United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in *How to Complete the National Register of Historic Places Registration Form* (National Register Bulletin 16A). Complete each item by marking "x" in the appropriate box or by entering the information requested. If any item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions. Place additional entries and narrative items on continuation sheets (NPS Form 10-900a). Use a typewriter, word processor, or computer, to complete all items.

1. Name of Property

historic name Madison-Derr Iron Furnace

other names/site number Jonas Derr Iron Foundry, 31LN64**

2. Location

street & number end of Madison Furnace Trail, 0.8 miles southwest of Otis Dellinger Road X not for publication

city or town Lincolnton X vicinity

state North Carolina code NC county Lincoln code 109 zip code 28092

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act of 1986, as amended, I hereby certify that this _X_ nomination ____ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property __X_ meets ____ does not meet the National Register Criteria. I recommend that this property be considered significant ___ nationally ___ statewide _X_ locally. (___ See continuation sheet for additional comments.)

_____
Signature of certifying official Date

_____
State or Federal agency and bureau

In my opinion, the property ____ meets ____ does not meet the National Register criteria. (___ See continuation sheet for additional comments.)

_____
Signature of commenting or other official Date

_____
State or Federal agency and bureau

4. National Park Service Certification

I, hereby certify that this property is:

____ entered in the National Register
___ See continuation sheet.
____ determined eligible for the National Register
___ See continuation sheet.
____ determined not eligible for the National Register
____ removed from the National Register
____ other (explain): _____

_____

Signature of the Keeper Date of Action

5. Classification

Ownership of Property
(Check as many boxes as apply)

- _X_ private
- ___ public-local
- ___ public-State
- ___ public-Federal

Category of Property
(Check only one box)

- ___ building(s)
- ___ district
- _X_ site
- ___ structure
- ___ object

Number of Resources within Property
(Do not include previously listed resources in the count)

Contributing	Noncontributing	
0	1	buildings
1	0	sites
0	0	structures
0	0	objects
1	1	Total

Name of related multiple property listing
(Enter "N/A" if property is not part of a multiple property listing.)

N/A

Number of contributing resources previously listed
In the National Register

N/A

6. Function or Use

Historic Functions
(Enter categories from instructions)

INDUSTRY/ iron

Current Functions
(Enter categories from instructions)

Vacant

7. Description

Architectural Classification
(Enter categories from instructions)

Other: iron furnace

Materials
(Enter categories from instructions)

foundation Stone
walls Stone
roof N/A
other N/A

Narrative Description
(Describe the historic and current condition of the property on one or more continuation sheets.)

8. Statement of Significance

Applicable National Register Criteria
(Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing)

X **A** Property is associated with events that have made a significant contribution to the broad patterns of our history.

_ **B** Property is associated with the lives of persons significant in our past.

X **C** Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.

X **D** Property has yielded, or is likely to yield, information important in prehistory or history.

Criteria Considerations
(Mark "X" in all the boxes that apply.)

Property is:

_ **A** owned by a religious institution or used for religious purposes.

__ **B** removed from its original location.

_ **C** a birthplace or a grave.

_ **D** a cemetery.

_ **E** a reconstructed building, object, or structure.

_ **F** a commemorative property.

_ **G** less than 50 years of age or achieved significance within the past 50 years.

Areas of Significance
(Enter categories from instructions)
INDUSTRY
ARCHITECTURE
ARCHAEOLOGY

Period of Significance
c.1809-c.1875

Significant Dates
1855

Significant Person
(Complete if Criterion B is marked above)
N/A

Cultural Affiliation
N/A

Architect/Builder

Unknown

Narrative Statement of Significance
(Explain the significance of the property on one or more continuation sheets.)

9. Major Bibliographical References

Bibliography
(Cite the books, articles, and other sources used in preparing this form on one or more continuation sheets.)

Previous documentation on file (NPS):

___preliminary determination of individual listing (36 CFR 67) has been requested.
_ _ previously listed in the National Register
___ previously determined eligible by the National Register
___ designated a National Historic Landmark
___ recorded by Historic American Buildings Survey # _____
___ recorded by Historic American Engineering Record # _____

Primary Location of Additional Data:
_X_ State Historic Preservation Office
___ Other State agency (NCDOT)
___ Federal agency
___ Local government
___ University
___ Other

Name of repository:

10. Geographical Data

Acreage of Property 9.8 acres

UTM References
(Place additional UTM references on a continuation sheet)

	Zone	Easting	Northing
1			
2			
3			
4			

_X_ See continuation sheet

Verbal Boundary Description
(Describe the boundaries of the property on a continuation sheet.)

Boundary Justification
(Explain why the boundaries were selected on a continuation sheet.)

11. Form Prepared By

name/title Linwood R. King, III, Historic Preservation Specialist; Sherry Joines Wyatt, Historic Preservation Consultant; Rebecca Fenwick, Historic Preservation Specialist

organization David E. Gall, Architect, P.A. date September 2018

street & number 938 West Fifth Street telephone (336) 773-1213

city or town Winston-Salem state NC zip code 27101

Additional Documentation

Submit the following items with the completed form:

Continuation Sheets

Maps

A **USGS map** (7.5 or 15 minute series) indicating the property's location.

A **sketch map** for historic districts and properties having large acreage or numerous resources.

Photographs

Representative **black and white photographs** of the property.

Additional items
(Check with the SHPO or FPO for any additional items)

Property Owner

(Complete this item at the request of the SHPO or FPO.)

name Lincoln County Historic Properties Commission

street & number 115 W. Main Street telephone (704) 748-9090

city or town Lincolnton state NC zip code 28092

7. Narrative Physical Description

The Madison-Derr Iron Furnace is located on the north bank of Leepers Creek in Pumpkin Center, an unincorporated community in central Lincoln County, approximately eight miles northeast of the city of Lincolnton. The furnace is located at the southern end of Madison Furnace Trail (SR 1350). Madison Furnace Trail becomes a private gravel road 0.2 miles south of its junction with N. C. Highway 150 at the intersection with Otis Dellinger Road and continues 0.8 miles south to the furnace.

The 9.8 acre National Register boundary identified follows the outline of two parcels with the southern arm extending along Leeper's Creek. Madison Furnace Trail sits parallel to the eastern boundary, as the parcel line is setback thirty feet from the road. The Jacob Forney House, a non-contributing building, was moved here May 30, 2002 and is situated approximately 350 feet northeast of the furnace on the west side of Madison Furnace Trail. Set in the south central section of the bounded area, the furnace's four corners are situated north, south, east, and west, with the faces of the furnace oriented northwest, northeast, southeast, and southwest.

As shown on the 2010 Freeman Land Survey included as a supporting document, the site contains a well-preserved stone furnace, earthen sluiceways (also known as flumes), remains of stone foundations, stone walls, three submerged logs from a log dam, and slag deposit areas in addition to portions of a stone quarry, remnants of a stone chimney, and an old road bed, the peak of which extends roughly 520 feet from Madison Furnace Trail at its farthest point. The property is relatively flat along the creek, but slopes upward to the northeast. The northeast side of the furnace is situated against the slope of the hill. The land immediately adjoining the furnace has been cleared of large trees on the south and east sides and a wooded area sits adjacent to the furnace to the west and north. The creek bank is also wooded. To the southeast of

the furnace, is a large area, which is outside of the National Register nomination boundary, which is cleared of trees and appears to have been recently cultivated.

A trace road rises northeast of the furnace, near Madison Furnace Trail. The trace road travels past the northeast side of the furnace, where it once gave access to the charging deck, approximately fifty feet then continues west, parallel to the longer flume. The road then turns northeast at Leeper's Creek and continues east into the surrounding woods.

The period of significance for the Madison-Derr Iron Furnace begins c. 1809, when the furnace was constructed by Peter Forney (Lesly, J.P., *Iron Manufacturer's Guide to the Furnaces, Forge's, and Rolling Mills of the United States*, 1859, 74-75) and ends c. 1875 as a result of depressed markets following the Civil War which resulted in a lack of transportation improvements and a collapse of the slave-based economy. This paired with the inability to compete with successful ironworks in other regions, led to the decline of the Madison-Derr Iron Furnace by this date (Lincoln County Historical Association, web).

Iron Furnace, c. 1809, c. 1855 (rebuilt)

The most prominent resource on the site is the stone furnace structure situated approximately 200 feet to the northeast of Leeper's Creek at the base of a slope to the north. Built c. 1809, the furnace was rebuilt in 1855 as indicated in the 1859 *Iron Manufacturer's Guide to the Furnaces, Forges and Rolling Mills of the United States* (Lesley, as quoted in Ferguson and Cowan, 57). The furnace is a cut stone prismoid, thirty feet square at the base and tapers to a height of approximately twenty-nine feet. The stones of the structure are randomly sized local schist rock cut and roughly dressed to conform to the sloped walls of the furnace, and appear to have been laid with little or no mortar. The southwest and southeast elevations of the furnace contain centered, triangular arches, called tuyere arches, named for the tuyeres, or holes, that

admitted the blast pipes. The tuyere arch located on the southeast face is truncated and appears to have been the run-out arch where the iron was tapped out into the sand molds. It is also the larger and creates a recessed area with a base fourteen feet in width, rising to an overall height of fourteen feet with a flat iron head plate and very narrow opening exiting the top of the arch. A second recessed opening where the iron was tapped out is situated at the base of the larger arched area. This opening has a vertical rise of four feet, six inches above grade before tapering to a squared top supported by an iron head plate; a narrow channel exits the furnace at this opening. The smaller tuyere arch on the southwest elevation is eight feet wide at the base and rises to an overall height of twelve feet. The opening on the southwest face also begins with a vertical rise of five feet at its base before tapering to a point. Again, this arched area has a small recessed opening at the base supported by an iron head plate.

The interior flue in the center of the furnace appears to be prismoidal following the exterior shape of the furnace and exits the top of the furnace through a round stone shaft extending approximately three feet above the top of the furnace, which is missing some stones from its top layer.

