final report

April 26, 2021

Traffic Impact Study

Garrett Bridwell
Old Heady Road
Louisville, KY

Prepared for

Louisville Metro Planning Commission

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INTRODUCTION

The site plan for the proposed subdivision shows 119 single-family lots and 30 multi-family units on Old Heady Road in Louisville, KY. **Figure 1** displays a map of the site. Access from Old Heady Road to the site will be from an entrance opposite Chenoweth Run Road. The subdivision also connects to Saratoga Springs at Saddle Bend Way. The purpose of this study is to examine the traffic impacts of the development upon the adjacent highway system. For this study, the impact area was defined to be the intersection of Old Heady Road with Chenoweth Run Road.

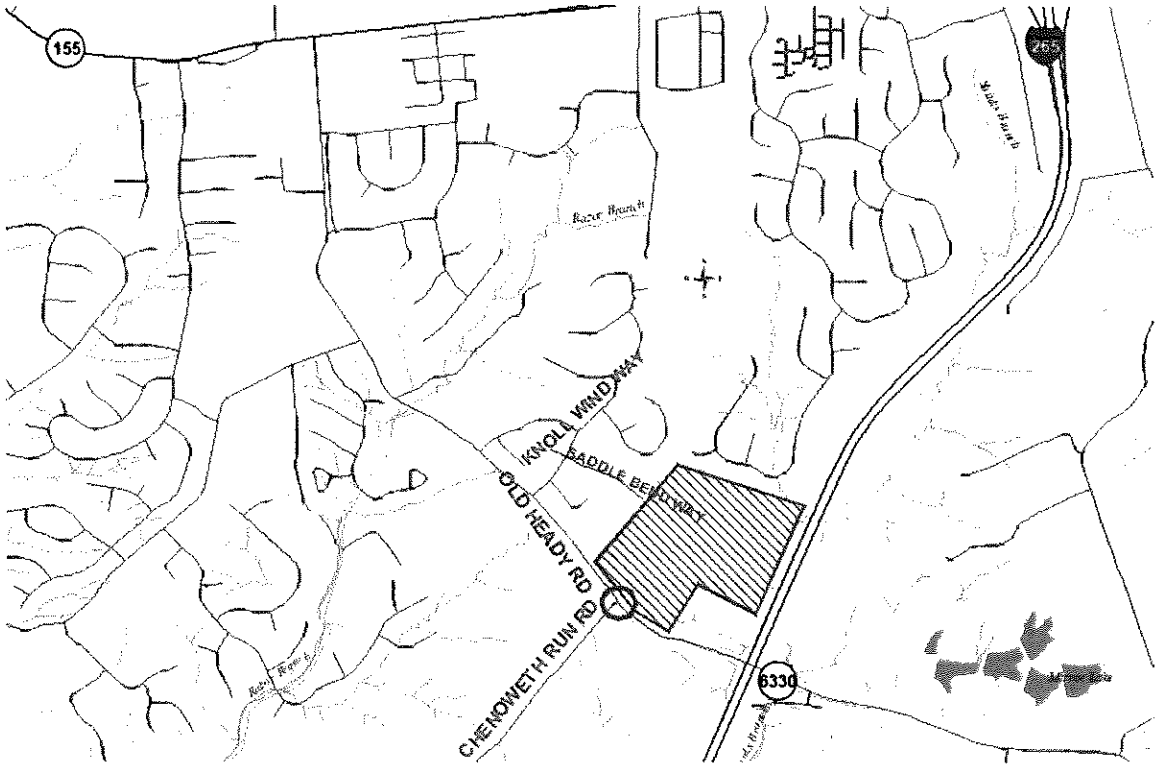


Figure 1. Site Map

EXISTING CONDITIONS

Old Heady Road is a maintained by Louisville Metro with an estimated 2021 ADT of 900 vehicles per day south of Knoll Wind Way, as estimated from the turning movement count. The road is a two-lane highway with ten-foot lanes with three-foot stabilized shoulders. The speed limit is 35 mph. There are no sidewalks. The intersection with Chenoweth Run Road is controlled with a stop sign.

Peak hour traffic count for the intersections was obtained on Tuesday, April 13, 2021. The a.m. peak hour occurred between 8:00 to 9:00 a.m. and the p.m. peak hour occurred between 5:00 and 6:00. **Figure 2** illustrates the existing a.m. and p.m. peak hour traffic volumes. The Appendix contains the full count data.

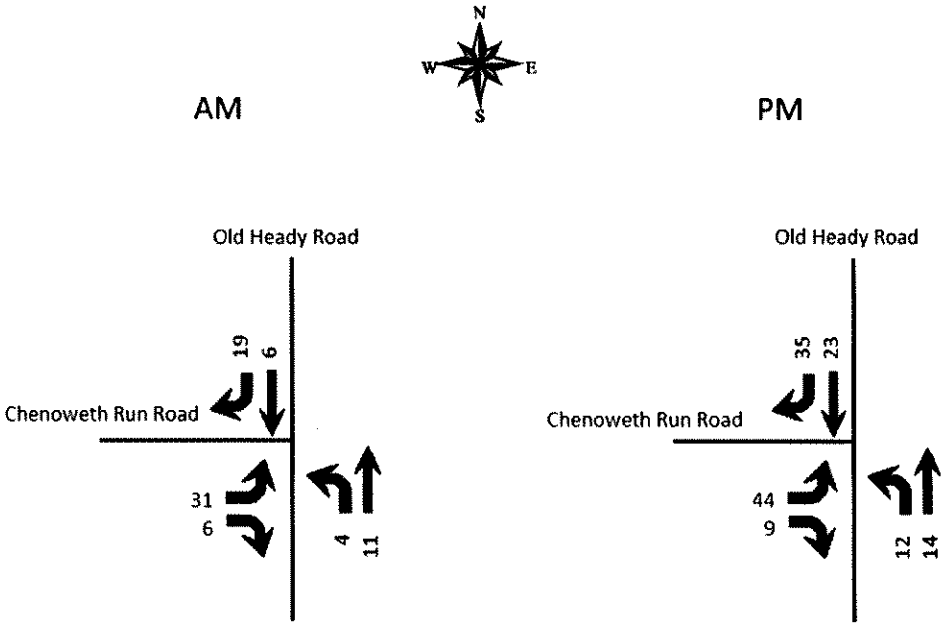


Figure 2. Existing Peak Hour Volumes

FUTURE CONDITIONS

The project completion date is 2025. An annual growth rate of 2 percent was applied to the 2021 volumes. **Figure 3** displays the 2025 No Build peak hour volumes.

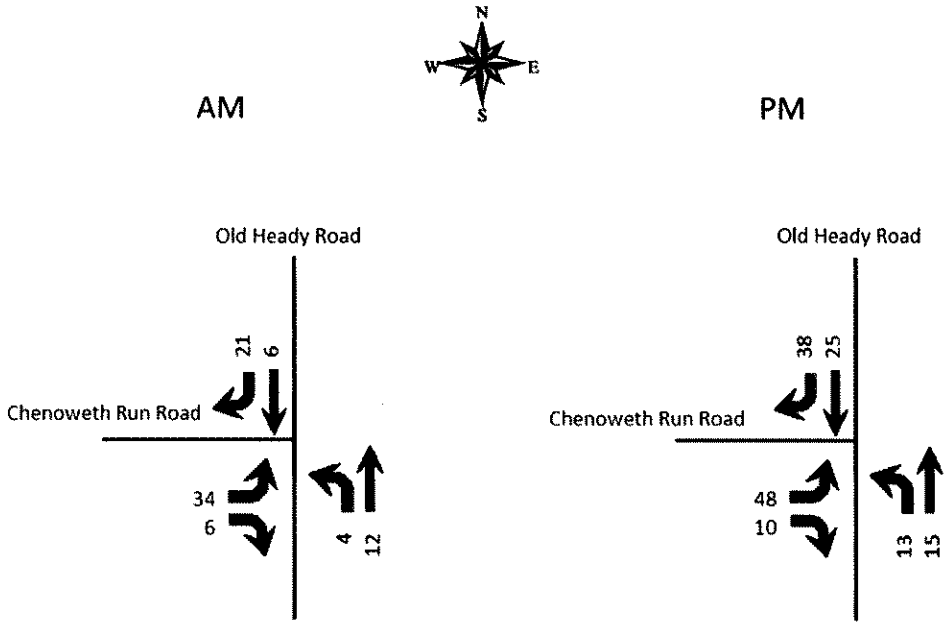


Figure 3. 2025 No Build Peak Hour Volumes

TRIP GENERATION

The Institute of Transportation Engineers Trip Generation Manual, 10th Edition contains trip generation rates for a wide range of developments. The land use of "Single-Family Detached (210)" was reviewed and determined to be the best match. The trip generation results are listed in **Table 1**. The trips were assigned to the highway network with the percentages shown in **Figure 4**. **Figure 5** shows the trips generated by this development and distributed throughout the road network during the peak hours. **Figure 6** displays the individual turning movements for the peak hours when the development is completed.

Table 1. Peak Hour Trips Generated by Site

	A.M. Peak Hour			P.M. Peak Hour		
Land Use	**Trips**	**In**	**Out**	**Trips**	**In**	**Out**
Single-Family (119 units)	89	22	67	120	76	44
Multi-Family (30 units)	15	3	12	20	13	7
TOTAL	104	25	79	140	89	51

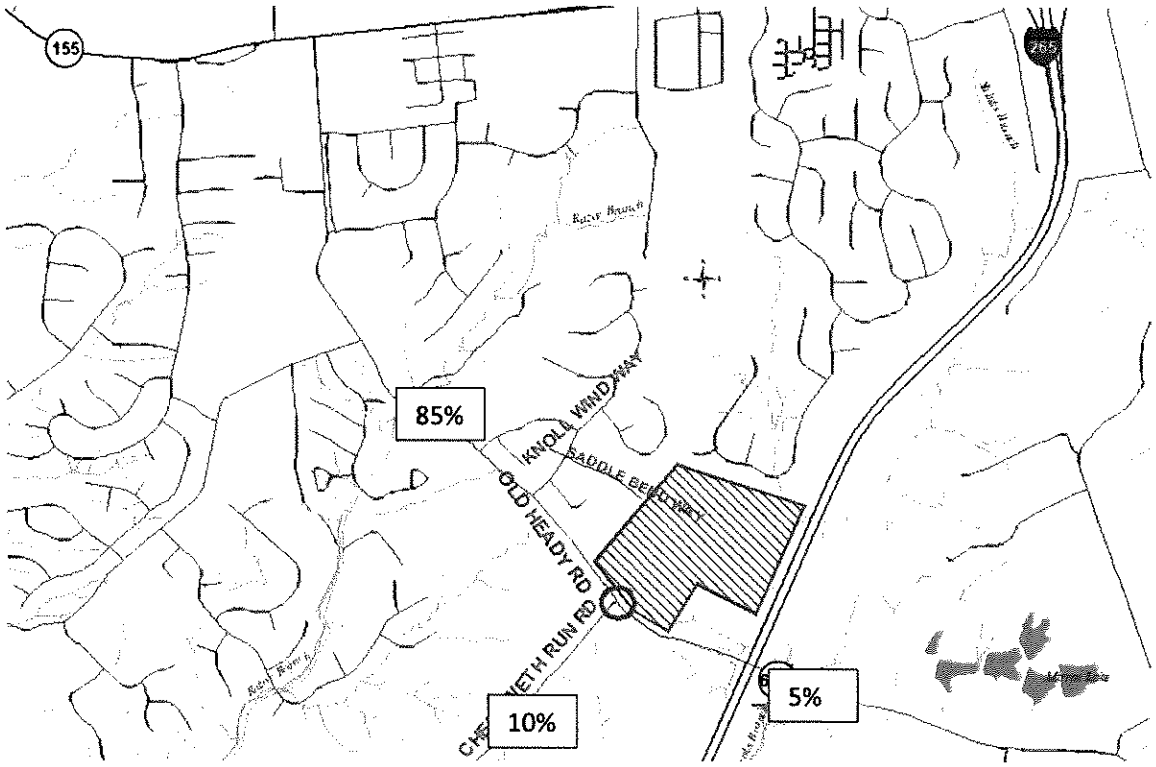


Figure 4. Trip Distribution Percentages

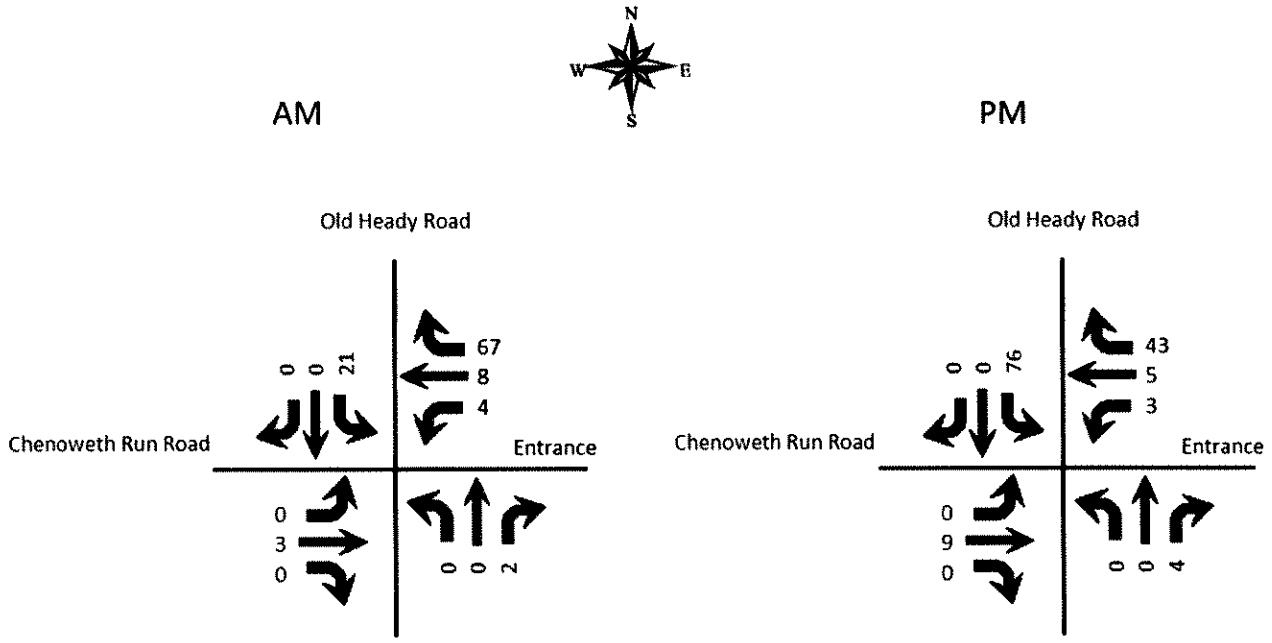


Figure 5. Peak Hour Trips Generated by Site

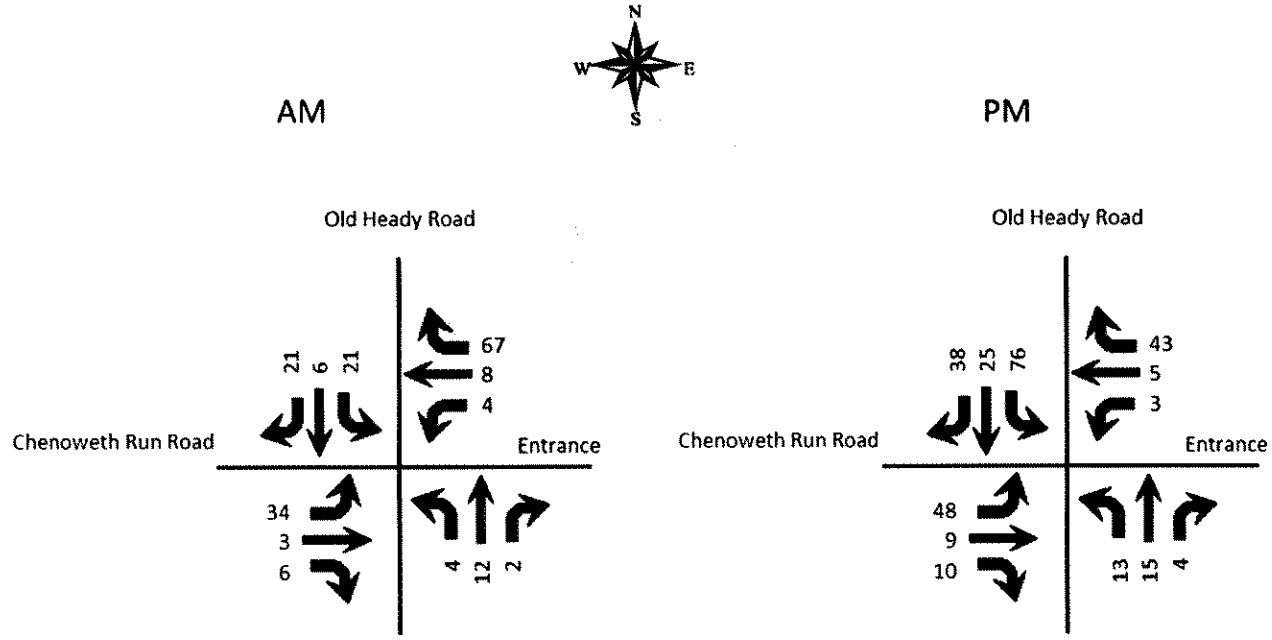


Figure 6. 2025 Build Peak Hour Volumes

ANALYSIS

The qualitative measure of operation for a roadway facility or intersection is evaluated by assigning a "Level of Service". Level of Service is a ranking scale from A through F, "A" is the best operating condition and "F" is the worst. Level of Service results depend upon the facility that is analyzed. In this case, the Level of Service is based upon the total delay experienced for lanes at stop-controlled intersections.

To evaluate the impact of the proposed development, the vehicle delays at the intersections were determined using procedures detailed in the Highway Capacity Manual, 6th edition. Future delays and Level of Service were determined for the intersections using the HCS Streets (version 7.9) software. The delays and Level of Service are summarized in **Table 2.**

Table 2. Peak Hour Level of Service

	A.M.			P.M.		
Approach	2021 Existing	2025 No Build	2025 Build	2020 Existing	2025 No Build	2025 Build
Old Heady Road at Chenoweth Run Road						
Chenoweth Run Road Eastbound	A 9.0	A 9.1	B 10.9	A 9.4	A 9.5	B 12.8
Entrance Westbound			A 9.2			A 9.3
Old Heady Road Northbound (left)	A 7.3	A 7.3	A 7.3	A 7.4	A 7.4	A 7.4
Old Heady Road Southbound (left)			A 7.3			A 7.4

Key: Level of Service, Delay in seconds per vehicle

The entrances were evaluated for turn lanes using the Kentucky Transportation Cabinet Highway Design Guidance Manual dated July, 2020. Using the volumes in Figure 6, a southbound left-turn lane will not be required at the entrance.

CONCLUSIONS

Based upon the volume of traffic generated by the development and the amount of traffic forecasted for the year 2025, there will be a slight impact to the existing highway network. A left-turn lane will not be required at the entrance. No other improvements are required.

APPENDIX

Traffic Counts

Classified Turn Movement Count || All vehicles

Marr Traffic DATA COLLECTION
www.marrtraffic.com

Old Heady Road, KY

Site 2 of 2
Old Heady Rd (South)
Old Heady Rd (North)
Chenoweth Run Rd

Date
Tuesday, April 13, 2021

Weather
Cloudy
61°F

Lat/Long
38.169725°, -85.524743°

0700 - 0900 (Weekday 2h Session) (13-04-2021)
All vehicles

	Northbound				Southbound				Eastbound				
	Old Heady Rd (South)				Old Heady Rd (North)				Chenoweth Run Rd				
TIME	Left 2.1	Thru 2.2	U-Turn 2.3	App Total	Thru 2.4	Right 2.5	U-Turn 2.6	App Total	Left 2.7	Right 2.8	U-Turn 2.9	App Total	Int Total
0700 - 0715	0	1	0	1	0	5	0	5	1	4	0	5	11
0715 - 0730	0	2	0	2	0	10	0	10	5	1	0	6	18
0730 - 0745	0	1	0	1	0	7	0	7	4	1	0	5	13
0745 - 0800	0	2	0	2	1	1	0	2	3	0	0	3	7
Hourly Total	0	6	0	6	1	23	0	24	13	6	0	19	49
0800 - 0815	2	2	0	4	0	9	0	9	19	2	0	21	34
0815 - 0830	1	3	0	4	2	3	0	5	7	1	0	8	17
0830 - 0845	0	2	0	2	1	2	0	3	3	2	0	5	10
0845 - 0900	1	4	0	5	3	5	0	8	2	1	0	3	16
Hourly Total	4	11	0	15	6	19	0	25	31	6	0	37	77
Grand Total	4	17	0	21	7	42	0	49	44	12	0	56	126
Approach %	19.05	80.95	0.00	-	14.29	85.71	0.00	-	78.57	21.43	0.00	-	
Intersection %	3.17	13.49	0.00	16.67	5.56	33.33	0.00	38.89	34.92	9.52	0.00	44.44	
PHF	0.50	0.69	0.00	0.75	0.50	0.53	0.00	0.69	0.41	0.75	0.00	0.44	0.57

1600 - 1800 (Weekday 2h Session) (13-04-2021)
All vehicles

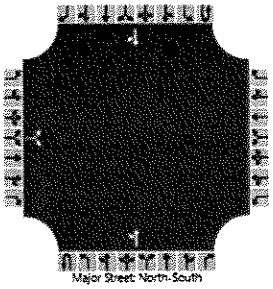
	Northbound				Southbound				Eastbound				
	Old Heady Rd (South)				Old Heady Rd (North)				Chenoweth Run Rd				
TIME	Left 2.1	Thru 2.2	U-Turn 2.3	App Total	Thru 2.4	Right 2.5	U-Turn 2.6	App Total	Left 2.7	Right 2.8	U-Turn 2.9	App Total	Int Total
1600 - 1615	3	7	0	10	9	9	0	18	8	2	0	10	38
1615 - 1630	2	2	0	4	4	10	0	14	12	1	0	13	31
1630 - 1645	6	2	0	8	7	9	0	16	20	4	0	24	48
1645 - 1700	1	3	0	4	3	7	0	10	4	2	0	6	20
Hourly Total	12	14	0	26	23	35	0	58	44	9	0	53	137
1700 - 1715	4	3	0	7	6	7	0	13	4	1	0	5	25
1715 - 1730	5	5	0	10	6	6	0	12	6	2	0	8	30
1730 - 1745	1	3	0	4	3	5	0	8	3	3	0	6	18
1745 - 1800	2	3	0	5	7	1	0	8	4	3	0	7	20
Hourly Total	12	14	0	26	22	19	0	41	17	9	0	26	93
Grand Total	24	28	0	52	45	54	0	99	61	18	0	79	230
Approach %	46.15	53.85	0.00	-	45.45	54.55	0.00	-	77.22	22.78	0.00	-	
Intersection %	10.43	12.17	0.00	22.61	19.57	23.48	0.00	43.04	26.52	7.83	0.00	34.35	
PHF	0.50	0.50	0.00	0.65	0.64	0.88	0.00	0.81	0.55	0.56	0.00	0.55	0.71

