

# Asher Engineering, Inc.

*Environmental & Engineering Consulting*

---

March 25, 2021

Mr. Rich Heareth  
Perfection Builders  
rich@perfectionbuilders.com

**RE:** Karst Survey and Sinkhole Remediation  
Proposed Aiken North Subdivision  
Louisville, Ky

Dear Mr. Heareth,

On March 24, 2021 Asher Engineering visited the referenced site to inspect the property grounds for the presence of karst topography and sinkholes. We also reviewed published geographic maps of the site, and have re visited some past experiences with the subsurface conditions and karst features in this area.

Karst topography is formed by the dissolution of the underlying Limestone or Dolomite bedrock. Depressions in the ground surface can develop when the bedrock surface dissolves due to years of water migrating through the area. The dissolved rock may leave a void space, or the void may be replaced by soft redeposited soil. Over time, the weight of the soil subsides over the void or soft soil, leaving a visible depression in the ground surface.

The subject site is underlain by the Louisville Limestone formation, which is susceptible to dissolution and the formation of sinkholes. Eleven depressed areas / possible sinkholes were noted and mapped during our site visit (see attached sketch). Still, these areas and the rest of the site can be made suitable for development with house lots and paved roads provided the site is inspected by a Geotechnical Engineer during construction. This inspection would include a visual observation of the soil subgrade after the site has been stripped of grass and topsoil. A proofroll with a loaded dump truck would be conducted to identify any soft areas in the soil subgrade. If depressed areas and/or sinkholes are identified during the construction inspection, recommendations would be made for stabilizing the sinkholes with inspection of the remediation by the Geotechnical Engineer.

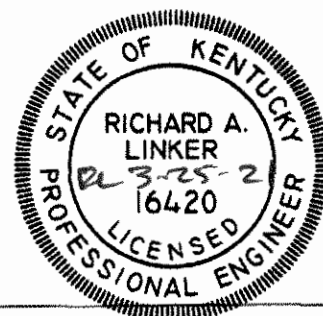
While there is some variation in the methods and materials used to repair sinkholes, recommendations would generally be as follows:

The sinkhole area would be cleaned of all soft, re-deposited soil down to bedrock. A nonwoven geotextile fabric would be placed in the bottom and sides of the excavation. The excavation would be backfilled with clean (limited fines) crushed limestone to stabilize the area and allow water to flow. The stone would be overlain by smaller stone (Ky No. 3s or Ky No. 57s), with the geotextile fabric placed over the stone. Soil fill could then be placed and compacted to finish subgrade.

Sincerely,

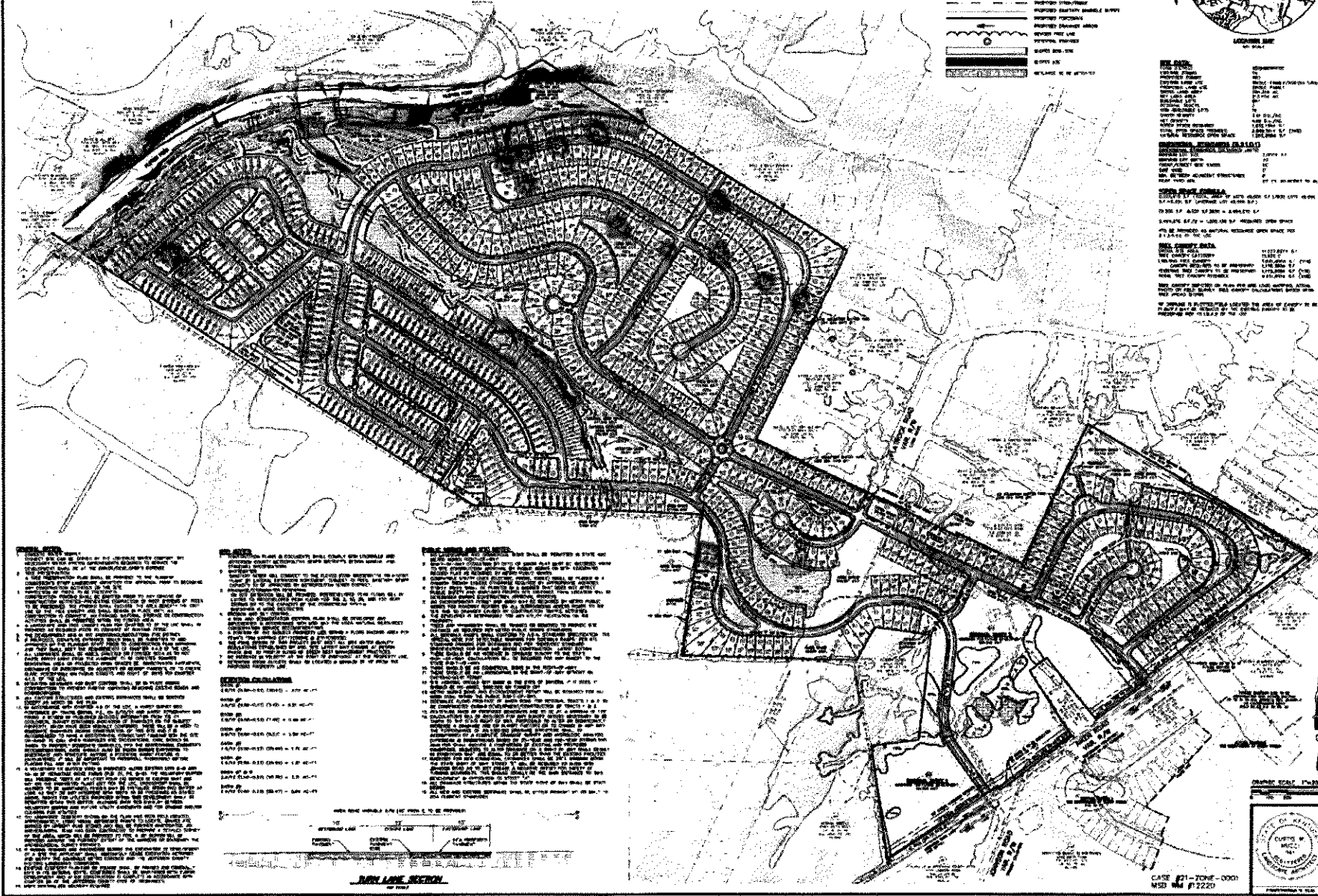


Richard A. Linker, P.E.



**NOTES:**  
1. THIS PLAN IS THE PROPERTY OF MINDAL SCOTT & ASSOCIATES, INC. AND IS NOT TO BE REPRODUCED OR COPIED IN ANY MANNER WITHOUT THE WRITTEN PERMISSION OF MINDAL SCOTT & ASSOCIATES, INC.  
2. THE DEVELOPER HAS BEEN ADVISED THAT THIS PLAN IS SUBJECT TO THE REVIEW AND APPROVAL OF THE LOCAL GOVERNMENT. THE DEVELOPER IS RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE LOCAL GOVERNMENT.  
3. THE DEVELOPER HAS BEEN ADVISED THAT THIS PLAN IS SUBJECT TO THE REVIEW AND APPROVAL OF THE LOCAL GOVERNMENT. THE DEVELOPER IS RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE LOCAL GOVERNMENT.

—— SLOPE  
—— SINKHOLE



**GENERAL NOTES:**  
1. THE DEVELOPER SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE LOCAL GOVERNMENT.  
2. THE DEVELOPER SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE LOCAL GOVERNMENT.  
3. THE DEVELOPER SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE LOCAL GOVERNMENT.  
4. THE DEVELOPER SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE LOCAL GOVERNMENT.  
5. THE DEVELOPER SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE LOCAL GOVERNMENT.

**LEGEND:**  
SLOPE  
SINKHOLE



**MINDAL SCOTT**  
INCORPORATED  
1000 N. W. 10th St.  
Coral Gables, FL 33134  
Tel: 305-442-1000  
Fax: 305-442-1001  
www.mindalscott.com

**OWNER:** MINDAL SCOTT & ASSOCIATES, INC.  
**DEVELOPER:** MINDAL SCOTT & ASSOCIATES, INC.  
**PLANNING & DESIGN:** MINDAL SCOTT & ASSOCIATES, INC.  
**DATE:** 08/12/2010  
**PROJECT:** AIKEN NORTH SUBDIVISION  
**LOCATION:** 1815 N. W. 10th St., Coral Gables, FL 33134

**RECORDING & SUBDIVISION PLAN:**  
1815 N. W. 10th St., Coral Gables, FL 33134  
1815 N. W. 10th St., Coral Gables, FL 33134  
D. B. 1815 N. W. 10th St., Coral Gables, FL 33134



# Asher Engineering, Inc.

*Environmental & Engineering Consulting*

March 25, 2021

Mr. Rich Hearth  
Perfection Builders  
rich@perfectionbuilders.com

**RE:** Slope Stability  
Proposed Aiken North Subdivision  
Louisville, Ky

Dear Mr. Hearth,

On March 24, 2021 Asher Engineering visited the referenced site to inspect the property grounds for slope stability issues, and comment on construction of proposed house lots situated in areas with steep slopes.

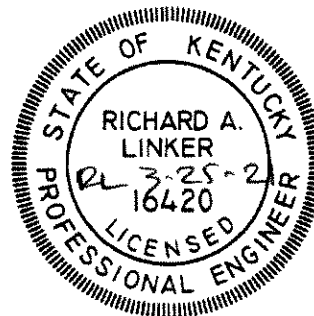
While no slope failures were noted during our site visit, there are several areas designated as house lots and paved roads that have steep slopes. These lots and road areas (see attached sketch) must be inspected by the Geotechnical Engineer during the earthwork portion of the site and site development, and inspected during construction of the new house foundation.

The subsurface conditions at the site consist of clayey soil underlain by limestone bedrock. Placement of any fill in sloped areas must be inspected by the Geotechnical Engineer. Soil fill must be benched into the slope and placed horizontally, and compacted to 98 percent of the Standard Proctor (ASTM D698). Field density tests would be conducted to confirm that the specified compaction was achieved. Some lots may require additional efforts to insure positive drainage away from the house foundations. This may include perimeter and subfloor drains connected to a sump or French drain. Lot yards should be graded such that water drains away from structures. Any such recommendations would be made at the time of house construction.

Sincerely,



Richard A. Linker, P.E.







**REDWING**  
ECOLOGICAL SERVICES, INC.

1139 South Fourth Street • Louisville, KY 40203 • Phone 502.625.3009 • Fax 502.625.3077

---

**VIA EMAIL**

August 29, 2019

Mr. Richard Hearth  
Perfection Builders, LLC  
P.O. Box 435494  
Louisville, Kentucky 40253  
rich@perfectionbuilders.com

**Subject: Water/Wetland Reconnaissance Summary Report  
Aiken 103  
Jefferson County, Kentucky  
Redwing Project No.: 19-109**

Dear Mr. Hearth

Redwing Ecological Services, Inc. (Redwing) is pleased to provide Perfection Builders, LLC with this Water/Wetland Reconnaissance Summary Report for the 250-acre Aiken 103 property in Jefferson County, Kentucky. The goal of these services was to identify the approximate location and extent of jurisdictional waters/wetlands and threatened/endangered (T/E) species habitat on the site to assist with preliminary project planning.

The perennial stream Floyds Fork comprises the northwest boundary of the property and one other perennial stream, 12 intermittent streams, 38 ephemeral streams, and 14 wetlands were identified along well-defined drainageways or within old pond beds which are tributaries to Floyds Fork.

