

# Asher Engineering, Inc.

*Environmental and Engineering Consulting*

## **Subject: Karst Observations – 10619 Watterson Trail Site**

Concept Development Group, Inc.

PO Box #9 Dorchester PO Dorchester, ON, N0L 1G0

Re: Geotechnical Engineering Study 10619 Watterson Trail, Jeffersontown, KY 40299

Asher Project No. 25-072

During site reconnaissance for the referenced project, including a walkover of the site, no surface-level evidence of karst features such as sinkholes or depressions was observed. The subsurface exploration also encountered shallow, competent bedrock refusal without voids or other karst indicators in the borings.

However, the site is underlain by carbonate bedrock (Laurel Dolomite, Osgood Formation, and Brassfield Dolomite), which is regionally classified as **PRONE** (moderate karst potential) on the Kentucky Geological Survey's 1:500,000-scale Karst Potential Index. Documented sinkholes exist within approximately a 1.5-mile radius of the site, consistent with this geologic classification.

No dedicated karst investigation (e.g., geophysics or LiDAR) was included in the original scope. Please contact us if additional evaluation is desired.

Sincerely,



Austin Horvat, PE

# **GEOTECHNICAL ENGINEERING STUDY**

**10619 WATTERSON TRAIL  
JEFFERSONTOWN, KY 40299  
ASHER PROJECT NO. 25-072**

**Prepared For:**

**Concept Development Group, Inc.  
PO Box # 9  
Dorchester PO, ON, N0L 1G0**

**Prepared By:**

**Asher Engineering, Inc.  
1021 S. Floyd Street  
Louisville, Kentucky 40203**

**October 10, 2025**

October 10, 2025

Concept Development Group, Inc.  
PO Box # 9  
Dorchester PO, ON, N0L 1G0

Re: Geotechnical Engineering Report  
10619 Watterson Trail Jeffersontown, KY  
Jeffersontown, KY 40299

Asher Engineering has completed a Geotechnical Engineering study for the proposed apartment buildings located at 10619 Watterson Trail Jeffersontown, KY 40299

This report contains the findings of our subsurface exploration, and our inspection of the recent sitework to establish rough finish grades, with geotechnical recommendations to aid design of foundations, and pavements, and final sitework recommendations.

We appreciate the opportunity to be of service to you on this project. If we can be of further assistance, or if you have any questions regarding this report, please contact our office.

Sincerely,



Richard A. Linker, P. E.  
President



Austin Horvat, P.E.



# TABLE OF CONTENTS

<b>LETTER OF TRANSMITTAL .....</b>	<b>i</b>
<b>1.0 PROJECT INFORMATION .....</b>	<b>1</b>
<b>2.0 SUBSURFACE EXPLORATION.....</b>	<b>1</b>
<b>3.0 DESIGN RECOMMENDATIONS .....</b>	<b>3</b>
3.1 Site Development.....	3
3.2 Foundations.....	3
3.3 Floor Slabs .....	4
3.4 Below Grade Walls .....	4
3.5 Pavements .....	5
<b>4.0 CONSTRUCTION RECOMMENDATIONS .....</b>	<b>6</b>
4.1 Subgrade Preparation .....	6
4.2 Engineered Fill.....	6
4.3 Foundation Excavations.....	6
4.4 Construction Dewatering .....	6
<b>5.0 QUALIFICATIONS .....</b>	<b>7</b>

## APPENDICES

- Location of Test Borings
- Test Boring Logs
- Site Location
- Historical Aerial Photographs

## 1.0 PROJECT INFORMATION

The project site, located at the northwest corner of Watterson Trail and Bluebird Lane in Jeffersontown, KY (40299), comprises a 5.56-acre rectangular tract. The site is primarily an open, grass-covered lot with mature trees along its boundaries and a single-story residential duplex in the southeastern quadrant. Historical aerial imagery indicates prior development along the southern boundary, adjacent to Watterson Trail, with the site maintaining its current configuration since approximately 2002. The terrain slopes downward from an elevation of 705 ft (southwest corner) to 671 ft (northeast corner). The proposed development includes four multi-story residential apartment buildings with a semi-below-grade parking garage. Our geotechnical assessment suggests the site is suitable for shallow foundations or drilled piers.