HCS Reports

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Old Heady at Chenoweth Ru
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	4/27/2021	East/West Street	Chenoweth Run Road
Analysis Year	2021	North/South Street	Old Heady Road
Time Analyzed	AM Peak	Peak Hour Factor	0.57
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Old Heady		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		31		6						4	11				6	19
Percent Heavy Vehicles (%)		3		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.43		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.30						2.20						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			65							7						
Capacity, c (veh/h)			956							1578						
v/c Ratio			0.07							0.00						
95% Queue Length, Q_{95} (veh)			0.2							0.0						
Control Delay (s/veh)			9.0							7.3						
Level of Service (LOS)			A							A						
Approach Delay (s/veh)		9.0								2.0						
Approach LOS		A														

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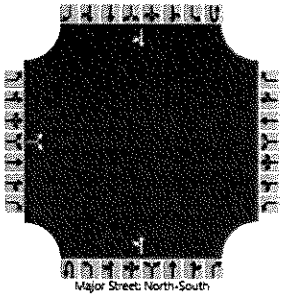
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Old Heady at Chenoweth Ru
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	4/27/2021	East/West Street	Chenoweth Run Road
Analysis Year	2025	North/South Street	Old Heady Road
Time Analyzed	AM Peak No Build	Peak Hour Factor	0.57
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Old Heady		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		34		6						4	12				6	21
Percent Heavy Vehicles (%)		3		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.43		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.30						2.20						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			70							7						
Capacity, c (veh/h)			951							1573						
v/c Ratio			0.07							0.00						
95% Queue Length, Q_{95} (veh)			0.2							0.0						
Control Delay (s/veh)			9.1							7.3						
Level of Service (LOS)			A							A						
Approach Delay (s/veh)		9.1								1.8						
Approach LOS		A														

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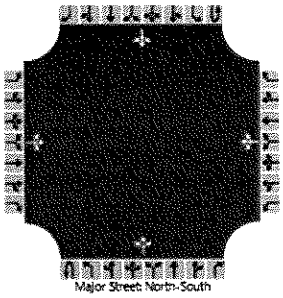
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Old Heady at Chenoweth Ru
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	4/27/2021	East/West Street	Chenoweth Run Road
Analysis Year	2025	North/South Street	Old Heady Road
Time Analyzed	AM Peak Build	Peak Hour Factor	0.57
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Old Heady		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		34	3	6		4	8	67		4	12	2		21	6	21
Percent Heavy Vehicles (%)		3	0	0		3	3	3		0				5		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.50	6.20		7.13	6.53	6.23		4.10				4.15		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.53	4.00	3.30		3.53	4.03	3.33		2.20				2.25		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			75				139			7				37		
Capacity, c (veh/h)			685				987			1573				1571		
v/c Ratio			0.11				0.14			0.00				0.02		
95% Queue Length, Q_{95} (veh)			0.4				0.5			0.0				0.1		
Control Delay (s/veh)			10.9				9.2			7.3				7.3		
Level of Service (LOS)			B				A			A				A		
Approach Delay (s/veh)		10.9				9.2				1.6				3.3		
Approach LOS		B				A										

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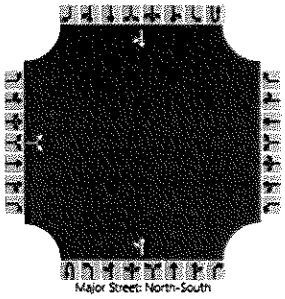
HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	DBZ	Intersection	Old Heady at Chenoweth Ru
Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	4/27/2021	East/West Street	Chenoweth Run Road
Analysis Year	2021	North/South Street	Old Heady Road
Time Analyzed	PM Peak	Peak Hour Factor	0.71
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Old Heady		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		44		9						12	14				23	35
Percent Heavy Vehicles (%)		3		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.43		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.30						2.20						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			75							17						
Capacity, c (veh/h)			895							1529						
v/c Ratio			0.08							0.01						
95% Queue Length, Q_{95} (veh)			0.3							0.0						
Control Delay (s/veh)			9.4							7.4						
Level of Service (LOS)			A							A						
Approach Delay (s/veh)	9.4								3.5							
Approach LOS	A															

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HCS7 Two-Way Stop-Control Report

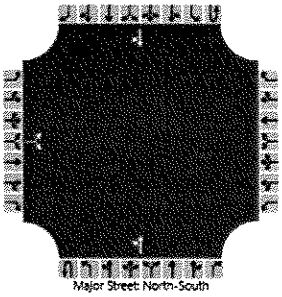
General Information

Analyst	DBZ
Agency/Co.	Diane B Zimmerman Traffic Engineering
Date Performed	4/27/2021
Analysis Year	2025
Time Analyzed	PM Peak No Build
Intersection Orientation	North-South
Project Description	Old Heady

Site Information

Intersection	Old Heady at Chenoweth Ru
Jurisdiction	
East/West Street	Chenoweth Run Road
North/South Street	Old Heady Road
Peak Hour Factor	0.71
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		48		10						13	15				25	38
Percent Heavy Vehicles (%)		3		0						0						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.43		6.20						4.10						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.30						2.20						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			82							18						
Capacity, c (veh/h)			885							1520						
v/c Ratio			0.09							0.01						
95% Queue Length, Q_{95} (veh)			0.3							0.0						
Control Delay (s/veh)			9.5							7.4						
Level of Service (LOS)			A							A						
Approach Delay (s/veh)		9.5								3.5						
Approach LOS		A														

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HCS7 Two-Way Stop-Control Report

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Agency/Co.	Diane B Zimmerman Traffic Engineering	Jurisdiction	
Date Performed	4/27/2021	East/West Street	Chenoweth Run Road
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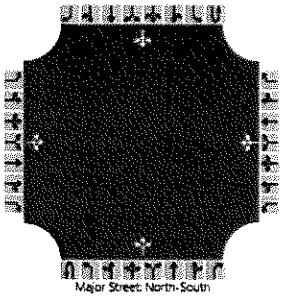
Time Analyzed	PM Peak Build	Peak Hour Factor	0.71
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	Old Heady		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		48	9	10		3	5	43		13	15	4		76	25	38
Percent Heavy Vehicles (%)		3	0	0		0	0	3		0				3		
Proportion Time Blocked																
Percent Grade (%)			0				0									
Right Turn Channelized																
Median Type | Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.50	6.20		7.10	6.50	6.23		4.10				4.13		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.53	4.00	3.30		3.50	4.00	3.33		2.20				2.23		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			94				72			18				107		
Capacity, c (veh/h)			555				911			1520				1581		
v/c Ratio			0.17				0.08			0.01				0.07		
95% Queue Length, Q_{95} (veh)			0.6				0.3			0.0				0.2		
Control Delay (s/veh)			12.8				9.3			7.4				7.4		
Level of Service (LOS)			B				A			A				A		
Approach Delay (s/veh)		12.8				9.3				3.1				4.3		
Approach LOS		B				A										

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VIA EMAIL

January 29, 2021

Mr. David Baldridge
Chief, South Branch Regulatory Division
U.S. Army Corps of Engineers
Louisville District
600 Dr. Martin Luther King, Jr. Place
Louisville, Kentucky 40202
David.E.Baldridge@usace.army.mil
CELRL.Door.To.The.Corps@usace.army.mil

Subject: **Request for Jurisdictional Determination – DRAFT**
Old Heady Property
Jefferson County, Kentucky
Redwing Project No.: 20-236

Dear Mr. Baldridge:

On behalf of Sunshine Builders, LLC, RES Kentucky, LLC dba Redwing (Redwing) is pleased to submit this Request for Jurisdictional Determination to the U.S. Army Corps of Engineers (USACE) for the approximately 55-acre project site located on the north side of Old Heady Road, immediately West of I-265 in Jefferson County, Kentucky (Figure 1). This report describes the location, extent, and characteristics of waters/wetlands that were delineated within the project boundary.

The project site consists primarily of upland mixed-age woods, maintained open field and old field habitat (Figure 2). Based on the water/wetland delineation, jurisdictional features on the site include six intermittent streams totaling 3,138 linear feet and one open water pond measuring 0.716 acre. The non-jurisdictional water/wetland features identified on site include 23 ephemeral streams totaling 2,611 linear feet (Figure 3). These ephemeral streams are considered non-jurisdictional features under the Navigable Waters Protection Rule (NWPR 2020). No wetlands were identified on site.

METHODOLOGY

Redwing wetland scientists conducted a delineation of the site on January 11, 2021. The wetland delineation was accomplished through documentation of the presence/absence of hydric soils, wetland hydrology, and hydrophytic vegetation according to the Routine On-Site Determination Method, as defined in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0)* (April 2012). The presence of open waters, such as streams and ponds, within the project boundary was determined based on ordinary high water mark (OHWM), defined bed and bank features, and flow regime.

RESULTS

Based on the water/wetland delineation, jurisdictional features on site include:

- six jurisdictional intermittent streams totaling 3,138 linear feet (0.406 acre)
- one open water pond measuring 0.716 acre

Non-jurisdictional water/wetland features identified during the field assessment include 23 ephemeral streams totaling 2,611 linear feet (0.097 acre). No wetlands were present. Wetland determination data were formally collected at four data points within the project boundary (Figure 3) and are attached as Appendix A. The quality of intermittent streams was assessed using Rapid Bioassessment Protocol (RBP) methodology established by the U.S. Environmental Protection Agency (USEPA). The RBP forms are provided as Appendix B. An Approved Jurisdictional Determination Form is provided as Appendix C. The results of the water/wetland delineation are summarized in Table 1 (attached), depicted on Figure 3, and discussed below.

Intermittent Stream: Six intermittent streams were identified during the field assessment. All of them generally flow eastward and contribute flow to downstream navigable waters via Shinks Branch, Chenoweth Run, and Floyds Fork. Thus, they are considered to be under USACE jurisdiction.

> Intermittent Stream 1 is three to seven feet wide with silt, sand, gravel, cobble and bedrock substrate. During the field assessment, Intermittent Stream 1 had flowing water at depths of up to six inches. One RBP point was assessed along Intermittent Stream 1 with a score of 104 which characterizes it as "Poor" quality.
>
> Intermittent Stream 2 is approximately seven feet wide with silt, sand, gravel, cobble, boulders and bedrock substrate. During the field assessment, Intermittent Stream 2 had flowing water at depths of up to six inches. Two RBP points were assessed along Intermittent Stream 2 with a score of 115 and 110 which characterizes it as "Poor" quality.

Intermittent Stream 3 is three to five feet wide with silt, sand, gravel and cobble substrate. During the field assessment, Intermittent Stream 3 had flowing water at depths less than six inches. One RBP point was assessed along Intermittent Stream 3 with a score of 100 which characterizes it as "Poor" quality.

Intermittent Stream 4 is two to four feet wide with silt, sand, gravel and cobble substrate. During the field assessment, Intermittent Stream 4 had flowing water at depths less than six inches. One RBP point was assessed along Intermittent Stream 4 with a score of 115 which characterizes it as "Poor" quality.

Intermittent Stream 5 is three to six feet wide with silt, sand, gravel, cobble and bedrock substrate. During the field assessment, Intermittent Stream 5 had flowing water at depths less than six inches. One RBP point was assessed along Intermittent Stream 5 with a score of 98 which characterizes it as "Poor" quality.

Intermittent Stream 6 is two to five feet wide with silt, sand, gravel and cobble substrate. During the field assessment, Intermittent Stream 6 had flowing water at depths less than six inches. One RBP point was assessed along Intermittent Stream 6 with a score of 66 which characterizes it as "Poor" quality.

Ephemeral Streams: A total of 23 ephemeral streams were identified within the project boundary. The ephemeral streams are approximately one to two feet wide with bank heights ranging from one to two feet. The substrates consist primarily of silt with scattered gravel and cobble. Only shallow isolated standing pools of water were observed within the banks of the ephemeral streams during the field assessment, confirming that they only flow in direct response to precipitation. Thus, they are considered non-jurisdictional features under the NWPR.

Wetlands: No wetlands were identified on the site during the field assessment.

General site characteristics of soil, hydrology, and vegetation for the project are discussed below.

Soils: The USDA Soil Survey Geographic Database for Jefferson County, Kentucky maps the site as being underlain primarily by Beasley silt loam, Crider silt loam, Nicholson silt loam, and Shrouts silt loam (Figure 4). None of these soils are listed on the Hydric Soil List for Jefferson County, Kentucky. No hydric soil indicators were observed on site.

Hydrology: The main sources of hydrology to the site include direct precipitation and surface runoff from adjacent areas. The site is not located within the 100-year floodplain (Figure 5). No wetland hydrology indicators were observed at the four wetland data point locations.

Vegetation: The project boundary consists primarily of mixed-age upland woods, maintained open field, and old field habitat (Figure 2). No wetland plant communities were observed.

Common species in the upland woods habitat include: eastern red cedar (*Juniperus virginiana),* bush honeysuckle (*Lonicera maackii*), chinkapin oak (*Quercus muehlenbergii*), white oak (*Quercus alba)* and shagbark hickory (*Carya ovata*). These species are listed as upland (UPL) and facultative upland (FACU), in the *National Wetland Plant List: Eastern Mountain and Piedmont Final Regional Wetland Plant List – 2018, Version 3.4* (NWPL).

Common species in the maintained open field habitat include: tall fescue (*Schedonorus arundinaceus*), yellow foxtail (*Setaria pumila*), nodding foxtail (*Setaria faberi*), broomsedge (*Andropogon virginicus*), and white clover (*Trifolium repens*). These species are listed as UPL, FACU, and facultative (FAC) in the NWPL.

Common species in the old field habitat include: eastern red cedar, tall fescue, yellow foxtail, nodding foxtail, broomsedge, Johnson grass (*Sorghum halepense*), multiflora rose (*Rosa multiflora),* and green ash (*Fraxinus pennsylvanica).* These species are listed as UPL, FACU, and FAC in the NWPL.

Open Water: Open Water Pond 1 is located in the south-central portion of the site. It measures 0.716 acre with an estimated maximum depth of eight feet and a primarily silt substrate. Pond 1 is hydrologically supplied by surface water and flows directly discharged from Intermittent Stream 5. The pond outlets to Intermittent Stream 6 via a culvert located in the southwest corner of the pond. This feature is considered jurisdictional based on its immediate downstream connection to Intermittent Stream 6.

CONCLUSION

This water/wetland delineation identified six jurisdictional intermittent streams totaling 3,138 linear feet (0.406 acre) and one open water pond measuring 0.716 acre within the project boundary. The non-jurisdictional water/wetland features identified during the field assessment include 23 ephemeral streams totaling 2,611 linear feet (0.097 acre). As the USACE holds final authority over determinations of the extent and location of jurisdictional waters/wetlands, we respectfully request USACE verification of delineated water/wetland boundaries and issuance of an Approved Jurisdictional Determination for the property.

We appreciate your review of this request. Please contact Rich Fangman or Ronald Thomas at (502) 625-3009 with any questions regarding this report or the overall project.

Sincerely,

DRAFT

Richard J. Fangman
Project Manager I

DRAFT

Ronald L. Thomas
Senior Project Manager

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cc: Mr. Damon Garrett – Sunshine Builders, LLC

Attachments: Table
Figures
Photographs
Appendix A: Wetland Determination Data Forms
Appendix B: Rapid Bioassessment Protocol Form
Appendix C: Approved Jurisdictional Determination Form (Interim)

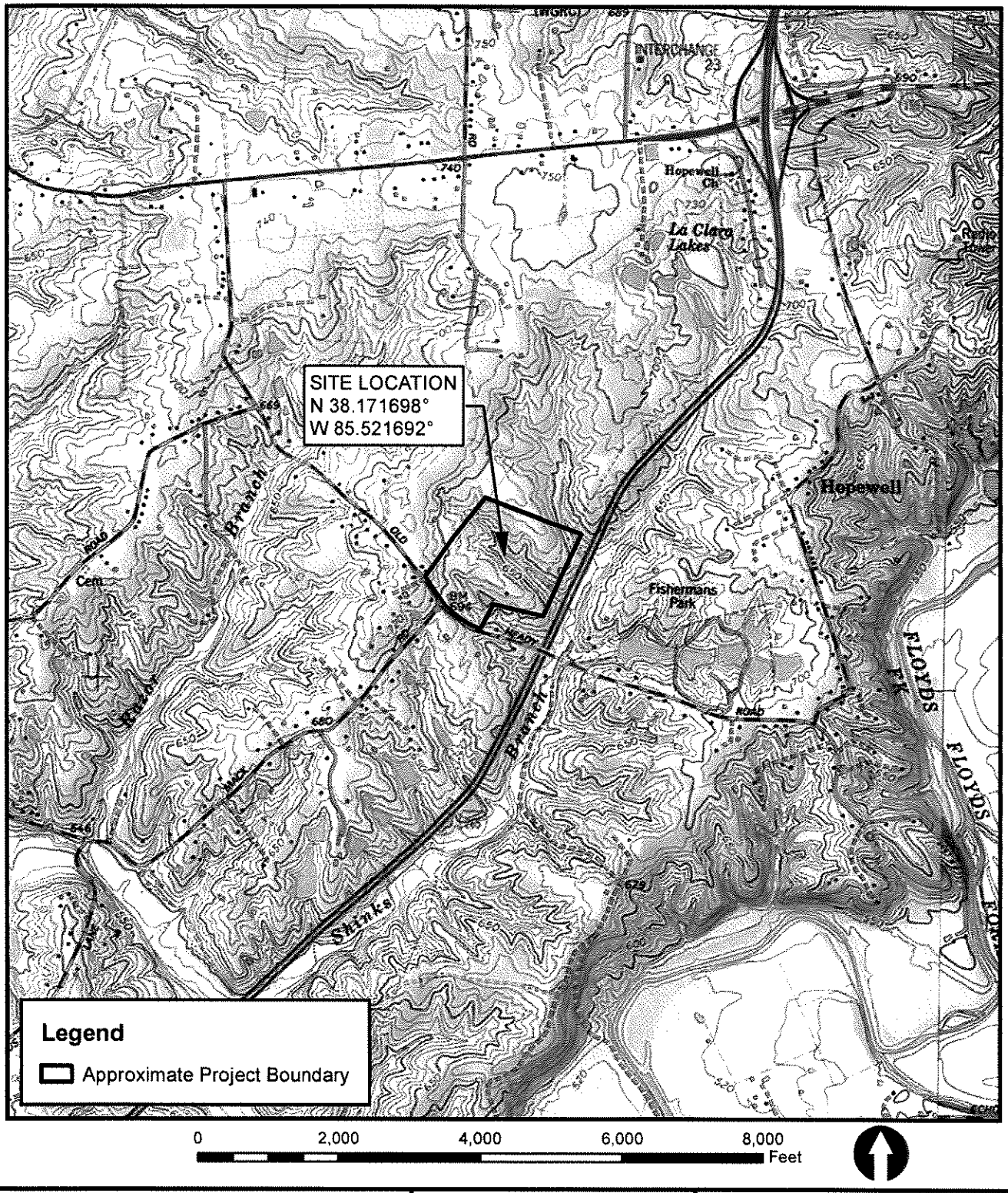
TABLE

Table 1: Water/Wetland Summary
Old Heady Property
Jefferson County, Kentucky
Redwing Project: 20-236

Feature	Stream Length (feet)	Stream Width (feet)	Area (acres)	Federal Status
Intermittent Stream 1	175	5	0.020	Jurisdictional
Intermittent Stream 2	1,789	7	0.287	Jurisdictional
Intermittent Stream 3	102	4	0.009	Jurisdictional
Intermittent Stream 4	458	3	0.032	Jurisdictional
Intermittent Stream 5	365	4.5	0.038	Jurisdictional
Intermittent Stream 6	249	3.5	0.020	Jurisdictional
Intermittent Stream Total	**3,138**		**0.406**	
Ephemeral Stream 1	84	1	0.002	Non-Jurisdictional
Ephemeral Stream 2	289	2	0.013	Non-Jurisdictional
Ephemeral Stream 3	21	1.5	0.001	Non-Jurisdictional
Ephemeral Stream 4	412	2	0.019	Non-Jurisdictional
Ephemeral Stream 5	175	1.5	0.006	Non-Jurisdictional
Ephemeral Stream 6	94	2	0.004	Non-Jurisdictional
Ephemeral Stream 7	26	2.5	0.001	Non-Jurisdictional
Ephemeral Stream 8	38	1.5	0.001	Non-Jurisdictional
Ephemeral Stream 9	111	1.5	0.004	Non-Jurisdictional
Ephemeral Stream 10	120	1.5	0.004	Non-Jurisdictional
Ephemeral Stream 11	169	1.5	0.006	Non-Jurisdictional
Ephemeral Stream 12	97	1	0.002	Non-Jurisdictional
Ephemeral Stream 13	76	1.5	0.003	Non-Jurisdictional
Ephemeral Stream 14	139	1.5	0.005	Non-Jurisdictional
Ephemeral Stream 15	81	1.5	0.003	Non-Jurisdictional
Ephemeral Stream 16	167	1.5	0.006	Non-Jurisdictional
Ephemeral Stream 17	120	1	0.003	Non-Jurisdictional
Ephemeral Stream 18	65	1.5	0.002	Non-Jurisdictional
Ephemeral Stream 19	45	2	0.002	Non-Jurisdictional
Ephemeral Stream 20	95	2	0.004	Non-Jurisdictional
Ephemeral Stream 21	21	1	0.000	Non-Jurisdictional
Ephemeral Stream 22	31	2	0.001	Non-Jurisdictional
Ephemeral Stream 23	135	1.5	0.005	Non-Jurisdictional
Ephemeral Stream Total	**2,611**		**0.097**	
Open Water 1	---	---	0.716	Jurisdictional
Jurisdictional Open Water Total	**---**	**---**	**0.716**	
Jurisdictional Features Total	**3,138**		**1.122**	

FIGURES

Source: USGS 7.5-minute Topographic Map - Jeffersontown and Fisherville, Kentucky Quadrangle.



