photograph Date: 5**-24-24 **Comments:** Center of the Site looking at SH-01. Recommended treatment: NA	

Photograph Number: 11 **Coordinates (UTM Meters)** NA **Photograph Date:** 5-24-24 **Comments:** West side of the Site looking east. Recommended treatment: NA	

Photograph Number: 12 **Coordinates (UTM Meters)** NA **Photograph Date: 5**-24-24 **Comments:** West side of the Site looking south. Recommended treatment: NA	

Photograph Number: 13 **Coordinates (UTM Meters)** NA **Photograph Date:** 5-24-24 **Comments:** Center of the Site looking at SH-01. Recommended treatment: NA	

Photograph Number: 14 **Coordinates (UTM Meters)** NA **Photograph Date: 5**-24-24 **Comments:** Center of the Site looking north. Recommended treatment: NA	

Photograph Number: 15 **Coordinates (UTM Meters)** NA **Photograph Date:** 5-24-24 **Comments:** West side of the Site looking east. Recommended treatment: NA	

Photograph Number: 16 **Coordinates (UTM Meters)** NA **Photograph Date: 5**-24-24 **Comments:** Center of the Site looking at SH-01. Recommended treatment: NA	

Photograph Number: 17 **Coordinates (UTM Meters)** NA **Photograph Date:** 5-24-24 **Comments:** West side of the Site looking east. Recommended treatment: NA	

Photograph Number: 18 **Coordinates (UTM Meters)** NA **Photograph Date: 5**-24-24 **Comments:** Northwest corner of the Site looking southeast. Recommended treatment: NA	

Photograph Number: 19 **Coordinates (UTM Meters)** NA **Photograph Date:** 5-24-24 **Comments:** North side of the Site looking south. Recommended treatment: NA	

Photograph Number: 20 **Coordinates (UTM Meters)** NA **Photograph Date: 5**-24-24 **Comments:** North side of the Site looking at SH-01. Recommended treatment: NA	

Photograph Number: 21 **Coordinates (UTM Meters)** NA **Photograph Date:** 5-24-24 **Comments:** North side of the Site looking at SH-01. Recommended treatment: NA	

Photograph Number: 22 **Coordinates (UTM Meters)** NA **Photograph Date: 5**-24-24 **Comments:** East side of the Site looking at lowest point in SH-01. Recommended treatment: NA	

Photograph Number: 23 **Coordinates (UTM Meters)** NA **Photograph Date:** 5-24-24 **Comments:** East side of the Site looking at SH-01. Recommended treatment: NA	

Photograph Number: 24 **Coordinates (UTM Meters)** NA **Photograph Date: 5**-24-24 **Comments:** East side of the Site looking at SH-01. Recommended treatment: NA	

Photograph Number: 25 **Coordinates (UTM Meters)** NA **Photograph Date:** 5-24-24 **Comments:** East side of the Site looking north at SH-01. Recommended treatment: NA	

Photograph Number: 26 **Coordinates (UTM Meters)** NA **Photograph Date: 5**-24-24 **Comments:** East side of the Site looking south. Recommended treatment: NA	

Photograph Number: 27 **Coordinates (UTM Meters)** NA **Photograph Date:** 5-24-24 **Comments:** East side of the Site looking south. Recommended treatment: NA	

Photograph Number: 28 **Coordinates (UTM Meters)** NA **Photograph Date: 5**-24-24 **Comments:** Disturbed soil on the edge of SH-03. Recommended treatment: NA	

Photograph Number: 29 **Coordinates (UTM Meters)** NA **Photograph Date:** 5-24-24 **Comments:** Mound along east side of SH-03. Recommended treatment: NA	

Photograph Number: 30 **Coordinates (UTM Meters)** NA **Photograph Date: 5**-24-24 **Comments:** Disturbed soil on the edge of SH-03. Recommended treatment: NA	

Photograph Number: 31 **Coordinates (UTM Meters)** NA **Photograph Date:** 5-24-24 **Comments:** Southeast corner of the Site looking at SH-03. Recommended treatment: NA	

Photograph Number: 32 **Coordinates (UTM Meters)** NA **Photograph Date: 5**-24-24 **Comments:** Disturbed soil on the edge of SH-03. Recommended treatment: NA	