## 2.0 SUBSURFACE CONDITIONS

The subsurface conditions were explored by conducting 16 test borings at the locations shown on the sketch in the Appendix. (Boring 1 was not accessible.) The boring logs (also included in the Appendix) describe the materials and conditions encountered at each location. The borings encountered similar subsurface conditions across the site with medium stiff silty clay soil underlain by weathered Waldron Shale followed by Louisville Limestone bedrock. The on-site soil is suitable for use as structural fill. No water was noted in any of the test borings. The borings refused on limestone at the depths summarized below in *Table 1 Depth to Bedrock*.

During excavation at the site, particularly for the semi-below-grade parking garage, un-rippable, moderately weathered Shale may be encountered above intact bedrock. This shale, may require hoe-ramming or controlled blasting for practical removal. The weathered shale is unsuitable for caisson socketing due to its compressibility under high structural loads. Caissons should be designed to penetrate through this layer, targeting a 2 ft socket into intact limestone. The estimated depths to un-rippable shale are summarized below in *Table 2 Depth to Un-Rippable Rock*.

Table 1 Depth to Bedrock

Boring	Depth to Bedrock (ft)	Surface Elevation (ft)**	Bedrock Elevation (ft)
B1			
B2	7.75	684	676.25
B3	11.00	688	677.00
B4	8.91	687	678.09
B5	6.41	691	684.59
B6	11.50	694	682.50
B7	12.50	695	682.50
B8	9.33	703	693.67
B9	NA	NA	NA
B10	12.00	703	691.00
B11	10.25	698	687.75
B12	4.91	696	691.09
B13	5+	688	683+
B14	5+	702	697+
B15	5+	696	691+
B16	5+	694	689+
**Elevations taken from google earth and are approximate			

Table 2 Depth to Un-Rippable Rock

Boring	Depth to Competent Shale*	Surface Elevation (ft)**	Competent Shale Elevation (ft)
B1			
B2	6.41	684	677.59
B3	10.00	688	678.00
B4	8.50	687	678.50
B5	6.00	691	685.00
B6	6.50	694	687.50
B7	7.50	695	687.50
B8	9.33	703	693.67
B9	NA	NA	NA
B10	12.00	703	691.00
B11	10.25	698	687.75
B12	4.91	696	691.09
B13	5+	688	683+
B14	5+	702	697+
B15	5+	696	691+
B16	5+	694	689+
*Depths are to competent (un-rippable) Shale or Bedrock, whichever is shallower **Elevations taken from google earth and are approximate			

## **3.0 DESIGN RECOMMENDATIONS**

### **3.1 Site Development**

Subsurface conditions at the site are generally favorable for supporting the proposed development. However, deleterious construction debris encountered from previous developments (e.g., as observed in Boring B-9) is unsuitable for use as structural fill and must be removed and replaced with approved materials. Additional such material is likely to be encountered during excavations in the southern portion of the site, adjacent to Watterson Trail. With the exception of this debris, the onsite soils are suitable for reuse as structural

### **3.2 Foundations**

#### **Shallow Foundations**

Shallow foundations may be used to support the buildings. Shallow foundations can be proportioned using a net allowable soil bearing capacity of 2,500 psf. Site Classification C can be used for seismic design. Should any shallow footings encounter old fill material. The footings must be undercut to firm natural soil. Any undercut footing excavations can be backfilled with KY No. 57 crushed limestone (or similar) to re-establish the planned bottom of footing elevation.

#### **Drilled Pier Foundations.**

Drilled pier foundations may also be used to support the buildings. Drilled piers must bear on sound continuous limestone bedrock. The depth to bedrock varies across the site but is generally found at about 5 ft to 12.5 ft. below existing grade. To assess the quality of the limestone, 5' cores were performed in borings 2, 8, and 12, with Rock Quality Designation (RQD) ranging from 70% to 96%, generally considered "good" bearing rock. The piers can be designed for an allowable rock bearing capacity of 48,000 lb. per sq. ft. (24 tons / sq. ft.). It may be necessary for the drilled pier contractor to drill through and remove some weathered bedrock to reach sound continuous bedrock suitable for support

of the new structure. The drilled pier excavation should be extended into the bedrock at least 2 ft.