Earthworks, ca. 1809-c. 1875

Earthworks are an above-ground feature at the furnace site. These include two earthen flumes, also known as sluiceways. The flumes intersect at the west corner of the furnace in a large dug-out, rectangular pool or basin approximately fifty feet by sixty feet in size. Remains of stone walls are situated on the west side of the basin and may have been part of the structure supporting a water wheel that operated the bellows of the furnace. The arrangement of the flumes likely allowed for a longer flume to intake water from the portion of the creek to the north of the furnace, channeling the water flow through the basin and back into the creek to the south of the furnace by way of the shorter flume. The longer flume extends approximately

400 feet from the western corner of the furnace and the basin toward Leeper's Creek to the northwest. This flume is approximately eleven feet wide by eight feet deep and appears to have terminated at the creek in a slightly larger mouth although its connection with the creek has been obstructed by sediment and tree growth about eighty feet from the furnace. The shorter flume originally extended 300 feet south from the basin to the creek (noted as the shallow area on the Freeman Land Survey) but the flume's final 150 feet have been infilled. The open section is about ten feet wide by eight feet deep.

Dam, c. 1809-c. 1875

A series of three large logs which are partially deteriorated lie underwater across the creek bed, indicating the location of the dam in the vicinity of the longer flume's mouth as shown in the photographs in the supporting documents section.

Slag Deposits, c. 1809-c. 1875

Also within the furnace site are deposits of iron slag, a by-product of the iron smelting process. They are scattered along the trace road that travels on the north side of the furnace. Additional slag deposits are located to the south of the furnace on either side of the shorter flume, which has been infilled.

Stone Quarry, c. 1809-c. 1875

The stone quarry at the Madison-Derr site is located northwest of the furnace, as shown on the Freeman Land Survey. Exposed bedrock is visible along a bank of Leeper's Creek where there are visible cuts from the removal of stone as well as evidence of a quartz vein that cuts through the bedrock. The hillside associated with the quarry rises roughly 45 feet from ground level at Leeper's Creek along an embankment. The quarry area is filled with underbrush and trees that have covered much of the quarry's original extents.

Stone Wall Remnants, c. 1809-c. 1875

Remnants of an above ground stacked stone wall retain the south side of the road as it passes the furnace. Additionally, remnants of a stacked cut stone wall that appears to be coursed extend perpendicularly between the road and the north corner of the furnace. The presence of the road and portions of the stone walls suggest that the road was utilized to deliver the iron ore, limestone, and charcoal deposits to the charging deck that would have been at the top of the furnace. The remnants of the stone walls may have formed the supports for the wooden charging deck platform extending between the road and the top of the northeast side of the furnace.

Jacob Forney House, c. 1817

The ca. 1817 Jacob Forney House is a non-contributing building to the Madison-Derr Iron Furnace site. Built of heavy timber, the house has a massing of five bays wide by two bays deep. The exterior is clad in unpainted clapboard siding with two Flemish bond, double-brick chimneys that stand at the center of the house's two side gable ends, each of which has been reduced in height. The first floor of the front, southeast facade is boarded and the house has several missing windows. Also on the southeast facade, an original nine-over-nine double-hung sash window remains on the first floor. On the northwest, northeast, and southeast facades, there are four and a half original nine-over-six double-hung sash windows. Also on the rear, west elevation is a single opening on the first story, the rear exit door. The house has a replacement cedar shingle roof that was added in the early 2000s. The house was moved on May 30, 2002 from its original location off of Ingleside Farm Road near N.C. 73 to the Madison-Derr Furnace site, where it sits 230 feet northeast of the furnace, facing southeast, setback 102 feet from Madison Furnace Trail.

Archaeological Investigations

In 2002, a preliminary archaeological investigation was performed on the site, which summarized the following results:

> Initial objectives of the Madison Furnace Project included determining the location of the casting floor as well as the location of any outlying structures. We placed several excavation pits in the presumed location of the casting floor, in front of the hearth of the furnace stack. Of these pits, four revealed some eroded brick fragments, and (5) large slabs of iron with sandy soil beneath. These iron slabs were removed for further study and storage (2 feet by 4 feet and roughly an inch thick). The other [pits] yielded charcoal fragments, pieces of limestone, and various nails, as well as other miscellaneous historic debris. While surveying the furnace site, a partial rock structure and cornerstones were located on the hill adjacent to the furnace stack, presumably the loading area for the charge and charcoal storage. Also located were earthen features thought to be related to the [wooden] bridge structure (no longer standing) that was used in carrying the charge to the furnace (Madison/Derr: A Cold Blast Furnace in Early Lincoln County North Carolina).

Led by a Dr. Alan May, Ph.D., the archaeological team completed work from 2001 to 2005 to include deed research, field investigations, site mapping, and testing to determine sub-surface remains. Over the course of five field sessions, twenty-two squares were excavated, seven beyond the casting floor as well as six backhoe trenches excavated between the furnace stack and Leepers Creek to the south. Five of these trenches were perpendicular to Leepers Creek with the sixth paralleling the creek south of the turbine well, crosscutting a hypothesized trailrace (see Freeman Land Survey for trench locations). Large quantities of slag, charcoal, and corroded metal fragments were discovered. Several large cast iron slabs

were recovered in the area of the casting floor as well as a quantity of nails and other building debris. Outside of the casting area toward Leepers Creek, the majority of material found was slag and geologic rock. An examination of backhoe trench profiles revealed several feet of byproduct slag deposited during the life of the furnace. Dr. May hypothesizes that additional areas of slag deposits are likely located downstream and east of the furnace and its surrounding eleven acres.

Four squares were dug north of the furnace in an area believed to be a stockpile of ore, charcoal, and flux. Abundant charcoal was found in two of these squares as well as a small quantity of ore. The other two squares revealed dressed stone which may have been part of a foundation for a structure of an unknown function.

Additional squares were dug near the hypothesized casting floor (as shown on the Freeman Land Survey), which is denoted by the low stone wall to the south and higher walls to the east and north of the furnace stack, which showed thin layers of charcoal, slag, and corroded metal fragments. These elements, as well as the presence of brick fragments, increase moving west toward the furnace crucible. Large cast slabs were recovered in the area of 45N/15W at the bottom of level one in this and adjacent squares. Toward the east, these thin layers rest on undisturbed clay with a small amount of sandy soil associated with the casting floor. Squares closer to the furnace stack contain thicker layers of disturbed, mottled sandy soil, much of which exhibited highly oxidized areas produced by higher temperatures associated with casting. The brick fragments are congruous with the many rebuilding episodes at the Madison-Derr Iron Furnace, as well as work performed as maintenance at the furnace. Ash sediments and burned and unburned wood were identified adjacent to the crucible opening, although ash can be found as far east as 45N/10W. Wood and charcoal were largely absent along the east wall of the casting floor. No posts or other evidence of a

covering for a structure was identified along the stone enclosure, however a fragment of a wood pole was identified closer to the crucible. The abundance of nails is indirect evidence of a covered structure which may have covered the stockpile area north of the stack. No other structural evidence was found (Archaeological Methodology and Investigations 2001-2005, Alan May, Ph.D., 2007).

Artifacts excavated during this work include sections of the casting floor and an iron pig marked "J.W. Derr N.C.Cold Blast," as shown in the photographs included in the supporting documents section (Madison Iron Furnace Committee, "Performance and Financial Report, September 2000 – January 2003 for Madison Iron Furnace Project," Lincoln County Historical Society).

Integrity

Situated within a largely rural, undeveloped area, the Madison-Derr Iron Furnace site retains its integrity of location and setting. While the c. 1809 furnace was rebuilt in 1855, the furnace remains in its original location. Further, many of the site's features directly involved in furnace's use during its period of significance are evidenced on site, as shown on the Freeman Land Survey completed in 2001. These elements are in-situ, with no change to their location or historic material composition outside of weathering over time. The design of the furnace is likewise a strong contributor to the site's integrity, unchanged since its 1855 rebuild. Further, the furnace's design and workmanship is indicative of iron furnace construction in its local context, specifically Lincoln County, and is one of the few remaining, intact furnaces in the region from the height of iron production in the nineteenth century. The condition of the furnace varies on each elevation, though the majority of the structure is intact and with little deterioration. The northwest and northeast elevations of the furnace have heavy growths of moss and ferns, while the southwest and southeast elevations are relatively devoid of vegetation. The top portions of the furnace have suffered the most

deterioration with vegetation in crevices and in the flue opening, where a small number of stones are missing. Post-furnace activities have had minor impact on archaeological deposits, and excavations have revealed intact subsurface features and in situ artifacts.

With regards to feeling, elements of the site's original sense of place remain, such as the sound of the neighboring creek and wildlife in nearby wooded areas, both elements present on the site during the period of significance. Together, the site's integrity of location, setting, design, workmanship, materials, and feeling combine to convey its integrity of association.

8. Statement of Significance

Summary

The Madison-Derr Iron Furnace site is located along the Big Ore Bank area in eastern Lincoln County, approximately eight miles northeast of Lincolnton on the north bank of Leepers Creek in the unincorporated community of Pumpkin Center. The site includes a well-preserved stone furnace, earthen sluiceways or flumes, three submerged logs from a log dam, slag deposit areas, portions of a stone quarry, remains of stone foundations, and a non-contributing house that was moved to the site. The furnace is a monumental, prismoidal stone structure and is one of the few extant furnace structures related to the iron industry that operated in the Piedmont of North Carolina from c. 1775 to c. 1875. The iron industry in the area, spurred by the availability of natural resources suited for iron production and state land grants established in 1788 for the creation of ironworks in North Carolina, contributed greatly to the early development and growth of Lincoln County and surrounding areas. The Madison-Derr Furnace is thought to have been established in 1809 and the extant prismoidal stone furnace was either refurbished or entirely rebuilt in 1855 (Lesly, J.P., *Iron Manufacturer's Guide to the Furnaces, Forge's, and Rolling Mills of the United States*, 1859, 74-75). The stone furnace feature is one of the best preserved iron furnaces in the region and one of three intact furnaces surviving in Lincoln County (Bishir and Southern, 467). A fourth exists within the county but only as a ruin. The site exemplifies the design and operation of charcoal-fueled furnaces of the period with an intact furnace structure and significant site features that yield information about its historic operations, including an earthen flume; stone foundations, a raised earthen staging area and road, and slag deposits. The Madison-Derr Furnace is eligible for the National Register under Criterion A, significant in the area of industry at the local level, for its association with the

important iron industry in south-central North Carolina during the nineteenth century. The Madison-Derr Furnace is also significant under Criterion C in the area of industry at the local level, for its distinctive stone furnace design with triangular openings that is representative of Lincoln County furnaces. As the site contains one of the most complete remains of an early ironworks in the state, its potential to yield significant archaeological information is great, therefore it is also eligible under Criterion D, significant in the area of industry at the local level. Potential research topics that may be addressed include furnace construction, style and operation; intra- and inter-site patterning; local commerce; and transportation networks ("Madison-Derr: A Cold-Blast Furnace in Early Lincoln County North Carolina," J. Alan May, PhD). The period of significance of the site begins with the establishment of the Madison-Derr Iron Furnace c.1809 and ends c.1875 when the furnace is thought to have come into disuse.