**METHODOLOGY**

The reconnaissance included in-house and field components. In-house research involved review of the USGS topographic quadrangle map, aerial photography, the Jefferson County soil survey, FEMA floodplain mapping, and digital elevation model (DEM) mapping. Following review of these materials, Redwing conducted a field reconnaissance on August 13 and 15, 2019, to identify the approximate location and extent of jurisdictional waters/wetlands on the site. During the field visit, the presence of jurisdictional streams and open water bodies was evaluated based on ordinary high water mark (OHWM), defined bed and bank features, and flow regimes. Potential wetland areas were investigated using 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). This technique identifies wetlands based on evidence of wetland hydrology, hydric soils, and hydrophytic vegetation. The water/wetland features have not been formally delineated or surveyed, and have not been verified by the U.S. Army Corps of Engineers (USACE), who holds final authority over their regulatory status.

The field assessment was also used to identify the potential presence of suitable habitat for T/E species known to occur within the project vicinity. The U.S. Fish and Wildlife Service (USFWS) Information for Planning and Conservation (IPaC) website was used to obtain a list of federally-listed T/E species that may occur on the project site, which include the Indiana bat (*Myotis sodalis*), northern long-eared bat (*Myotis septentrionalis*), gray bat (*Myotis grisescens*), and running buffalo clover (*Trifolium stoloniferum*). Potential impacts to T/E species must be addressed in any federal permitting process.

## RESULTS

The 250-acre site is located on the northwest side of Aiken Road at the Aiken Road and Johnson Road intersection in Jefferson County, Kentucky (Figures 1 and 2). The site consists primarily of old field with medium-aged woods throughout, along fencelines, drainageways, and scattered woodlots (Figure 2). The water/wetland features identified on site are depicted on Figure 3, listed in Table 1, and summarized below.

Based on the reconnaissance, water/wetland features present on the site include:

- two perennial streams (including Floyds Fork) totaling approximately 3,050 linear feet
- 12 jurisdictional intermittent streams totaling approximately 8,100 linear feet
- 35 jurisdictional ephemeral streams totaling approximately 7,615 linear feet
- 12 jurisdictional wetlands totaling approximately 1.37 acres
- three isolated, non-jurisdictional ephemeral streams measuring 820 linear feet
- two isolated, non-jurisdictional wetlands totaling approximately 0.05 acre

In addition, suitable habitat for T/E species on the site includes: summer roosting habitat for the Indiana bat (*Myotis sodalis*) and northern long-eared bat (*Myotis septentrionalis*) within medium-aged wooded areas and scattered trees; suitable foraging and commuting habitat for the gray bat (*Myotis grisescens*) along the Floyds Fork riparian corridor; and marginal habitat for running buffalo clover (*Trifolium stoloniferum*) along old trails and roadways. Most of the trails and roadways are covered with Chinese stiltgrass (*Microstegium vimineum*) which would outcompete running buffalo clover, however, some of them contained marginal habitat for running buffalo clover that will need to be reviewed in detail during the delineation.

## PERMITTING AND MITIGATION DISCUSSION

Jurisdictional waters of the U.S., including wetlands, are defined by 33 CFR Part 328.3 and are protected by Section 404 of the Clean Water Act (33 USC 1344), which is administered and enforced by the USACE. Impacts to waters of the U.S. can require permitting ranging from activities that are pre-authorized, to those requiring a Nationwide Permit (NWP), to those requiring a full Individual Permit (IP). Certain activities can also require Section 401 Water Quality Certification (WQC) from the Kentucky Division of Water (KDOW) WQC Section and/or a permit from the KDOW Floodplain Management Section. Current permitting thresholds are as follows:

- Avoidance of the on-site streams and wetlands would require no permits from, or coordination with, the USACE or KDOW. A formal Jurisdictional Determination (JD) can be obtained from the USACE if desired.
- Impacts to 300 feet or less of stream and 0.5 acre or less of total waters can be authorized by the USACE under the NWP program.
- Impacts to greater than 300 feet of stream or 0.5 acre of total waters require an IP from the USACE (unless the USACE issues a waiver to allow impacts to greater than 300 feet of stream to be handled under a NWP).
- Impacts to less than 300 feet of intermittent/perennial stream and 0.5 acre of wetland meet the conditions of the General WQC under Section 401 and do not require coordination with the KDOW.
- Impacts to greater than 300 feet of intermittent/perennial stream or 0.5 acre of wetland, or construction of in-line detention basins along intermittent/perennial streams, require an Individual WQC from the KDOW.
- Impacts to isolated, non-jurisdictional waters/wetlands are not regulated by the USACE or KDOW and therefore, do not require a permit from, or coordination with, either agency.
- Impacts to 300 feet or more of stream and 0.1 acre or more of total waters require compensatory mitigation.

NWPs often require a three to six-month review period, while IPs can take six to twelve months. Permitting with the KDOW can generally be completed within the federal time frames. Final jurisdictional impacts and specific permit and mitigation requirements can be determined based on a formal delineation and final site development plans.

Mitigation for streams and wetlands, if required, is generally provided through the purchase of credits from an approved mitigation bank or the Kentucky In-Lieu Fee program. Impacts to ephemeral streams are no longer allowed to be mitigated by the on-site stormwater management system. Stream mitigation is required at a 0.5:1 to 3:1 ratio depending on stream type and quality, and wetland mitigation is generally required at a 2:1 ratio. Stream credits can currently be purchased for approximately \$325 to \$400 each, while wetland credits cost approximately \$60,000 each.

In order to minimize and/or spread out permit and mitigation requirements, the project could be separated into phases which could be permitted individually. The USACE generally allows individual phases of projects to be permitted separately as long as they can be considered stand-alone projects and are separated in time.

### **ADDITIONAL COORDINATION**

Under the Section 404 permitting process, the USACE determines if consultation with the USFWS is required to address potential impacts to federally-listed species. Federally-listed species issues of concern at this site are likely limited to the clearing of suitable Indiana and northern long-eared bat summer habitat, gray bat commuting and foraging habitat, and running buffalo clover habitat. Based on maps prepared by the USFWS, the project is located within "Potential" habitat zone for the Indiana and northern long-eared bats. If Section 404 permitting is required, impacts to suitable bat habitat will require consultation with the USFWS and can include conducting presence/absence surveys or the preparation of a Biological Assessment with a potential fee payment of \$1,910 to \$3,820 per acre of habitat cleared depending on the time of year. If suitable running buffalo clover habitat will be impacted, a survey during the flowering period (late April to June) will be necessary to determine the presence/absence of running buffalo clover on site.

The USACE also determines if consultation with the State Historic Preservation Office (SHPO) is required to address potential impacts to significant cultural resources. We are not aware of any cultural resource studies that have been completed on the site; however, the USACE may require archaeological or cultural-historic surveys during their review.

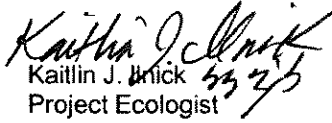
### **CONCLUSION**

In conclusion, based on Redwing's preliminary reconnaissance, potential jurisdictional waters on site include two perennial streams (including Floyds Fork) totaling approximately 3,050 linear feet; 12 intermittent streams totaling approximately 8,100 linear feet; 35 ephemeral streams totaling approximately 7,615 linear feet; and 12 wetlands totaling approximately 1.37 acres. In addition, potential isolated (non-jurisdictional) waters on the site include three ephemeral streams measuring 820 linear feet and two wetlands totaling approximately 0.05 acre. These features have not been formally delineated/surveyed or verified by the USACE. Specific permit and mitigation requirements for the overall project site or select phases can be determined based on a formal delineation and final site development plans.



We appreciate the opportunity to assist you on this important project. Please call Ron Thomas or Kaitlin Ilnick at (502) 625-3009 with any questions on this report or the overall project.

Sincerely,

  
Kaitlin J. Ilnick  
Project Ecologist



Ronald L. Thomas  
Principal  
Senior Ecologist

P:\2019 Projects\19-109-Aiken103\Reports\ReconSummaryReport - Aiken 103.docx

Attachments: Table 1 – Water/Wetland Reconnaissance Summary Table  
Figure 1 – Site Location Map  
Figure 2 – Water/Wetland Location Map

## TABLE

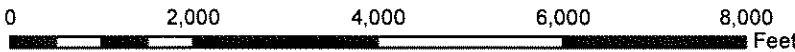
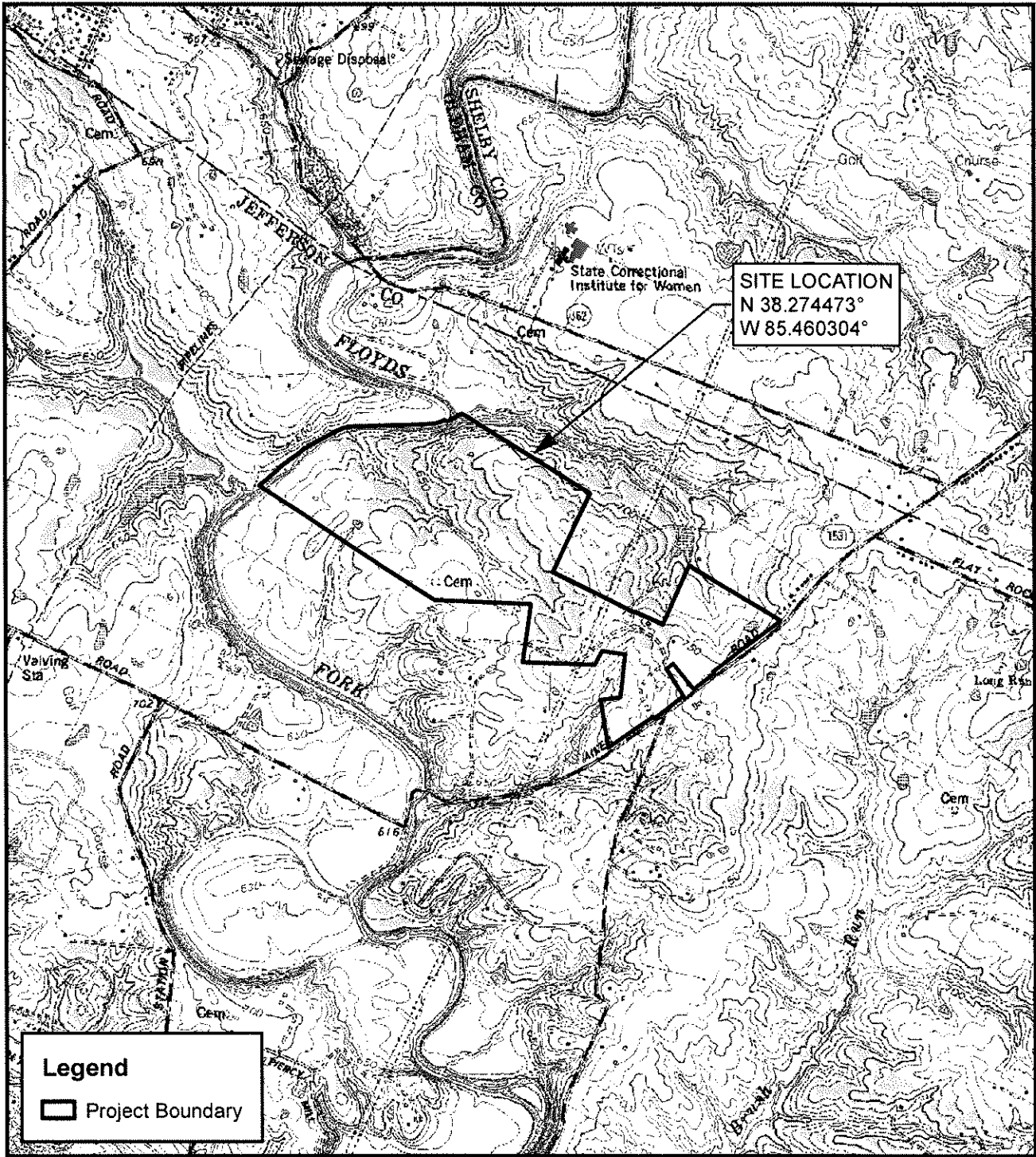
**Table 1: Water/Wetland Reconnaissance Summary**  
**Aiken 103**  
**Jefferson County, Kentucky**