OLD HEADY PROPERTY
JEFFERSON COUNTY, KENTUCKY

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SITE LOCATION MAP

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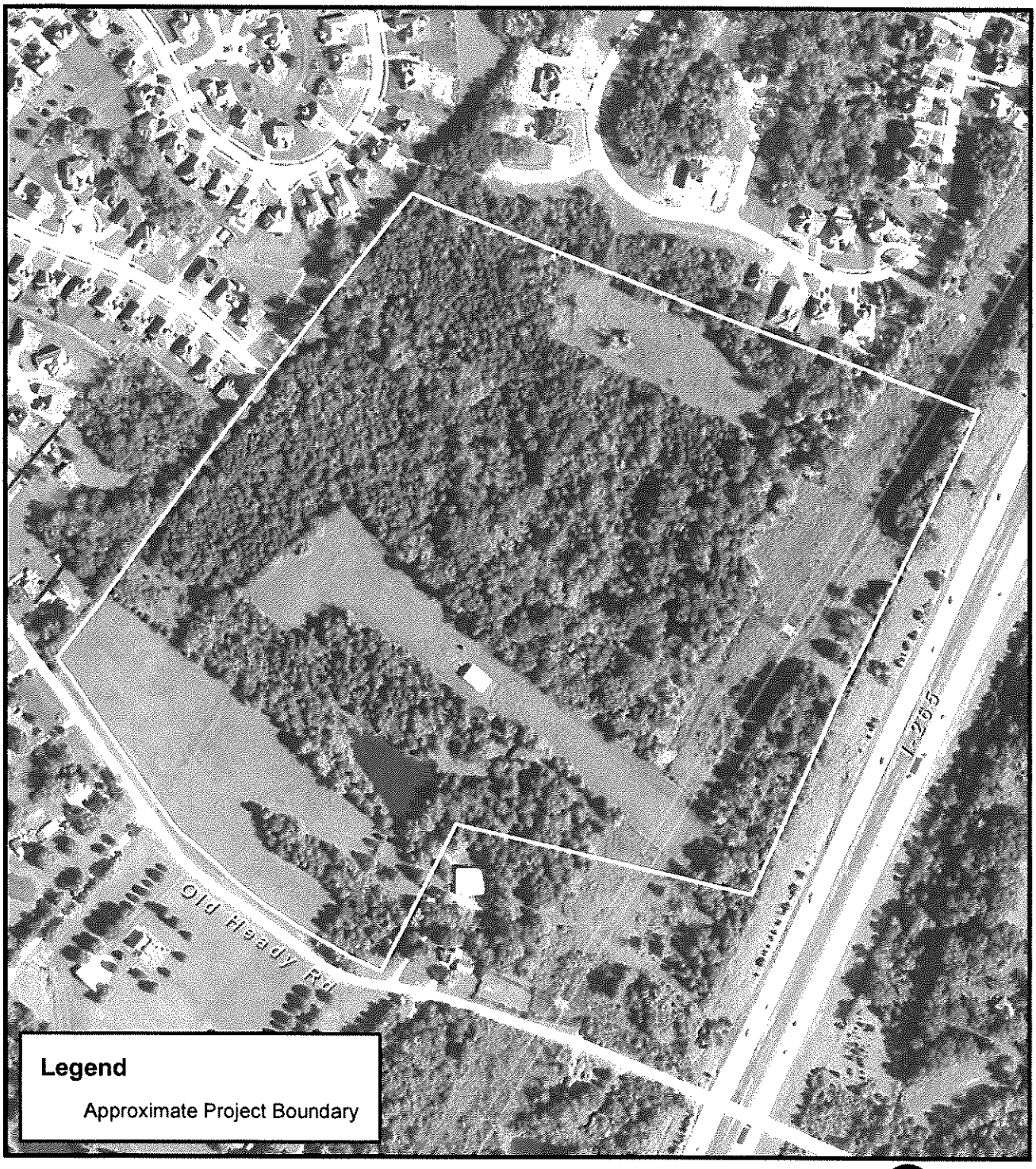
FIGURE 1

P:\2020 Projects\20-236-Old Heady Property\Figures\SiteLoc.mxd, 01-22-2021, Temp

Source: Aerial - kyraster.ky.gov (2018).



OLD HEADY PROPERTY
JEFFERSON COUNTY, KENTUCKY

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AERIAL PHOTOGRAPH MAP

REVISED DATE: 01-22-21 | DRAWN BY: ZTT

FIGURE 2

P:\2020 Projects\20-236-Old Heady Property\Figures\Aerial.mxd, 01-22-2021, Temp

Source: Aerial - kyraster.ky.gov (2019).

Feature	Stream Length (feet)	Stream Width (feet)	Area (acres)	Federal Status
Intermittent Stream 1	175	5	0.020	Jurisdictional
Intermittent Stream 2	1,789	7	0.287	Jurisdictional
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Intermittent Stream 4	458	3	0.032	Jurisdictional
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Ephemeral Stream 11	169	1.5	0.006	Non-Jurisdictional
Ephemeral Stream 12	97	1	0.002	Non-Jurisdictional
Ephemeral Stream 13	76	1.5	0.003	Non-Jurisdictional
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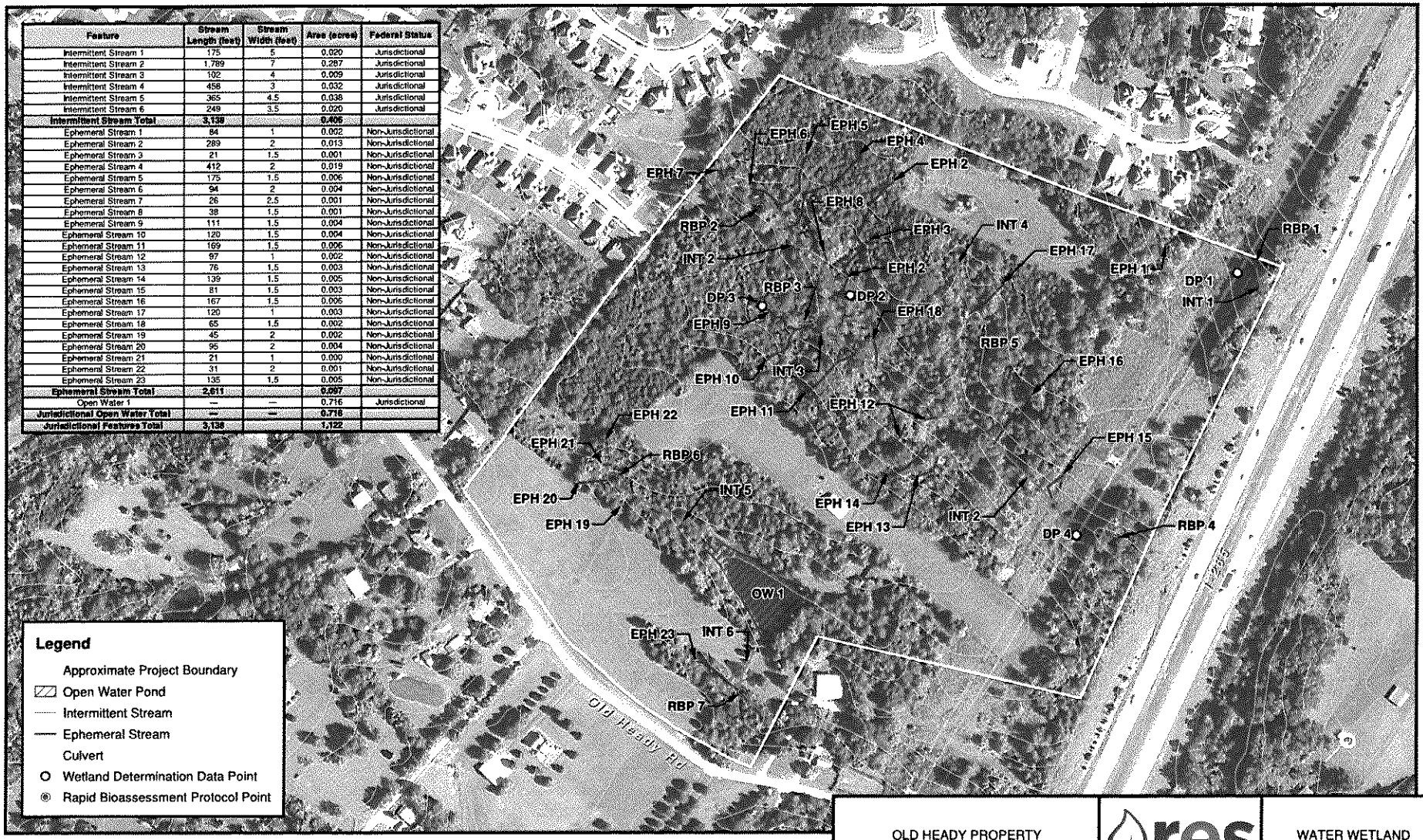
Ephemeral Stream 15	81	1.5	0.003	Non-Jurisdictional
Ephemeral Stream 16	167	1.5	0.006	Non-Jurisdictional
Ephemeral Stream 17	120	1	0.003	Non-Jurisdictional
Ephemeral Stream 18	65	1.5	0.002	Non-Jurisdictional
Ephemeral Stream 19	45	2	0.002	Non-Jurisdictional
Ephemeral Stream 20	95	2	0.004	Non-Jurisdictional
Ephemeral Stream 21	21	1	0.000	Non-Jurisdictional
Ephemeral Stream 22	31	2	0.001	Non-Jurisdictional
Ephemeral Stream 23	135	1.5	0.005	Non-Jurisdictional
Ephemeral Stream Total	**2,611**		**0.097**	
Open Water 1	—	—	0.716	Jurisdictional
Jurisdictional Open Water Total	**—**	**—**	**0.716**	
Jurisdictional Features Total	**3,138**		**1,122**	



NOTE: JURISDICTIONAL WATER/WETLAND BOUNDARIES WERE DELINEATED AND SURVEYED BY RES WETLAND SCIENTISTS ON JANUARY 11, 2021. THESE BOUNDARIES HAVE NOT BEEN VERIFIED BY THE U.S. ARMY CORPS OF ENGINEERS. USE OF THIS MAP IS FOR PRELIMINARY PLANNING PURPOSES ONLY.

OLD HEADY PROPERTY
JEFFERSON COUNTY, KENTUCKY

REVISED DATE: 01-22-21 | DRAWN BY: ZTT

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WATER WETLAND LOCATION MAP

FIGURE 3

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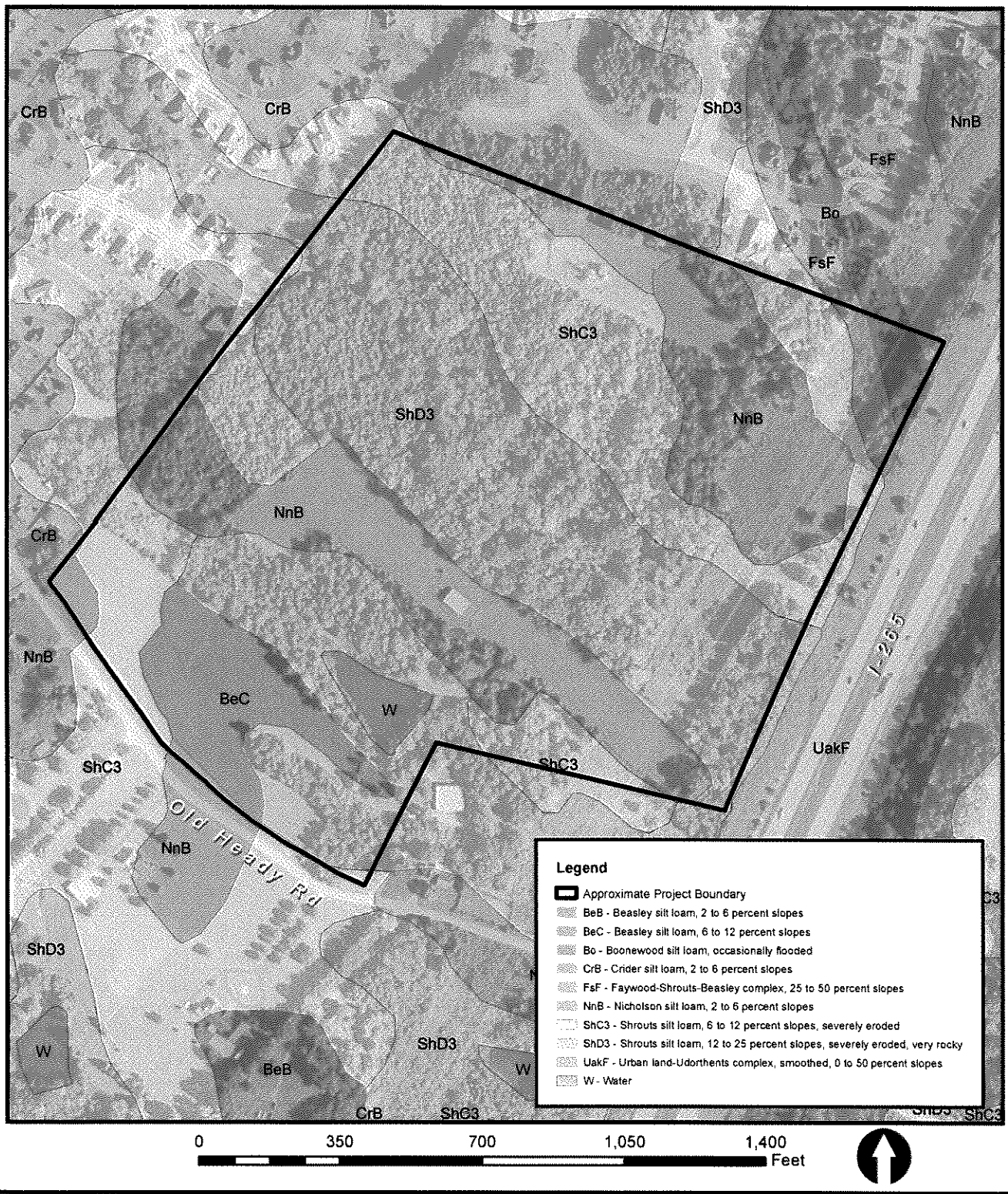
Source: Aerial - kyraster.ky.gov (2018); Soil Survey Geographic (SSURGO) database for Jefferson County, Kentucky (2008).



OLD HEADY PROPERTY
JEFFERSON COUNTY, KENTUCKY

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SOIL SURVEY MAP

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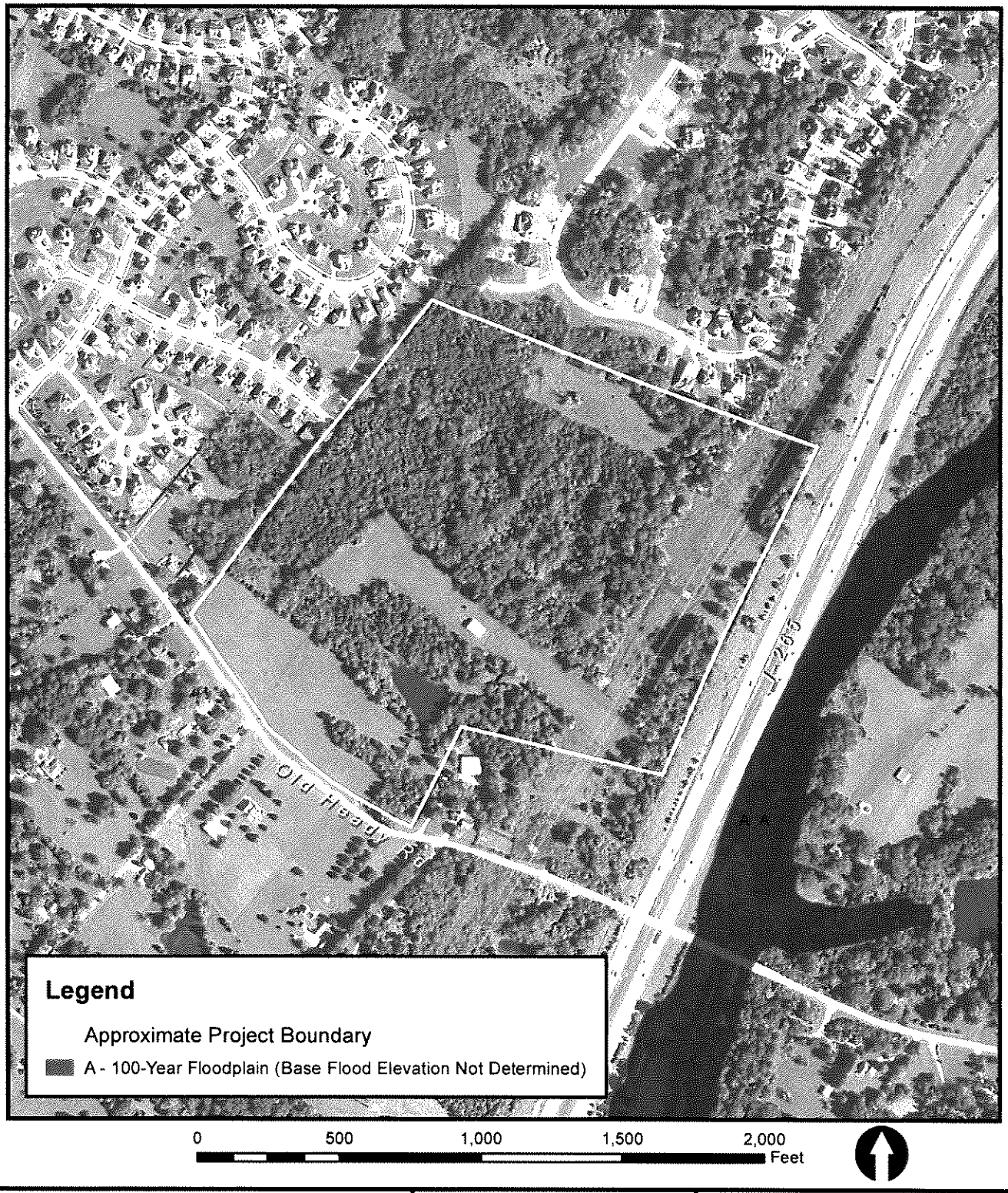
FIGURE 4

P:\2020 Projects\20-236-Old Heady Property\Figures\Soils.mxd, 01-22-2021, Temp

Source: Aerial - kyraster.ky.gov (2018); FEMA National Flood Hazard Layer (NFHL) (2015).



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JEFFERSON COUNTY, KENTUCKY

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FEMA FLOODPLAIN MAP

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FIGURE 5

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PHOTOGRAPHS

Photograph 1: General view of the upland mixed-age woods found throughout the site. This habitat is dominated by trees/shrubs such as white oak, bush honeysuckle, eastern red cedar. January 11, 2021.

Photograph 2: General view of the maintained open field habitat located throughout the site. January 11, 2021.

Photograph 3: General view of the old field habitat located throughout the site. January 11, 2021.

Photograph 4: Open Water Pond 1 is located in the south-central portion of the site. January 11, 2021.

Photograph 5: Downstream view of Ephemeral Stream 11. This is a representative view of the on-site ephemeral streams. These streams did not have flowing water at the time of the field assessment. January 11, 2021.

Photograph 6: Downstream view of Intermittent Stream 2 in the central portion of the site. Downstream waters continue off site and flow under I-265 and into Shinks Branch. January 11, 2021.

APPENDIX A

WETLAND DETERMINATION DATA FORMS

VEGETATION (Four Strata) -- Us cientific names of plants

Sampling Point: DP1

Tree Stratum (Plot Size (30'))	Absolute % Cover	Dominant Species	Indicator Status
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
	0 =	Total Cover	

Sapling/Shrub Stratum (Plot Size (15'))	Absolute % Cover	Dominant Species	Indicator Status
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
	0 =	Total Cover	

Herb Stratum (Plot Size (5'))	Absolute % Cover	Dominant Species	Indicator Status
1 *Schedonorus arundinaceus*	40	Yes	FACU
2 *Setaria faberi*	20	Yes	UPL
3 *Sorghum halepense*	20	Yes	FACU
4 *Setaria pumila*	10	No	FAC
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
	90 =	Total Cover	

Woody Vine Stratum (Plot Size (30'))	Absolute % Cover	Dominant Species	Indicator Status
1			
2			
3			
4			
5			
	0 =	Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 3 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column totals	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid test for hydrophytic vegetation

___ 2 - Dominance test is >50%

___ 3 - Prevalence index is ≤3.0*

___ 4 - Morphological adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Definitions of Four Vegetation Strata

Tree - Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic vegetation present? No

Remarks: (Include photo numbers here or on a separate sheet)

SOIL **Sampling Point:** DP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	2.5Y 3/3	100					silty clay	
6-14	10YR 4/3	60	2.5Y 5/3	40	C	M	silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains - [2]Location: PL=Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Muck Mineral (S1) **(LRR,N MLRA 147, 148)**
- ___ Sandy Gley Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S9) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? No

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont

Project/Site: Old Heady Property City/County: Louisvulle/Jefferson Sampling Date: 1/11/21
Applicant/Owner: Sunshine Builders, LLC State: Kentucky Sampling Point: DP2
Investigator(s): R. Fangman/Z. Triplett Section, Township, Range:
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 1
Subregion (LRR or MLRA) LRR N Lat.: 38.172253 Long.: -85.521867 Datum:
Soil Map Unit Name: ShD3 - Shrouts silt loam, 12 to 25 percent slopes, severely eroded, very rocky NWI Classification:
Are climatic/hydrologic conditions of the site typical for this time of the year? Yes (If no, explain in remarks)
Are vegetation ____, soil ____, or hydrology ____ significantly disturbed? Are "normal circumstances"
Are vegetation ____, soil ____, or hydrology ____ naturally problematic? present? Yes
(If needed, explain any answers in remarks)

SUMMARY OF FINDINGS

Hydrophytic vegetation present?	No	**Is the Sampled Area within a Wetland?**	No
Hydric soil present?	No		
Wetland hydrology present?	No		

Remarks: (Explain alternative procedures here or in a separate report.)
Upland data point

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface water present?	Yes	____	No	X	Depth (inches):	N/A
Water table present?	Yes	____	No	X	Depth (inches):	>14
Saturation present? (includes capillary fringe)	Yes	____	No	X	Depth (inches):	>14

Wetland hydrology present? No

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) -- Us cientific names of plants

Sampling Point: DP2

Tree Stratum	Plot Size (30')	Absolute % Cover	Dominant Species	Indicator Status
1	*Juniperus virginiana*	40	Yes	FACU
2	*Ulmus americana*	30	Yes	FACW
3	*Fraxinus pennsylvanica*	15	No	FACW
4	*Betula nigra*	10	No	FACW
5				
6				
7				
8				
9				
10				
		95 =	Total Cover	

Sapling/Shrub Stratum	Plot Size (15')	Absolute % Cover	Dominant Species	Indicator Status
1	*Lonicera maackii*	60	Yes	UPL
2				
3				
4				
5				
6				
7				
8				
9				
10				
		60 =	Total Cover	

Herb Stratum	Plot Size (5')	Absolute % Cover	Dominant Species	Indicator Status
1	*Lonicera maackii*	10	Yes	UPL
2	*Carex blanda*	5	Yes	FAC
3	*Euonymus fortunei*	3	No	UPL
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
		18 =	Total Cover	

Woody Vine Stratum	Plot Size (30')	Absolute % Cover	Dominant Species	Indicator Status
1				
2				
3				
4				
5				
		0 =	Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across all Strata: 5 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 40.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column totals	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid test for hydrophytic vegetation

___ 2 - Dominance test is >50%

___ 3 - Prevalence index is ≤3.0*

___ 4 - Morphological adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Definitions of Four Vegetation Strata

Tree - Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic vegetation present? No

Remarks: (Include photo numbers here or on a separate sheet)

SOIL

Sampling Point: DP2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 4/3	100					silty clay loam	
4-14	2.5Y 6/4	100					silty clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains - [2]Location: PL=Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Muck Mineral (S1) **(LRR,N MLRA 147, 148)**
- ___ Sandy Gley Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S9) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? No