Historical Background

The history of the Madison-Derr Furnace was researched in 1987 by Terry Ferguson and Thomas Cowan in "Investigations into the Early Ironworks of South-Central North Carolina." The deed and will records in the following history are drawn from their work. The genealogical website, Rootsweb, was heavily utilized to piece together the interconnected family ties that were an important part of the furnace's history.

The Madison-Derr Furnace is located on the Big Ore Bank iron ore vein in central Lincoln County about eight miles northeast of Lincolnton. Big Ore Bank was described in the 1883 book, *In the Coal and Iron Counties of North Carolina,* as a vein of magnetite running through part of Lincoln County's Ironton township. The vein was "upon the High Shoal property, in Gaston County, and disappears at the South Fork River, and coming out at Big Ore Bank in Lincoln County, runs thence into

Catawba, disappearing near Sherrill's Ford on Catawba River." The book records that the Big Ore Bank had been worked since 1792, producing self-fluxing iron that has "no superior for strength, and is well suited for the manufacture of ordnance, and cables, wire, etc." By 1883, the Big Ore Bank was home to the Vesuvius, Rehoboth, Madison, and Stonewall Furnaces (P.M. Hale, *In the Coal and Iron Counties of North Carolina*, 284, photocopy, Lincoln County Historical Association).

The early history of the furnace property is difficult to determine due to the lack of land conveyances for the property from the early nineteenth century. However, J. P. Lesley's 1859 *Iron Manufacturer's Guide to the Furnaces, Forge's, and Rolling Mills of the United States* and Alfred Nixon's 1910 *History of Lincoln County* both attribute the connection of the Madison Furnace (later known as the Derr Furnace) to Lincoln County resident Peter Forney c. 1809, although the extant furnace structure was possibly refurbished or rebuilt in 1855. Forney and others (primarily family members) controlled several tracts of land along Leeper's Creek in the area of the Big Ore Bank during this period (Ferguson & Cowan, *Investigations Into the Early Iron Works of South-Central North Carolina*, 56). Chain of titles prepared by Ferguson and Cowan in 1987 indicate that Abram Forney, Abraham Reinhart, and Turner Abernathy were involved with Peter Forney in both the Madison and Rehoboth-Reinhardt furnace ventures. The earliest deed references are a conveyance of forty-five acres from David Abernathy to Abraham Earhardt, T. Abernathy, A. Forney, and Peter Forney on July 1, 1788, as well as a state grant of 300 acres to Abraham Earhardt, Abram Forney, Turner Abernathy, and Peter Forney dated May 18, 1789 (Ferguson and Cowan, "Rehoboth chain of title"). The 1937 *Annals of Lincoln County* states that the Forney brothers along with Earhardt and Abernathy "were the pioneers in the manufacture of iron in Lincoln County" in 1787, and deed references from 1788 and 1789 support this early date (William L.

Sherrill, Annals of Lincoln County, North Carolina, 109, photocopy, Lincoln County Historical Association). Further, Alfred Nixon wrote that Peter Forney: "erected a forge at his home [Mt. Welcome Forge] and Madison furnace on Leeper's Creek, that was afterwards owned by J. W. Derr. He obtained possession of valuable ore beds, and commenced building his iron works in 1787 [at Mt. Welcome], and recorded that he produced hammered iron in his forge 26th August, 1788" (Alfred Nixon, The History of Lincoln County, electronic version <www.rootsweb.com> 2006).

Peter Forney (April 21, 1756 – February 1, 1834) was born in Lincoln County to Jacob and Maria Forney. Interestingly, the elder Forney, a native of Alsace, France, worked at an iron works after he immigrated to Philadelphia in 1739. He returned to France for a time, but was again in Pennsylvania in 1752 where he married Maria Bergner. The couple moved to Lincoln County, North Carolina in 1754 and settled near the present town of Denver. It is not known if Jacob Forney continued his work in the iron industry after his removal to Lincoln County. Jacob and Maria Forney had five daughters and three sons (www.rootsweb.com and Alfred Nixon, "The History of Lincoln County," 1910).

Peter Forney married Nancy Abernathy in 1783. The 1790 Federal Census lists Peter Fornay (sic) as the head of a household with eight white males above the age of 16, two white males under the age of sixteen, and three females. Forney also owned four slaves. Peter and Nancy Forney had at least eleven children (1790 Census and <www.rootsweb.com> 2006). Peter Forney was a General during the American Revolution and served in the North Carolina legislature in 1794-96; the state senate 1801-02; and the U.S. Congress 1813-15. He was a presidential elector on the Jefferson, Madison, Monroe, and Jackson tickets. Forney apparently named the Madison Furnace after President James Madison for whom he was an elector in 1808 (Nixon, <http://bioguide.congress.gov/scripts/biodisplay.pl?index=F000279>,

2007, and Bishir and Southern, 467).

The other partners listed in Peter Forney's 1789 land grant held close family ties. Abram Forney (1758-1849) was his brother and served as a Captain during the Revolutionary War. He inherited his father's farm in the Denver, N.C. vicinity (Nixon, "History" and <www.rootsweb.com> 2006). Turner Abernathy was David Turner Abernathy (1759/60-1838), a Revolutionary War veteran who was married to Christina Forney, Peter Forney's sister. He lived the latter part of his life in Tennessee (www.tngenweb.org/giles/revwar/abernathydavid.html). Abraham Earhardt (d. 1812) was married to Catherine Forney, another sister of Peter Forney. Earhardt was an ordained minister who served several churches including Earhardt's Church, for which he donated the land. Additionally, he was a large land holder and an entrepreneur who operated a flour mill, a tan yard, a blacksmith shop, and a distillery (Nixon, "History").

The first clear reference to the Madison furnace is in an 1847 deed by Jacob Forney (Peter Forney's son and executor of his estate) conveying his half-interest in the land "on which tract are situated the Furnace and Forge" to Bartlett Shipp for $1,802. The deed notes that the other half-interest was held by William Johnston. Jacob Forney also sold Shipp "1/2 of 3/5 of land (the other half of 3/5 belonging to William Johnston) known as the Ore Bank Tract adjoining the land of E. [Ephraim] Brevard, the heirs of Jno. D. Graham and others" (Ferguson & Cowan, 57). Again, the family connections help us to understand these transactions. Bartlett Shipp was married to one of Peter Forney's daughters. Shipp was a lawyer and a member of the state legislature. William Johnston, a Revolutionary War veteran and physician, married Nancy Forney, another daughter of Peter Forney. This couple lived at Mt. Welcome, Peter Forney's homestead and forge site. They had five sons, all of whom served the Confederacy:

William H., Robert D., James F., Joseph F., and Bartlett S. Johnston (Nixon, "History"). William Sherrill writes in *The Annals of Lincoln County* that Peter Forney "left Mount Welcome forge to his son-in-law, Dr. William Johnston, who with his sons operated it until 1860, when Jonas W. Derr bought it and ran it until his death in 1881" (Sherrill, 58).

Returning to the history of the Madison Furnace, the *Manufacturing Census* of 1850 for Lincoln County shows the furnace, now owned by Shipp and Johnston, was operating with $10,000 in capital and consuming 350 "loads" of ore valued at $700 annually. The company employed an average of sixteen males and two females working to produce 150 tons of "castings" worth $5,000 (*U.S. Manufacturing Census*, 1850, Lincoln County, "N.C. Industry Schedule," 403).

In October of 1854, William Johnston's will was probated. The will directed that his wife receive the "forge tract[,] also negroes, and interest in the ore bank, and also cattle, hogs, and sheep" and that "my executors shall have the authority if they think it advisable to rebuild Madison Furnace provided arrangements can be made with Bartlett Shipp" (Ferguson and Cowan, 57). Arrangements were made and in 1854, Shipp sold his half-interest "of Madison Furnace, Forge lands and old Company ore bank . . . supposed to contain 3,000 acres more or less" to James and Robert Johnston, the sons of William Johnston, for $4,000 (Ferguson and Cowan, 57).

As their father had indicated in his will, the brothers did rebuild the furnace in 1855 although the extent of their remodeling at the property is unknown. The *Iron Manufacturer's Guide to the Furnaces, Forge's, and Rolling Mills of the United States*, published in 1859, included this description, which is quoted in Ferguson and Cowan's report:

Madison Cold-blast Charcoal Furnace, owned by James F. & R.D. Johnston, and

managed by J.F. Johnston, Lincolnton P.O., Lincoln County North Carolina, and standing on Leiper's Creek three miles above Rehoboth Furnace last described and six miles east of Lincolnton, was built in 1809, and rebuilt in 1855, 6 feet across the bosh and 30 feet high, and made in 1849 225 tons of foundry metal out of magnetic ore from the "iron bank" one and a half miles distant.

The Johnstons owned at least two other ironworks including the Madison Bloomery Forge and the aforementioned Mount Welcome Bloomery Forge (Ferguson and Cowan, 58).

In January of 1859, the Johnston brothers sold the Madison Furnace to Jonas W. Derr for $10,500. The "Furnace Tract" and "rights of title and interest in and to the Company Ore Bank which contains about 150 acres" were itemized in the transaction as were many separate tracts of land in Lincoln and Catawba counties totaling several thousand acres on Leeper's Creek, Stoney Creek, and Andersons Creek in Lincoln County. In Catawba County were the Morrison ore bank and two limestone quarries (Ferguson and Cowan, 57-8). The quarries are significant as lime was necessary to the furnace's production.