Special care should be taken during construction when identifying suitable bearing material. In order to confirm the integrity of the bearing rock, the geotechnical engineer should observe the bearing surface to ensure that the drilled pier excavation extends into sound bedrock, and that the excavation is thoroughly cleaned of weathered rock and debris.

A 2-inch diameter probe hole should be drilled to a depth of at least 5 ft. into the rock for each drilled pier to identify any discontinuities in the bedrock. If the test hole reveals discontinuities in the bedrock, the drilled pier would be drilled. The drilled shaft excavation would be inspected to confirm that all loose soil, mud, or other extraneous materials are removed, and that the shaft bottom is level. Provisions should be made for water removal from the drilled shaft excavation.

Drilled Piers designed and constructed as outlined above would experience foundation settlements of less than 1/2 in.

### **3.3 Floor Slabs**

The slab should be supported on a 6-in. layer of KY DGA crushed stone compacted to 100 percent of the standard Proctor. A Modulus of Subgrade Reaction, K-value of 150 pci can be used for floor slab design.

### **3.4 Below Grade Walls**

Below grade walls and retaining walls should be designed to provide sufficient drainage to relieve hydrostatic pressure. A clean, free draining granular fill such as KY No. 57 stone should be used to backfill against below grade walls. The backfill zone should be drained using a perforated pipe placed at the base of the wall. An Equivalent Hydrostatic Pressure of 50 pcf can be used to design below grade walls. A unit weight of 130 pcf should be used for the granular backfill.

### 3.5 Pavements

Assuming proper subgrade preparation and drainage, a California Bearing Ratio (CBR) value of 3 is recommended.

In areas that would be limited to automobiles and light trucks, the following asphalt pavement section is recommended:

<i>Automobile and Light Truck Areas</i>	1.5 in. asphalt concrete surface
	2.0 in. asphalt concrete base
	4.0 in. IN No. 53 or Ky DGA
	4.0 in. Surge or 4-minus size crushed stone

Areas that may experience heavier loading conditions should be provided with the following pavement section.

<i>Heavy Truck Areas</i>	1.5 in. asphalt concrete surface
	3.0 in. asphalt concrete base
	4.0 in. IN No. 53 or Ky DGA
	8.0 in. Surge or 4-minus size crushed stone

The following rigid pavement section may be used.

<i>Rigid Pavement (Concrete)</i>	6.0 in. Concrete
	6.0 in. KY DGA

## **4.0 CONSTRUCTION RECOMMENDATIONS**

Variations in subsurface conditions must be expected during construction. It is therefore recommended that the geotechnical engineer be retained to review the soils-related phases of the project and to correlate the subsurface data with the soil conditions that are encountered during construction.

### **4.1 Subgrade Preparation**

Prior to construction or the placement of new engineered fill, the exposed subgrade should be evaluated by the project geotechnical engineer. The evaluation should include proofrolling of the exposed subgrade with a loaded dump truck. If unsuitable material were disclosed, the geotechnical engineer would recommend an appropriate remedial measure at that time.

### **4.2 Engineered Fill**

Engineered fill should be placed on a prepared subgrade that has been evaluated by the geotechnical engineer. Engineered fill placed in the building pad should be compacted to at least 98 percent of the standard Proctor maximum dry density (ASTM D-698). Fill placed in paved areas may be compacted to 95 percent; and fill placed in landscape (green) areas may be compacted to 90 percent. The geotechnical engineer or his representative should monitor engineered fill placement and compaction operations. Field density tests should be performed on each lift as necessary to ensure that the specified compaction is being achieved.

### **4.3 Foundation Excavations**

All concrete for foundations should be poured the same day the excavation is made. If this is not practical, the foundation excavation should be adequately protected. Soils exposed in the base of all excavations must be protected against rain and freezing. Surface water should be drained away from all excavations and not allowed to pond.

### **4.4 Construction Dewatering**

At the time of our field investigation, groundwater was not encountered in any of the test borings.