Feature	Approximate Stream Length (feet)	Approximate Stream Width (feet)	Approximate Area (acres)	Status
Floyds Fork	2,895	100	6.646	Jurisdictional
Perennial Stream 2	165	15	0.053	Jurisdictional
<b>Perennial Stream Total</b>	<b>3,060</b>		<b>6.70</b>	
Intermittent Stream 1	695	3	0.048	Jurisdictional
Intermittent Stream 2	265	3	0.018	Jurisdictional
Intermittent Stream 3	10	4.5	0.001	Jurisdictional
Intermittent Stream 4	55	1	0.001	Jurisdictional
Intermittent Stream 5	35	3.5	0.003	Jurisdictional
Intermittent Stream 6	155	2.5	0.009	Jurisdictional
Intermittent Stream 7	3,685	12.5	1.057	Jurisdictional
Intermittent Stream 8	370	3.5	0.030	Jurisdictional
Intermittent Stream 9	190	5	0.022	Jurisdictional
Intermittent Stream 10	480	3	0.033	Jurisdictional
Intermittent Stream 11	1,580	4.5	0.163	Jurisdictional
Intermittent Stream 12	580	2	0.027	Jurisdictional
<b>Intermittent Stream Total</b>	<b>8,100</b>		<b>1.41</b>	
Ephemeral Stream 1	510	2	0.023	Jurisdictional
Ephemeral Stream 2	45	1.5	0.002	Jurisdictional
Ephemeral Stream 3	205	2	0.009	Jurisdictional
Ephemeral Stream 4	725	2	0.033	Jurisdictional
Ephemeral Stream 5	195	1.5	0.007	Isolated
Ephemeral Stream 6	115	1.5	0.004	Jurisdictional
Ephemeral Stream 7	515	2	0.024	Jurisdictional
Ephemeral Stream 8	375	2	0.017	Isolated
Ephemeral Stream 9	220	3.5	0.018	Jurisdictional
Ephemeral Stream 10	130	2	0.006	Jurisdictional
Ephemeral Stream 11	250	2.5	0.014	Jurisdictional
Ephemeral Stream 12	25	2	0.001	Jurisdictional
Ephemeral Stream 13	80	1	0.002	Jurisdictional
Ephemeral Stream 14	365	3.5	0.029	Jurisdictional
Ephemeral Stream 15	55	3	0.004	Jurisdictional
Ephemeral Stream 16	120	2	0.006	Jurisdictional
Ephemeral Stream 17	205	2.5	0.012	Jurisdictional
Ephemeral Stream 18	225	1	0.001	Jurisdictional
Ephemeral Stream 19	55	2.5	0.003	Jurisdictional
Ephemeral Stream 20	60	2.5	0.003	Jurisdictional
Ephemeral Stream 21	75	2	0.003	Jurisdictional
Ephemeral Stream 22	525	2	0.024	Jurisdictional
Ephemeral Stream 23	250	3.5	0.020	Isolated
Ephemeral Stream 24	160	2.5	0.009	Jurisdictional
Ephemeral Stream 25	125	2	0.006	Jurisdictional
Ephemeral Stream 26	80	2.5	0.005	Jurisdictional
Ephemeral Stream 27	195	3.5	0.016	Jurisdictional
Ephemeral Stream 28	350	1	0.008	Jurisdictional
Ephemeral Stream 29	185	2	0.008	Jurisdictional
Ephemeral Stream 30	570	2	0.026	Jurisdictional
Ephemeral Stream 31	230	1.5	0.008	Jurisdictional
Ephemeral Stream 32	155	2.5	0.009	Jurisdictional
Ephemeral Stream 33	120	1	0.003	Jurisdictional
Ephemeral Stream 34	35	1.5	0.001	Jurisdictional
Ephemeral Stream 35	605	2	0.028	Jurisdictional
Ephemeral Stream 36	135	2	0.006	Jurisdictional
Ephemeral Stream 37	40	2	0.002	Jurisdictional
Ephemeral Stream 38	125	1.5	0.004	Jurisdictional
<b>Ephemeral Stream Total<sup>1</sup></b>	<b>7,615</b>		<b>0.36</b>	
Wetland 1	---	---	0.03	Jurisdictional
Wetland 2	---	---	0.06	Jurisdictional
Wetland 3	---	---	0.02	Isolated
Wetland 4	---	---	0.01	Jurisdictional
Wetland 5	---	---	0.05	Jurisdictional
Wetland 6	---	---	0.14	Jurisdictional
Wetland 7	---	---	0.08	Jurisdictional
Wetland 8	---	---	0.70	Jurisdictional
Wetland 9	---	---	0.13	Jurisdictional
Wetland 10	---	---	0.03	Isolated
Wetland 11	---	---	0.01	Jurisdictional
Wetland 12	---	---	0.04	Jurisdictional
Wetland 13	---	---	0.10	Jurisdictional
Wetland 14	---	---	0.04	Jurisdictional
<b>Wetland Total<sup>1</sup></b>			<b>1.39</b>	
<b>Jurisdictional Features Total</b>	<b>18,765</b>		<b>8.66</b>	


<sup>1</sup> These totals are only for jurisdictional features. Isolated features are not included.

## FIGURES

Source: USGS 7.5-minute Topographic Map - Crestwood, Kentucky Quadrangle.



**Legend**

 Project Boundary

AIKEN 103  
JEFFERSON COUNTY, KENTUCKY

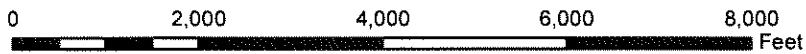
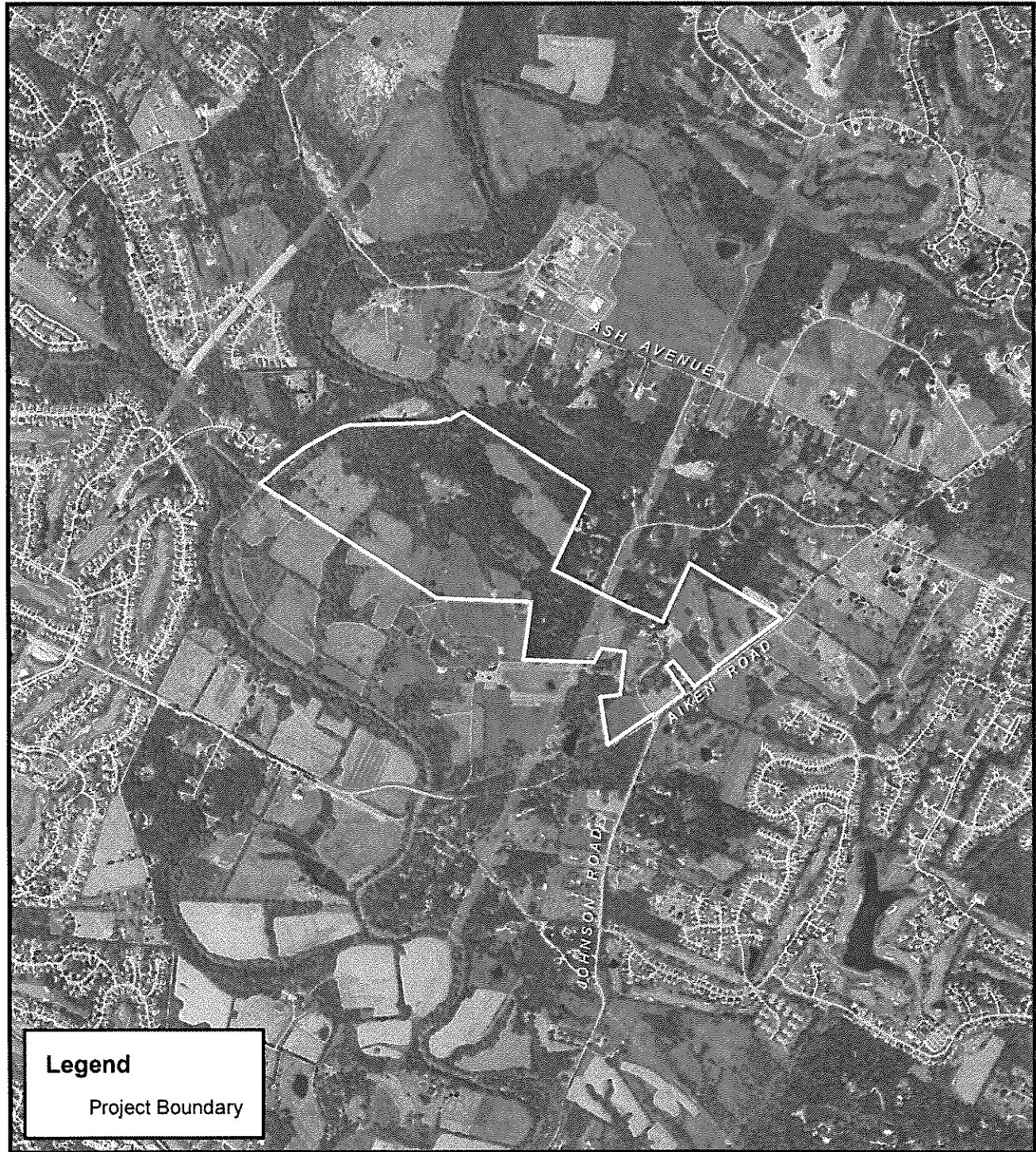


SITE LOCATION MAP

REVISED DATE: 08-09-19 | DRAWN BY: EDB

FIGURE 1

Source: Aerial - 60cm color orthoimagery of the Commonwealth of Kentucky (NAIP-FSA) from kygissserver.ky.gov ArcGIS services (2016).