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont

Project/Site: Old Heady Property City/County: Louisville/Jefferson Sampling Date: 1/11/21
Applicant/Owner: Sunshine Builders, LLC State: Kentucky Sampling Point: DP3
Investigator(s): R. Fangman/Z. Triplett Section, Township, Range:
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 3
Subregion (LRR or MLRA) LRR N Lat.: 38.172167 Long.: -85.522690 Datum:
Soil Map Unit Name: ShD3 - Shrouts silt loam, 12 to 25 percent slopes, severely eroded, very rocky NWI Classification:
Are climatic/hydrologic conditions of the site typical for this time of the year? Yes (If no, explain in remarks)
Are vegetation ____, soil ____, or hydrology ____ significantly disturbed? Are "normal circumstances"
Are vegetation ____, soil ____, or hydrology ____ naturally problematic? present? Yes
(If needed, explain any answers in remarks)

SUMMARY OF FINDINGS

Hydrophytic vegetation present?	No	**Is the Sampled Area within a Wetland?**	No
Hydric soil present?	No		
Wetland hydrology present?	No		

Remarks: (Explain alternative procedures here or in a separate report.)
Upland data point

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface water present?	Yes	____	No	X	Depth (inches):	N/A
Water table present?	Yes	____	No	X	Depth (inches):	>14
Saturation present? (includes capillary fringe)	Yes	____	No	X	Depth (inches):	>14

Wetland hydrology present? No

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) -- Us cientific names of plants

Sampling Point: DP3

Tree Stratum (Plot Size (30'))	Absolute % Cover	Dominant Species	Indicator Status
1 *Juniperus virginiana*	40	Yes	FACU
2 *Fraxinus pennsylvanica*	20	Yes	FACW
3 *Juglans nigra*	20	Yes	FACU
4			
5			
6			
7			
8			
9			
10			
	80 =	Total Cover	

Sapling/Shrub Stratum (Plot Size (15'))	Absolute % Cover	Dominant Species	Indicator Status
1 *Lonicera maackii*	40	Yes	UPL
2 *Cornus florida*	10	Yes	FACU
3			
4			
5			
6			
7			
8			
9			
10			
	50 =	Total Cover	

Herb Stratum (Plot Size (5'))	Absolute % Cover	Dominant Species	Indicator Status
1 *Glechoma hederacea*	20	Yes	FACU
2 *Microstegium vimineum*	20	Yes	FAC
3 *Carex blanda*	10	No	FAC
4 *Ligustrum sinense*	10	No	FACU
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
	60 =	Total Cover	

Woody Vine Stratum (Plot Size (30'))	Absolute % Cover	Dominant Species	Indicator Status
1			
2			
3			
4			
5			
	0 =	Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across all Strata: 7 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 28.57% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column totals	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid test for hydrophytic vegetation

___ 2 - Dominance test is >50%

___ 3 - Prevalence index is ≤3.0*

___ 4 - Morphological adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Definitions of Four Vegetation Strata

Tree - Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic vegetation present? No

Remarks: (Include photo numbers here or on a separate sheet)

SOIL

Sampling Point: DP3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 4/3	100					silty clay	
4-14	10YR 5/4	100					silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains - [2]Location: PL=Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Muck Mineral (S1) **(LRR,N MLRA 147, 148)**
- ___ Sandy Gley Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S9) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? No

Remarks:

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont

Project/Site: Old Heady Property City/County: Louisvulle/Jefferson Sampling Date: 1/11/21
Applicant/Owner: Sunshine Builders, LLC State: Kentucky Sampling Point: DP4
Investigator(s): R. Fangman/Z. Triplett Section, Township, Range:
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): concave Slope (%): 0
Subregion (LRR or MLRA) LRR N Lat.: 38.170497 Long.: -85.519718 Datum:
Soil Map Unit Name: ShD3 - Shrouts silt loam, 12 to 25 percent slopes, severely eroded, very rocky NWI Classification:
Are climatic/hydrologic conditions of the site typical for this time of the year? Yes (If no, explain in remarks)
Are vegetation ____, soil ____, or hydrology ____ significantly disturbed? Are "normal circumstances" present? Yes
Are vegetation ____, soil ____, or hydrology ____ naturally problematic? (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS

Hydrophytic vegetation present?	No	**Is the Sampled Area within a Wetland?**	No
Hydric soil present?	No		
Wetland hydrology present?	No		

Remarks: (Explain alternative procedures here or in a separate report.)
Upland data point

HYDROLOGY

Wetland Hydrology Indicators

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface water present?	Yes	____	No	X	Depth (inches):	N/A
Water table present?	Yes	____	No	X	Depth (inches):	>14
Saturation present? (includes capillary fringe)	Yes	____	No	X	Depth (inches):	>14

Wetland hydrology present? No

Describe recorded data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Four Strata) -- Us cientific names of plants

Sampling Point: DP4

Tree Stratum	Plot Size (30')	Absolute % Cover	Dominant Species	Indicator Status
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
		0 =	Total Cover	

Sapling/Shrub Stratum	Plot Size (15')	Absolute % Cover	Dominant Species	Indicator Status
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
		0 =	Total Cover	

Herb Stratum	Plot Size (5')	Absolute % Cover	Dominant Species	Indicator Status
1	*Schedonorus arundinaceus*	80	Yes	FACU
2	*Carex blanda*	10	No	FAC
3	*Sorghum halepense*	10	No	FACU
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
		100 =	Total Cover	

Woody Vine Stratum	Plot Size (30')	Absolute % Cover	Dominant Species	Indicator Status
1				
2				
3				
4				
5				
		0 =	Total Cover	

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across all Strata: 1 (B)

Percent of Dominant Species that are OBL, FACW, or FAC: 0.00% (A/B)

Prevalence Index Worksheet

Total % Cover of:

OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column totals		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ 1 - Rapid test for hydrophytic vegetation

___ 2 - Dominance test is >50%

___ 3 - Prevalence index is ≤3.0*

___ 4 - Morphological adaptations* (provide supporting data in Remarks or on a separate sheet)

___ Problematic hydrophytic vegetation* (explain)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Definitions of Four Vegetation Strata

Tree - Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic vegetation present? No

Remarks: (Include photo numbers here or on a separate sheet)

SOIL **Sampling Point:** DP4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-14	10YR 4/3	80	10YR 5/4	20	C	M	silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains - [2]Location: PL=Lining, M=Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10) **(LRR N)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Muck Mineral (S1) **(LRR,N MLRA 147, 148)**
- ___ Sandy Gley Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S9) **(MLRA 147, 148)**
- ___ Thin Dark Surface (S9) **(MLRA 147, 148)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Iron-Manganese Masses (F12) **(LRR N MLRA 136)**
- ___ Umbric Surface (F13) **(MLRA 136, 122)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 148)**
- ___ Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils:

- ___ 2 cm Muck (A10) **(MLRA 147)**
- ___ Coast Prairie Redox (A16) **(MLRA 147, 148)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric soil present? No

Remarks:

APPENDIX B

RAPID BIOASSESSMENT PROTOCOL FORMS

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: Intermittent Stream 1	**LOCATION:** Old Heady Property		
STATION #: RBP 1	**COUNTY:** Jefferson	**PROJECT:** 20-236	
INVESTIGATORS: R. Fangman/ Z. Triplett	**DATE:** 1/11/2021	**TIME:** 9:41	**AM** ☑ **PM** ☐

Verify Site LAT/LONG vs GPS Yes ☐ No ☐ N/A ☐

	Station	Downstream	Upstream
LAT	38.172507		
LONG	-85.518081		

CANOPY COVER::

- Fully Exposed (0-25%) ☑
- Partially Exposed (25-50%) ☐
- Partially Shaded (50-75%) ☐
- Fully Shaded (75-100%) ☐

STREAM TYPE:

- Perennial ☐
- Ephemeral ☐
- Intermittent ☑

WEATHER

	Now	Past 24 hours
Heavy rain	☐	☐
Steady rain	☐	☐
Intermittent showers	☐	☐
Clear/sunny	☐	☐
Cloudy	☑	☑

Has there been a scouring rain in the last 14 days? Yes ☐ No ☑

LOCAL WATERSHED FEATURES (Predominant Surrounding Land Use):

Surface Mining ☐	Construction ☐	Forest ☑
Deep Mining ☐	Commercial ☐	Pasture/Grazing ☐
Oil Wells ☐	Industrial ☐	Silviculture ☐
Land Disposal ☐	Row Crops ☐	Urban Runoff/ Storm Sewers ☑
Residential ☑		

INSTREAM FEATURES

Stream Width	3-7	ft
Maximum Depth	0.5	ft
Reach Length	50	m
Discharge		cfs

HYDRAULIC STRUCTURES

- Dams ☐
- Bridge Abutments ☐
- Island ☐
- Waterfalls ☐
- Other: ☐

STREAM FLOW

- Dry ☐
- Pooled ☐
- Low ☐
- High ☐
- Normal ☑

RIPARIAN VEGETATION

Trees ☑ Herbaceous ☑ Grasses ☑ Shrubs ☐

Dom. Tree/Shrub Taxa: white oak, shagbark hickory, sugar maple

CHANNEL ALTERATIONS

- Dredging ☐
- Channelization ☐ (Full) ☐ (Partial) ☐

Riffle/Run/Pool Sequence (No. Sampled in Reach) _____Riffle _____Run _____Pool

P-CHEM Instrument Used: Date Calibrated:

Temp(°F) _____ D.O. (mg/l) _____ %Saturation _____ pH(S.U.) _____ Cond. (µS/cm) _____ Turb. _____

Substrate Characterization

Substrate Est. P.C.	Riffle 15 %	Run 70 %	Pool 15 %	Reach Total
Silt/Clay (<0.06 mm/0.002 in)	X	X	X	
Sand (0.06–2 mm/0.002–0.08 in)	X	X	X	
Gravel (2–64 mm/0.08–2.52 in)	X	X	X	
Cobble (64–256 mm/2.52–10.08 in)	X	X	X	
Boulders (>256 mm/10.08 in)				
Bedrock	X	X	X	

NOTES/COMMENTS:

Bluegrass Bioregion (High Gradient Assessments)		Headwater (<5.0 mi²)	Wadeable (>5.0 mi²)
Fully Supporting	(Excellent)	156-200	130-200
Supporting but Threatened and Partially Supporting	(Average)	142-155	114-129
Not Supporting	(Poor)	0-141	0-113

Kentucky Division of Water's "Methods for Assessing Habitat in Wadeable Waters" (2011) (Revision 1)

Project Name:	Old Heady Property	Stream Name:	Intermittent Stream 1

RBP High Gradient Habitat

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
1. Epifaunal Substrate/ Available Cover 7 Score	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
2. Embeddedness 12 Score	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
3. Velocity/Depth Regime 8 Score	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low)	Dominated by 1 velocity/ depth regime (usually slow-deep).
4. Sediment Deposition 14 Score	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
5. Channel Flow Status 14 Score	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
6. Channel Alteration 17 Score	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
7. Frequency of Riffles (or bends) 9 Score	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
Left/Right Bank	10 9	8 7 6	5 4 3	2 1
8. Bank Stability 4 LB 7 RB	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
9. Vegetative Protection 3 LB 3 RB	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
10. Riparian Vegetative Zone Width 3 LB 3 RB	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
Total Score 104	NOTES/COMMENTS: Poor Quality			

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: Intermittent Stream 2	**LOCATION:** Old Heady Property		
STATION #: RBP 2	**COUNTY:** Jefferson	**PROJECT:** 20-236	
INVESTIGATORS: R. Fangman/ Z. Triplett	**DATE:** 1/11/2021	**TIME:** 11:15	**AM** ☑ **PM** ☐

Verify Site LAT/LONG vs GPS Yes ☐ No ☐ N/A ☐

	Station	Downstream	Upstream
LAT	38.172897		
LONG	-85.522723		

CANOPY COVER::

Fully Exposed (0-25%)	☐
Partially Exposed (25-50%)	☐
Partially Shaded (50-75%)	☐
Fully Shaded (75-100%)	☑

STREAM TYPE:

Perennial	☐
Ephemeral	☐
Intermittent	☑

WEATHER	**Now**	**Past 24 hours**	
Has there been a scouring rain in the last 14 days?	☐	☐	Heavy rain
	☐	☐	Steady rain
	☐	☐	Intermittent showers
Yes ☐	☐	☐	Clear/sunny
No ☑	☑	☑	Cloudy

LOCAL WATERSHED FEATURES (Predominant Surrounding Land Use):

Surface Mining	☐	Construction	☐	Forest	☑
Deep Mining	☐	Commercial	☐	Pasture/Grazing	☐
Oil Wells	☐	Industrial	☐	Silviculture	☐
Land Disposal	☐	Row Crops	☐	Urban Runoff/ Storm Sewers	☑
Residential	☑				

INSTREAM FEATURES		**HYDRAULIC STRUCTURES**		**STREAM FLOW**		**RIPARIAN VEGETATION**			**CHANNEL ALTERATIONS**	
Stream Width	6-10 ft	Dams	☐	Dry	☐	Trees	☑	Herbaceous ☑	Dredging	☐
Maximum Depth	0.4 ft	Bridge Abutments	☐	Pooled	☐	Grasses	☐	Shrubs ☑	Channelization	☐
Reach Length	50 m	Island	☐	Low	☐	Dom. Tree/Shrub Taxa:			(Full) ☐	(Partial) ☐
Discharge	cfs	Waterfalls	☐	High	☐	green ash		bush honeysuckle		
		Other:	☐	Normal	☑	Eastern red cedar		hackberry		

Riffle/Run/Pool Sequence (No. Sampled in Reach) _____Riffle _____Run _____Pool

P-CHEM Instrument Used: Date Calibrated:

Temp(°F) _____ D.O. (mg/l) _____ %Saturation _____ pH(S.U.) _____ Cond. (µS/cm) _____ Turb. _____

Substrate Characterization

Substrate Est. P.C.	Riffle 20 %	Run 50 %	Pool 30 %	Reach Total
Silt/Clay (<0.06 mm/0.002 in)	X	X	X	
Sand (0.06–2 mm/0.002–0.08 in)	X	X	X	
Gravel (2–64 mm/0.08–2.52 in)	X	X	X	
Cobble (64–256 mm/2.52–10.08 in)	X	X	X	
Boulders (>256 mm/10.08 in)	X	X	X	
Bedrock	X	X	X	

NOTES/COMMENTS:

Bluegrass Bioregion (High Gradient Assessments)		**Headwater (<5.0 mi²)**	**Wadeable (>5.0 mi²)**
Fully Supporting	(Excellent)	156-200	130-200
Supporting but Threatened and Partially Supporting	(Average)	142-155	114-129
Not Supporting	(Poor)	0-141	0-113

Kentucky Division of Water's "Methods for Assessing Habitat in Wadeable Waters" (2011) (Revision 1)

Project Name:	Old Heady Property	Stream Name:	Intermittent Stream 2

RBP High Gradient Habitat

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	6 4 3 2 1
1. Epifaunal Substrate/ Available Cover 12 Score	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
2. Embeddedness 7 Score	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
3. Velocity/Depth Regime 13 Score	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
4. Sediment Deposition 6 Score	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
5. Channel Flow Status 10 Score	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
6. Channel Alteration 18 Score	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
7. Frequency of Riffles (or bends) 11 Score	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
Left/Right Bank	10 9	8 7 6	5 4 3	2 1
8. Bank Stability 3 LB 3 RB	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
9. Vegetative Protection 8 LB 8 RB	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
10. Riparian Vegetative Zone Width 8 LB 8 RB	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
Total Score 115	NOTES/COMMENTS: Poor Quality			

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: Intermittent Stream 3	**LOCATION:** Old Heady Property		
STATION #: RBP 3	**COUNTY:** Jefferson	**PROJECT:** 20-236	
INVESTIGATORS: R. Fangman/ Z. Triplett	**DATE:** 1/11/2021	**TIME:** 11:30	**AM** ☑ **PM** ☐

Verify Site LAT/LONG vs GPS Yes ☐ No ☐ N/A ☐

	Station	Downstream	Upstream
LAT	38.172015		
LONG	-85.522278		

CANOPY COVER::

- Fully Exposed (0-25%) ☐
- Partially Exposed (25-50%) ☐
- Partially Shaded (50-75%) ☐
- Fully Shaded (75-100%) ☑

STREAM TYPE:

- Perennial ☐
- Ephemeral ☐
- Intermittent ☑

WEATHER	Now	Past 24 hours	
Has there been a scouring rain in the last 14 days?	☐	☐	Heavy rain
	☐	☐	Steady rain
	☐	☐	Intermittent showers
Yes ☐	☐	☐	Clear/sunny
No ☑	☑	☑	Cloudy

LOCAL WATERSHED FEATURES (Predominant Surrounding Land Use):

Surface Mining ☐	Construction ☐	Forest ☑
Deep Mining ☐	Commercial ☐	Pasture/Grazing ☐
Oil Wells ☐	Industrial ☐	Silviculture ☐
Land Disposal ☐	Row Crops ☐	Urban Runoff/ Storm Sewers ☑
Residential ☑		

INSTREAM FEATURES		HYDRAULIC STRUCTURES	STREAM FLOW	RIPARIAN VEGETATION	CHANNEL ALTERATIONS
Stream Width	3-5 ft	Dams ☐	Dry ☐	Trees ☑ Herbaceous ☑	Dredging ☐
Maximum Depth	0.2 ft	Bridge Abutments ☐	Pooled ☐	Grasses ☐ Shrubs ☑	Channelization ☐
Reach Length	50 m	Island ☐	Low ☐	Dom. Tree/Shrub Taxa:	(Full) ☐ (Partial) ☐
Discharge	cfs	Waterfalls ☐	High ☐	pin oak	flowering dogwood
		Other: ☐	Normal ☑	bush honeysuckle	Eastern red cedar

Riffle/Run/Pool Sequence (No. Sampled in Reach) ____Riffle ____Run ____Pool

P-CHEM Instrument Used: Date Calibrated:

Temp(°F) _____ D.O. (mg/l) _____ %Saturation _____ pH(S.U.) _____ Cond. (µS/cm) _____ Turb. _____

Substrate Characterization

Substrate Est. P.C.	Riffle 10 %	Run 80 %	Pool 10 %	Reach Total
Silt/Clay (<0.06 mm/0.002 in)	X	X	X	
Sand (0.06–2 mm/0.002–0.08 in)	X	X	X	
Gravel (2–64 mm/0.08–2.52 in)	X	X	X	
Cobble (64–256 mm/2.52–10.08 in)	X	X	X	
Boulders (>256 mm/10.08 in)				
Bedrock				

NOTES/COMMENTS:

Bluegrass Bioregion (High Gradient Assessments)		Headwater (<5.0 mi²)	Wadeable (>5.0 mi²)
Fully Supporting	(Excellent)	156-200	130-200
Supporting but Threatened and Partially Supporting	(Average)	142-155	114-129
Not Supporting	(Poor)	0-141	0-113

Kentucky Division of Water's "Methods for Assessing Habitat in Wadeable Waters" (2011) (Revision 1)

Project Name:	Old Heady Property		Stream Name:	Intermittent Stream 3

RBP High Gradient Habitat

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
1. Epifaunal Substrate/ Available Cover 8 Score	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
2. Embeddedness 7 Score	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
3. Velocity/Depth Regime 6 Score	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
4. Sediment Deposition 11 Score	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
5. Channel Flow Status 7 Score	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel; and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
6. Channel Alteration 18 Score	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
7. Frequency of Riffles (or bends) 5 Score	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
Left/Right Bank	10 9	8 7 6	5 4 3	2 1
8. Bank Stability 4 LB 4 RB	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
9. Vegetative Protection 7 LB 7 RB	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
10. Riparian Vegetative Zone Width 8 LB 8 RB	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
Total Score 100	NOTES/COMMENTS: Poor Quality			

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: Intermittent Stream 2	**LOCATION:** Old Heady Property		
STATION #: RBP 4	**COUNTY:** Jefferson	**PROJECT:** 20-236	
INVESTIGATORS: R. Fangman/ Z. Triplett	**DATE:** 1/11/2021	**TIME:** 2:15	**AM** ☐ **PM** ☑

Verify Site LAT/LONG vs GPS Yes ☐ No ☐ N/A ☐

	Station	Downstream	Upstream
LAT	38.170468		
LONG	-85.519359		

CANOPY COVER::

- Fully Exposed (0-25%) ☐
- Partially Exposed (25-50%) ☑
- Partially Shaded (50-75%) ☐
- Fully Shaded (75-100%) ☐

STREAM TYPE:

- Perennial ☐
- Ephemeral ☐
- Intermittent ☑

WEATHER

	Now	Past 24 hours	
Has there been a scouring rain in the last 14 days?	☐	☐	Heavy rain
	☐	☐	Steady rain
	☐	☐	Intermittent showers
Yes ☐	☐	☐	Clear/sunny
No ☑	☑	☑	Cloudy

LOCAL WATERSHED FEATURES (Predominant Surrounding Land Use):

Surface Mining ☐	Construction ☐	Forest ☑
Deep Mining ☐	Commercial ☐	Pasture/Grazing ☐
Oil Wells ☐	Industrial ☐	Silviculture ☐
Land Disposal ☐	Row Crops ☐	Urban Runoff/ Storm Sewers ☑
Residential ☑		

INSTREAM FEATURES

Stream Width	3-7	ft
Maximum Depth	0.5	ft
Reach Length	50	m
Discharge		cfs

HYDRAULIC STRUCTURES

- Dams ☐
- Bridge Abutments ☐
- Island ☐
- Waterfalls ☐
- Other: ☐

STREAM FLOW

- Dry ☐
- Pooled ☐
- Low ☐
- High ☐
- Normal ☑

RIPARIAN VEGETATION

Trees ☑ Herbaceous ☑ Grasses ☑ Shrubs ☑

Dom. Tree/Shrub Taxa: sycamore, eastern red cedar, white oak, sugar maple

CHANNEL ALTERATIONS

- Dredging ☐
- Channelization ☐ (Full) ☐ (Partial) ☐

Riffle/Run/Pool Sequence (No. Sampled in Reach) _____Riffle _____Run _____Pool

P-CHEM Instrument Used: Date Calibrated:

Temp(°F) _____ D.O. (mg/l) _____ %Saturation _____ pH(S.U.) _____ Cond. (µS/cm) _____ Turb. _____

Substrate Characterization

Substrate Est. P.C.	Riffle 20 %	Run 50 %	Pool 30 %	Reach Total
Silt/Clay (<0.06 mm/0.002 in)	X	X	X	
Sand (0.06–2 mm/0.002–0.08 in)	X	X	X	
Gravel (2–64 mm/0.08–2.52 in)	X	X	X	
Cobble (64–256 mm/2.52–10.08 in)	X	X	X	
Boulders (>256 mm/10.08 in)				
Bedrock				

NOTES/COMMENTS:

Bluegrass Bioregion (High Gradient Assessments)		Headwater (<5.0 mi²)	Wadeable (>5.0 mi²)
Fully Supporting	(Excellent)	156-200	130-200
Supporting but Threatened and Partially Supporting	(Average)	142-155	114-129
Not Supporting	(Poor)	0-141	0-113