## 5.0 QUALIFICATIONS

Our professional services have been performed, our findings obtained, and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. This warranty is in lieu of all other warranties, either express or implied. Asher, Inc. is not responsible for the independent conclusion, opinions or recommendations made by others based on the field exploration and laboratory test data presented in this report.

The nature and extent of variation and change in the subsurface conditions at the site may not become evident until the course of construction. Construction monitoring by the geotechnical engineer or his representative is therefore considered necessary to verify the subsurface conditions and to check that the soil connected construction phases are properly carried out. If significant variations or changes are in evidence, it may then be necessary to reevaluate the recommendations of this report.

Furthermore, if the project characteristics are altered significantly from those discussed in this report, if the project information contained in this report is incorrect, or if additional information becomes available, a review must be made to determine if any modification in the recommendations will be required.

**APPENDIX**

**Location of Test Borings**

**Test Boring Logs**

**Site Location**

**Historical Aerial Photographs**



# BORING LOG

**Asher Engineering**  
1021 South Floyd St.  
Louisville, KY 40203  
(502) 589-0073

Boring No.: 1 Page 1 of 1

ELEV.: \_\_\_\_\_

Project: Bluebird Lane

Project No.: 25-072

Location: 10619 Bluebird Ln, Jeffersontown KY

Client: Concept Development

Date: 09-29-2025

Elev (feet)	Depth (feet)	Sample Number	SPT Blows / 6"	N	Percent Moisture	Description of Material
	5					Location Not accessible
	10					
	15					
	20					
	25					

Notes:

# BORING LOG

**Asher Engineering**

**1021 South Floyd St.  
Louisville, KY 40203  
(502) 589-0073**

Boring No.: 2 Page 1 of 1

ELEV.: 684

Project: Bluebird Lane

Project No.: 25-072

Location: 10619 Bluebird Ln, Jeffersontown KY

Client: Concept Development

Date: 09-29-2025

Elev (feet)	Depth (feet)	Sample Number	SPT Blows / 6"	N	Percent Moisture	Description of Material	
	—	1	2-2-2	4		T.S. 8" Silty Clay (CL) - Soft, moist, brown	
	5 —	2	3-5-10	15		Silty Clay (CL) - Stiff, moist, brown	
	—	3	50/5"			Weathered Shale, Gray	
							<b>Augar Refusal 7' - 9"</b>
	10 —					Length of Core = 59.5" Length of Core piece > 4" = 57.625 <b>RQD = 96%</b>	
	15 —						
	20 —						
	25 —						

**Notes:**

# BORING LOG

**Asher Engineering**

**1021 South Floyd St.  
Louisville, KY 40203  
(502) 589-0073**

Boring No.:     3     Page 1 of 1

ELEV.:     688    

Project: Bluebird Lane

Project No.: 25-072

Location: 10619 Bluebird Ln, Jeffersontown KY

Client: Concept Development

Date: 09-29-2025

Elev (feet)	Depth (feet)	Sample Number	SPT Blows / 6"	N	Percent Moisture	Description of Material
	—	1	2-2-3	5		T.S. 8" Silty Clay (CL) - Firm, moist, brown
	5 —	2	2-2-4	6		Silty Clay (CL) - Stiff, moist, brown
	—	3	3-5-10	15		Weathered Shale, Gray
	10 —	4	6-12-22	34		Weathered Shale, Gray
	—					<b>Augar Refusal 11' - 0"</b>
	15 —					
	—					
	20 —					
	—					
	25 —					

**Notes:**

# BORING LOG

**Asher Engineering**  
**1021 South Floyd St.**  
**Louisville, KY 40203**  
**(502) 589-0073**

Boring No.: 4 Page 1 of 1

ELEV.: 687

Project: Bluebird Lane

Project No.: 25-072

Location: 10619 Bluebird Ln, Jeffersontown KY

Client: Concept Development

Date: 09-29-2025

Elev (feet)	Depth (feet)	Sample Number	SPT Blows / 6"	N	Percent Moisture	Description of Material
	—	1	3-4-3	7		T.S. 8" Silty Clay (CL) - Firm, moist, brown
	5 —	2	3-4-3	7		Silty Clay (CL) - Firm, moist, brown
	—	3	5-9-13	22		Weathered Shale, Gray
	—	4	50/5"			Shale, Gray
	10 —					<b>Refusal 8' -11"</b>
	—					
	15 —					
	—					
	20 —					
	—					
	25 —					