**Legend**  
Project Boundary

AIKEN 103  
JEFFERSON COUNTY, KENTUCKY



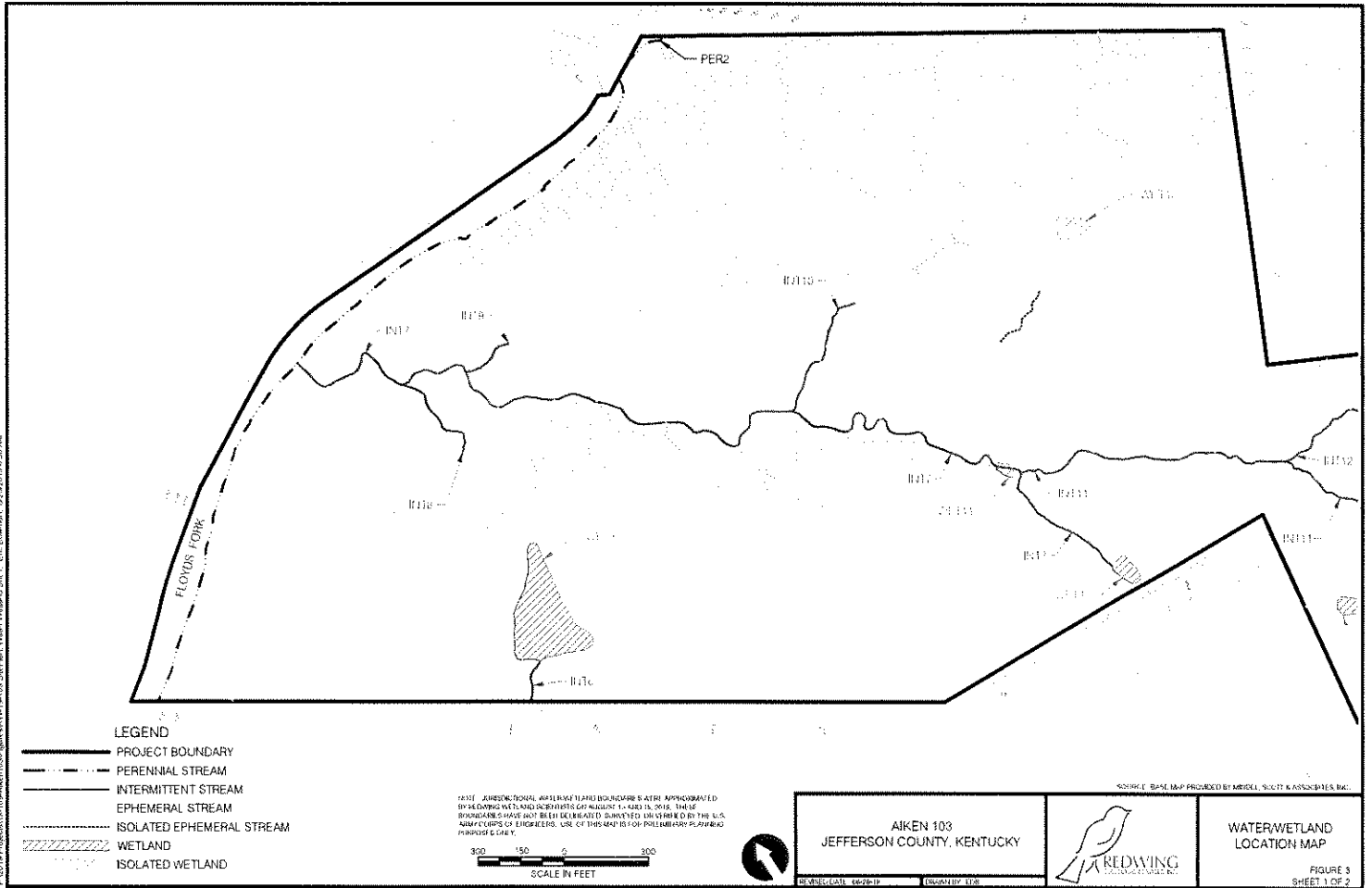
AERIAL PHOTOGRAPH MAP

REVISED DATE: 08-28-19 | DRAWN BY: EDB

FIGURE 2

P:\2019 Projects\19-109-Aiken\103\Figures\Aerial.mxd, 08-28-2019, ebowman

P:\2015 Projects\103-Aiken\03\DWG\103-Aiken\103-Aiken\103-Aiken.dwg, 8/7/2016 8:31 AM



LEGEND

- PROJECT BOUNDARY
- - - PERENNIAL STREAM
- INTERMITTENT STREAM
- · · · · EPHEMERAL STREAM
- · · · · ISOLATED EPHEMERAL STREAM
- ▨ WETLAND
- ▨ ISOLATED WETLAND

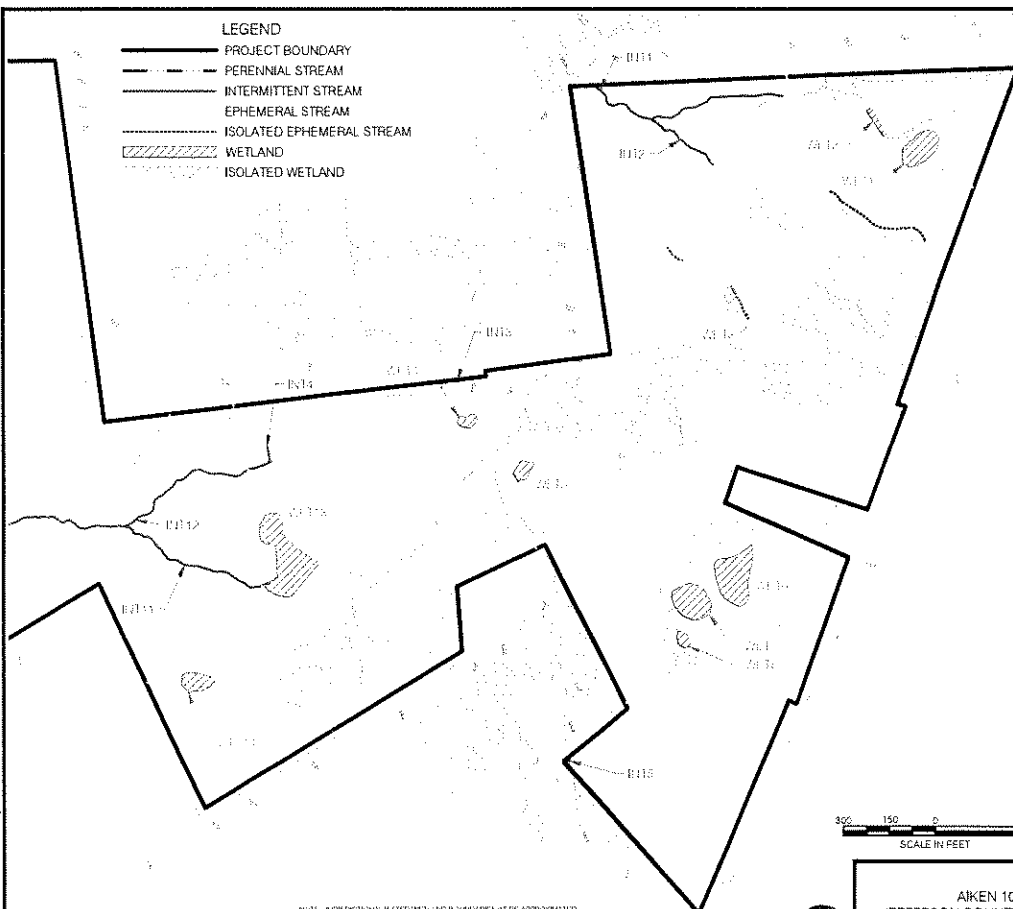
NOTE: JURISDICTIONAL WATER/WETLAND BOUNDARIES ARE APPROXIMATED BY REDWING WETLAND SCIENTISTS ON AUGUST 11, 2016. THESE BOUNDARIES HAVE NOT BEEN VERIFIED, SURVEYED OR FIELD BY THE U.S. ARMY CORPS OF ENGINEERS. USE OF THIS MAP IS FOR PRELIMINARY PLANNING PURPOSES ONLY.

300 150 0 300  
SCALE IN FEET

SOURCE: BASE MAP PROVIDED BY MRCOG, SUEZ & ASSOCIATES, INC.

<p>AIKEN 103 JEFFERSON COUNTY, KENTUCKY</p>		<p>WATER/WETLAND LOCATION MAP</p> <p>FIGURE 3 SHEET 1 OF 2</p>
---	---	--

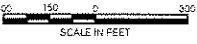
P:\0119\Projects\119\_006\Aiken103\Map\WaterWetland\_S12\_ EIR.dwg, 8/20/2018 9:37 AM



NOTE: JURISDICTIONAL WATERWETLAND BOUNDARIES WERE APPROXIMATED BY MEANS OF AERIAL PHOTOGRAPHS ON AUGUST 13 AND 15, 2018. THESE BOUNDARIES HAVE NOT BEEN DELINEATED, SURVEYED, OR VERIFIED BY THE U.S. ARMY CORPS OF ENGINEERS. USE OF THIS MAP FOR PRELIMINARY PLANNING PURPOSES ONLY.

Feature	Approximate Stream Length (Feet)	Approximate Stream Width (Feet)	Approximate Area (Acres)	Status
Flowe Fork	2,895	100	4,846	Jurisdictional
Perennial Stream 1	183	10	0.263	Jurisdictional
<b>Perennial Stream Total</b>	<b>3,078</b>		<b>5,110</b>	
Ephemeral Stream 1	688	3	0.048	Jurisdictional
Ephemeral Stream 2	268	3	0.018	Jurisdictional
Ephemeral Stream 3	57	4.5	0.001	Jurisdictional
Ephemeral Stream 4	58	1	0.001	Jurisdictional
Ephemeral Stream 5	30	2.5	0.002	Jurisdictional
Ephemeral Stream 6	181	2.5	0.009	Jurisdictional
Ephemeral Stream 7	3,686	12.6	1.067	Jurisdictional
Ephemeral Stream 8	370	3.5	0.036	Jurisdictional
Ephemeral Stream 9	190	5	0.022	Jurisdictional
Ephemeral Stream 10	480	3	0.033	Jurisdictional
Ephemeral Stream 11	1,880	4.8	0.163	Jurisdictional
Ephemeral Stream 12	140	2	0.007	Jurisdictional
<b>Ephemeral Stream Total</b>	<b>8,338</b>		<b>4.41</b>	
Isolated Ephemeral Stream 1	310	2	0.003	Jurisdictional
Isolated Ephemeral Stream 2	45	1.5	0.002	Jurisdictional
Isolated Ephemeral Stream 3	205	2	0.003	Jurisdictional
Isolated Ephemeral Stream 4	701	2	0.013	Jurisdictional
Isolated Ephemeral Stream 5	151	1.0	0.001	Isolated
Isolated Ephemeral Stream 6	111	1.5	0.004	Jurisdictional
Isolated Ephemeral Stream 7	113	2	0.004	Jurisdictional
Isolated Ephemeral Stream 8	171	2	0.017	Isolated
Isolated Ephemeral Stream 9	200	3.5	0.018	Jurisdictional
Isolated Ephemeral Stream 10	130	2	0.006	Jurisdictional
Isolated Ephemeral Stream 11	250	2.5	0.014	Jurisdictional
Isolated Ephemeral Stream 12	28	2	0.001	Jurisdictional
Isolated Ephemeral Stream 13	80	1	0.002	Jurisdictional
Isolated Ephemeral Stream 14	281	3.1	0.016	Jurisdictional
Isolated Ephemeral Stream 15	95	2	0.004	Jurisdictional
Isolated Ephemeral Stream 16	120	2	0.006	Jurisdictional
Isolated Ephemeral Stream 17	203	2.3	0.012	Jurisdictional
Isolated Ephemeral Stream 18	203	1	0.001	Jurisdictional
Isolated Ephemeral Stream 19	30	2.5	0.003	Jurisdictional
Isolated Ephemeral Stream 20	60	2.5	0.003	Jurisdictional
Isolated Ephemeral Stream 21	75	2	0.003	Jurisdictional
Isolated Ephemeral Stream 22	323	2	0.004	Jurisdictional
Isolated Ephemeral Stream 23	280	3.5	0.020	Isolated
Isolated Ephemeral Stream 24	150	2.5	0.009	Jurisdictional
Isolated Ephemeral Stream 25	125	2	0.006	Jurisdictional
Isolated Ephemeral Stream 26	80	2.5	0.004	Jurisdictional
Isolated Ephemeral Stream 27	185	3.5	0.016	Jurisdictional
Isolated Ephemeral Stream 28	330	1	0.008	Jurisdictional
Isolated Ephemeral Stream 29	185	2	0.008	Jurisdictional
Isolated Ephemeral Stream 30	310	2	0.021	Jurisdictional
Isolated Ephemeral Stream 31	250	1.5	0.008	Jurisdictional
Isolated Ephemeral Stream 32	185	2.5	0.009	Jurisdictional
Isolated Ephemeral Stream 33	150	2	0.003	Jurisdictional
Isolated Ephemeral Stream 34	30	1.5	0.001	Jurisdictional
Isolated Ephemeral Stream 35	405	2	0.028	Jurisdictional
Isolated Ephemeral Stream 36	135	2	0.006	Jurisdictional
Isolated Ephemeral Stream 37	40	2	0.002	Jurisdictional
Isolated Ephemeral Stream 38	125	1.5	0.004	Jurisdictional
<b>Isolated Ephemeral Stream Total</b>	<b>7,815</b>		<b>0.36</b>	
Wetland 1	---	---	0.03	Jurisdictional
Wetland 2	---	---	0.06	Jurisdictional
Wetland 3	---	---	0.02	Isolated
Wetland 4	---	---	0.01	Jurisdictional
Wetland 5	---	---	0.08	Jurisdictional
Wetland 6	---	---	0.14	Jurisdictional
Wetland 7	---	---	0.06	Jurisdictional
Wetland 8	---	---	0.15	Jurisdictional
Wetland 9	---	---	0.13	Jurisdictional
Wetland 10	---	---	0.03	Isolated
Wetland 11	---	---	0.01	Jurisdictional
Wetland 12	---	---	0.04	Jurisdictional
Wetland 13	---	---	0.10	Jurisdictional
Wetland 14	---	---	0.04	Jurisdictional
<b>Wetland Total</b>	<b>---</b>	<b>---</b>	<b>0.39</b>	
<b>Jurisdictional Features Total</b>	<b>---</b>	<b>---</b>	<b>48,785</b>	

These totals are only for jurisdictional features. Isolated features are not included.