Kentucky Division of Water's "Methods for Assessing Habitat in Wadeable Waters" (2011) (Revision 1)

Project Name:	Old Heady Property	Stream Name:	Intermittent Stream 2

RBP High Gradient Habitat

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
1. Epifaunal Substrate/ Available Cover 12 Score	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
2. Embeddedness 7 Score	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
3. Velocity/Depth Regime 10 Score	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
4. Sediment Deposition 11 Score	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
5. Channel Flow Status 15 Score	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
6. Channel Alteration 18 Score	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
7. Frequency of Riffles (or bends) 13 Score	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
Left/Right Bank	10 9	8 7 6	5 4 3	2 1
8. Bank Stability 4 LB 4 RB	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
9. Vegetative Protection 5 LB 5 RB	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
10. Riparian Vegetative Zone Width 3 LB 3 RB	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
Total Score 110	NOTES/COMMENTS: Poor Quality			

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: Intermittent Stream 4	**LOCATION:** Old Heady Property		
STATION #: RBP 5	**COUNTY:** Jefferson	**PROJECT:** 20-236	
INVESTIGATORS: R. Fangman/ Z. Triplett	**DATE:** 1/11/2021	**TIME:**	**AM** ☐ **PM** ☐

Verify Site LAT/LONG vs GPS Yes ☐ No ☐ N/A ☐

	Station	Downstream	Upstream
LAT	38.171913		
LONG	-85.520725		

CANOPY COVER::

- Fully Exposed (0-25%) ☐
- Partially Exposed (25-50%) ☐
- Partially Shaded (50-75%) ☐
- Fully Shaded (75-100%) ☑

STREAM TYPE:

- Perennial ☐
- Ephemeral ☐
- Intermittent ☑

WEATHER	**Now**	**Past 24 hours**	
Has there been a scouring rain in the last 14 days?	☐	☐	Heavy rain
	☐	☐	Steady rain
	☐	☐	Intermittent showers
Yes ☐	☐	☐	Clear/sunny
No ☑	☑	☑	Cloudy

LOCAL WATERSHED FEATURES (Predominant Surrounding Land Use):

Surface Mining	☐	Construction	☐	Forest	☑
Deep Mining	☐	Commercial	☐	Pasture/Grazing	☐
Oil Wells	☐	Industrial	☐	Silviculture	☐
Land Disposal	☐	Row Crops	☐	Urban Runoff/ Storm Sewers	☐
Residential	☑				

INSTREAM FEATURES

- Stream Width: 2-4 ft
- Maximum Depth: 0.2 ft
- Reach Length: 25 m
- Discharge: _____ cfs

HYDRAULIC STRUCTURES

- Dams ☐
- Bridge Abutments ☐
- Island ☐
- Waterfalls ☐
- Other: ☐

STREAM FLOW

- Dry ☐
- Pooled ☐
- Low ☐
- High ☐
- Normal ☑

RIPARIAN VEGETATION

Trees ☑ Herbaceous ☑ Grasses ☐ Shrubs ☑

Dom. Tree/Shrub Taxa: bush honeysuckle, white oak, Eastern red cedar

CHANNEL ALTERATIONS

- Dredging ☐
- Channelization ☐ (Full) ☐ (Partial) ☐

Riffle/Run/Pool Sequence (No. Sampled in Reach) _____Riffle _____Run _____Pool

P-CHEM Instrument Used: Date Calibrated:

Temp(°F) _____ D.O. (mg/l) _____ %Saturation _____ pH(S.U.) _____ Cond. (µS/cm) _____ Turb. _____

Substrate Characterization

Substrate Est. P.C.	Riffle 20 %	Run 70 %	Pool 10 %	Reach Total
Silt/Clay (<0.06 mm/0.002 in)	X	X	X	
Sand (0.06–2 mm/0.002–0.08 in)	X	X	X	
Gravel (2–64 mm/0.08–2.52 in)	X	X	X	
Cobble (64–256 mm/2.52–10.08 in)	X	X	X	
Boulders (>256 mm/10.08 in)				
Bedrock				

NOTES/COMMENTS:

Bluegrass Bioregion (High Gradient Assessments)		Headwater (<5.0 mi²)	Wadeable (>5.0 mi²)
Fully Supporting	(Excellent)	156-200	130-200
Supporting but Threatened and Partially Supporting	(Average)	142-155	114-129
Not Supporting	(Poor)	0-141	0-113

Kentucky Division of Water's "Methods for Assessing Habitat in Wadeable Waters" (2011) (Revision 1)

Project Name:	Old Heady Property		Stream Name:	Intermittent Stream 4

RBP High Gradient Habitat

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
1. Epifaunal Substrate/ Available Cover 8 Score	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
2. Embeddedness 10 Score	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
3. Velocity/Depth Regime 6 Score	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
4. Sediment Deposition 12 Score	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
5. Channel Flow Status 10 Score	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
6. Channel Alteration 18 Score	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
7. Frequency of Riffles (or bends) 9 Score	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
Left/Right Bank	10 9	8 7 6	5 4 3	2 1
8. Bank Stability 5 LB 5 RB	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
9. Vegetative Protection 8 LB 8 RB	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
10. Riparian Vegetative Zone Width 8 LB 8 RB	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
Total Score 115	NOTES/COMMENTS: Poor Quality			

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: Intermittent Stream 5	**LOCATION:** Old Heady Property		
STATION #: RBP 6	**COUNTY:** Jefferson	**PROJECT:** 20-236	
INVESTIGATORS: R. Fangman/ Z. Triplett	**DATE:** 1/11/2021	**TIME:** 3:56	**AM** ☐ **PM** ☑

Verify Site LAT/LONG vs GPS Yes ☐ No ☐ N/A ☐

	Station	Downstream	Upstream
LAT	38.170885		
LONG	-85.524064		

CANOPY COVER::

Fully Exposed (0-25%)	☐
Partially Exposed (25-50%)	☐
Partially Shaded (50-75%)	☐
Fully Shaded (75-100%)	☑

STREAM TYPE:

Perennial	☐
Ephemeral	☐
Intermittent	☑

WEATHER	**Now**	**Past 24 hours**	
Has there been a scouring rain in the last 14 days?	☐	☐	Heavy rain
	☐	☐	Steady rain
	☐	☐	Intermittent showers
Yes ☐	☐	☐	Clear/sunny
No ☑	☑	☑	Cloudy

LOCAL WATERSHED FEATURES (Predominant Surrounding Land Use):

Surface Mining ☐	Construction ☐	Forest ☑
Deep Mining ☐	Commercial ☐	Pasture/Grazing ☑
Oil Wells ☐	Industrial ☐	Silviculture ☐
Land Disposal ☐	Row Crops ☐	Urban Runoff/ Storm Sewers ☐
Residential ☐		

INSTREAM FEATURES		**HYDRAULIC STRUCTURES**	**STREAM FLOW**	**RIPARIAN VEGETATION**	**CHANNEL ALTERATIONS**
Stream Width	3-6 ft	Dams ☐	Dry ☐	Trees ☑ Herbaceous ☑	Dredging ☐
Maximum Depth	0.2 ft	Bridge Abutments ☐	Pooled ☐	Grasses ☐ Shrubs ☑	Channelization ☐
Reach Length	50 m	Island ☐	Low ☐	Dom. Tree/Shrub Taxa:	(Full) ☐ (Partial) ☐
Discharge	cfs	Waterfalls ☐	High ☐	eastern red cedar	green ash
		Other: ☐	Normal ☑	black walnut	sugar maple

Riffle/Run/Pool Sequence (No. Sampled in Reach) _____Riffle _____Run _____Pool

P-CHEM Instrument Used: Date Calibrated:

Temp(°F) _____ D.O. (mg/l) _____ %Saturation _____ pH(S.U.) _____ Cond. (µS/cm) _____ Turb. _____

Substrate Characterization

Substrate Est. P.C.	Riffle 10 %	Run 80 %	Pool 10 %	Reach Total
Silt/Clay (<0.06 mm/0.002 in)	X	X	X	
Sand (0.06–2 mm/0.002–0.08 in)	X	X	X	
Gravel (2–64 mm/0.08–2.52 in)	X	X	X	
Cobble (64–256 mm/2.52–10.08 in)	X	X	X	
Boulders (>256 mm/10.08 in)				
Bedrock	X	X	X	

NOTES/COMMENTS:

Bluegrass Bioregion (High Gradient Assessments)		**Headwater (<5.0 mi²)**	**Wadeable (>5.0 mi²)**
Fully Supporting	(Excellent)	156-200	130-200
Supporting but Threatened and Partially Supporting	(Average)	142-155	114-129
Not Supporting	(Poor)	0-141	0-113

Kentucky Division of Water's "Methods for Assessing Habitat in Wadeable Waters" (2011) (Revision 1)

Project Name: Old Heady Property **Stream Name:** Intermittent Stream 5

RBP High Gradient Habitat

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
1. Epifaunal Substrate/ Available Cover **7** Score	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
2. Embeddedness **8** Score	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
3. Velocity/Depth Regime **6** Score	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low)	Dominated by 1 velocity/ depth regime (usually slow-deep).
4. Sediment Deposition **8** Score	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
5. Channel Flow Status **8** Score	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
6. Channel Alteration **17** Score	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
7. Frequency of Riffles (or bends) **8** Score	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
Left/Right Bank	10 9	8 7 6	5 4 3	2 1
8. Bank Stability **4** LB **4** RB	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
9. Vegetative Protection **8** LB **8** RB	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
10. Riparian Vegetative Zone Width **6** LB **6** RB	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
Total Score **98**	**NOTES/COMMENTS:** **Poor Quality**			

High Gradient Bioassessment Stream Visit Sheet

STREAM NAME: Intermittent Stream 6	**LOCATION:** Old Heady Property		
STATION #: RBP 7	**COUNTY:** Jefferson	**PROJECT:** 20-236	
INVESTIGATORS: R. Fangman/ Z. Triplett	**DATE:** 1/11/2021	**TIME:** 4:20	**AM** ☐ **PM** ☑

Verify Site LAT/LONG vs GPS Yes ☐ No ☐ N/A ☐

	Station	Downstream	Upstream
LAT	38.169314		
LONG	-85.522824		

CANOPY COVER::

Fully Exposed (0-25%)	☐
Partially Exposed (25-50%)	☐
Partially Shaded (50-75%)	☑
Fully Shaded (75-100%)	☐

STREAM TYPE:

Perennial	☐
Ephemeral	☐
Intermittent	☑

WEATHER	**Now**	**Past 24 hours**	
Has there been a scouring rain in the last 14 days?	☐	☐	Heavy rain
	☐	☐	Steady rain
	☐	☐	Intermittent showers
Yes ☐	☐	☐	Clear/sunny
No ☑	☑	☑	Cloudy

LOCAL WATERSHED FEATURES (Predominant Surrounding Land Use):

Surface Mining ☐	Construction ☐	Forest ☑
Deep Mining ☐	Commercial ☐	Pasture/Grazing ☑
Oil Wells ☐	Industrial ☐	Silviculture ☐
Land Disposal ☐	Row Crops ☐	Urban Runoff/ Storm Sewers ☐
Residential ☑		

INSTREAM FEATURES		**HYDRAULIC STRUCTURES**	**STREAM FLOW**	**RIPARIAN VEGETATION**	**CHANNEL ALTERATIONS**
Stream Width	2-5 ft	Dams ☐	Dry ☐	Trees ☑ Herbaceous ☑	Dredging ☐
Maximum Depth	0.2 ft	Bridge Abutments ☐	Pooled ☐	Grasses ☑ Shrubs ☑	Channelization ☐
Reach Length	25 m	Island ☐	Low ☐	Dom. Tree/Shrub Taxa:	(Full) ☐ (Partial) ☐
Discharge	cfs	Waterfalls ☐	High ☐	eastern red cedar	hackberry
		Other: ☐	Normal ☑	sycamore	sugar maple

Riffle/Run/Pool Sequence (No. Sampled in Reach) _____Riffle _____Run _____Pool

P-CHEM Instrument Used: Date Calibrated:

Temp(°F) _____ D.O. (mg/l) _____ %Saturation _____ pH(S.U.) _____ Cond. (µS/cm) _____ Turb. _____

Substrate Characterization

Substrate Est. P.C.	Riffle 10 %	Run 80 %	Pool 10 %	Reach Total
Silt/Clay (<0.06 mm/0.002 in)	X	X	X	
Sand (0.06–2 mm/0.002–0.08 in)	X	X	X	
Gravel (2–64 mm/0.08–2.52 in)	X	X	X	
Cobble (64–256 mm/2.52–10.08 in)	X	X	X	
Boulders (>256 mm/10.08 in)				
Bedrock				

NOTES/COMMENTS:

Bluegrass Bioregion (High Gradient Assessments)		**Headwater (<5.0 mi²)**	**Wadeable (>5.0 mi²)**
Fully Supporting	(Excellent)	156-200	130-200
Supporting but Threatened and Partially Supporting	(Average)	142-155	114-129
Not Supporting	(Poor)	0-141	0-113

Kentucky Division of Water's "Methods for Assessing Habitat in Wadeable Waters" (2011) (Revision 1)

Project Name: Old Heady Property **Stream Name:** Intermittent Stream 6

RBP High Gradient Habitat

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1
1. Epifaunal Substrate/ Available Cover 5 Score	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
2. Embeddedness 7 Score	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
3. Velocity/Depth Regime 5 Score	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
4. Sediment Deposition 8 Score	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
5. Channel Flow Status 6 Score	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
6. Channel Alteration 10 Score	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
7. Frequency of Riffles (or bends) 5 Score	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
Left/Right Bank	10 9	8 7 6	5 4 3	2 1
8. Bank Stability 4 LB / 4 RB	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
9. Vegetative Protection 4 LB / 4 RB	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
10. Riparian Vegetative Zone Width 1 LB / 3 RB	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
Total Score 66	**NOTES/COMMENTS:** **Poor Quality**			

APPENDIX C

APPROVED JURISDICTIONAL DETERMINATION FORM (INTERIM)

I. ADMINISTRATIVE INFORMATION

Completion Date of Approved Jurisdictional Determination (AJD): 1/29/2021
ORM Number:
Associated JDs: N/A
Review Area Location[1]: State/Territory: Kentucky City: Louisville County/Parish/Borough: Jefferson
Center Coordinates of Review Area: Latitude 38.171698° Longitude -85.521692°

II. FINDINGS

A. Summary: Check all that apply. At least one box from the following list MUST be selected. Complete the corresponding sections/tables and summarize data sources.

- ☐ The review area is comprised entirely of dry land (i.e., there are no waters or water features, including wetlands, of any kind in the entire review area). Rationale: N/A or describe rationale.
- ☐ There are "navigable waters of the United States" within Rivers and Harbors Act jurisdiction within the review area (complete table in Section II.B).
- ☒ There are "waters of the United States" within Clean Water Act jurisdiction within the review area (complete appropriate tables in Section II.C).
- ☒ There are waters or water features excluded from Clean Water Act jurisdiction within the review area (complete table in Section II.D).

B. Rivers and Harbors Act of 1899 Section 10 (§ 10)[2]

§ 10 Name	§ 10 Size		§ 10 Criteria	Rationale for § 10 Determination
N/A.	N/A.	N/A	N/A.	N/A.

C. Clean Water Act Section 404

Territorial Seas and Traditional Navigable Waters ((a)(1) waters):[3]				
(a)(1) Name	(a)(1) Size		(a)(1) Criteria	Rationale for (a)(1) Determination
N/A.	N/A.	N/A.	N/A.	N/A.

Tributaries ((a)(2) waters):				
(a)(2) Name	(a)(2) Size		(a)(2) Criteria	Rationale for (a)(2) Determination
Intermittent 1	175	linear feet	(a)(2) Intermittent tributary contributes surface water flow directly or indirectly to an (a)(1) water in a typical year.	Intermittent Stream 1 is three to seven feet wide with silt, sand, gravel, cobble and bedrock substrate. During the January 11, 2021 site visit the channel contained flowing and pooled water which indirectly contribute to an (a)(1) water.
Intermittent 2	1,789	linear feet	(a)(2) Intermittent tributary contributes	Intermittent Stream 2 is approximately seven feet wide with silt, sand, gravel, cobble, boulders and bedrock substrate. During the January 11, 2021 site

[1] Map(s)/figure(s) are attached to the AJD provided to the requestor.
[2] If the navigable water is not subject to the ebb and flow of the tide or included on the District's list of Rivers and Harbors Act Section 10 navigable waters list, do NOT use this document to make the determination. The District must continue to follow the procedure outlined in 33 CFR part 329.14 to make a Rivers and Harbors Act Section 10 navigability determination.
[3] A stand-alone TNW determination is completed independently of a request for an AJD. A stand-alone TNW determination is conducted for a specific segment of river or stream or other type of waterbody, such as a lake, where upstream or downstream limits or lake borders are established. A stand-alone TNW determination should be completed following applicable guidance and should NOT be documented on the AJD Form.

Tributaries ((a)(2) waters):				
(a)(2) Name	(a)(2) Size		(a)(2) Criteria	Rationale for (a)(2) Determination
			surface water flow directly or indirectly to an (a)(1) water in a typical year.	visit the channel contained flowing and pooled water which indirectly contribute to an (a)(1) water.
Intermittent 3	102	linear feet	(a)(2) Intermittent tributary contributes surface water flow directly or indirectly to an (a)(1) water in a typical year.	Intermittent Stream 3 is three to five feet wide with silt, sand, gravel and cobble substrate. During the January 11, 2021 site visit the channel contained flowing and pooled water which indirectly contribute to an (a)(1) water.
Intermittent 4	458	linear feet	(a)(2) Intermittent tributary contributes surface water flow directly or indirectly to an (a)(1) water in a typical year.	Intermittent Stream 4 is two to four feet wide with silt, sand, gravel and cobble substrate. During the January 11, 2021 site visit the channel contained flowing and pooled water which indirectly contribute to an (a)(1) water.
Intermittent 5	365	linear feet	(a)(2) Intermittent tributary contributes surface water flow directly or indirectly to an (a)(1) water in a typical year.	Intermittent Stream 5 is three to six feet wide with silt, sand, gravel, cobble and bedrock substrate. During the January 11, 2021 site visit the channel contained flowing and pooled water which indirectly contribute to an (a)(1) water.
Intermittent 6	249	linear feet	(a)(2) Intermittent tributary contributes surface water flow directly or indirectly to an (a)(1) water in a typical year.	Intermittent Stream 6 is two to five feet wide with silt, sand, gravel and cobble substrate.During the January 11, 2021 site visit the channel contained flowing and pooled water which indirectly contribute to an (a)(1) water.

Lakes and ponds, and impoundments of jurisdictional waters ((a)(3) waters):				
(a)(3) Name	(a)(3) Size		(a)(3) Criteria	Rationale for (a)(3) Determination
Pond 1	0.716	acre(s)	(a)(3) Lake/pond or impoundment of a jurisdictional water contributes surface water flow directly or indirectly to an	Pond 1 has a presumed maximum depth of eight feet with a silt substrate. Pond 1 is connected to downstream (a)(1) waters via Intermittent Stream 6.

Lakes and ponds, and impoundments of jurisdictional waters ((a)(3) waters):				
(a)(3) Name	(a)(3) Size		(a)(3) Criteria	Rationale for (a)(3) Determination
			(a)(1) water in a typical year.	
N/A.	N/A.	N/A.	N/A.	N/A.

Adjacent wetlands ((a)(4) waters):				
(a)(4) Name	(a)(4) Size		(a)(4) Criteria	Rationale for (a)(4) Determination
N/A.	N/A.	N/A.	N/A.	N/A.

D. Excluded Waters or Features

Excluded waters ((b)(1) – (b)(12)):[4]				
Exclusion Name	Exclusion Size		Exclusion[5]	Rationale for Exclusion Determination
Ephemeral 1	84	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	Eph 1 only contains surface water flowing or pooling in direct response to precipitation and had no flow in the channel during the field assessment. Eph 1 is a (b)(3) water and is therefore excluded from the rule.
Ephemeral 2	289	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	Eph 2 only contains surface water flowing or pooling in direct response to precipitation and had no flow in the channel during the field assessment. Eph 2 is a (b)(3) water and is therefore excluded from the rule.
Ephemeral 3	21	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	Eph 3 only contains surface water flowing or pooling in direct response to precipitation and had no flow in the channel during the field assessment. Eph 3 is a (b)(3) water and is therefore excluded from the rule.
Ephemeral 4	412	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	Eph 4 only contains surface water flowing or pooling in direct response to precipitation and had no flow in the channel during the field assessment. Eph 4 is a (b)(3) water and is therefore excluded from the rule.
Ephemeral 5	175	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	Eph 5 only contains surface water flowing or pooling in direct response to precipitation and had no flow in the channel during the field assessment. Eph 5 is a (b)(3) water and is therefore excluded from the rule.
Ephemeral 6	94	linear feet	(b)(3) Ephemeral feature, including an ephemeral	Eph 6 only contains surface water flowing or pooling in direct response to precipitation and had no flow in the channel during the field

[4] Some excluded waters, such as (b)(2) and (b)(4), may not be specifically identified on the AJD form unless a requestor specifically asks a Corps district to do so. Corps districts may, in case-by-case instances, choose to identify some or all of these waters within the review area.
[5] Because of the broad nature of the (b)(1) exclusion and in an effort to collect data on specific types of waters that would be covered by the (b)(1) exclusion, four sub-categories of (b)(1) exclusions were administratively created for the purposes of the AJD Form. These four sub-categories are not new exclusions, but are simply administrative distinctions and remain (b)(1) exclusions as defined by the NWPR.

Excluded waters ((b)(1) – (b)(12)):[4]				
Exclusion Name	Exclusion Size		Exclusion[5]	Rationale for Exclusion Determination
			stream, swale, gully, rill, or pool.	assessment. Eph 6 is a (b)(3) water and is therefore excluded from the rule.
Ephemeral 7	26	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	Eph 7 only contains surface water flowing or pooling in direct response to precipitation and had no flow in the channel during the field assessment. Eph 7 is a (b)(3) water and is therefore excluded from the rule.
Ephemeral 8	38	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	Eph 8 only contains surface water flowing or pooling in direct response to precipitation and had no flow in the channel during the field assessment. Eph 8 is a (b)(3) water and is therefore excluded from the rule.
Ephemeral 9	111	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	Eph 9 only contains surface water flowing or pooling in direct response to precipitation and had no flow in the channel during the field assessment. Eph 9is a (b)(3) water and is therefore excluded from the rule.
Ephemeral 10	120	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	Eph 10 only contains surface water flowing or pooling in direct response to precipitation and had no flow in the channel during the field assessment. Eph 19 is a (b)(3) water and is therefore excluded from the rule.
Ephemeral 11	169	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	Eph 11 only contains surface water flowing or pooling in direct response to precipitation and had no flow in the channel during the field assessment. Eph 11 is a (b)(3) water and is therefore excluded from the rule.
Ephemeral 12	97	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	Eph 12 only contains surface water flowing or pooling in direct response to precipitation and had no flow in the channel during the field assessment. Eph 12 is a (b)(3) water and is therefore excluded from the rule.
Ephemeral 13	76	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	Eph 13 only contains surface water flowing or pooling in direct response to precipitation and had no flow in the channel during the field assessment. Eph 13is a (b)(3) water and is therefore excluded from the rule.
Ephemeral 14	139	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	Eph 14 only contains surface water flowing or pooling in direct response to precipitation and had no flow in the channel during the field assessment. Eph 14 is a (b)(3) water and is therefore excluded from the rule.
Ephemeral 15	81	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	Eph 15 only contains surface water flowing or pooling in direct response to precipitation and had no flow in the channel during the field assessment. Eph 15 is a (b)(3) water and is therefore excluded from the rule.