The enormous acreages illustrated in the deeds is suggestive of the iron-making process where four important elements were necessary: ore, which was mined from "the Company Ore Bank;" water from Leeper's Creek; limestone; and woodland. All of these elements were part of the Madison-Derr site. Trees were necessary for the production of the charcoal that fired the furnace. Ferguson and Cowan note that an 1853 deed from Jacob Forney, who was then living in Alabama, to William Johnston dealt with a tract of land earlier-owned by David Abernathy. They theorize that this tract may have been one of the early timber tracts for the furnace (Ferguson and Cowan, 57). The 1860 *Manufacturing Census* illustrates

the quantities of charcoal consumed by the furnace. In that year, Jonas Derr's "iron foundry" as the furnace was called, used 48,000 bushels of charcoal, 300 loads of ore, and forty-seven tons of lime to produce 140 tons of bars, and ninety tons of "pig metal." By 1870 the production was reduced; yet, the Derr Furnace, had a daily capacity of 1 2/3 tons. Five men were the average number of employees earning fifty dollars in wages that year. In its production of 83 tons of pig iron and 50 tons of castings, 250 tons of iron ore, 11,112 bushels of charcoal, and 21 tons of limestone were used (*U.S. Manufacturing Census*, 1860-1870, Lincoln County, "N.C. Industry Schedule," 2).

Jonas W. Derr was a man of means who also owned the nearby Madison Bloomery Forge on Leeper's Creek, which had been previously owned by the Johnston brothers. The forge was the second step in iron production. After pig iron was produced at a furnace, the forge created bar iron ready for the manufacture of iron goods. The forge could also smelt small quantities of ore to produce iron. Derr's Madison Bloomery Forge employed seven men for seven months and paid $784.00 annually in 1870. The forge was powered by a water wheel and used 25 tons of pig iron and 120 tons of charcoal to produce 20 tons of bar iron valued at $2,400. Even before his entry into the iron industry, Derr was an industrial entrepreneuer. In 1850, he owned a tannery that employed two men producing leather (*U.S. Manufacturing Census*, 1850-1870, Lincoln County, "N.C. Industry Schedule," 403). Branson's business directory shows Derr involved in iron manufacture and the owner of a grist mill in 1872, but by 1877 only his grist mill is mentioned (Rev. L. Branson, A.M., *The North Carolina Business Directory*, 1872 and 1877).

The formation of a community around an ironworks was not uncommon. Often found nearby were buildings used as an ironmaster's house, workers' dwellings, slave quarters, and a company store.

The development of such communities in Lincoln County is illustrated by the Rehoboth and Vesuvius Furnace ledgers, which record products such as tobacco, molasses, coffee, bacon, flour, corn, whiskey, tools, and shoes for sale at the company-operated stores ("Draft - Gaston and Lincoln Counties Iron Industry Historic and Archaeological District," E-4).

The inventory of goods sold from the estate of Jonas Derr in 1882 is less conclusive, but it does help us to understand the complexity of the Madison-Derr Furnace operation. The inventory enumerates a wide variety of metal goods that were most likely made by the ironworks, particularly tools such as shovels and picks, agricultural implements such as scythes and plows, and household goods like tongs, pans, and ovens. Other tools and items in the inventory seem to have been used in the ironworks' production: hand tools such as chisels, saws, anvils, scales, chains, and planes; and wagons and wagon parts including one cord wood wagon, which may have been used in charcoal manufacturing. Naturally, a large number of iron bars and "lots" of iron were also sold. Additionally, many other items illustrate the belongings, activities, and sustenance of the people that were involved in the workings of the furnace. Sold from the furnace property were at least fifty-five books, seven head of cattle, two mules, molasses, corn, kegs of vinegar, a looking glass, a bed, tables, a table cloth, wash stands, a desk, 110 bushels of cotton seed, and 142 bushels of wheat (North Carolina State Archives, Estate Records).

Iron production was labor-intensive. A workforce numbering between one hundred and 150 were employed at a single furnace site at one time. Serving under the direction of the ironmaster were ranks of skilled and unskilled workers, ranging from the company clerk to the founder. Intermediate positions included colliers, blacksmiths, keepers, and moulders as well as a large force of woodcutters, miners, teamsters, laborers, and servants. A furnace employment structure in the form of a hierarchical pyramid

has been included in the supporting documents section for reference. Tasks included mining ore, cutting timber, making charcoal, hauling lime, and transporting these materials to be dumped into the furnace. The majority of this workforce were slaves, supplemented by workers hired from various families in the surrounding area (Lincoln County Historical Association, web).

Along with most furnaces in the area, the Madison-Derr Furnace appears to have stopped production in the late nineteenth century. The furnace is listed in the 1883 book, *In the Coal and Iron Counties of North Carolina*, suggesting that it was still operating at this time, but this seems unlikely since no iron furnaces were recorded in the 1880 county industrial schedules. The furnace's closure may have been due, in part, to economic hardships brought about by the Panic of 1873. The economic crash was closely related to overbuilding in the railroad industry and forced the ten-day closure of the New York Stock Exchange in 1873. The crash precipitated the failure of thousands of small businesses over the next three years (Neil Wenborn, *The U.S.A.: a Chronicle in Pictures*, 1991). Another reason for the iron industry's decline is suggested in *In the Coal and Iron Counties of North Carolina.* Hale writes: "the only market which this iron finds is a home market." He goes on to predict that additional railroad connections would make Lincoln County iron "compete successfully with northern iron in a northern market" (Hale, 58-59). His predictions never materialized, however.

Deed records indicate that Jonas Derr sold the land to Woodson M. Rogers for only $599.56 in 1879. This low sale price makes it likely that the furnace was not in operation or operating at a greatly reduced rate at the time of the sale. Estate records show that Jonas Derr was deceased by 1882 and his executors sold his personal property at auction on January 4th and 5th of that year. The auction ledger separates the "furnace property," meaning the personal property associated with the ironworks, from other

property owned by Derr. Rogers sold the furnace property to J. Smith Cambell who sold it to J. A. Goode in 1911. Ed. Painter acquired the property in 1938 and his daughter Geneve Proctor inherited the furnace in 1973 (1880 Census; Hale, 284; NC State Archives, Estate Records; and Ferguson and Cowan, Chain of Title).

The cessation of iron production in the county followed the trend of other charcoal furnaces throughout North Carolina and the region. Declines in local economies after the Civil War, the collapse of the slave-based work force, development of the continental railroad system and subsequent improvement of the influx of goods from other areas of the country, and the general demise of charcoal-fired furnaces in favor of more efficient coal-fired furnaces, made furnaces like Madison-Derr unprofitable and obsolete. The decline of charcoal-based iron works was actually a national trend, as coal-fired furnaces could be of greater size and remain efficient, thereby producing larger quantities of iron in less time. With the advent of coal-fueled furnaces around 1850, which were typically located in more urban settings with available quantities of coal, charcoal-fueled furnaces in rural areas began to shut down (Ferguson and Cowan, 24).

The Madison-Derr Iron Furnace site is now owned by the Lincoln County Historic Properties Commission. The Lincoln County Historical Association conducted a preliminary archaeological survey of the property in 2002, with plans to conduct a more thorough investigation to determine exact placements of missing portions of the works and gather additional information and artifacts important to an understanding of early iron works in the state. Long-term goals for the property are to establish an interpretive historic site.

The Iron-Making Process and North Carolina Iron Industry Context (Criterion A)

The Iron-Making Process

The early iron industry of North Carolina was focused in Catawba, Cleveland, Gaston, Lincoln, and Rutherford Counties where iron ore, limestone, abundant hardwood forests which provided charcoal, and fast flowing streams and rivers were all readily available. Iron production sites tended to be in rural areas, where the above materials were located and where charcoal, which was used as the primary fuel, could be manufactured (Ferguson and Cowan, 6). *In the Coal and Iron Counties of North Carolina* summarizes the ideal conditions for ironworks in these counties: "the ore being inexhaustible, water power to move machinery being abundant, and more than all, a sufficiency of fuel for charcoal, makes the production of iron cheap" (Hale, 58-59).

It is helpful at this point to look closely at how furnaces like the Madison-Derr operated and how the necessary materials were obtained. A 2D model of the Madison-Derr Furnace, developed to better understand the site, is placed within a covered interpretive panel southeast of the furnace and has been included in the supporting documents of the nomination for reference. The production of iron required smelting, a process that chemically reduces ores containing ferrous oxides to remove impurities from the iron. There were two ways in which iron could be smelted during the early nineteenth century. At a bloomery forge, ore was smelted in small quantities using charcoal as fuel. Ore was melted on a hearth into a congeal mass called a bloom, which was then hammered into malleable wrought iron. At a blast furnace, like Madison-Derr, the smelting could be done on a much larger scale. Most nineteenth-century blast furnaces operated by a similar method. The furnace burden, also called the charge, was comprised of iron ore, carbon fuels (usually charcoal), and fluxes (usually lime). These were loaded into the hollow

furnace interior from the charging deck or platform at the open top of the furnace in a particular layered manner. As the charcoal burned, driven by a blast of air from an exterior bellows (usually water-powered), a high sustained heat was generated, melting the iron out of its ore. The fluxes facilitated the separation of the iron from its ore by acting as a sponge to congeal the impurities together. Some ores (such as those of the Big Ore Bank) were known as self-fluxing because they naturally contained fluxing agents like lime or calcium oxide.

The congealed impurities, or slag, were a lower density, and they naturally rose to the top and were skimmed off. Significant quantities of slag are evident on the Madison-Derr site as shown in past archaeological investigations performed on June 30, 2001 and examined on July 7 and 14; August 1; and again on October 27, 2001. These revealed the use of slag deposits from the site as fill for a portion of the exit sluiceway running south, which was filled in sometime after the furnace ceased production, as shown in Figure 1 (Alan May email to Sherry Wyatt, December 12, 2006). The molten iron was allowed to flow from the base of the furnace into an exterior sand mold to create pig iron, which is so-named for the mold's configuration of small iron bars or pigs attached along a central channel, an abstract mother pig (Council, Honerkamp, and Will, *Industry and Technology in Antebellum Tennessee: the Archaeology of Bluff Furnace,* 11-16).