SOURCE: BASE MAP PROVIDED BY MICELLCORP & ASSOCIATES, INC.

AIKEN 103  
JEFFERSON COUNTY, KENTUCKY



WATER/WETLAND  
LOCATION MAP

FIGURE 3  
SHEET 2 OF 2





23 March 2021  
TR 21007

Ms. Karen Linares  
Mindel Scott  
5151 Jefferson Boulevard  
Louisville, Kentucky 40219  
(502) 485-1508

**SUBJECT:** Management Summary Letter: Archaeological Delineation of two Cemeteries  
Located in Eastern Jefferson County, Kentucky

Dear Ms. Linares:

This Management Summary describes an archaeological investigation conducted to delineate two historic cemeteries (Cemetery 1 and Cemetery 2) on privately owned property at 16907 Aiken Road in eastern Jefferson County, Kentucky (**Figure 1**). Cemetery 1 is known as the Howell Cemetery and contains upright and displaced gravestones with names and epitaphs and a relatively intact dry-laid limestone wall. Cemetery 2 has no known name and is located to the north of the walled cemetery (**Figure 2**). It consists of unmarked field stones, some of which remain in-situ while numerous others have been displaced. This cemetery is believed to be a cemetery used by enslaved people who lived in the area in the nineteenth century. Mindel Scott requested that Corn Island Archeology LLC provide an archaeological investigation to define the boundaries of the cemeteries to allow for use of the surrounding property for development.

The investigation included archival research using data derived from the engraved headstones at the cemetery, excavation of backhoe trenches around the existing, in-situ grave markers and cemetery wall, and preparation of this management summary summarizing the findings of the study.

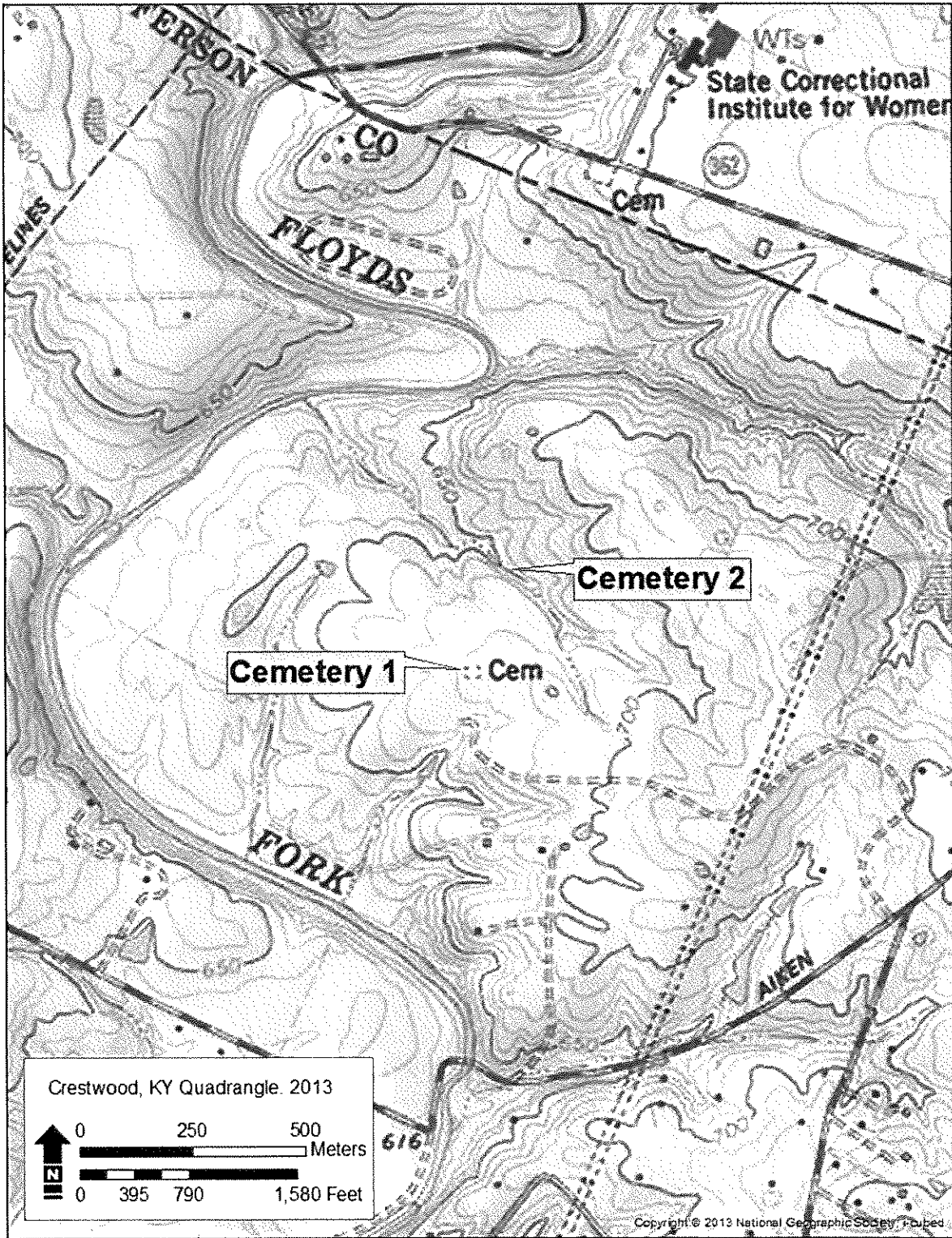


Figure 1. Location of Cemetery 1 and Cemetery 2 on USGS topographic map.

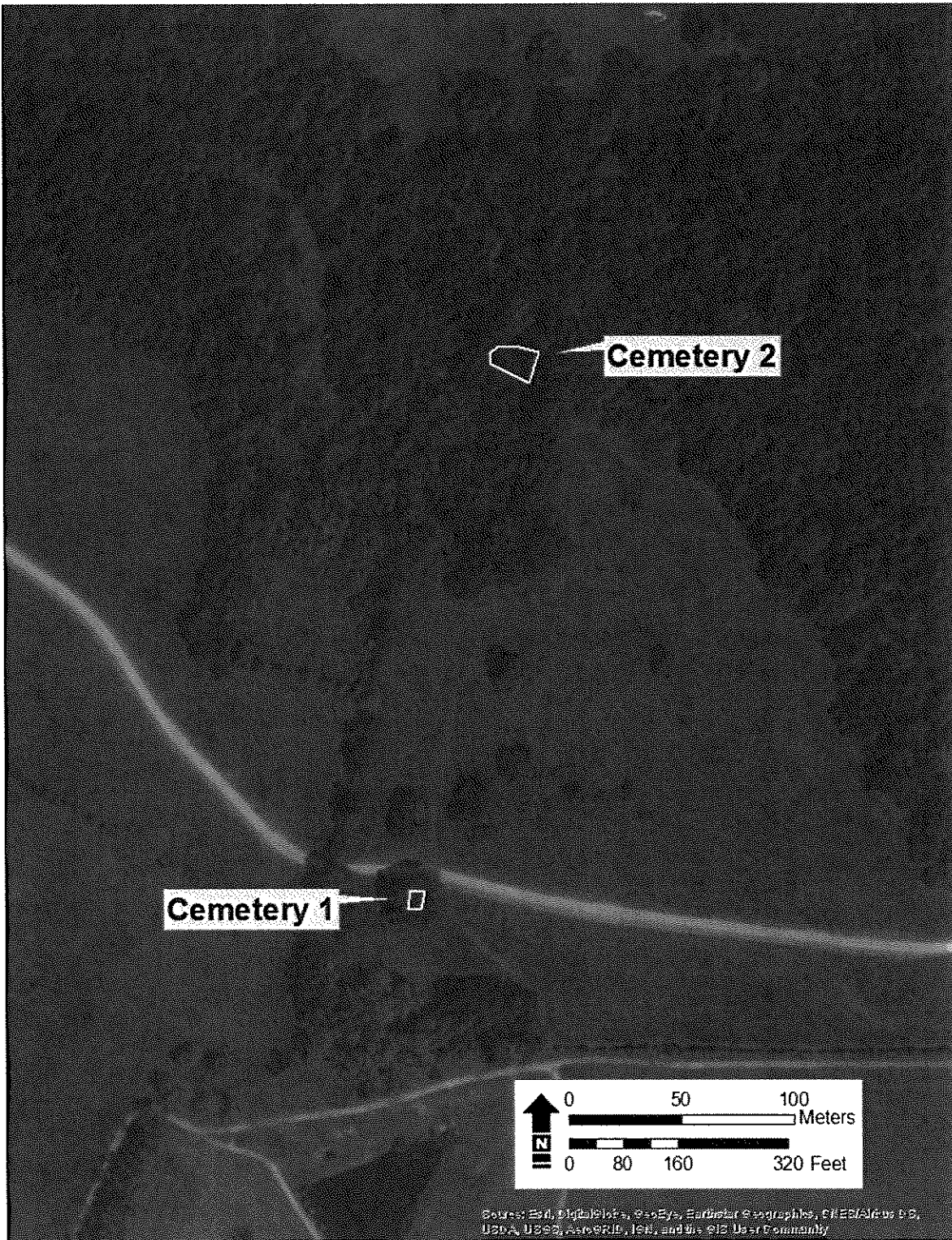
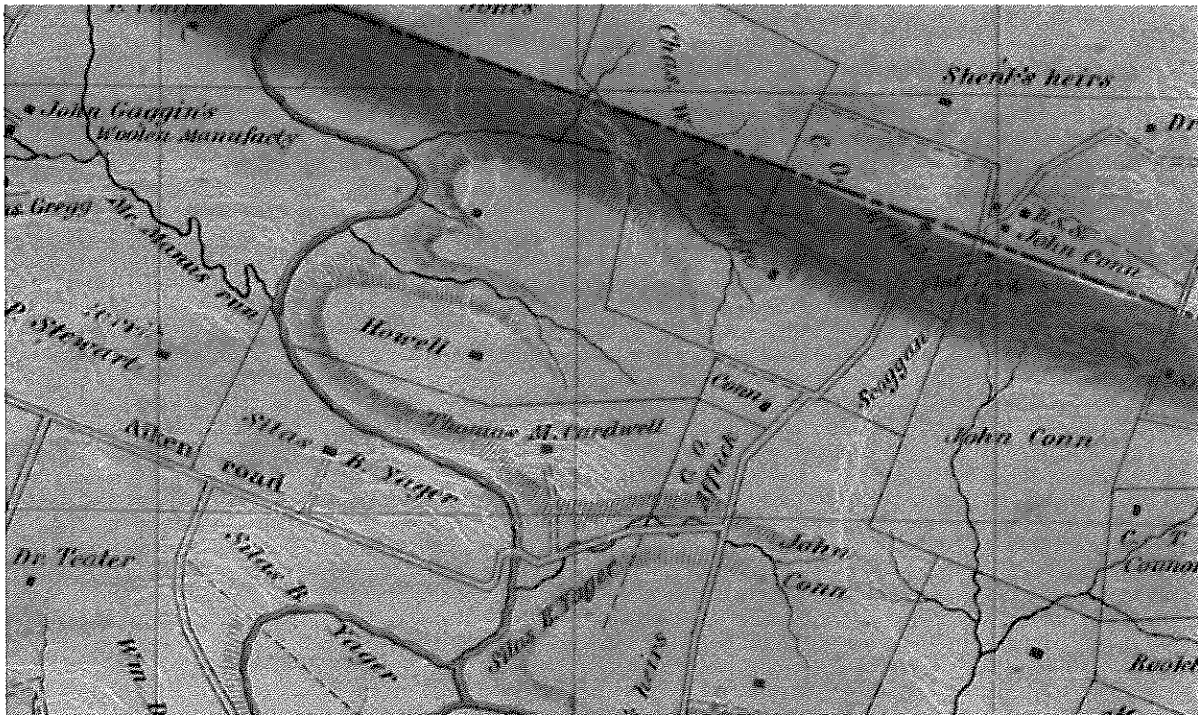


Figure 2. Aerial view of locations of Cemetery 1 and Cemetery 2.