Excluded waters ((b)(1) – (b)(12)):[4]				
Exclusion Name	Exclusion Size		Exclusion[5]	Rationale for Exclusion Determination
Ephemeral 16	167	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	Eph 16 only contains surface water flowing or pooling in direct response to precipitation and had no flow in the channel during the field assessment. Eph 16 is a (b)(3) water and is therefore excluded from the rule.
Ephemeral 17	120	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	Eph 17 only contains surface water flowing or pooling in direct response to precipitation and had no flow in the channel during the field assessment. Eph 17 is a (b)(3) water and is therefore excluded from the rule.
Ephemeral 18	65	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	Eph 18 only contains surface water flowing or pooling in direct response to precipitation and had no flow in the channel during the field assessment. Eph 18 is a (b)(3) water and is therefore excluded from the rule.
Ephemeral 19	45	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	Eph 19 only contains surface water flowing or pooling in direct response to precipitation and had no flow in the channel during the field assessment. Eph 19 is a (b)(3) water and is therefore excluded from the rule.
Ephemeral 20	95	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	Eph 20 only contains surface water flowing or pooling in direct response to precipitation and had no flow in the channel during the field assessment. Eph 20 is a (b)(3) water and is therefore excluded from the rule.
Ephemeral 21	21	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	Eph 21 only contains surface water flowing or pooling in direct response to precipitation and had no flow in the channel during the field assessment. Eph 21 is a (b)(3) water and is therefore excluded from the rule.
Ephemeral 22	31	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	Eph 22 only contains surface water flowing or pooling in direct response to precipitation and had no flow in the channel during the field assessment. Eph 22 is a (b)(3) water and is therefore excluded from the rule.
Ephemeral 23	135	linear feet	(b)(3) Ephemeral feature, including an ephemeral stream, swale, gully, rill, or pool.	Eph 23 only contains surface water flowing or pooling in direct response to precipitation and had no flow in the channel during the field assessment. Eph 23 is a (b)(3) water and is therefore excluded from the rule.

III. SUPPORTING INFORMATION

A. Select/enter all resources that were used to aid in this determination and attach data/maps to this document and/or references/citations in the administrative record, as appropriate.

☒ Information submitted by, or on behalf of, the applicant/consultant: Request for Jurisdictional Determination for Sunrise Builders, LLC

This information is **sufficient for purposes of this AJD.**

Rationale: N/A

- ☐ Data sheets prepared by the Corps: Title(s) and/or date(s).
- ☒ Photographs: Aerial and Other: site photographs January 11, 2021
- ☐ Corps site visit(s) conducted on: Date(s).
- ☐ Previous Jurisdictional Determinations (AJDs or PJDs): ORM Number(s) and date(s).
- ☐ Antecedent Precipitation Tool: *provide detailed discussion in Section III.B*.
- ☒ USDA NRCS Soil Survey: SSURGO, Jefferson County, Kentucky (2008).
- ☐ USFWS NWI maps: Title(s) and/or date(s).
- ☒ USGS topographic maps: 1:24,000 – Jeffersontown, Kentucky Quadrangle.

Other data sources used to aid in this determination:

Data Source (select)	Name and/or date and other relevant information
USGS Sources	N/A.
USDA Sources	N/A.
NOAA Sources	N/A.
USACE Sources	N/A.
State/Local/Tribal Sources	N/A.
Other Sources	N/A.

B. Typical year assessment(s): N/A or provide typical year assessment for each relevant data source used to support the conclusions in the AJD.

C. Additional comments to support AJD: N/A or provide additional discussion as appropriate.

GREENBAUM ASSOCIATES, INC.
GEOTECHNICAL & MATERIALS ENGINEERS

994 Longfield Avenue
Louisville, Kentucky 40215
502/361-8447
FAX 502/361-4793

April 25, 2021

Mr. David Garrett
Sunshine Builders, LLC
2703 Sparrows Point Place
Louisville, KY 40245

Re: **Slope Survey**
Garrett Bridwell Subdivision
Old Heady Road
Louisville, Kentucky
Project Number 21-089E

Dear Mr. Garrett:

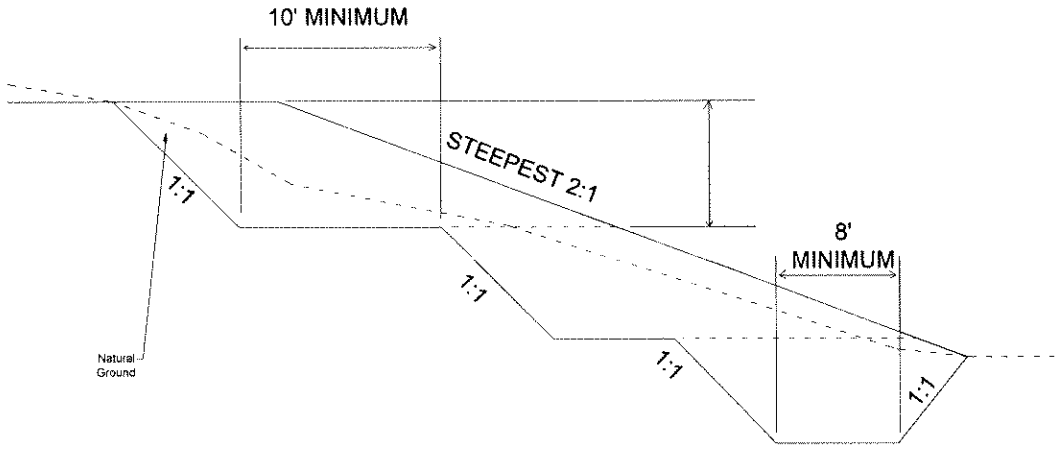
On April 22, 2021, Mr. Luke Van Nevel, EIT, walked the above referenced property and viewed several slopes with a greater than 20-degree inclination. Included is a drawing showing the approximate locations of the slopes (indicated by yellow shading) as well as a drawing showing the geologic mapping taken from the Kentucky Geological Survey. Most of the slopes located along the small tributary running northwest to southeast, just northeast of Saddle Bend Way. Also included are photos of several of the slopes taken during a walkover of the site. During the walkover, no evidence was found of slope movement, i.e.., no visual indication of landslide such as bulges or tension cracks indicative of a scarp.

This site is shown by the Kentucky Geological Survey to be underlain by the Drake's Formation. The Geological Survey describes the Drakes Formation as:

> Grayish green dolomite or limy silty mudstone and lesser amounts of argillaceous, fine-grained dolomite or dolomitic limestone. Megafossils absent or sparse in mudstone, some dolomite beds contain abundant poorly preserved bryozoans or brachiopods. Mudstone contains ripplemarks and mudcracks. 135 ft thick at type section. Divided into Rowland and overlying Preachersville Members. Conformably overlies Ashlock Formation; disconformably overlain by Brassfield Dolomite. Assigned to Late Ordovician. Approximately same rocks called the Waynesville limestone and overlying Liberty and Whitewater formations.

The topography of this property is rolling, resulting in substantial cuts and fills. When fill is to be placed on an existing slope it is imperative that the existing slope be benched as shown in the diagram below to prevent the formation of a plane of weakness along which a slope failure can develop. Benching will have to be adjusted as necessary, in consultation

with this office, where limestone bedrock is encountered that prevents benching as shown from being achieved



Soil fill must be no steeper than 2 horizontal to 1 vertical in order that it remain stable. Where there is a sharp angle in the slope, such as near the corner of a building or pavement corner, the slope must be no steeper than 2.5 to 1. If the slope is to be mowed with normal lawncare equipment, it should be no steeper than 3 to 1. This survey is intended to address existing slopes at this site. This is not a geotechnical investigation and does not include any boring, laboratory testing nor modeling of slope stability to determine factor of safety against sliding.

If you have any questions regarding this study, please call.

Sincerely,

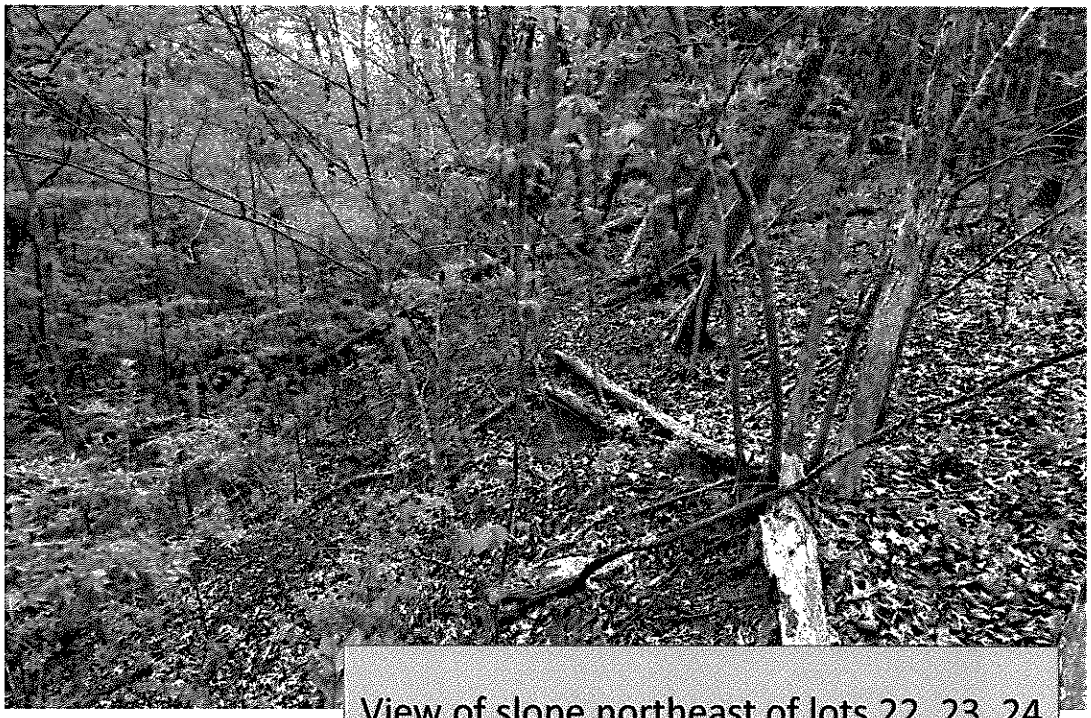
GREENBAUM ASSOCIATES, INC.