Iron ore in this region of North Carolina was mined on or near the surface of the ground, although Hale records that at Big Ore Bank one shaft dropped to 125 feet and several others reached fifty to seventy-five feet in depth (Hale, 284). In addition to ore, fuel for the smelting process was a primary concern. As noted above, the Madison Furnace consumed 48,000 bushels of charcoal in 1860. The production of this amount of charcoal required large tracts of timber. A typical nineteenth-century furnace

producing two tons of iron a day would consume 250 acres of mature timber in a single year. Such ironworks would employ two dozen men solely to chop wood. Colliers then converted the hardwood timber into charcoal by stacking it in large piles, covering it with a layer of soil, setting it on fire and allowing it to slowly burn. A typical mound was thirty feet in diameter and ten feet high. The burning was closely monitored by the colliers over the course of several days or up to a week. Colliers often erected small huts at the charcoal sites surrounding the ironworks. At the end of the charcoal process, one hundred pounds of wood would be reduced to about twenty pounds of charcoal. The large clearing which remains east of the Madison-Derr Furnace follows the pattern of deforestation that often was associated with lands surrounding ironworks (Ferguson and Cowan 6-7 and Council, et al, 16).

The situation of the Madison-Derr Furnace close to Leeper's Creek is typical. In Lincoln County, Leeper's Creek and Ballard Creek provided the water sources for the area's ironworks. Approximately 945 feet of Leeper's Creek sits within the site, as shown on the boundary map. The Madison-Derr Iron Furnace shared Leeper's Creek with the Rehoboth-Reinhardt Furnace (c.1814-c.1882), located approximately 3 miles to the east; with the Mount Tirzah-Brevard Forge (c.1795-c.1870), located approximately 4 miles to the southwest; as well as with the Mount Welcome Bloomary Forge (c.1855-c.1870) approximately 8 miles to the southeast (Ferguson and Cowan, 58). A flume diverted water flow from the creek to a waterwheel near the base of the Madison furnace. Near the west corner of the furnace, the flume culminates in a basin and the remains of stone walls in that location evidence the placement of the water-powered bellows that fired the furnace. A sluiceway appears to have been located to the southwest of the basin to provide an exit for the water.

The stone furnace of the Madison-Derr ironworks is a good example of charcoal-fired furnace

construction in Lincoln County and the state during the late eighteenth and early nineteenth centuries. The furnace stack, or interior, is essentially a large chimney with a heavy stone block exterior and an inner chamber lined with refractory stone, also known as firebrick. Furnaces were often built against a hillside in the manner of the Madison-Derr furnace such that the wooden charging deck took advantage of the difference in topography to make loading easy. The ramp that once connected the top of the Madison-Derr furnace with the embankment to the north of the furnace is now gone, though stone walls that retained the embankment and supported the ramp remain. A narrow trace road also passes along the embankment at this point and proceeds west parallel to the long flume before turning north for a short distance and disappearing into the surrounding woods. Archaeologist Dr. Alan May theorizes that a separate trail or road came into the furnace site from the north for loading ore and flux (Alan May email to Sherry Wyatt, December 12, 2006).

At the side of the furnace was a wooden casting shed which was situated to cover the casting floor that was located on the southeastern side of Madison-Derr furnace stack; this protected the sand mold and newly formed pig iron (Council, et al, 20-21). As the iron ore, limestone, and charcoal burned down, additional quantities were added, thus keeping the furnace constantly filled. In this manner, furnaces were in operation for as long as five or six months, usually in the winter, until stores of iron ore and charcoal were depleted or until the furnace's interior stone lining needed repair (Ferguson and Cowan, 22).

The North Carolina Iron Industry

The development of ironworks during the late eighteenth century in North Carolina, brought about by the local market for agricultural implements and other iron goods, was part of a larger pattern of

charcoal-fired furnace and forge development from Georgia to Massachusetts. In North Carolina, ironworks were not developed until after the western sections of the state were settled and an agricultural economic base was established, setting the stage for increased demand for iron products. At least twenty-five ironworks were established in south-central North Carolina between 1775 and 1865. Iron-maker General Joseph Graham noted in 1823 that there were ten forges and four furnaces producing 900 tons of iron bar and 200 tons of casting in Lincoln County alone (Ferguson and Cowan, 18 and Cappon, 343). These were part of what Lesley described in his 1859 *Iron Manufacturer's Guide to the Furnaces, Forges and Rolling Mills of the United States* as "a belt through the center of North Carolina passing over the line a few miles into South Carolina consisting of 27 forges and 5 furnaces" (Lesley, quoted in Ferguson and Cowan, 17). Additional ironworks in the state were concentrated in the mountain district along the North Carolina-Tennessee border and the Deep River area (Ferguson and Cowan, 17).

The early growth of an iron industry in North Carolina was discussed in the State Assembly in 1788 with the passing of "An Act to Encourage the Building of Iron Works in this State." The act directed that "three thousand acres of vacant land, not fit for cultivation…is hereby granted for every set of iron-works." In Lincoln County, Vesuvius Furnace and the Mount Tirza Forge, both constructed c. 1795, were developed in response to the act (Ferguson and Cowan, 19 and Lester J. Cappon, "Iron-making: a Forgotten Industry of North Carolina," 1932, 336). At the Madison Furnace, the 300 acre tract of land granted to Peter Forney, et al. by the state in 1789 was probably a product of the 1788 legislation as well. In fact, at least eight furnaces were established in Lincoln, Gaston, and Catawba counties in the 1790-1825 period; making this area home to the most active iron industry in North Carolina. Denison Olmsted recorded in his landmark 1823 geological survey of the state (published in 1827 as *Papers on*

Agricultural Subjects and Professor Olmsteads Report on the Geology of North Carolina) that "In Lincoln, there are ten forges and four furnaces. . . [that] made about 900 tons of bar iron. . . Bar iron sells at six and a quarter cents per pound, and castings, by the quantity, at five cents" (quoted in Ferguson and Cowan, 21).

James Larry Smith identified in his 1982 dissertation, "Historical Geography of the Southern Charcoal Iron Industry, 1800-1860," that Southern ironworks were often viewed as plantations by their contemporaries. Only the wealthiest planters or entrepreneurs could afford to develop ironworks, the large land holding associated with the ironworks, and the hierarchy of labor and management. Further, Southern iron masters commonly blasted their furnaces during the winter months, freeing slave labor for field work during the summer and fall. This pattern of use was noted by Olmsted when he recorded that "most of the iron works of the west [the region around Vesuvius Furnace], are kept in operation only in the fall and winter months, the remaining seasons of the year are devoted to agriculture" (quoted in Ferguson and Cowan, 22). Similarly, William Alexander Graham seems to refer to the ironworks as part of his plantation in a letter from 1835 and in 1839 he wrote: "The furnace blowed out five or six weeks since making a blow of six months since that time I have been busily engaged in clear land planting. . . will plant nearly 200 acres in corn at the place. . ." (quoted in Ferguson and Cowan, 22). The use of slaves is documented at the Stonewall Furnace in Lincoln County in a day book that records a "Negro Acct." crediting slaves for their extra work and deducting the cost of goods they purchased, such as tobacco (Ferguson and Cowan, 67-68). Although hard evidence of the use of slave labor at the Madison-Derr Furnace does not exist, it seems likely that this was the case. The census records reveal that Peter Forney was among the largest slaveholders in Lincoln County with twenty slaves 1800 and eighty-five in 1820

("Draft – Gaston and Lincoln Counties Iron Industry Historic and Archaeological District," E-5).

Supporting the hierarchical foundations of the industrial plantation idea, Lester Cappon's 1932 study of the state's early iron industry in the *North Carolina Historical Review*, notes that the industry was controlled by five closely interrelated families including that of Peter Forney, Major John Davidson, Captain Alexander Brevard, General Joseph Graham, and John Fulenwider (Cappon, 337). Further, the wealth of these families is evident in the scale and craftsmanship of several early houses built in Lincoln County. Two, the Jacob Forney House, the home of Jacob and Sarah Forney, and Ingleside, built for Daniel and Harriet Brevard Forney, were constructed for sons of Peter Forney (Bishir & Southern, 467). The Jacob Forney House, built c. 1817, was moved to an area north of the Madison-Derr Iron Furnace from Ingleside Farm Road near state road N.C. 73 on May 30, 2002 ("Pioneer House, Seedy But Sound, Moved to Foundry," Dave Baity, *The Charlotte Observer*, May 31, 2002), however the house has no direct tie to the furnace and its operation and is considered a non-contributing building.

The 1840s and 1850s saw a shift away from the plantation metaphor as larger scale ironworks coalesced, such as the rolling-mill constructed at an earlier iron works by High Shoals Manufacturing Company in northern Gaston County and the 1858 Charlotte Foundry and Machine Factory in Mecklenburg County. Until 1845, Lincoln County's extents encompassed present day Gaston County (Frances Alexander, Historic Structures Survey Report, 15). Advancement was not accompanied by significant technological improvement, however, and in the case of High Shoals it was short-lived; the firm closed in 1854 (Cappon, 345). Thus, by the postbellum period Southern iron producers, who were still using eighteenth century technology, were unable to compete with the advancement of the Northern coke-fueled furnaces, which had far greater output. Further, the surge in railroad construction throughout

the eastern United States in the 1850s and 1860s provided greater market accessibility for Northern iron producers. In his dissertation, Smith found that the combined production of pig iron in Southern iron producing districts comprised twenty-nine percent of the national output in 1840, but declined rapidly by 1860 (Ferguson and Cowan, 23-24).

The previously mentioned products sold during the 1882 Derr estate sale included agricultural implements, cast skillets and pans, and bar or pig iron which local smiths formed into more customized products, are typical of North Carolina ironworks. All of these had been consumed locally, but by the 1870s these items were readily available from Northern producers at a more affordable price. In 1893, the first bulletin of the North Carolina Geologic Survey noted that the Rehoboth Furnace was the last furnace in the region to operate and it closed on May 27, 1882. The bulletin went on to report that "the iron mines over this belt [the Catawba Valley] have suffered total ruin, and as most of them were crude shafts and open workings, they are naturally filled up and closed up . . ." (Ferguson and Cowan, 24-25).

The Madison-Derr Iron Furnace meets National Register Criterion A, significant in the area of industry at the local level in south-central North Carolina during the nineteenth century as the site contains one of the most complete remains of an early ironworks in the county and the state. Further, the site's location in Lincoln County, the region's greatest producer of iron amidst an abundance of natural resources necessary for its production, make the Madison-Derr Furnace a great example of a blast furnace industrial site from the first half of the nineteenth century.