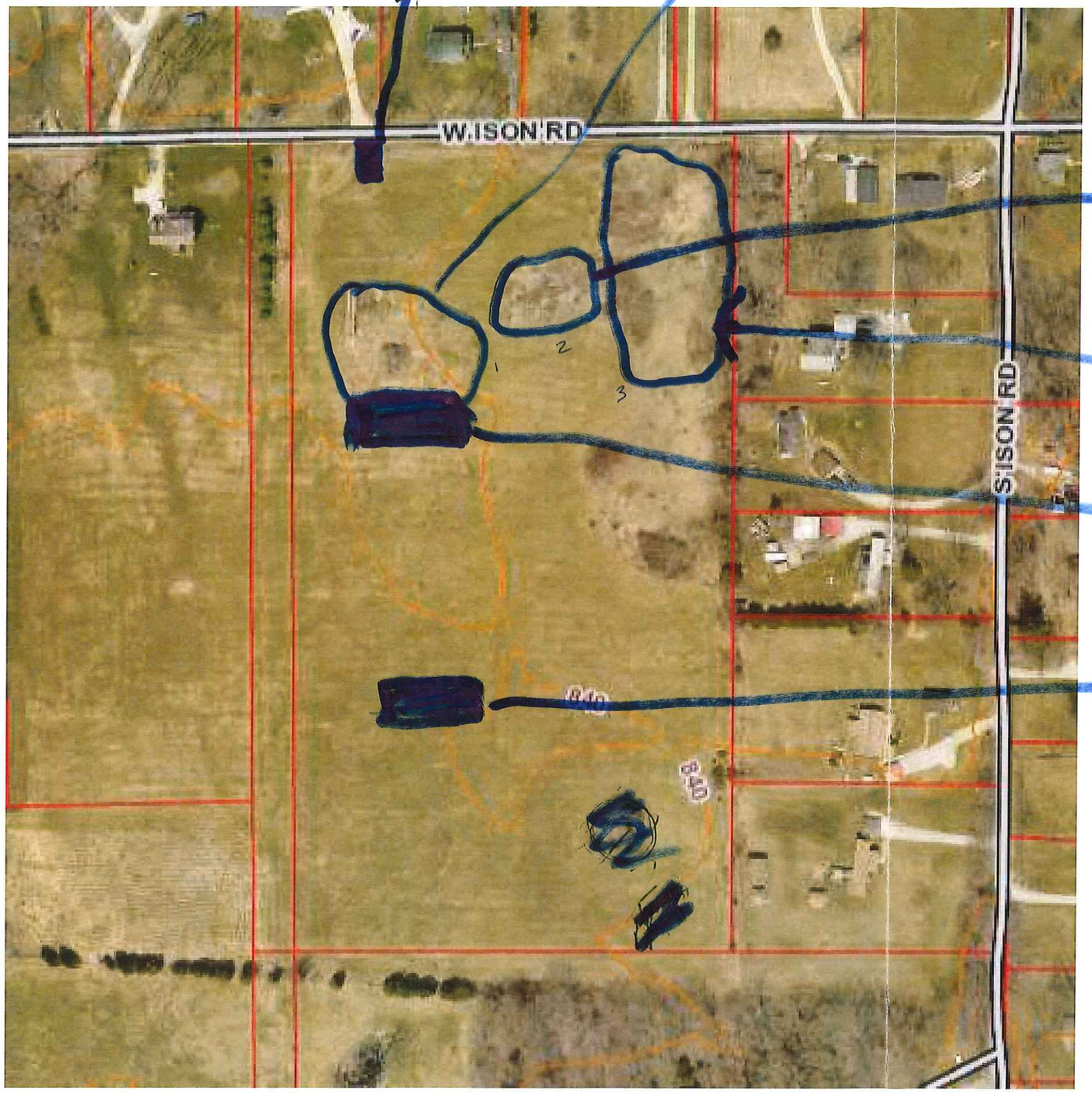
Photograph Number: 33 **Coordinates (UTM Meters)** NA **Photograph Date:** 5-24-24 **Comments:** Disturbed soil in SH-03. Recommended treatment: NA	

Photograph Number: 34 **Coordinates (UTM Meters)** NA **Photograph Date: 5**-24-24 **Comments:** Looking at SH-03. Recommended treatment: NA	

Photograph Number: 35 **Coordinates (UTM Meters)** NA **Photograph Date:** 5-24-24 **Comments:** Disturbed soil on the edge of SH-03. Recommended treatment: NA	

Photograph Number: 36 **Coordinates (UTM Meters)** NA **Photograph Date: 5**-24-24 **Comments:** Center of the site looking north-east at SH-01. Recommended treatment: NA	

Site Plan from 2016 Grading Permit
issued by Planning Department



Previous Hole Dug By previos owner. I filled in.

Also was brush along road that I cleaned up.

Rock put there by previos owner I cover rock with dirt

I was brush I just cleaned up brush Did nothing with Dirt

eventually purpose house

eventulally purpose a garage

Dirt Filled halfacre!

house and garage Later. Rgt now just trying to get mess cleaned up that previous owner left

↑ 2 blobs were mistakes