**Notes:**

# BORING LOG

**Asher Engineering**  
**1021 South Floyd St.**  
**Louisville, KY 40203**  
**(502) 589-0073**

Boring No.: 5 Page 1 of 1

ELEV.: 691

Project: Bluebird Lane

Project No.: 25-072

Location: 10619 Bluebird Ln, Jeffersontown KY

Client: Concept Development

Date: 09-29-2025

Elev (feet)	Depth (feet)	Sample Number	SPT Blows / 6"	N	Percent Moisture	Description of Material
	—	1	2-3-4	7		T.S. 8" Silty Clay (CL) - Firm, dry, brown
	5 —	2	5-9-12	21		Weathered Shale, Gray
	—	3	50/5"			Weathered Shale, Gray
	10 —					<b>Refusal 6' - 5"</b>
	—					
	15 —					
	—					
	20 —					
	—					
	25 —					

**Notes:**

# BORING LOG

**Asher Engineering**  
**1021 South Floyd St.**  
**Louisville, KY 40203**  
**(502) 589-0073**

Boring No.: 6 Page 1 of 1

ELEV.: 694

Project: Bluebird Lane

Project No.: 25-072

Location: 10619 Bluebird Ln, Jeffersontown KY

Client: Concept Development

Date: 09-29-2025

Elev (feet)	Depth (feet)	Sample Number	SPT Blows / 6"	N	Percent Moisture	Description of Material
	—	1	2-4-4	8		T.S. 8" Silty Clay (CL) - Firm, moist, brown
	5 —	2	2-3-3	6		Silty Clay (CL) - Firm, moist, brown
	—	3	11-20-50/5"			Weathered Shale, Gray
	10 —	4	11-18-50/5"			Weathered Shale, Gray
	—					<b>Augar Refusal 11' - 6"</b>
	15 —					
	—					
	20 —					
	—					
	25 —					

**Notes:**

# BORING LOG

**Asher Engineering**  
**1021 South Floyd St.**  
**Louisville, KY 40203**  
**(502) 589-0073**

Boring No.: 7 Page 1 of 1

ELEV.: 695

Project: Bluebird Lane

Project No.: 25-072

Location: 10619 Bluebird Ln, Jeffersontown KY

Client: Concept Development

Date: 09-29-2025

Elev (feet)	Depth (feet)	Sample Number	SPT Blows / 6"	N	Percent Moisture	Description of Material
		1	2-2-2	4		T.S. 8" Silty Clay (CL) - Soft, moist, brown
	5	2	2-3-5	8		Silty Clay (CL) - Firm, moist, brown
		3	4-12-16	28		Weathered Shale, Gray
	10	4	11-18-50/5"			Weathered Shale, Gray
	15					<b>Augar Refusal 12' - 6"</b>
	20					
	25					

**Notes:**

# BORING LOG

**Asher Engineering**

1021 South Floyd St.  
Louisville, KY 40203  
(502) 589-0073

Boring No.: 8 Page 1 of 1

ELEV.: 703

Project: Bluebird Lane

Project No.: 25-072

Location: 10619 Bluebird Ln, Jeffersontown KY

Client: Concept Development

Date: 09-29-2025

Elev (feet)	Depth (feet)	Sample Number	SPT Blows / 6"	N	Percent Moisture	Description of Material
	— — — — 5 — — — — — 10 — — — — — 15 — — — — — 20 — — — — — 25 —	1  2  3  4	2-3-4  4-5-6  5-5-10  3-50/4"	7  11  15		T.S. 7" Silty Clay (CL) - Firm, moist, brown  Silty Clay (CL) - Stiff, moist, brown  Silty Clay (CL) - Stiff, moist, brown  Weathered Limestone <b>Augar Refusal 9' - 4"</b>  Length of Core = 60.5" Length of Core piece > 4" = 42.75" <b>RQD = 70%</b>