## ARCHIVAL RESEARCH

Isaac Howell, for whom the walled cemetery (Cemetery 1) is named, owned the land that both cemeteries are located on in the 1850s (**Figure 3**). The 1979 Atlas of Jefferson County, Kentucky shows surnames Cardwell, Ward, Runyan and Conn in the area of the cemeteries (**Figure 4**). The earliest mention of cemeteries on the property was found in a deed dating to 1931 which states "This conveyance is made subject to the graveyards located on said property." (**Figure 5**) The deed includes a map of the property boundary and written within: "Mr. Jefferies, tenant, reports two graveyards within the area shown hereon" though the locations are not depicted on the map (**Figure 6**). Review of these documents was allowed by the current landowners during fieldwork.



**Figure 3. Portion of the 1858 Bergmann Map of Jefferson County showing landowners.**

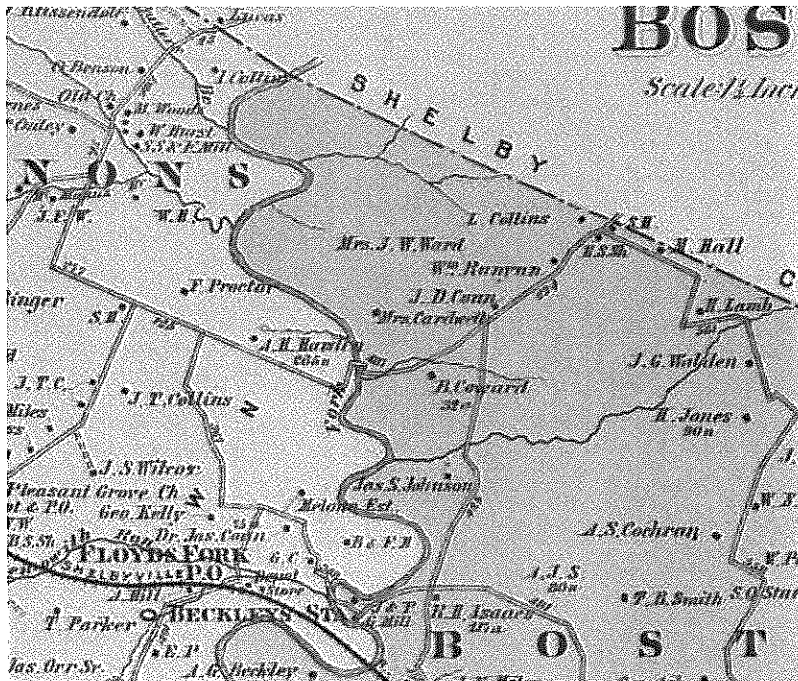


Figure 4. Portion of the 1879 Beers and Lanagan Atlas of Jefferson County, Kentucky.

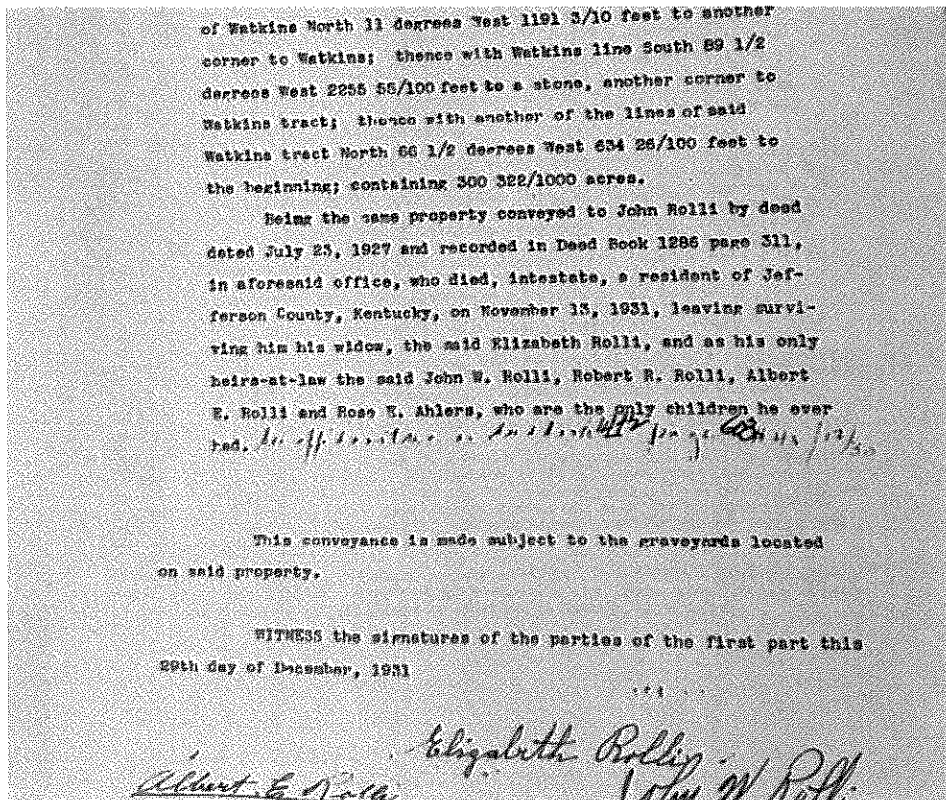


Figure 5. Image of 1931 deed mentioning "graveyards".

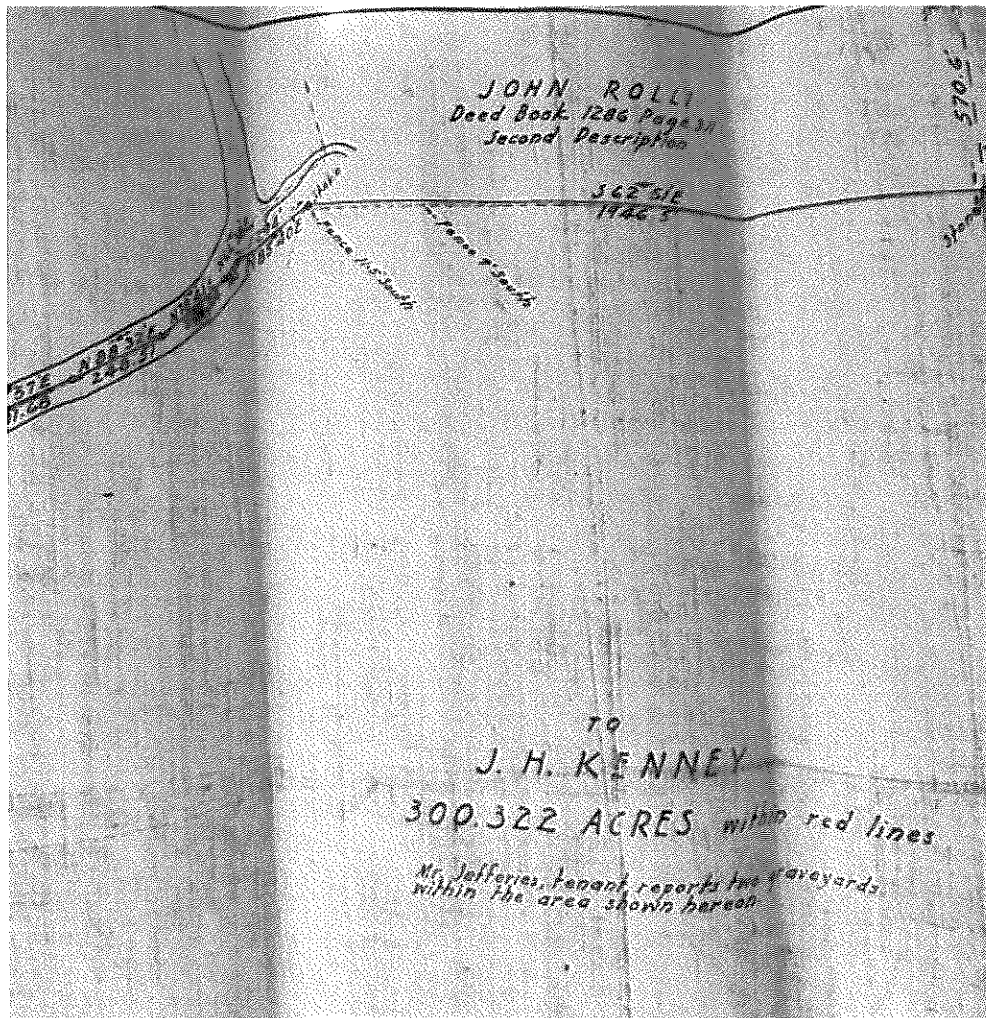


Figure 6. Photo of map associated with 1931 deed of the property.

Twelve headstones are present at Cemetery 1 (Table 1). Eight remain in-situ, three appear to be displaced, and the location of one is questionable. Five of the headstones possess an associated footstone. The headstones place the period of use of the cemetery to between ca. 1853 and 1904.

**Table 1. Headstone Summary at the Howell Cemetery**

Name	Birth	Death	Inscription	Headstone in Situ [Yes/No]	Footstone Present [Yes/No]
Mahala S Cardwell	12/29/1799	5/22/1855	illegible	yes	yes
Thomas M Cardwell	7/20/1797	3/23/1865	illegible	yes	yes
Juliet Ann Duncan	1/9/1821	5/12/(illegible)	<i>Daughter of... (illegible)</i>	yes	yes
(No Name)	9/23/1846	(illegible)	<i>In Memory of Infant Daughter of Mary Ann Fields</i>	yes	no
Levina Wilson	1/30/1808	11/11/1875	illegible	no	yes
Mary Ann Fields	[?]/26/1822	1/6/1897	<i>Daughter of (illegible) Ann Caldwell</i>	yes	no
Henrietta Kennedy	1854	1904	none	unknown	no
<i>Field (illegible)</i>	(illegible)	(illegible)	(illegible)... <i>Field</i>	no	no
<i>James Thomas (illegible)</i>	7/25/1850	8/17/1853	<i>Son of Charles O ... (illegible)</i>	yes	no
<i>John W Ward</i>	1/(illegible)/1839	4/27/1885	none	yes	no
<i>Emma Bell</i>	5/27/1858	1/28/1890	<i>Daut of (illegible) M J Howell ..... Wife of (illegible) Yager</i>	no	no
<i>I. S. Howell</i>	(illegible)	2/25/1865	base of stone embedded in tree	yes	yes

The earliest interment at the cemetery is that of James Thomas, son of Charles O. and Sarah Afflick. Preliminary review of archival data (including the 1858 Bergmann Map of Jefferson County, Kentucky (**Figure 3**) and US Federal Census records shows an Afflick neighbor of Isaac Howell in the 1850s.