Luke Van Nevel

Luke Van Nevel, E.I.T.
Engineer-in-Training

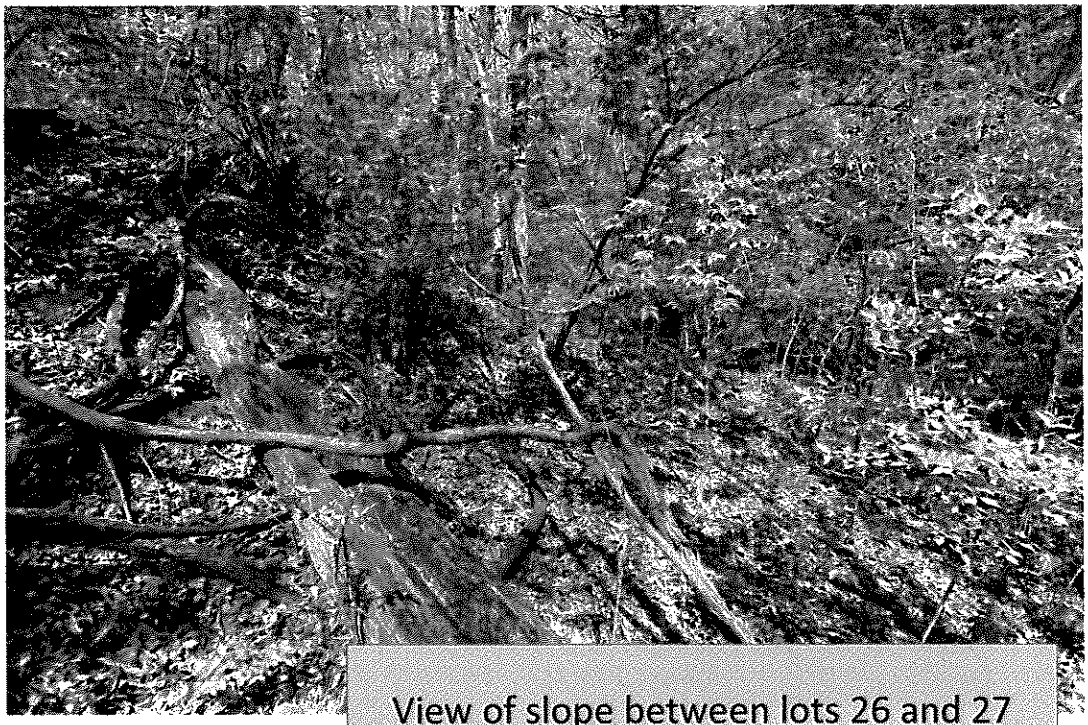
Sandor R. Greenbaum

Sandor R. Greenbaum, P. E.
Principal Engineer

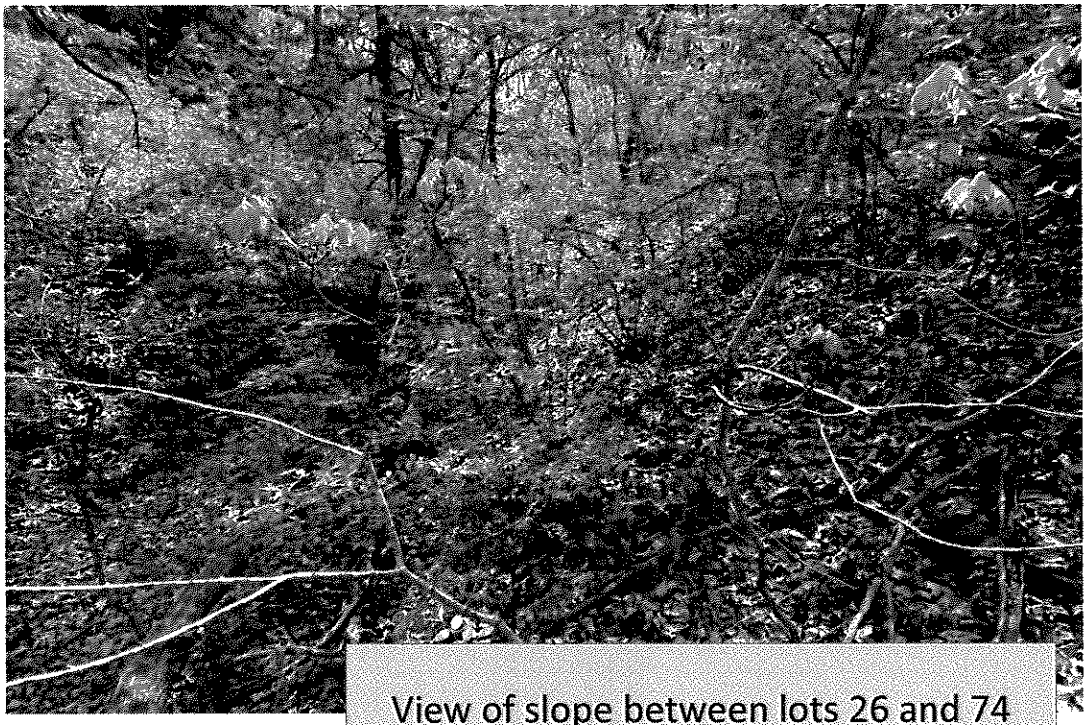


View of slope northeast of lots 22, 23, 24

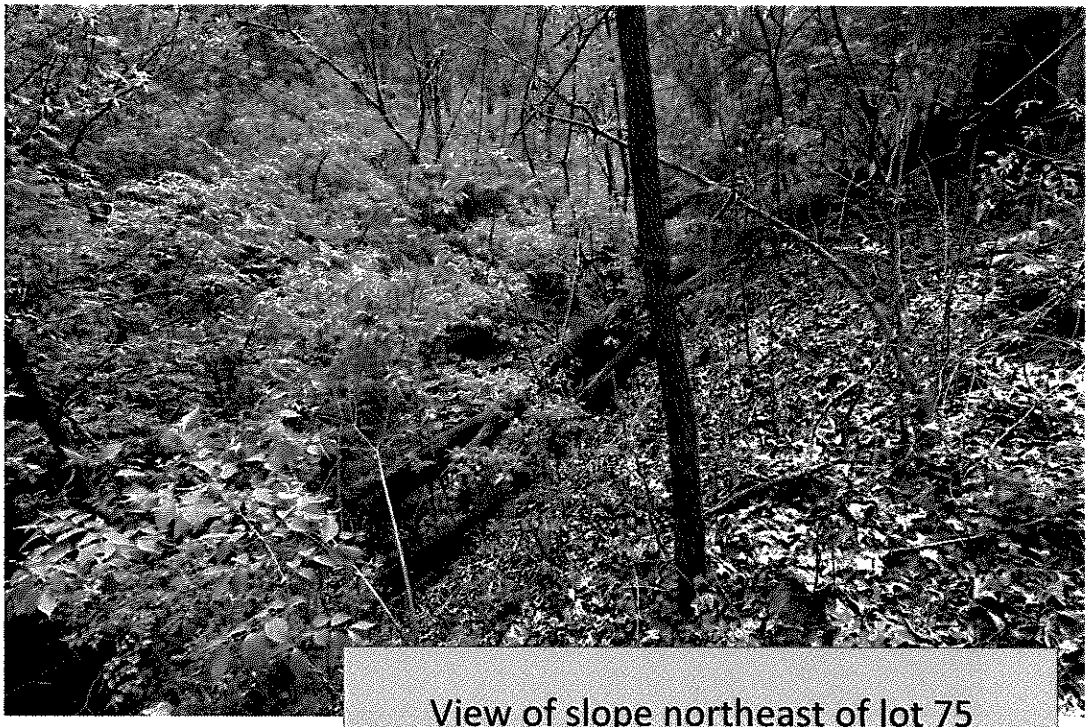
View of slope northeast of lot 24



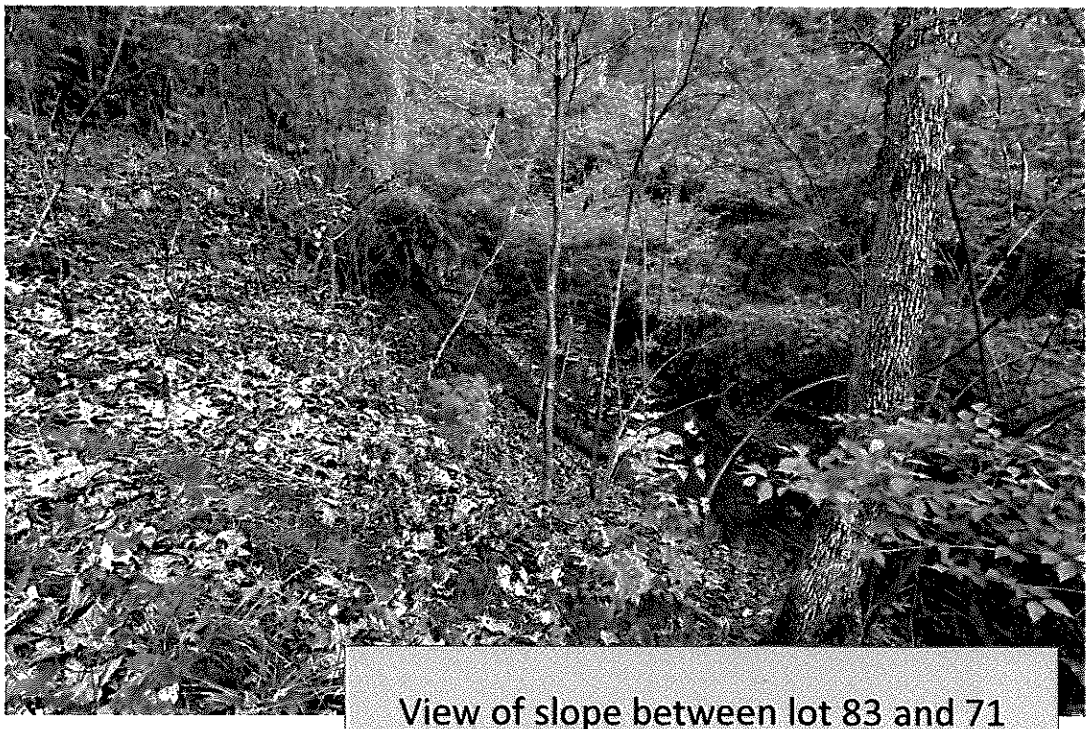
View of slope between lots 26 and 27



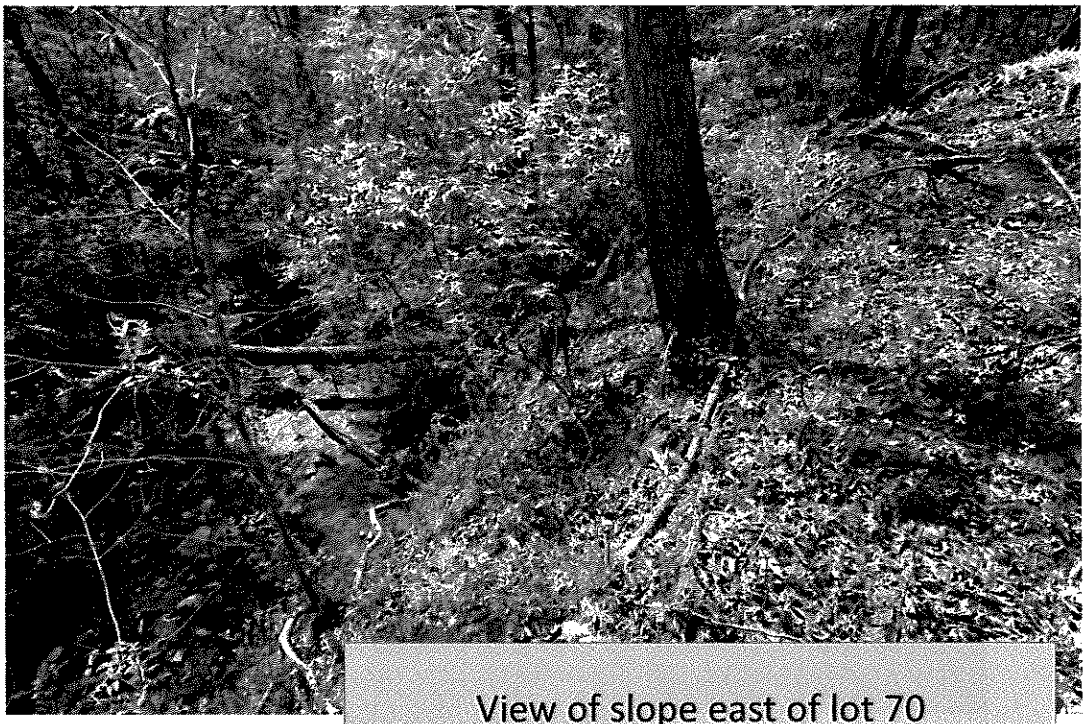
View of slope between lots 26 and 74



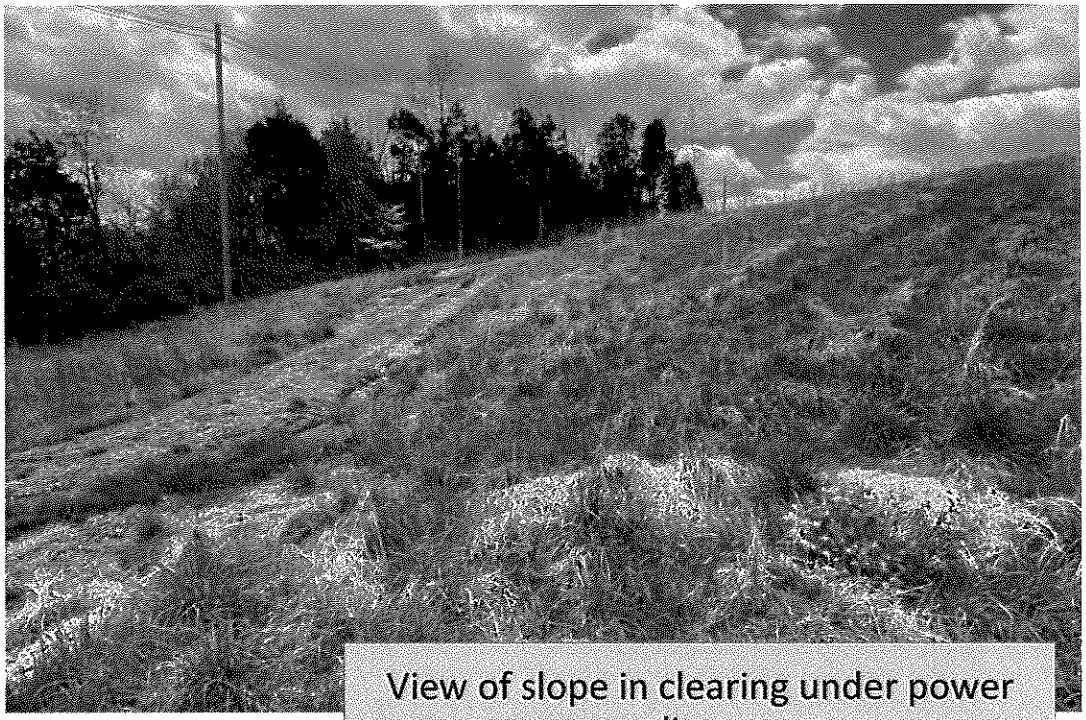
View of slope northeast of lot 75



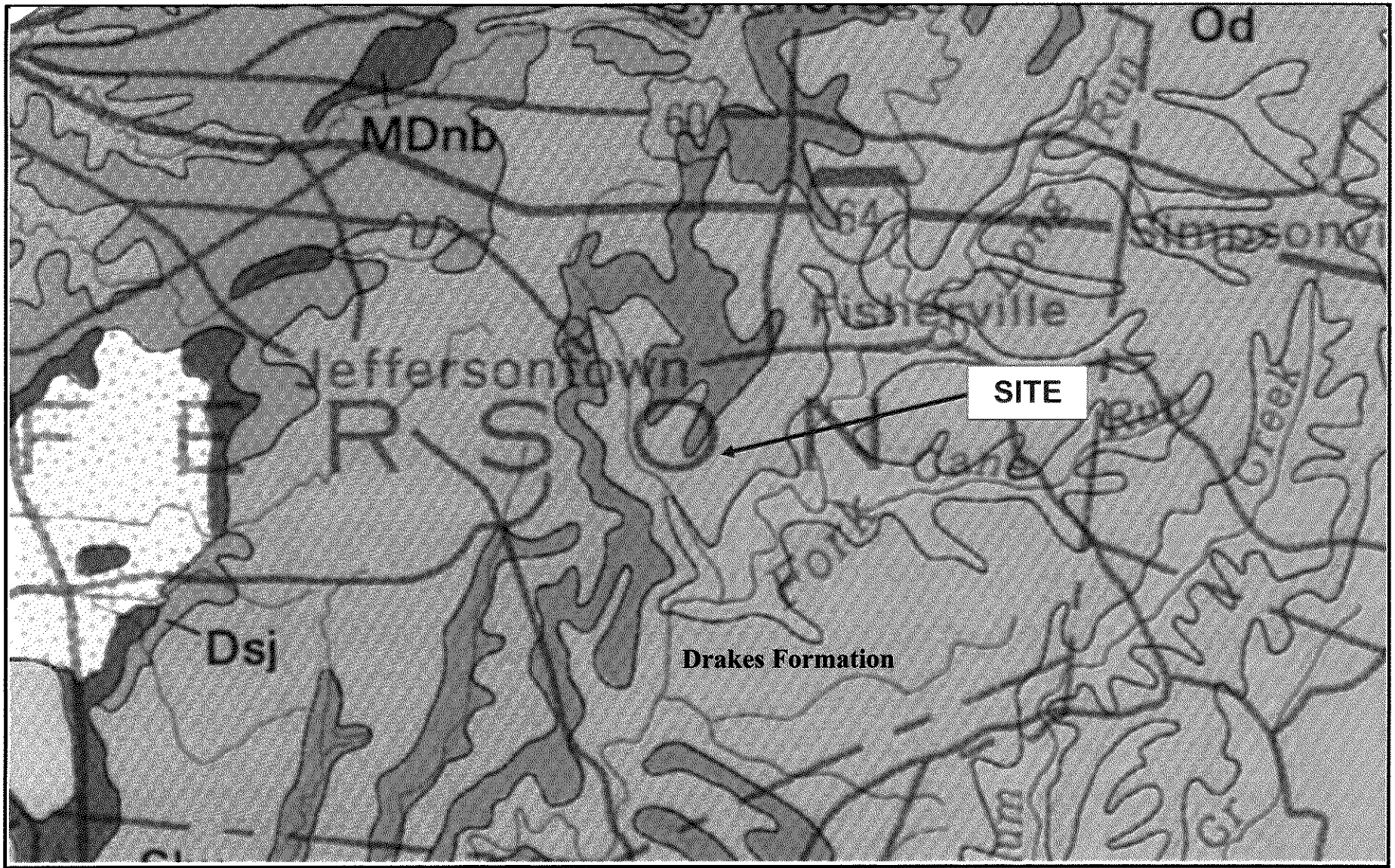
View of slope between lot 83 and 71



View of slope east of lot 70



View of slope in clearing under power lines



Sunshine Builders, LLC	Greenbaum Associates, Inc.	**Site Geology** Garrett Bridwell Subdivision Old Heady Road, Louisville, Kentucky Greenbaum Project Number: 20-089E

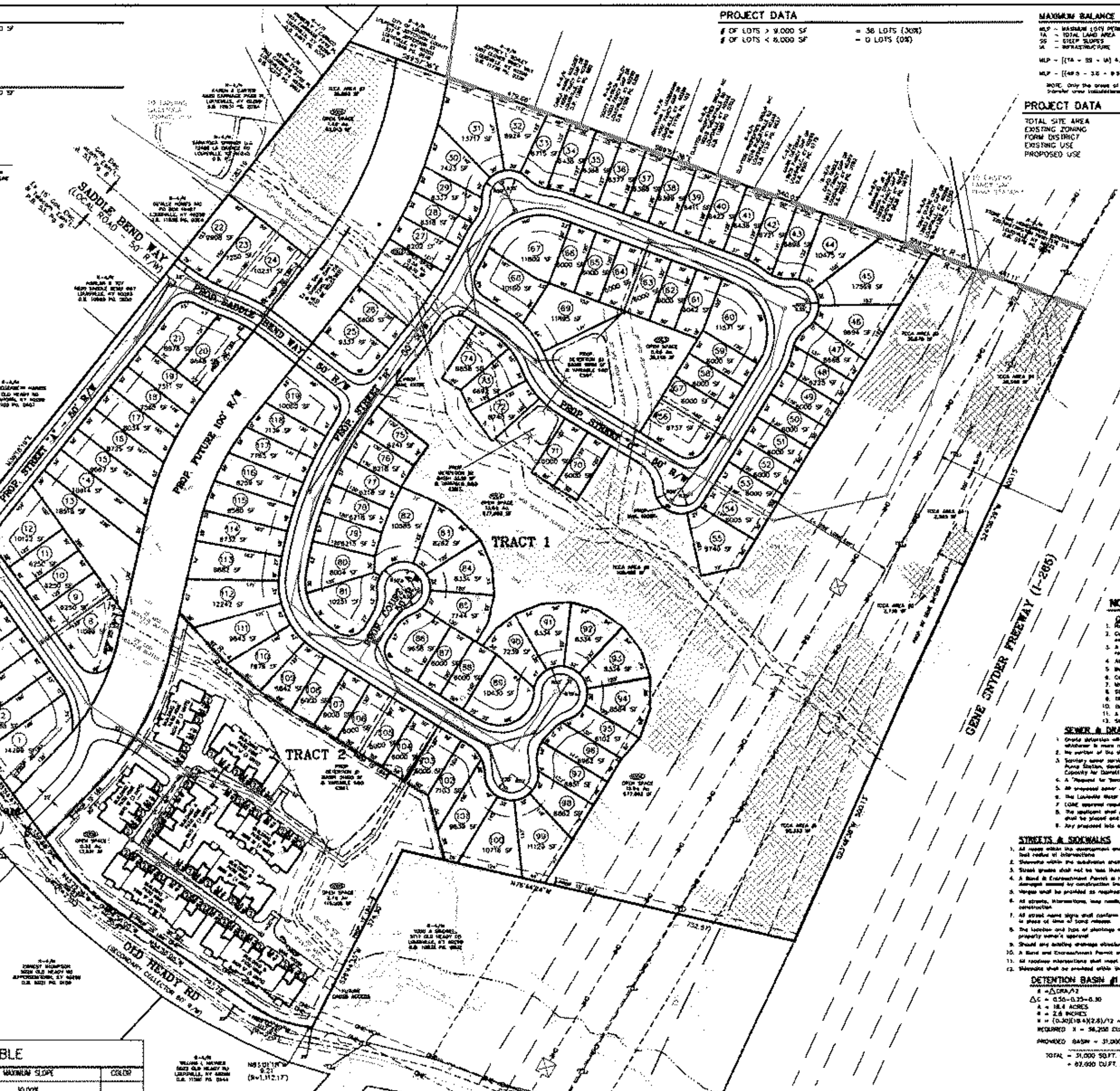
R-4 REQUIREMENTS

MINIMUM LOT AREA	= 9,000 SF
MINIMUM SIDE YARD	= 5'
MIN. FRONT YARD & STREET SIDE YARD	= 30'
MINIMUM LOT WIDTH	= 60'
MINIMUM REAR YARD	= 25'
MAX. BUILDING HEIGHT	= 35'

R-5A REQUIREMENTS

MINIMUM LOT AREA	= 9,000 SF
MINIMUM SIDE YARD	= 5'
MIN. FRONT YARD & STREET SIDE YARD	= 20'
MINIMUM LOT WIDTH	= 50'
MINIMUM REAR YARD	= 25'
MAX. BUILDING HEIGHT	= 35'

BENCHMARK DESCRIPTIONS



PROJECT DATA

# OF LOTS > 9,000 SF	= 36 LOTS (30%)
# OF LOTS < 6,000 SF	= 0 LOTS (0%)

MAXIMUM BALANCE TRANSFER LOT CALCULATIONS (TRACT 1)

MLP – MAXIMUM LOTS PERMITTED
TA – TOTAL LAND AREA = 49.7± Ac.
SS – STEEP SLOPES = 3.6± Ac.
IA – INFRASTRUCTURE = 9.5± Ac.

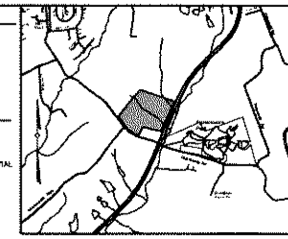
MLP = [(TA – SS – IA) 4.84] + SS X 4.84/2

MLP = [(49.5 – 3.6 – 9.5) 4.84] + 3.6 X 4.84/2 = 185 LOTS

NOTE: Only the areas of steep slopes within open space lots are being used for the balance transfer area calculations.

PROJECT DATA

TOTAL SITE AREA	= 56.3± Ac. (2,452,707 SF)
EXISTING ZONING	= R-4
FORM DISTRICT	= NEIGHBORHOOD
EXISTING USE	= SINGLE FAMILY RESIDENTIAL
PROPOSED USE	= SINGLE FAMILY/MULTI-FAMILY RESIDENTIAL



LOCATION MAP
NOT TO SCALE

TRACT 1

TRACT 1 AREA	= 49.7± Ac. (2,166,324 SF)
AREA OF RIGHT OF WAY	= 9.5± Ac. (413,059 SF)
NET SITE AREA	= 40.2± Ac. (1,753,265 SF)
EXISTING ZONING	= R-4
FORM DISTRICT	= NEIGHBORHOOD
EXISTING USE	= SINGLE FAMILY RESIDENTIAL TO REMAIN
TOTAL # RESIDENTIAL LOTS	= 119 LOTS
TOTAL ARE OF LOTS	= 22.0± Ac. (958,301 SF)
DENSITY	= 2.39 DU/Ac. (7.26 DU/Ac. MAX. ALLOWED)
NET DENSITY	= 2.96 DU/Ac. (7.26 DU/Ac. MAX. ALLOWED)
OPEN SPACE PROVIDED	= 18.1± Ac. (789,402 SF)

TRACT 2

TRACT 2 AREA	= 6.6± Ac. (286,383 SF)	
EXISTING ZONING	= R-4	
PROPOSED ZONING	= R-5A	
FORM DISTRICT	= NEIGHBORHOOD	
EXISTING USE	= SINGLE FAMILY RESIDENTIAL	
PROPOSED USE	= MULTI FAMILY RESIDENTIAL	
TOTAL # UNITS	= 30 UNITS	
BUILDING HEIGHT	= (35' MAX. ALLOWED)	
BUILDING AREA	= 60,468 SF	
F.A.R.	= 0.2 (0.5 MAX. ALLOWED)	
GROSS DENSITY	= 4.55 DU/Ac. (12.01 DU/Ac. MAX. ALLOWED)	
PARKING REQUIRED	MIN.	MAX.
1 SP/UNIT MIN	= 30 SP	
2 SP/UNIT MAX	=	60 SP
TOTAL PARKING PROVIDED	= 60 GARAGE SPACES	
TOTAL VEHICULAR USE AREA	= 35,716 SF	
INTERIOR LANDSCAPE AREA REQUIRED	= 2,679 SF	
INTERIOR LANDSCAPE AREA PROVIDED	= 14,434 SF	
OPEN SPACE REQUIRED	= 0% REQUIRED PER TABLE 5.4.1	
OPEN SPACE PROVIDED	= 3.0± Ac. (128,559 SF)	
EXISTING IMPERVIOUS	= 0 SF	
PROPOSED IMPERVIOUS	= 98,182 SF	

NOTES

GENERAL

SEWER & DRAINAGE

STREETS & SIDEWALKS

DETENTION BASIN #1 CALCULATIONS

X = ΔCRA/12
ΔC = 0.56–0.25=0.30
A = 18.4 ACRES
R = 2.6 INCHES
X = (0.30)(18.4)(2.6)/12 = 1.27 AC.-FT.
REQUIRED X = 56,200 CU.FT.

PROVIDED BASIN = 31,000 SQ.FT

TOTAL = 31,000 SQ.FT. @ APPROX. 2 FT. DEPTH
= 62,000 CU.FT. > 56,200 CU.FT.

DETENTION BASIN #2 CALCULATIONS

X = ΔCRA/12
ΔC = 0.5–0.25=0.25
A = 4.02 ACRES
R = 2.6 INCHES
X = (0.25)(4.02)(2.6)/12 = 0.23 AC.-FT.
REQUIRED X = 10,200 CU.FT.

PROVIDED BASIN = 3,236 SQ.FT.

TOTAL = 3,236 SQ.FT @ APPROX. 3.5 FT DEPTH
= 11,326 CU.FT. > 10,020 CU.FT.

DETENTION BASIN #3 CALCULATIONS

X = ΔCRA/12
ΔC = 0.50–0.25=0.25
A = 10.3 ACRES
R = 2.6 INCHES
X = (0.25)(10.3)(2.6)/12 = 0.60 AC.-FT.
REQUIRED X = 26,100 CU.FT.

PROVIDED BASIN = 9,890 SQ.FT

TOTAL = 9,690 SQ.FT. @ APPROX. 3 FT. DEPTH
= 29,070 CU.FT. > 26,100 CU.FT

SLOPES TABLE

MINIMUM SLOPE	MAXIMUM SLOPE	COLOR
20.00%	30.00%	
30.01%	>	

LEGEND

- = PROPOSED STORM SEWER, CATCH BASIN AND CREEKSTONE HEADWALL
- = PROPOSED SEWER AND MANHOLE
- = PROPOSED DRAINAGE SWALE
- UTILITY POLE
- FIRE HYDRANT
- CATCH BASIN
- WATER VALVE
- UNDERGROUND WATER LINE
- UNDERGROUND GAS LINE
- OVERHEAD ELECTRIC LINE

		REVISIONS	
NO.	DATE	DESCRIPTION	BY
1.	03/15/21	REVISED PER AGENCY COMMENTS	DT

GRAPHIC SCALE
(IN FEET)
1 inch = 100 ft.

PRELIMINARY
NOT FOR CONSTRUCTION

ENGINEER STAMP

TREE CANOPY CALCULATIONS

TOTAL SITE AREA	= 2,450,604 S.F.
EXISTING TREE CANOPY COVERAGE	= 60% (1,466,348 S.F.)
EXISTING TREE CANOPY TO BE PRESERVED	= 20% (297,270 S.F.)
TOTAL TREE CANOPY AREA REQUIRED	= 40% (980,242 S.F.)
TOTAL TREE CANOPY TO BE PROVIDED	= 40% (980,242 S.F.)

GARRETT BRIDWELL

PRELIMINARY SUBDIVISION PLAN

OWNERS:
DANIEL T & TODD A BRIDWELL
660 CHATMAN LN
TAYLORSVILLE, KY 40071

SITE ADDRESS:
OLD HEADY RAOD
LOUISVILLE, KY 40299
TAX BLOCK: 0047, LOT 0292,0293&0294
D.B 10297, PG. 0408

PREPARED BY
LAND DESIGN & DEVELOPMENT, INC.
503 WASHBURN AVENUE, SUITE 101
LOUISVILLE, KENTUCKY 40222
PHONE: (502) 426-9374
FAX: (502) 426-9375

JOB: 20130
WM #12239
DATE: 2/22/21
CASE #21ZONE0016

Neighborhood Meeting - January 21, 2021

Docket No. 21-ZONEPA-0002

(Dante St. Germain, DPDS Case Manager)

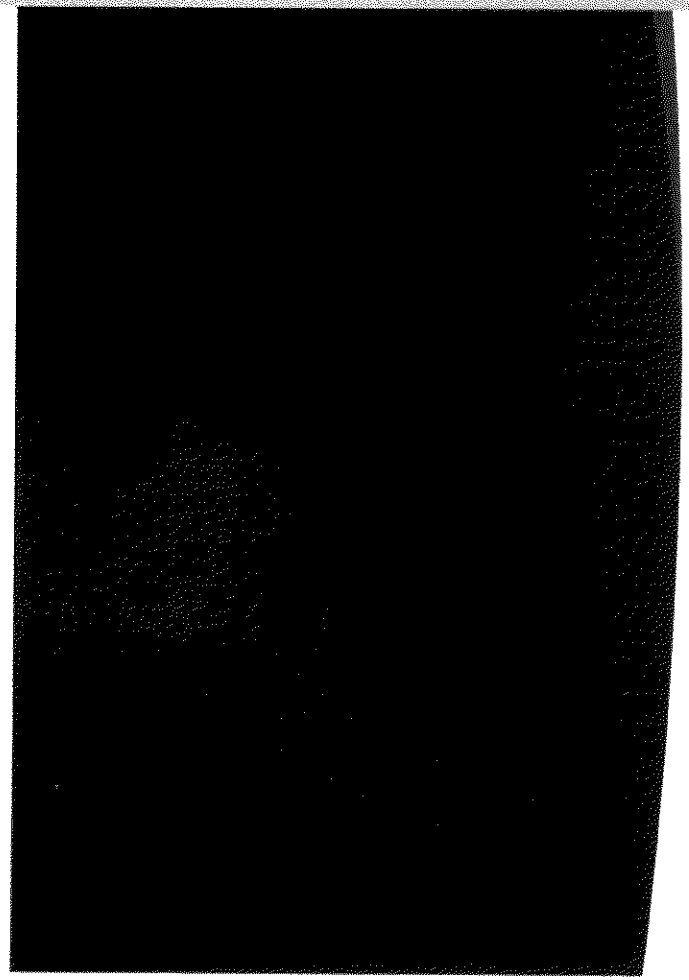
Zone change from R-4 to R-5 & R-5A to allow a 111 lot single family subdivision and 30 patio homes on property located on the north side of Old Heady Road, along and west of I-265

Blankerton Old Heady Development, LLC
d/b/a Sunshine Builders, LLC

Attorneys: Bardenwerper Talbott & Roberts, PLLC
Land Planners, Landscape Architects & Engineers: Land Design & Development, Inc.

Send Name and Address to "Organizer Only" in Chat for questions and identification to add to our mailing list, if not already on list

Neighborhood Meeting Letter



BARDENWERPER, TALBOTT & ROBERTS, PLLC
ATTORNEYS AT LAW
BUILDING INDUSTRY ASSOCIATION OF GREATER LOUISVILLE BLDG • 1000 N. HURSTBOURNE PARKWAY • SECOND FLOOR • LOUISVILLE, KENTUCKY 40223
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William B. Bardenwerper
Email: WBB@BARDLAW.NET
Mobile: (502) 419-7333

Nicholas R. Pregliasco
Email: NRP@BARDLAW.NET
Mobile: (502) 777-8831

January 7, 2021

RE: Neighborhood meeting for a proposed residential subdivision comprising of both single-family lots and patio home condominiums through a zone change from R-4 to R-5 & R-5A on property located on the north side of Old Heady Road, along and west of I-265

Dear Neighbor:

We are writing to notify you about an upcoming "neighborhood meeting" regarding the above referenced project. Because of the COVID-19 emergency orders requiring and/or recommending social distancing, the neighborhood meeting will be held virtually. The details are set forth in this letter and the supporting attachments. If you cannot obtain access to the virtual meeting, we may be able to assist you in that regard or otherwise assure a telephone or in-person conversation.