Architectural Context (Criterion C)

The Madison-Derr Iron Furnace is also significant under Criterion C in the area of industry at the

local level for its distinctive stone furnace design with triangular openings that is representative of Lincoln County furnaces. Since the nearby Vesuvius Furnace, which also had triangular openings (Graham, General Joseph Graham, 136), predates the Madison-Derr Furnace in Lincoln County, it is likely that this and other furnace sites were studied as examples of how to construct and operate a furnace.

Iron making began nearly 4,000 year ago in Asia; however Europeans made the greatest advances in technology by building the first blast furnace in England c. 1490. It was at this early date that the furnace's pyramidal shape with its top removed was developed, with a cone-shaped interior, or bosh (Centre County Historical Society, web). The earliest furnace sites were constructed in the United States in Massachusetts in the 1600s. It was at the Lynn iron works in Massachusetts that a blast furnace was first employed for the creation of iron in America in May of 1645 (Swank, *History of the Manufacture of Iron in All Ages*, 108-110). Following, iron production spread across New England, to include Pennsylvania by 1716. Interestingly, the Centre Furnace built in 1792, for which Centre County, Pennsylvania is named, also features triangular tuyere openings similar to the Madison-Derr Furnace (Centre County Historical Society, web). Although Peter Forney's father immigrated to Lincoln County c. 1754 after working at an iron works in Philadelphia, his father's knowledge may have influenced the construction of the 1790 Vesuvius Furnace and the c. 1809 Madison-Derr Furnace.

Most nineteenth-century charcoal-fired furnaces were constructed of quarried stone and averaged in overall dimension from about twenty-five to thirty feet square at the base and about twenty-five to thirty-five feet in height, making the Madison-Derr Furnace example typical for the larger furnaces of the time, being thirty feet square at the base and rising to a height of approximately twenty-nine feet. The vertical section of furnace interiors were either tapered trapezoids or egg-shaped with fairly consistent

interior dimensions ranging approximately six to eight feet in width at the bosh, or the widest point at the base, as is the case with the six foot bosh of the Madison-Derr Furnace. Interior heights for furnaces ranged from approximately twenty to thirty feet. These measurements are important because they are the largest dimensions attainable in charcoal-fueled furnaces. Larger furnaces would have resulted in crushing the charcoal and preventing efficient burning. Iron makers at the time that the Madison-Derr Furnace was in operation could not enlarge the size of the interior to increase production, and the Madison-Derr Iron Furnace was built to the largest dimensions obtainable for charcoal-fueled furnaces (Ferguson and Cowan).

An architectural feature of the Madison-Derr Furnace and other extant furnaces in Lincoln County is the use of triangular openings along the base, as opposed to the more typical round-arched openings. Apart from the possibility that the furnaces of Lincoln County may have originally developed as a collective enterprise and thus were built in similar fashion, no other evidence or documentation currently exists to explain why this method was used exclusively in Lincoln County. Because there was a close kinship as well as business connections between the original furnace founders in Lincoln County, it seems reasonable to surmise that a single architectural "model" for stack construction was employed (Alan May email to Sherry Wyatt, December 12, 2006). No other extant furnaces in North Carolina have been found with triangular openings. Furnaces with triangular openings have, however, been identified in other states to include the Henry Clay Furnace in West Virginia, the Bourbon Iron Furnace in Kentucky, the Cedar Creek Furnace in Tennessee, and the Centre Furnace in Pennsylvania.

Area furnaces that are similar to the Madison-Derr Furnace include the Moratock Furnace in Stokes County and the Endor Furnace in Lee County, NC; all three furnaces were built against the side of

a hill to allow ore and fuel to be hauled over a bridge from the hill to the stack of the furnace, as well as near a stream to provide waterpower for the bellows. Both the Moratock and Endor furnaces have rounded-arched openings at their bases (Bishir and Southern, 467). Unlike Madison-Derr, the Moratock Furnace was built as a trapezoidal cube that tapers only slightly. Other furnaces that remain in the south central region of North Carolina include the Vesuvius (as a ruin), Stonewall, and the Rehoboth-Reinhardt furnaces in Lincoln County, which have triangular openings, as well as the Washington-Ormand Furnace in Gaston (formerly Lincoln) County, which has round openings. Like the Madison-Derr Furnace, which was rebuilt in 1855, the Rehoboth-Reinhardt Furnace was rebuilt in 1869 (Harpe and Boles, 89). Similarities of all these regional furnace sites include their use of readily available granite or schist rock laid in courses without mortar to create a square or trapezoidal form that tapers as it rises.

Archaeological Context (Criterion D)

Of the eight iron furnaces documented in Ferguson and Cowan's 1987 report, which covers Lincoln, Gaston, Catawba, and Cleveland counties, the three with the most intact above-ground resources are all in Lincoln County: Rehoboth-Reinhardt Furnace (c.1814), Stonewall Furnace (c.1861), and the Madison-Derr Furnace (c.1809). In their analysis, Ferguson and Cowan state that the Madison Furnace is one of the best preserved nineteenth century iron works in North Carolina. Since this site contains one of the most complete furnaces in the study area, its potential to yield the most information about furnace construction and style is of major importance. It also has the potential to yield information

about site patterning and historical development, particularly when investigated comparatively (Ferguson and Cowan, 59).

In addition to the significance of the well-preserved furnace structure, the archaeological remains at the site meet the standards for significance under Criterion D at the local level in the area of industry as they indeed have potential to yield information valuable to our understanding of the operation of iron furnaces in nineteenth century south-central North Carolina. Of primary importance is the potential to answer questions related to the internal structure of the ironworks site as a whole. What were the internal transportation networks that brought charcoal, ore, and labor to the furnace? What and where were structures other than the furnace located on the site? How does this patterning reflect the necessities of industrial production? Based upon documentary and physical evidence at similar furnace sites, it seems likely that workers' housing, an ironmaster's house, and perhaps a company store were located on the site. Archaeological investigations may shed light not only on where these buildings were located, but what the cultural and social organization of the workers might have been, based upon material culture, thus answering questions about labor process and labor identity. These studies will be greatly enhanced through comparison with similar archaeological undertakings at other regional furnace locations, such as the Stonewall and Rehoboth-Reinhardt furnace sites.

Archaeology may also be able to answer specific questions related to the construction of the Madison-Derr Furnace. With only the stone furnace itself remaining largely intact above ground, identifying the configuration of ancillary structures such as the water wheel, casting shed, and charging deck via foundations, piers, post molds, and other archaeological evidence would help to give a more accurate picture of the Madison-Derr Furnace during operation. Similarly, investigations of submerged features, such as the underwater logs of the dam, would help to describe the process of producing water power at the furnace.

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10. Geographical Data

Verbal Boundary Description

The nominated property includes all of the 9.8 acres of Lincoln County tax parcels # 3654858978 and #3654868372 in Lincoln County as indicated on the enclosed Lincoln County, NC tax map drawn to the scale of 1" = 125."

The boundary is outlined as follows: the northeastern most corner (A) sits at -81.15532684, 35.50811386; which is 892 feet from the southeastern most corner (B) which sits at -81.15298462, 35.50658417; which is 384 feet west of (C) which sits at -81.15392303, 35.505867; which is 30 feet north of (D) which sits at -81.15385437, 35.50580978; which is 187 feet from the southwestern most boundary (E); which sits 456 feet southwest of (F) which sits at -81.15518188, 35.50647736; which is 115 feet southwest of (G) which sits at -81.15510559, 35.50679016; which is 154 feet southeast of (H) -81.15560913, 35.50689697; which sits 367 feet east of (I) -81.15636444, 35.50609589; which is 417 feet east of (J) -81.1568985, 35.50503922; which sits 72 feet south of the westernmost corner (K) which sits at -81.15708923, 35.50516129; which sits 390 feet west of (L) -81.15663147, 35.50616837; which sits 394 feet southwest of (M) which sits at -81.15591431, 35.50708008; which is 617 feet northwest of (N) which sits at -81.15532684, 35.50748825; which is 16 feet south of (O) which sits at -81.15536499, 35.50751877; which is 108 feet southeast of (P) which sits at -81.1556778, 35.50756073; which is 226 feet southwest of (A).

Boundary Justification

The boundary of the nominated property encompasses all of the property related to the Madison-Derr Iron Furnace that is currently owned by the Lincoln County Historic Properties Commission. The proposed boundaries encompass a broad area surrounding the furnace where much of the staging and furnace-related activity would likely have taken place. Additionally, the acreage includes a section of Leeper's Creek and adjacent banks to the south of the property, which appear to contain remnants of the the furnace's dam. The dam area and the immediate vicinity of the furnace stack are thought to hold the highest likelihood of yielding additional archaeological information.