### HISTORIC MAP REVIEW

A series of historic maps were reviewed for evidence of the cemetery (**Table 2**). The presence of a cemetery is first noted in 1960 on the USGS topographic quadrangle map of Crestwood, though only one is noted.

**Table 2. Historic Maps Reviewed**

<b>Date</b>	<b>Publisher</b>	<b>Map</b>	<b>Cemetery 1 indicated</b>	<b>Cemetery 2 indicated</b>
1858	G. T. Bergmann	Map of Jefferson County, Kentucky	No	No
1879	Beers & Lanagan	Map of Jefferson County, Boston District	No	No
1913	Louisville Title Company	Atlas of Louisville and Jefferson County, KY	No	No
1932	USGS	Topographic Map of the La Grange Quadrangle	No	No
1951	USGS	Topographic Map of the Crestwood Quadrangle	No	No
1956	USGS	Topographic Map of Louisville, Ky	No	No
1960	USGS	Topographic Map of the Crestwood Quadrangle	Yes	No
1964	USGS	Topographic Map of Louisville, Ky	No	No
1969	USGS	Topographic Map of the Crestwood Quadrangle	Yes	No
1981	USGS	Topographic Map of the Crestwood Quadrangle	Yes	No
1986	USGS	Topographic Map of Louisville, Ky	No	No
1993	USGS	Topographic Map of the Crestwood Quadrangle	Yes	No

### **EXCAVATIONS**

The field excavation and ground surface survey were conducted March 3<sup>rd</sup> through March 5<sup>th</sup>, 2021. The field investigation began by selecting excavation areas based upon the locations of the extant wall at Cemetery 1 and the location of fieldstones observable on the ground surface at Cemetery 2, as well as the landscape and topography of each location. A backhoe equipped with a 2-foot (ft) wide, smooth-blade bucket was used to carefully remove overburden soil in shallow passes measuring between 10 and 20 centimeters (cm) (**Figure 7**). The excavations were monitored carefully by Corn Island's bioarchaeologist and a field technicians who closely observed the soil for any indications of burials such as burial shafts, coffin wood, casket hardware, and/or grave markers. The investigation was led by a Registered Professional Archaeologist (RPA) and conducted by personnel who meet the Secretary of the Interior's standards for professional archaeologists.





**Figure 7. Excavation in progress at Cemetery 2.**

At Cemetery 1, four trenches were excavated around the perimeter of the extant dry-laid stone wall, leaving a space of 1 to 1.5 m away from the wall so as not to undermine its integrity. These trenches were numbered Trench 1 through 4 and upon completion were contiguous (**Figure 8**). The trenches measured between 4 and 5 m wide and 75 and 116 cm deep. Upon identification of one burial in Trench 1, just outside the northwest corner along the west wall, a fifth trench was excavated to the west of Trench 1. No further interments were observed in the excavations at Cemetery 1.

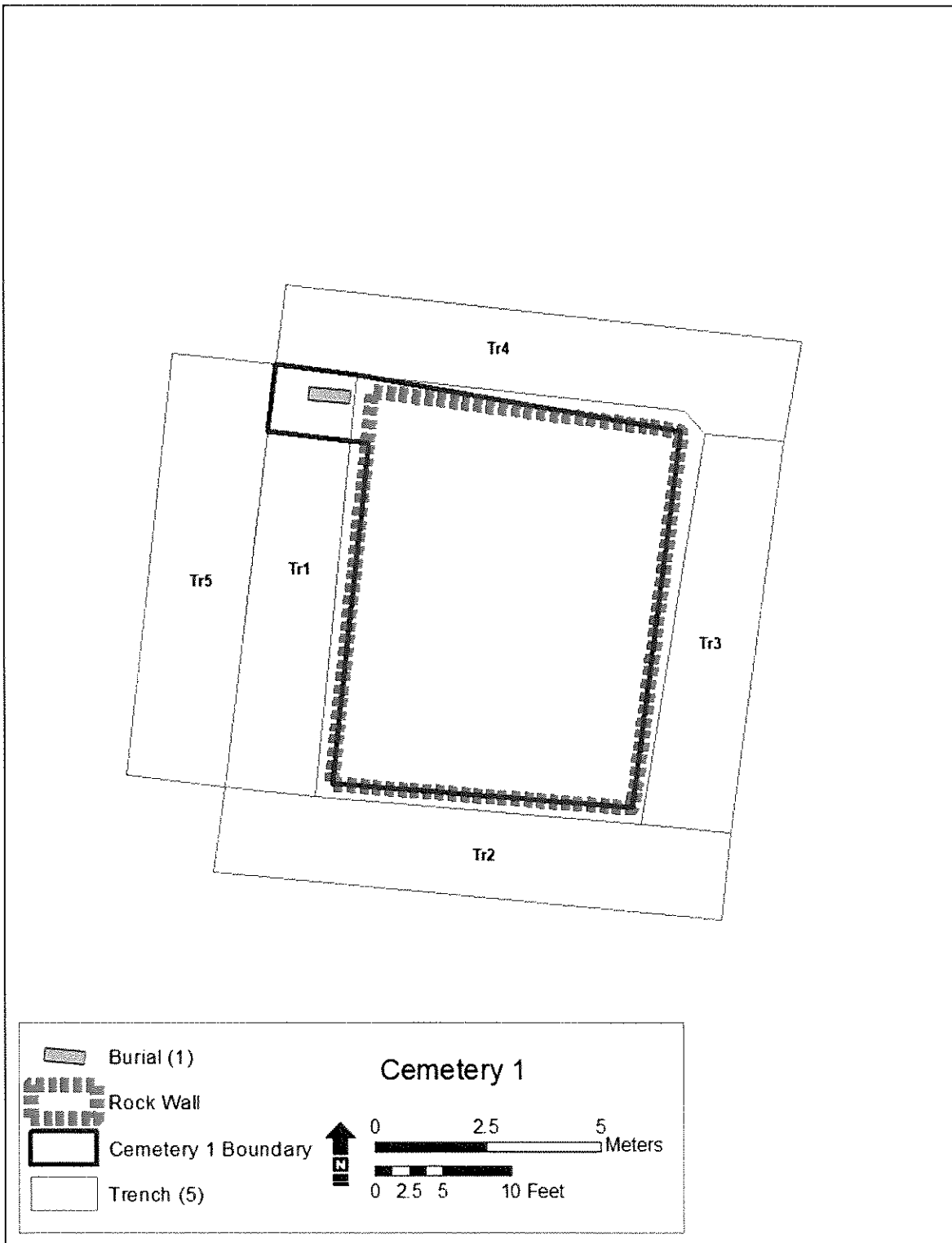


Figure 8. Excavations at Cemetery 1.



**Figure 9. Burial shaft located along western cemetery wall in Trench 1, facing west.**

Excavations at Cemetery 2 were constrained by its location in a wooded area with numerous trees measuring well above 4 inches in diameter. Prior to excavation, the area was subjected to ground surface survey and near-surface probing with a tile probe to locate fieldstones. Each fieldstone, whether in-situ, displaced, or naturally occurring, was marked with pin flags to aid in determining the boundary of the cemetery (**Figure 10** and **Figure 11**). Excavations then proceeded, with placement of the trenches to avoid intersection with interments and/or in-situ burial markers. A total of 8 trenches were excavated at Cemetery 2: three at the northwest extent of ground surface stones; one along the western extent; three along the southern extent; and one along the eastern extent (**Figure 12**). Two sinkholes were present along these extents as well and were avoided by the heavy machinery. As few stones were present along the northern edge and the presence of a steep slope down to a tributary of Floyds Fork, no excavations were conducted in the northeastern area.



**Figure 10. Cemetery 2, each flag marks a location of fieldstones. String marks in-situ headstone and associated foot stone.**



**Figure 11. Cemetery 2. Pin flags mark fieldstones, strings mark an in-situ headstone and associated footstone.**

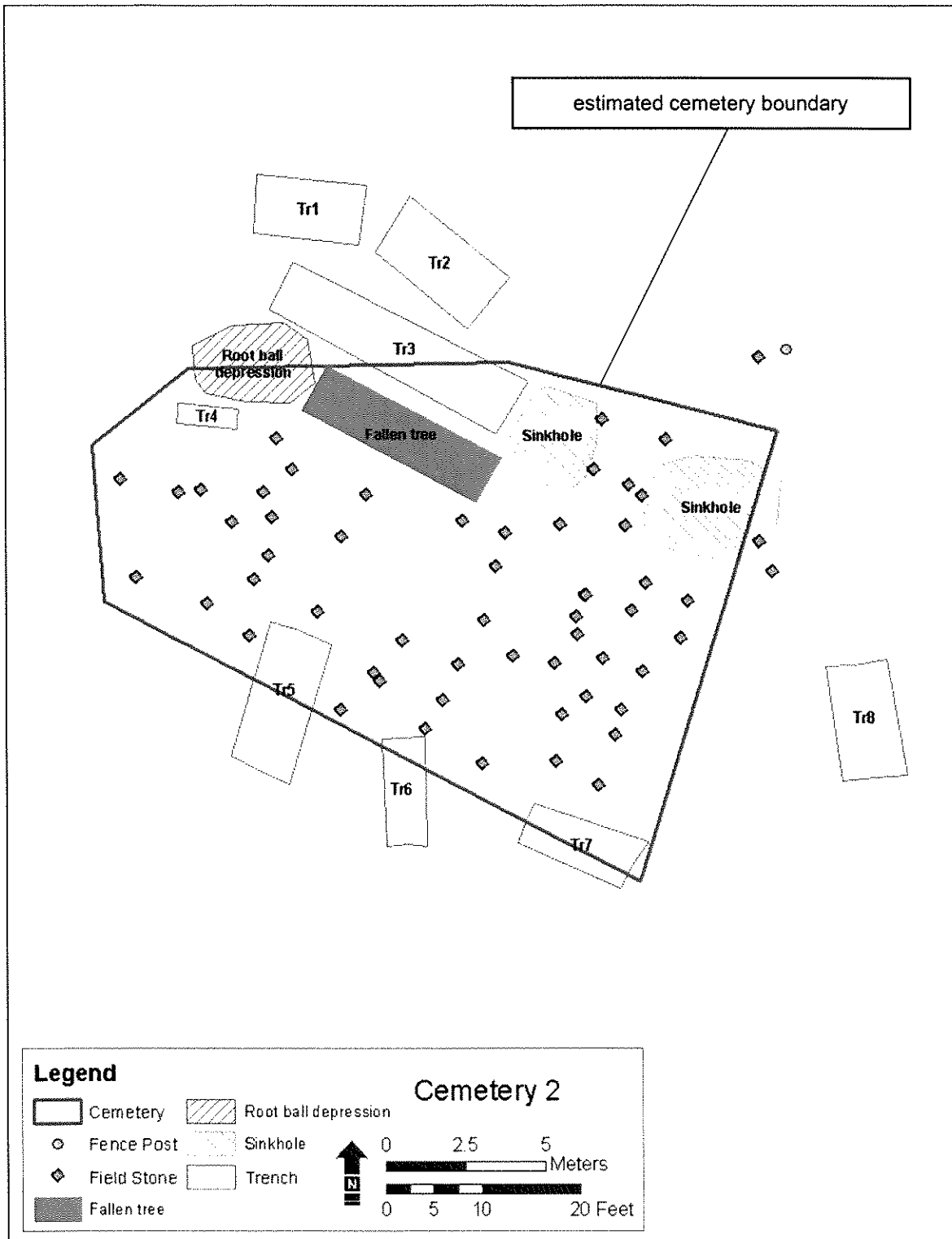


Figure 12. Excavations and surface features at Cemetery 2.