Damon Garrett with Sunshine Builders, LLC is seeking approval of a preliminary subdivision plat and detailed district development plan and corresponding rezoning from R-4 to R-5 and R-5A on the property referenced above. The project is proposed to consist of 111 detached single-family lots and 30 attached patio homes on approximately 56 acres. As such, a plan will be filed for pre-application review with Metro Planning and Design Services (PDS) which will be assigned a case number and case manager. At time of the neighborhood meeting, that information will be provided to those attending and posted on the PDS portal referenced on one of the attachments hereto.

The virtual meeting will be held on **Thursday, January 21st** beginning at **7:00 p.m.**

Enclosed for your review are the following:

1. The development plan and aerial photograph sheet
2. LOJIC site location zoning map sheet showing the location of the site
3. Detailed summary sheet of the project
4. Contact information sheet
5. Instruction sheet on how to join the virtual meeting.
6. Information sheet on how to obtain case information online from PDS' online customer service portal.
7. PDS' "After the Neighborhood Meeting" sheet

If you are unable to attend the virtual meeting, or have any questions or comments, please feel free to email or call me, or contact the PDS manager listed on the attached contact information sheet.

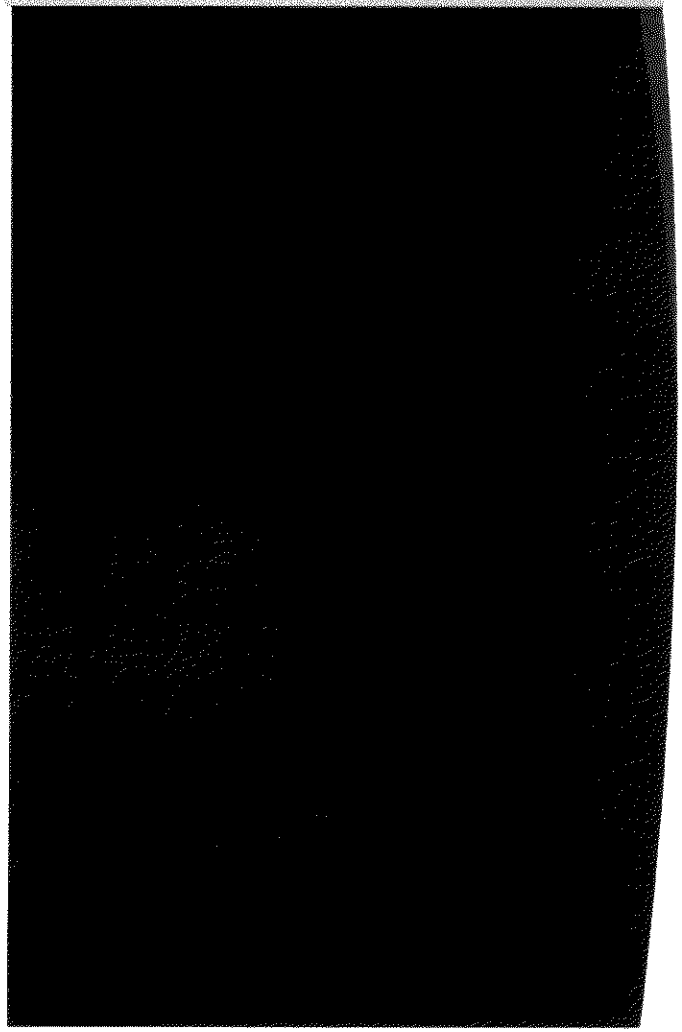
We look forward to our opportunity to visit virtually or by phone.

Sincerely,

Nicholas R. Pregliasco

cc: Hon. Stuart Benson, Councilman, District 20
Brian Davis, Planning & Design Manager
Derek Triplett, land planner with Land Design & Development, Inc.
W. Damon Garrett, applicant with Sunshine Builders, LLC

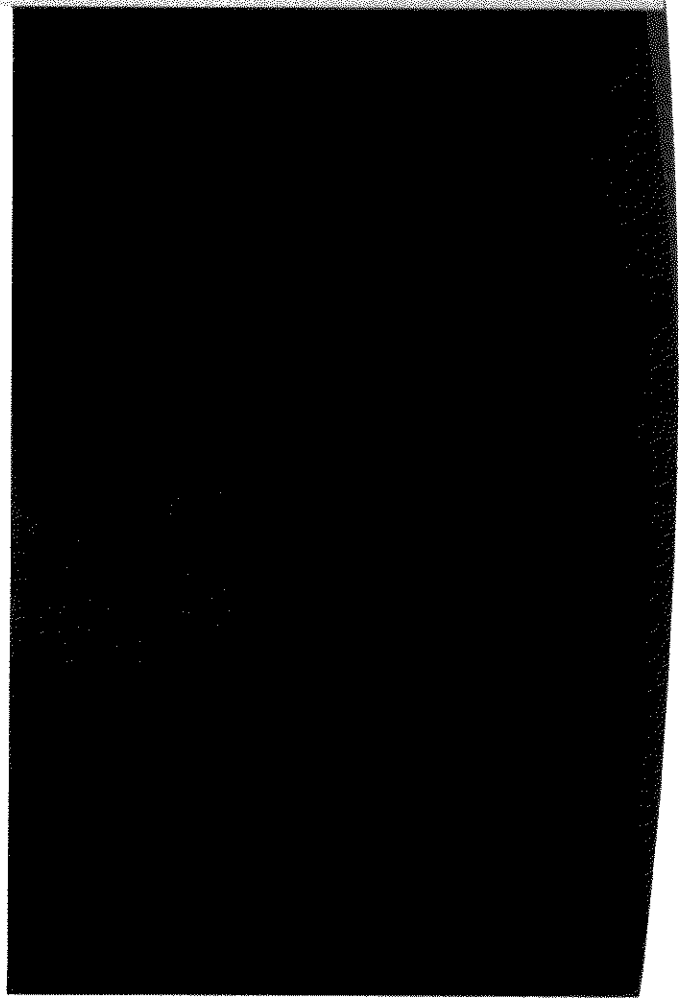
Process



- Pre-App Filing
- Neighborhood Meeting
- Formal Filing
- Land Development & Transportation Committee (LD&T)
- Planning Commission (PC)
- Metro Council

www.louisvilleky.gov/businessportal

DPDS Case Manager Contact Information



Dante St. Germain, AICP

Planner II

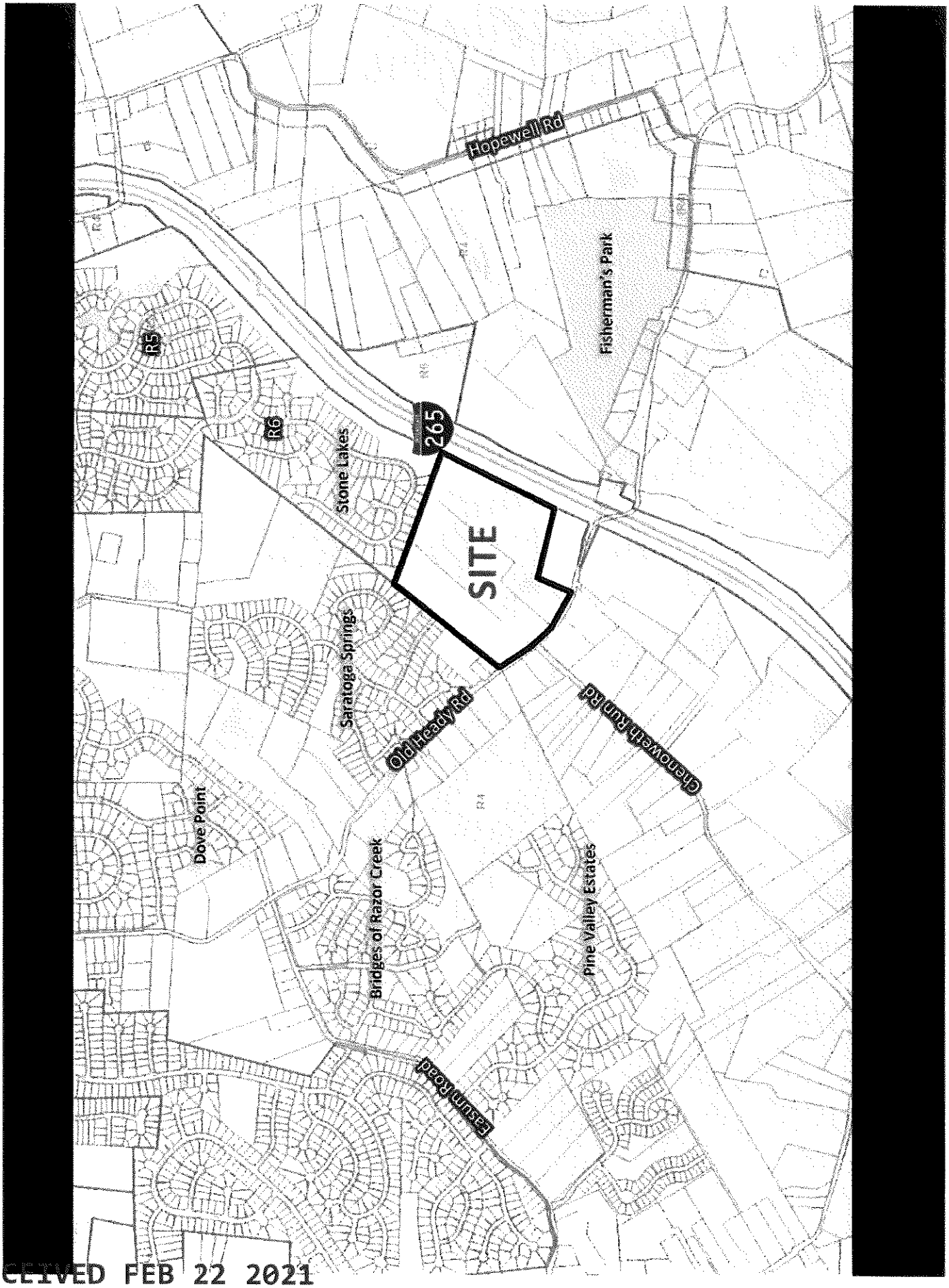
Planning & Design Services
444 South Fifth Street, Suite 300
Louisville, KY 40202

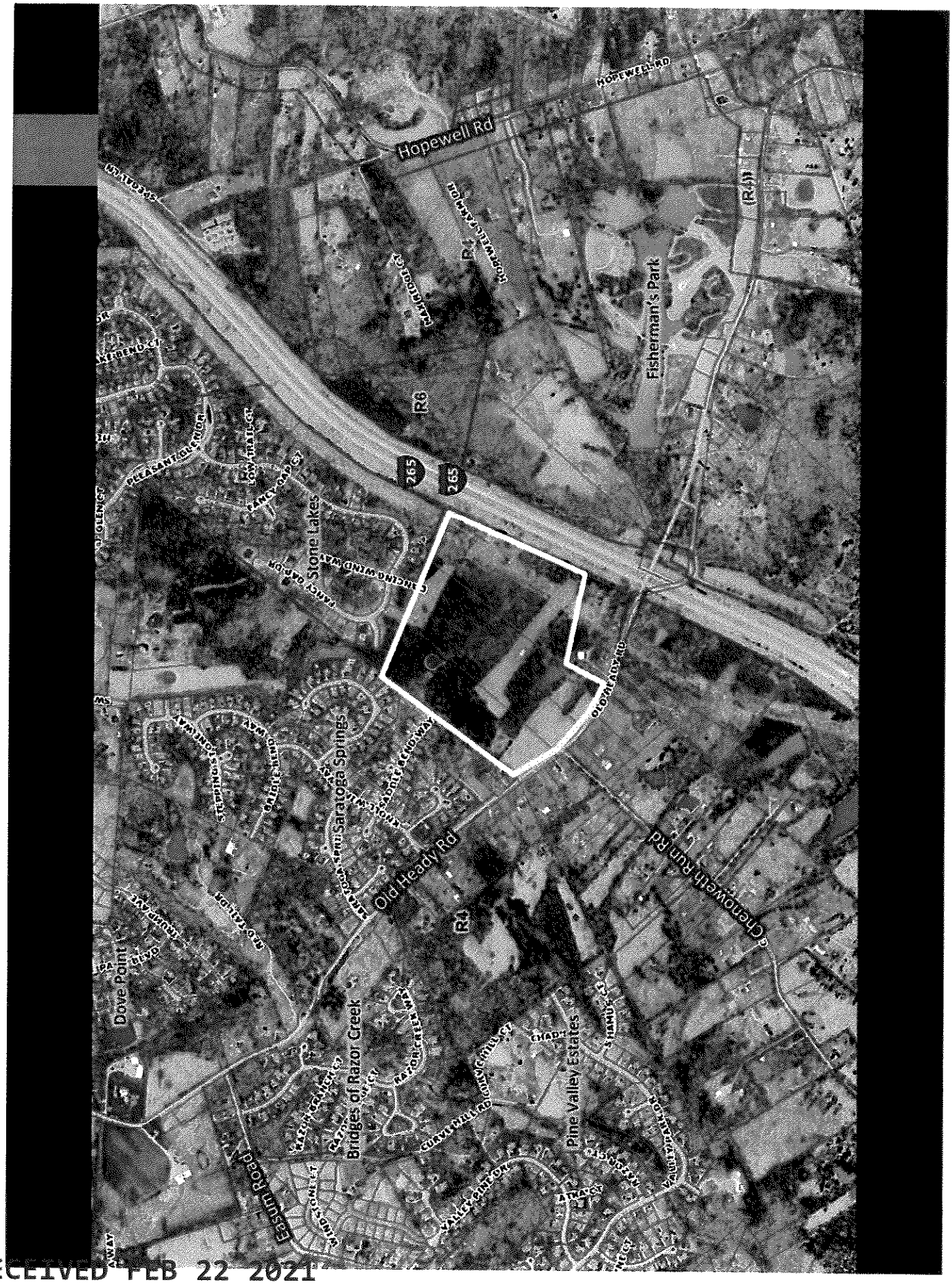
(502) 574-4388

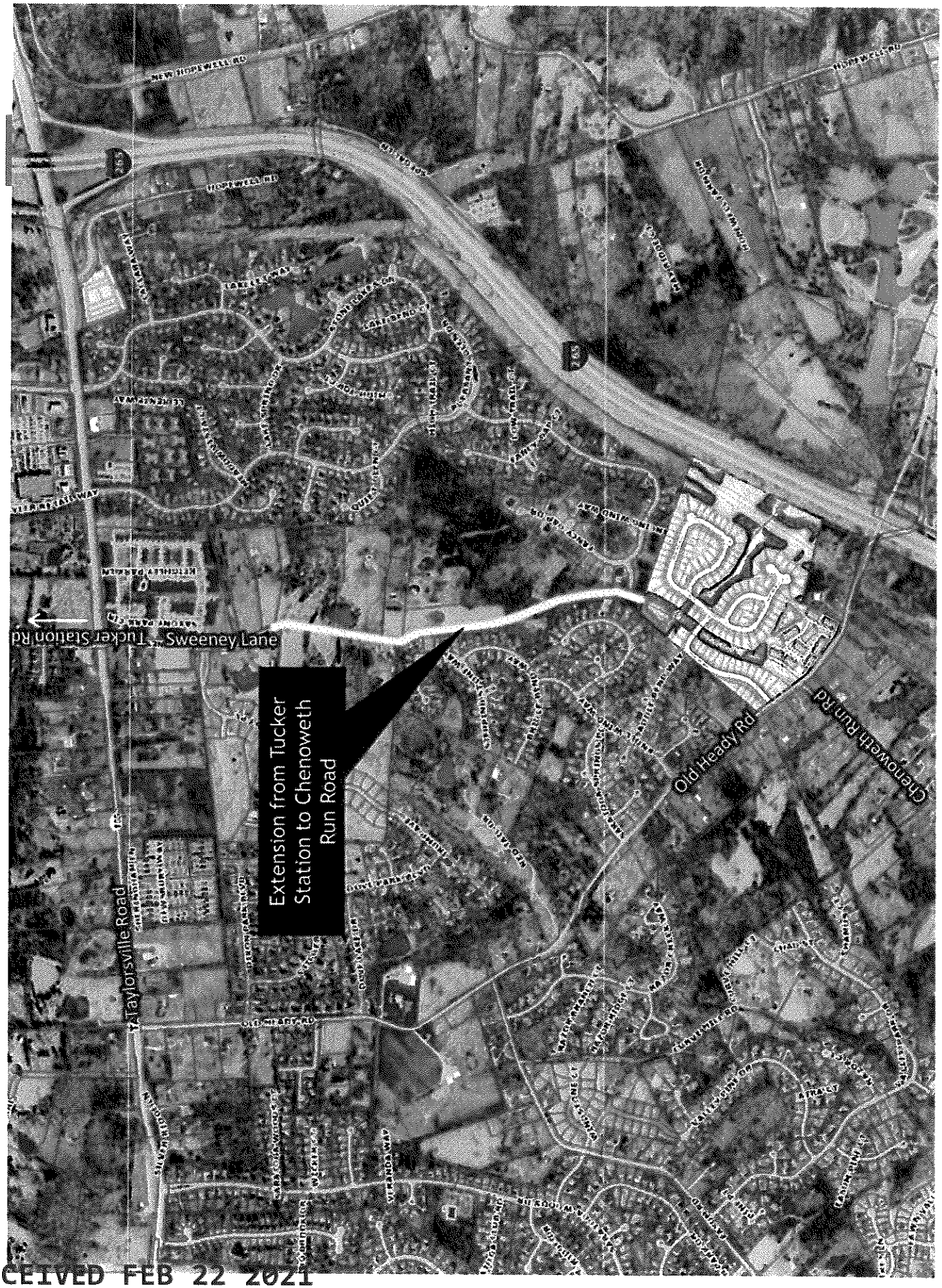
Dante.St.Germain@louisvilleky.gov

NOTICE OF POTENTIAL CHANGES

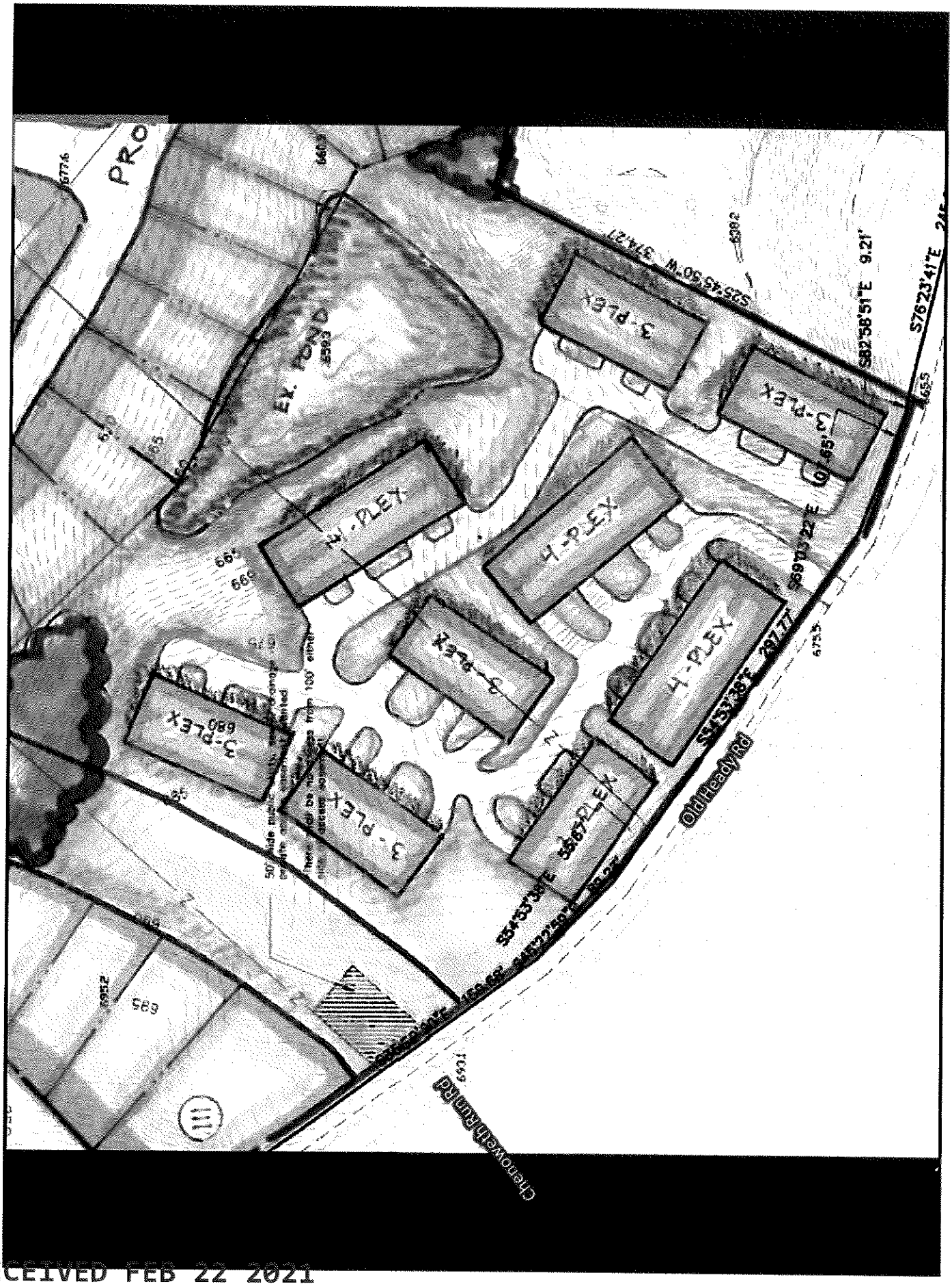
- Please be advised that every effort is made to make the information today accurate, but it is subject to change and correction.
- Changes will likely be made to the development plan and use after various agencies and DPDS staff review the plan.
- Plan changes will be available for review with Louisville Metro Planning & Design's Online Customer Service Portal and at the time of the public hearing.
- You may also contact the DPDS case manager if you have any questions, or contact any others listed on the Contact Information Page where contact information is provided.







21-ZONE-0016



R-5A Patio Homes

Similar style and design of patio home buildings with combination of brick, stone and siding

R-5A Patio Homes

Similar style and design of patio home buildings with combination of brick, stone and siding

R-5A Patio Homes

Similar style and design of patio home buildings with combination of brick, stone and siding

R-5 Subdivision Homes

Similar style and design of homes with combination of brick, stone and siding

R-5 Subdivision Homes

Similar style and design of homes with combination of brick, stone and siding

R-5 Subdivision Homes

Similar style and design of homes with combination of brick, stone and siding

R-5 Subdivision Homes

Similar style and design of homes with combination of brick, stone and siding

Questions?

Please use the chat box feature and you will be called on one at a time.

If you did not receive a letter in the mail regarding this neighborhood meeting, please e-mail Anna Martinez at amc@bardlaw.net or call her at 502.426.6688 and she will add your name to the mailing list.

Questions?

Please use the chat box feature and you will be called on one at a time.

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