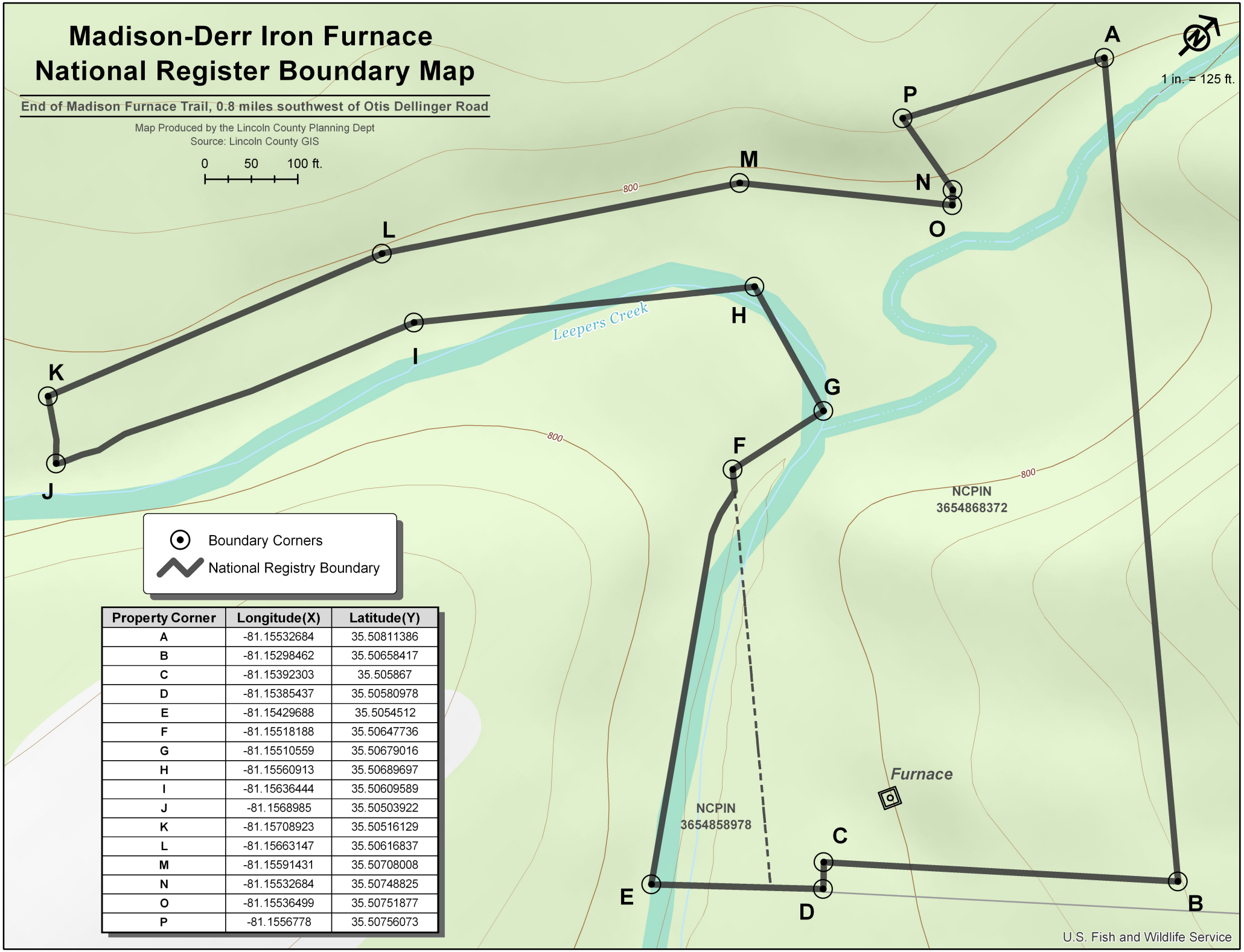
Madison-Derr Iron Furnace
National Register Boundary Map

End of Madison Furnace Trail, 0.8 miles southwest of Otis Dellinger Road

Map Produced by the Lincoln County Planning Dept
Source: Lincoln County GIS

0 50 100 ft.

1 in. = 125 ft.

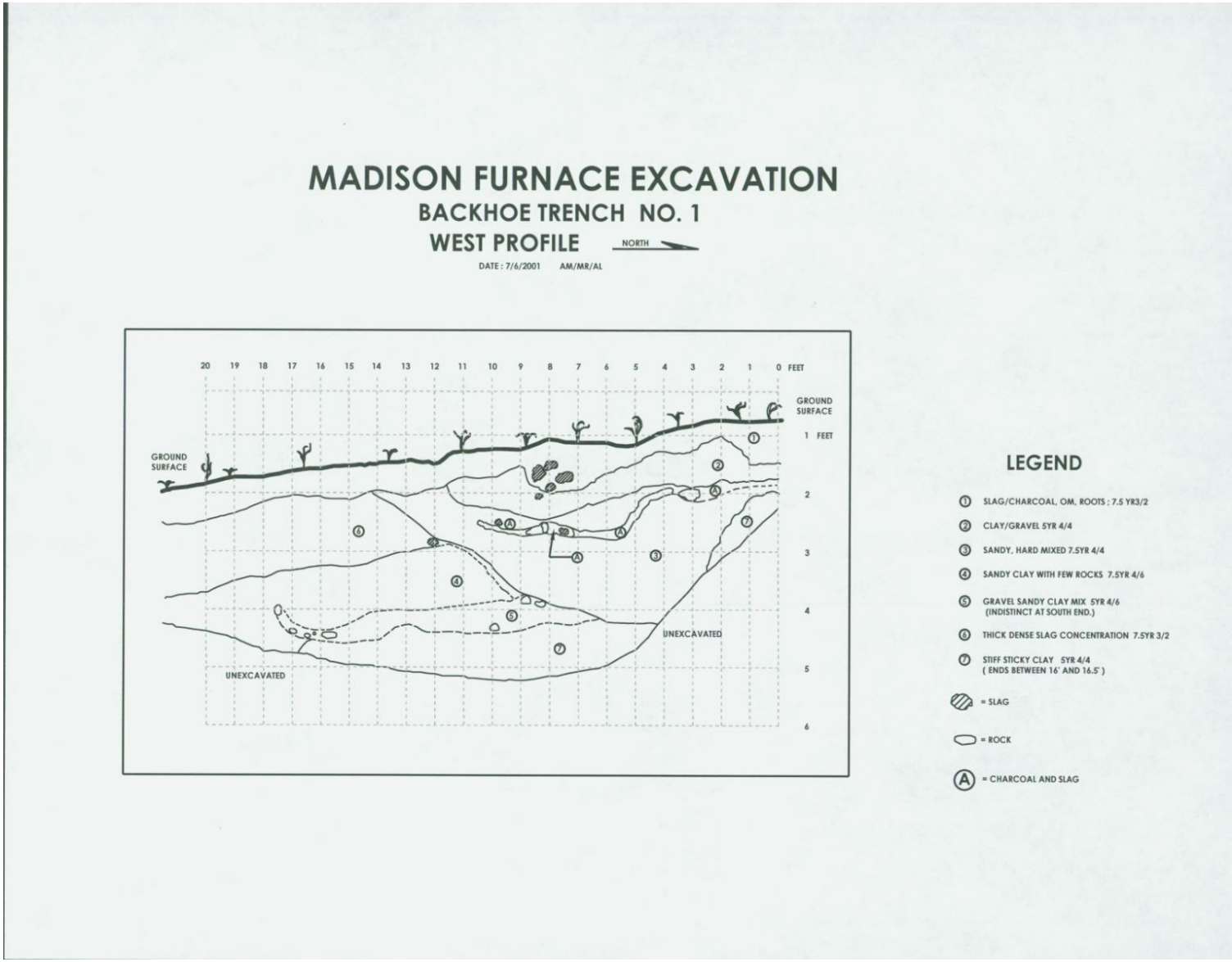


Property Corner	Longitude(X)	Latitude(Y)
A	-81.15532684	35.50811386
B	-81.15298462	35.50658417
C	-81.15392303	35.505867
D	-81.15385437	35.50580978
E	-81.15429688	35.5054512
F	-81.15518188	35.50647736
G	-81.15510559	35.50679016
H	-81.15560913	35.50689697
I	-81.15636444	35.50609589
J	-81.1568985	35.50503922
K	-81.15708923	35.50516129
L	-81.15663147	35.50616837
M	-81.15591431	35.50708008
N	-81.15532684	35.50748825
O	-81.15536499	35.50751877
P	-81.1556778	35.50756073

U.S. Fish and Wildlife Service

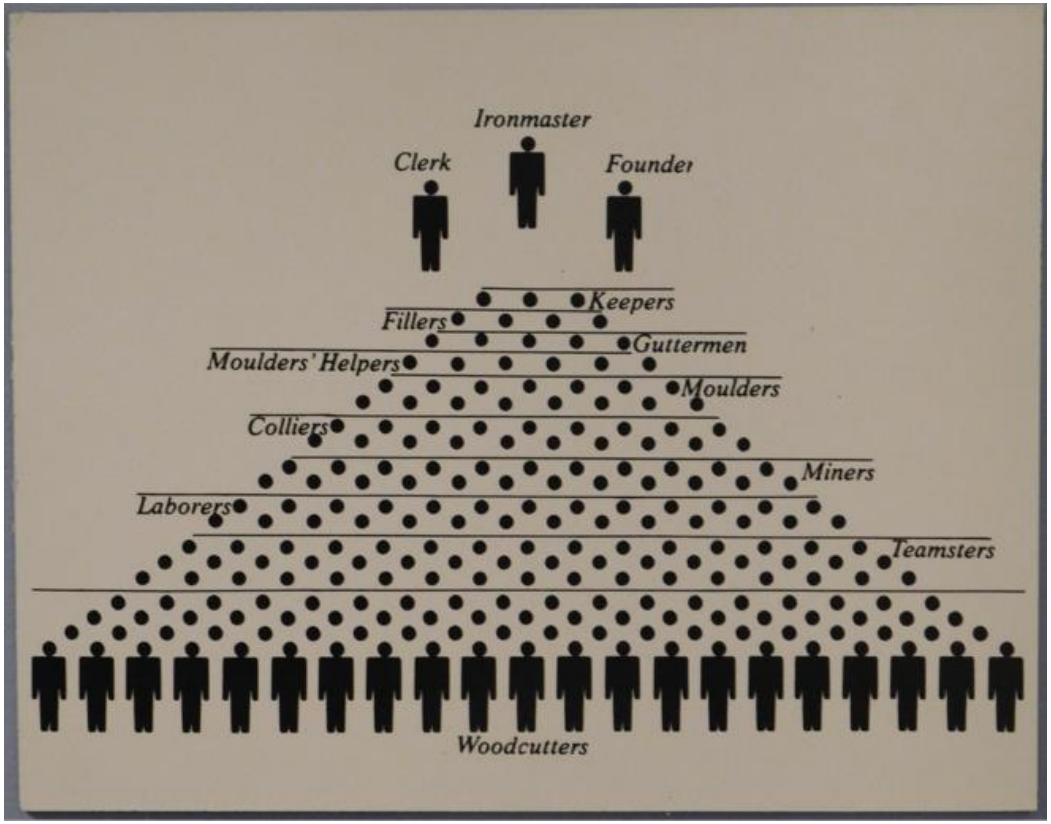
Supporting Documentation

Figure 1: Profile of Backhoe Trench One, Madison Furnace site, 31LN64 (provided by Dr. Alan May)



Supporting Documentation

Figure 2: Typical Iron Furnace Staffing Hierarchy (Lincoln County Historical Association, web)