No evidence of burials or sub-surface fieldstones was found in Trenches 1, 2, 3, 4, 6, 7, or 8. Evidence of a burial (a nail fragment (**Figure 13**) and small bits of coffin wood (**Figure 14**) was observed in the north profile wall of Trench 5. This trench was placed south of a row of in-situ fieldstone grave markers, with the northern end of the trench excavated as near as possible to the in-situ stones without displacing them. Just beneath the ground surface (ca. 3-5 cm), a cluster of fieldstones was uncovered that appear to be present along the length of the burial, between the in-situ headstone and foot stone. The nail and coffin wood observed in the north profile of Trench 5 were found at 68 cm and 74 cm below the surface (cmbs), respectively.



**Figure 13. Nail fragment found at 688 cmbs in north wall Trench 5.**



**Figure 14. Coffin wood fragment found at 74 cmbs in north wall Trench 5.**



**Figure 15. Trench 5 facing north.**

Soil discolorations or other anomalies observed during the mechanical removal of overburden soil were investigated by Corn Island's archaeologists. The areas were cleaned by hand-troweling to clarify boundaries and expose potential evidence of human interments.

### **SUMMARY AND FINDINGS**

One unmarked grave was exposed at Cemetery 1. This presented as a rectangular shaped area of darker soil, oriented east to west just outside the extant dry-laid stone wall in the northwest corner along the west wall. The current landowners recall seeing a headstone "just outside the west wall" and "near the gate" when they were children. All three recall that the name on the headstone was "Kennedy" but do not recall what happened to the stone. One of the only obviously displaced headstones within the wall of Cemetery 1 belongs to Henrietta Kennedy. Its style and material is also inconsistent with all the other grave markers within the stone wall and its date of 1904 is the most recent. It is likely that this stone is the headstone the landowners recall as being outside the wall and belongs to the interment recorded during this investigation.

No burial shafts were identified in the eight trenches excavated at Cemetery 2, though a nail fragment and coffin wood were exposed in the north wall of Trench 5. As no burial shafts were observed during the excavations, the presence of both in-situ and displaced fieldstone grave

markers, the farm access road, and the steep slope along the northern extent of in-situ stones appear to define the boundary of the cemetery quite accurately. Flagging tape was placed on trees around the perimeter of the stones at the completion of the fieldwork to mark the extent of the cemetery.

Based on the findings, the boundary of Cemetery 1 is estimated to be the dry-laid stone wall along the north, east, and south edges. The western boundary of the cemetery should be extended to include the single burial identified in the northwest corner (**Figure 16**).

The extent of Cemetery 2 measures approximately 15 m (49.21 ft) north to south by 20 m (65.62 ft) east to west. The estimated boundary of Cemetery 2 is shown in **Figure 17**.

Both cemeteries should be protected by a 30-ft "no disturbance" buffer. Cemetery 2 should also be enclosed, as should the unmarked grave outside of Cemetery 1. The fencing should be sympathetic to the period of the graves. The fencing is not intended to keep viewers away, but rather to protect the cemetery from future inadvertent damage. Ideally, the fencing should be permanent and require little maintenance. Wrought iron fencing is a recommended choice as it is attractive and was commonly used on historic cemeteries.



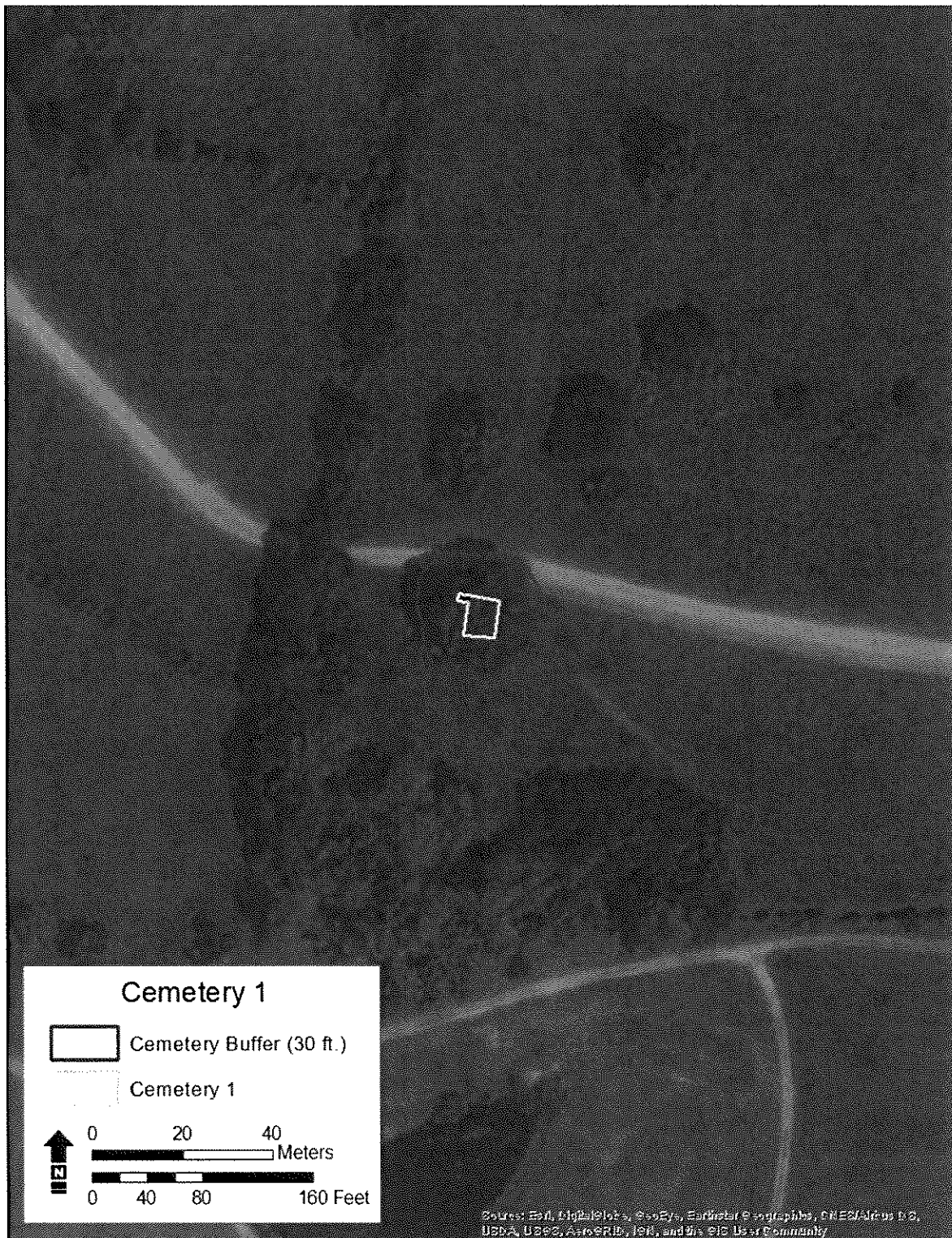


Figure 16. Modern aerial showing archaeologically-defined boundary and 30-ft buffer at Cemetery 1.

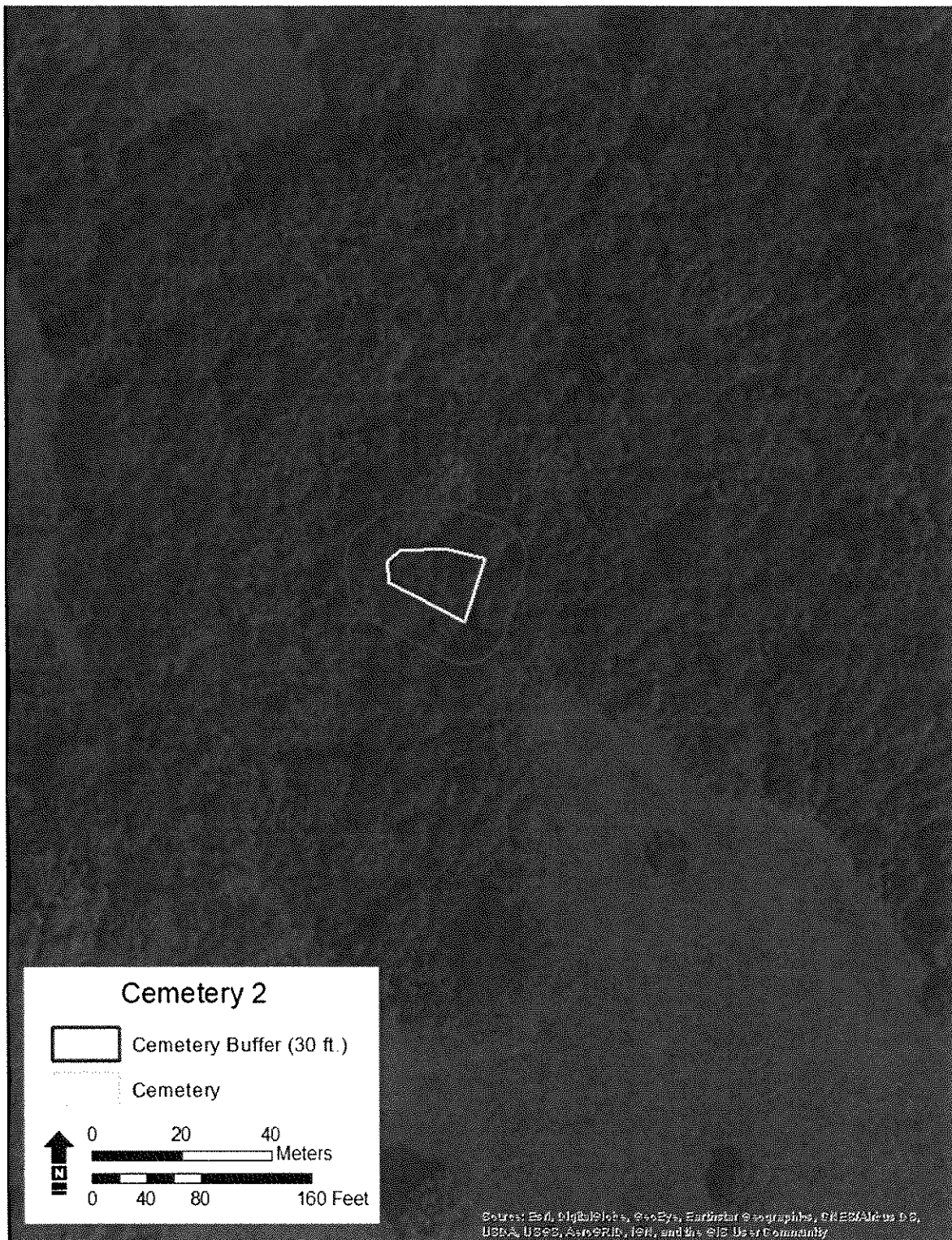
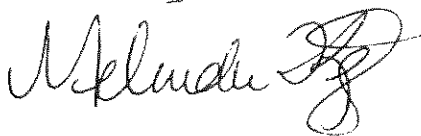


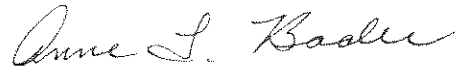
Figure 17. Modern aerial showing archaeologically defined boundary and 30-ft buffer at Cemetery 2.

Thank you for the opportunity to provide our archaeological services. If you have any questions or concerns please contact us by phone at (502) 614-8828 or (502) 592-2355 (mobile) or by email at [mwetzel@ciarch.com](mailto:mwetzel@ciarch.com) or [abader@ciarch.com](mailto:abader@ciarch.com).

Sincerely,



Melinda J. King Wetzel  
Vice President, Archaeology



Anne T. Bader  
Principal