**Notes:**



# BORING LOG

**Asher Engineering**  
**1021 South Floyd St.**  
**Louisville, KY 40203**  
**(502) 589-0073**

Boring No.: 10 Page 1 of 1

ELEV.: 703

Project: Bluebird Lane

Project No.: 25-072

Location: 10619 Bluebird Ln, Jeffersontown KY

Client: Concept Development

Date: 09-29-2025

Elev (feet)	Depth (feet)	Sample Number	SPT Blows / 6"	N	Percent Moisture	Description of Material
	—	1	7-9-10	19		T.S. 7" Silty Clay (CL) - V. Stiff, dry, brown
	5 —	2	6-4-4	8		Silty Clay (CL) - Stiff, dry, brown
	—	3	4-6-8	14		Silty Clay (CL) - Stiff, dry, dark brown
	10 —	4	4-5-6	11		Silty Clay (CL) - Stiff, dry, dark brown
	—					<b>Augar Refusal 12' - 0"</b>
	15 —					
	—					
	20 —					
	—					
	25 —					

**Notes:**

# BORING LOG

**Asher Engineering**  
**1021 South Floyd St.**  
**Louisville, KY 40203**  
**(502) 589-0073**

Boring No.: 11 Page 1 of 1

ELEV.: 698

Project: Bluebird Lane

Project No.: 25-072

Location: 10619 Bluebird Ln, Jeffersontown KY

Client: Concept Development

Date: 09-29-2025

Elev (feet)	Depth (feet)	Sample Number	SPT Blows / 6"	N	Perth Moisture	Description of Material
	—	1	5-5-5	10		T.S. 7" Silty Clay (CL) - Stiff, moist, brown
	5 —	2	4-5-6	11		Silty Clay (CL) - Stiff, dry, brown
	—	3	3-5-8	13		Silty Clay (CL) - Stiff, dry, dark brown
	10 —	4	2-4-5	9		Silty Clay (CL) - Stiff, dry, dark brown
	—					<b>Augar Refusal 10' - 3"</b>
	15 —					
	—					
	20 —					
	—					
	25 —					

**Notes:**

# BORING LOG

**Asher Engineering**  
**1021 South Floyd St.**  
**Louisville, KY 40203**  
**(502) 589-0073**

Boring No.: 12 Page 1 of 1

ELEV.: 696

Project: Bluebird Lane

Project No.: 25-072

Location: 10619 Bluebird Ln, Jeffersontown KY

Client: Concept Development

Date: 09-29-2025

Elev (feet)	Depth (feet)	Sample Number	SPT Blows / 6"	N	Percent Moisture	Description of Material
		1	3-4-3	7		T.S. 7" Silty Clay (CL) - firm, moist, brown
	5	2	2-3-50/5"			Silty Clay (CL) - Stiff, moist, brown
						<b>Refusal 4' - 11"</b>
	10					Length of Core = 51.5" Length of Core piece > 4" = 40.75 <b>RQD = 79%</b>
	15					
	20					
	25					

**Notes:**





# BORING LOG

Asher Engineering

1021 South Floyd St.  
Louisville, KY 40203  
(502) 589-0073

Boring No.: 15 Page 1 of 1

ELEV.: 696

Project: Bluebird Lane

Project No.: 25-072

Location: 10619 Bluebird Ln, Jeffersontown KY

Client: Concept Development

Date: 09-29-2025

Elev (feet)	Depth (feet)	Sample Number	SPT Blows / 6"	N	Percent Moisture	Description of Material
		1	2-3-3	6		T.S. 8" Silty Clay (CL) - Stiff, moist, brown
	5	2	2-2-3	5		Silty Clay (CL) - Stiff, dry, brown
						<b>Terminated at 5' - 0"</b>
	10					
	15					
	20					
	25					

Notes:

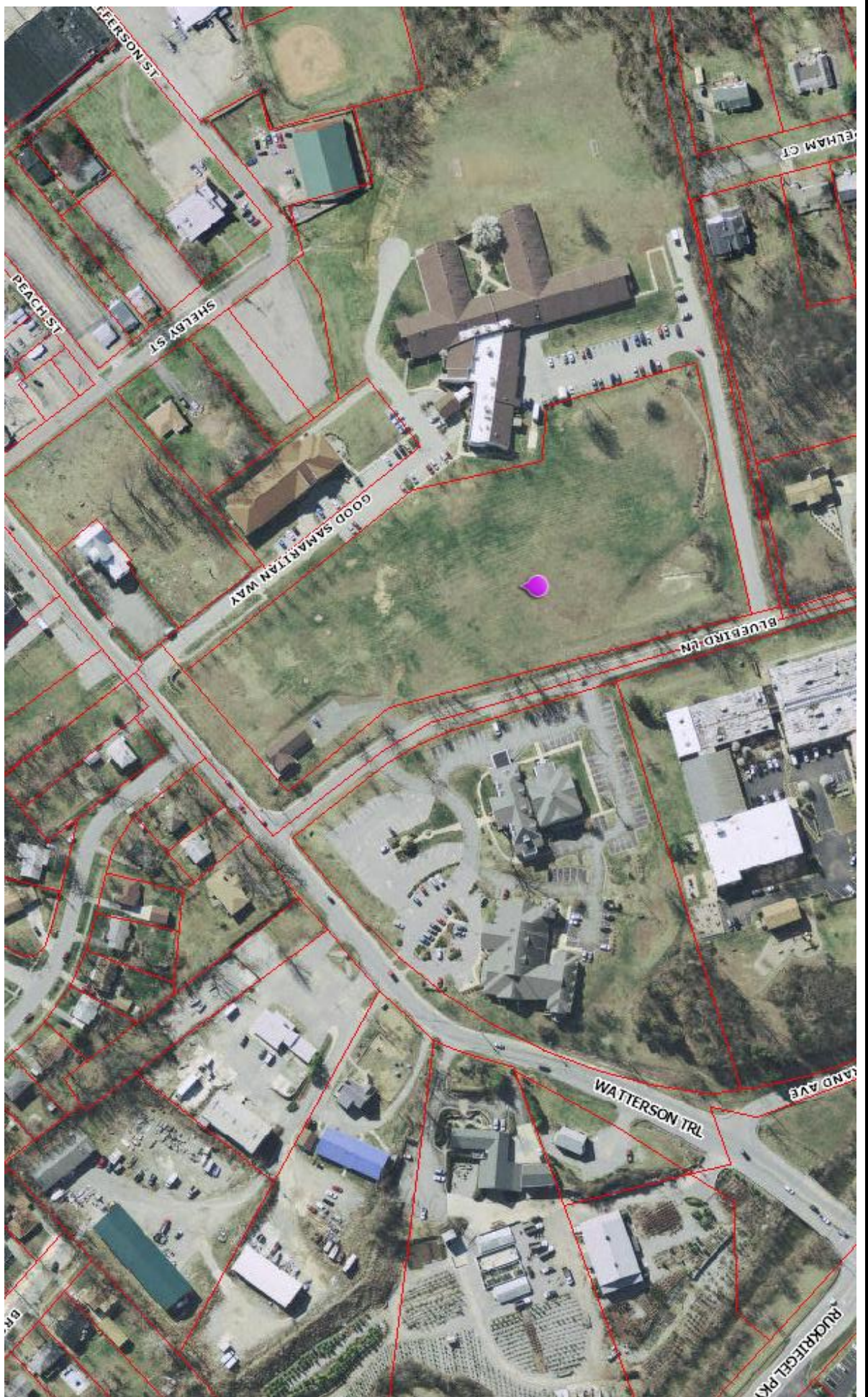




**Concept Development  
Group**

**10619 Watterson Trail  
Jeffersontown, KY**

**Asher Engineering, Inc.  
Project No.: 25-072  
Photo Date 2022**



**Concept Development  
Group**

**10619 Watterson Trail  
Jeffersontown, KY**

**Asher Engineering, Inc.  
Project No.: 25-072  
Photo Date 2009**



**Concept Development  
Group**

**10619 Watterson Trail  
Jeffersontown, KY**

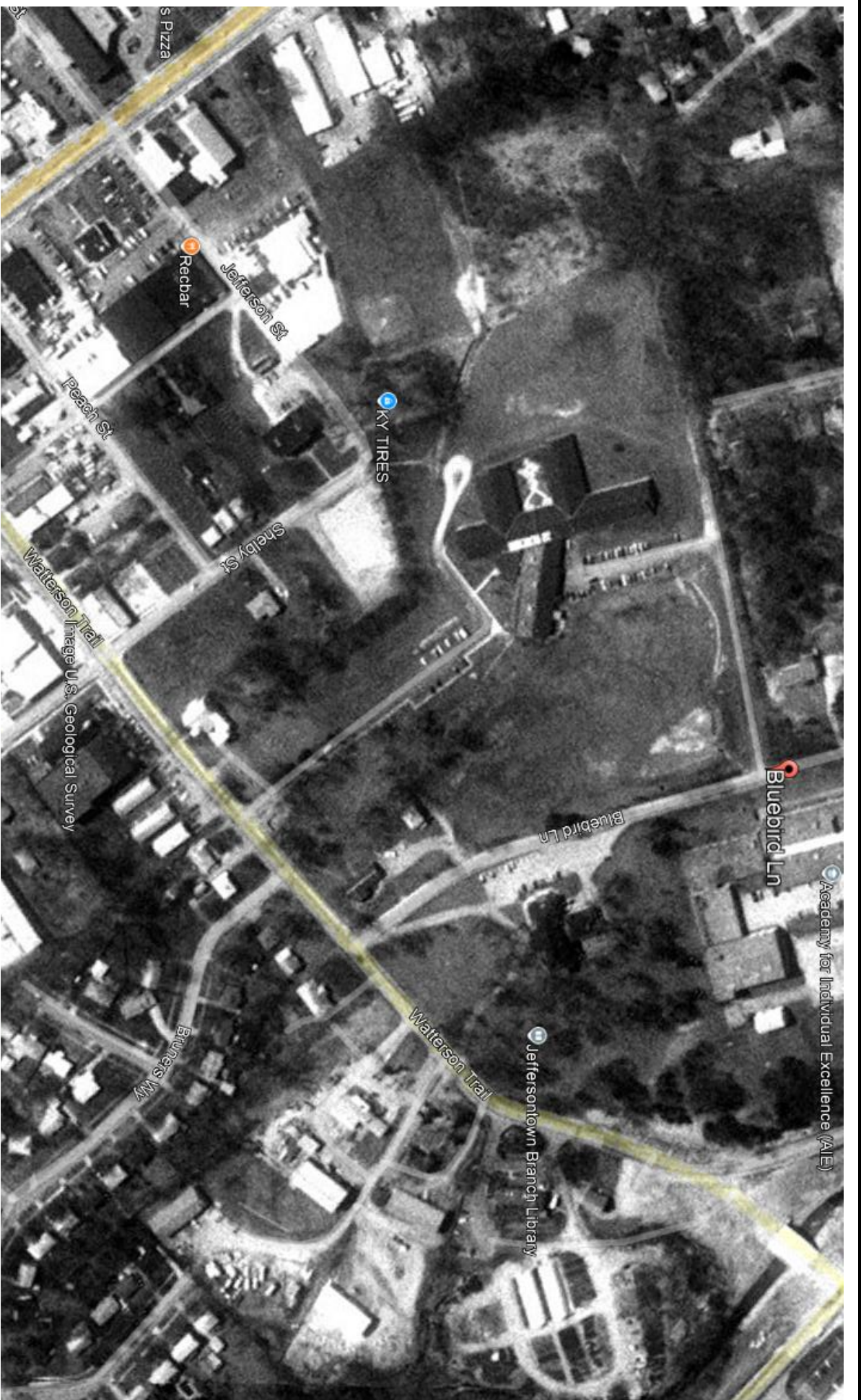
**Asher Engineering, Inc.  
Project No.: 25-072  
Photo Date 2000**



**Concept Development  
Group**

**10619 Watterson Trail  
Jeffersontown, KY**

**Asher Engineering, Inc.  
Project No.: 25-072  
Photo Date 1997**



**Concept Development  
Group**

**10619 Watterson Trail  
Jeffersontown, KY**

**Asher Engineering, Inc.  
Project No.: 25-072  
Photo Date 1993**