Supporting Documentation

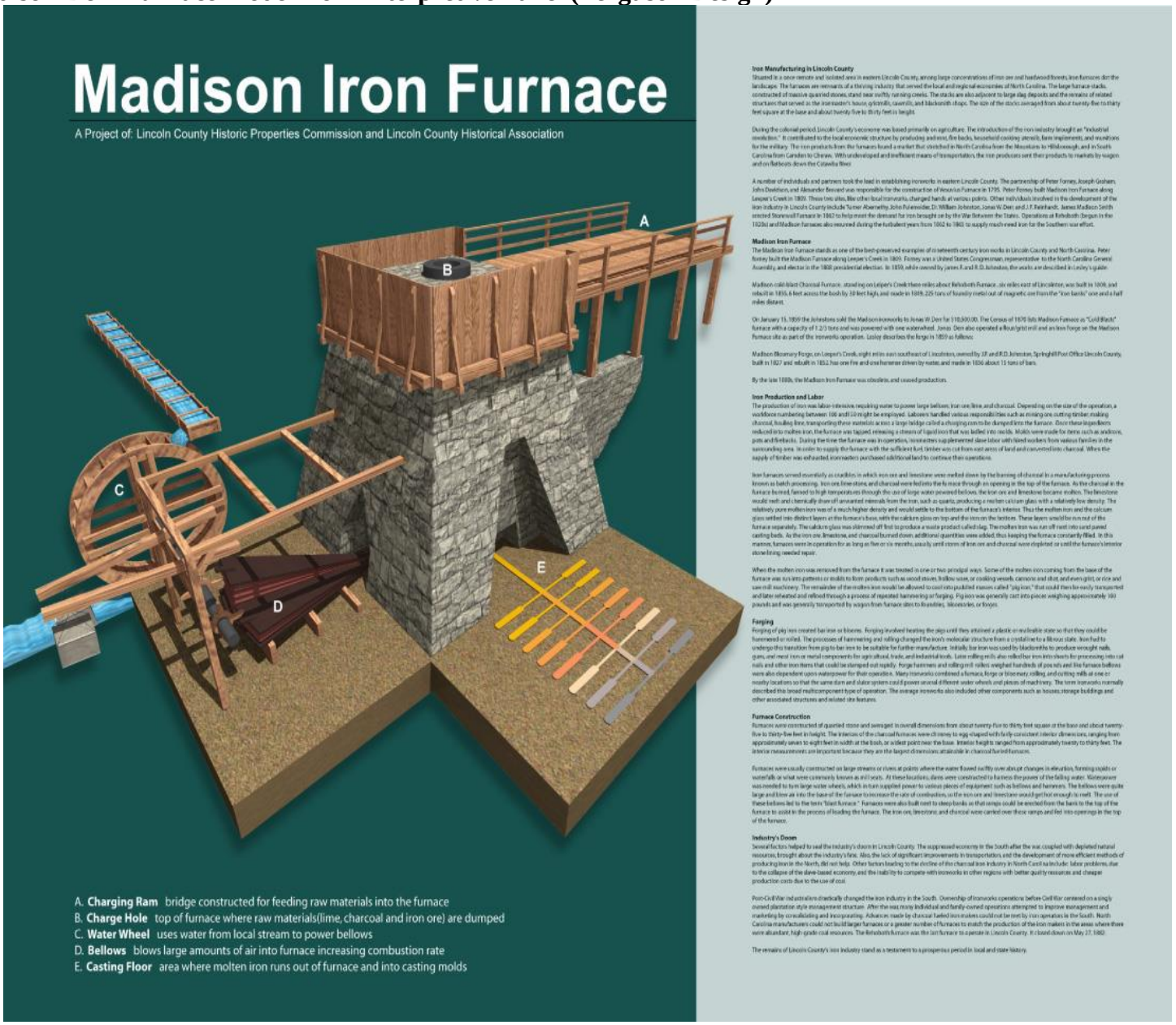
Figure 3: Iron Pig Artifact (Lincoln County Historical Association)

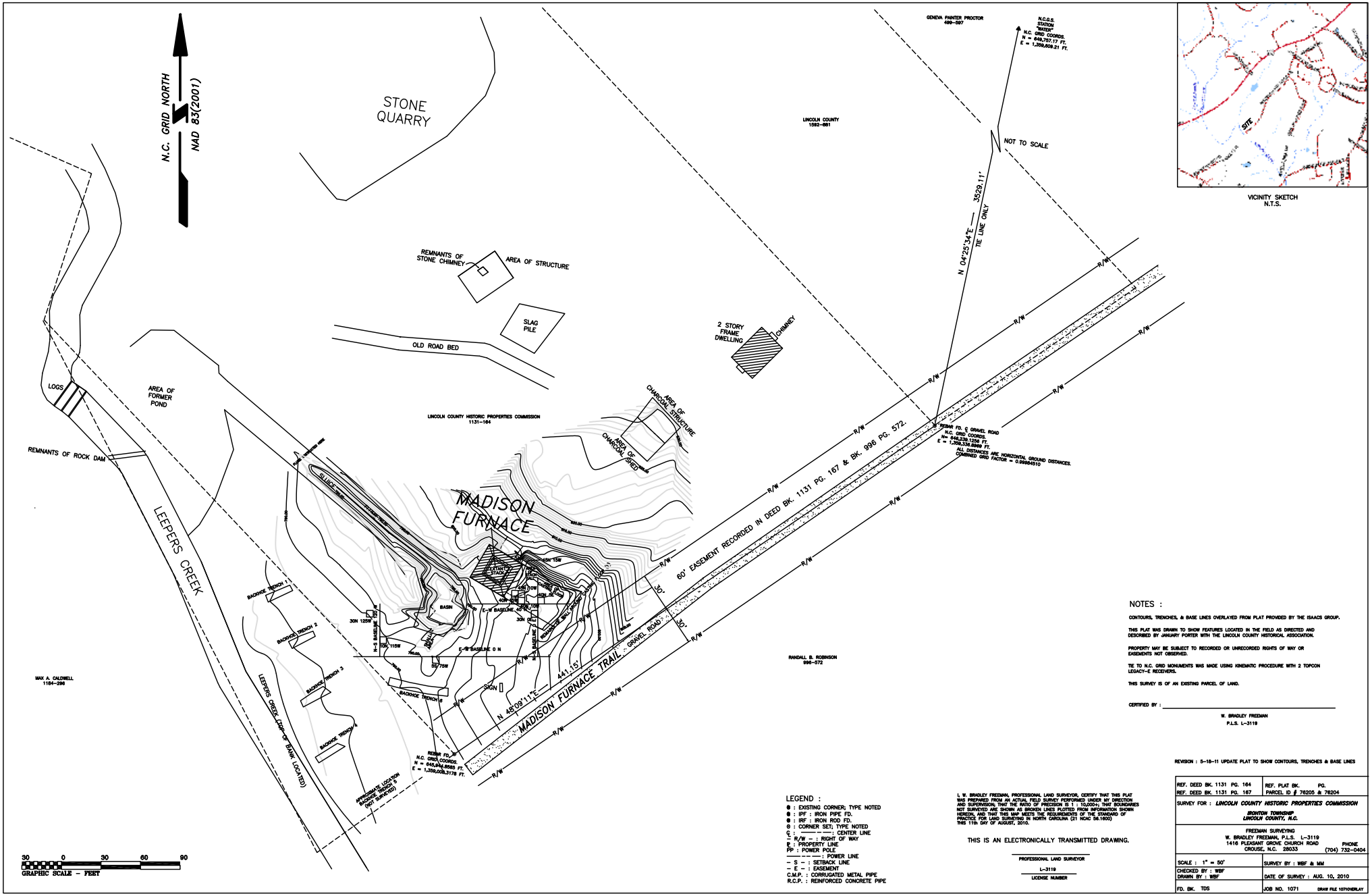
Supporting Documentation

Figure 4: Casting Floor Removed from Madison-Derr Furnace (Lincoln County Historical Association)

Supporting Documentation

Figure 5: Madison-Derr Furnace Model from Interpretive Panel (Ferguson Design)





NOTES :

CONTOURS, TRENCHES, & BASE LINES OVERLAYED FROM PLAT PROVIDED BY THE ISAACS GROUP.

THIS PLAT WAS DRAWN TO SHOW FEATURES LOCATED IN THE FIELD AS DIRECTED AND DESCRIBED BY JANUARY PORTER WITH THE LINCOLN COUNTY HISTORICAL ASSOCIATION.

PROPERTY MAY BE SUBJECT TO RECORDED OR UNRECORDED RIGHTS OF WAY OR EASEMENTS NOT OBSERVED.

TIE TO N.C. GRID MONUMENTS WAS MADE USING KINEMATIC PROCEDURE WITH 2 TOPCON LEGACY-E RECEIVERS.

THIS SURVEY IS OF AN EXISTING PARCEL OF LAND.

CERTIFIED BY : _____

W. BRADLEY FREEMAN
P.L.S. L-3119

REVISION : 5-18-11 UPDATE PLAT TO SHOW CONTOURS, TRENCHES & BASE LINES

LEGEND :

● : EXISTING CORNER; TYPE NOTED
● : IPF : IRON PIPE FD.
● : IRF : IRON ROD FD.
⊙ : CORNER SET; TYPE NOTED
℄ : ——— ——— ; CENTER LINE
R/W — : RIGHT OF WAY
P.L. : PROPERTY LINE
PP : POWER POLE
——— ——— ; POWER LINE
— S — : SETBACK LINE
— E — : EASEMENT
C.M.P. : CORRUGATED METAL PIPE
R.C.P. : REINFORCED CONCRETE PIPE

I, W. BRADLEY FREEMAN, PROFESSIONAL LAND SURVEYOR, CERTIFY THAT THIS PLAT WAS PREPARED FROM AN ACTUAL FIELD SURVEY PERFORMED UNDER MY DIRECTION AND SUPERVISION; THAT THE RATIO OF PRECISION IS 1 : 10,000+; THAT BOUNDARIES NOT SURVEYED ARE SHOWN AS BROKEN LINES PLOTTED FROM INFORMATION SHOWN HEREON; AND THAT THIS PLAT MEETS THE REQUIREMENTS OF THE STANDARD OF PRACTICE FOR LAND SURVEYING IN NORTH CAROLINA (21 NCAC 56.1600) THIS 11th DAY OF AUGUST, 2010.

THIS IS AN ELECTRONICALLY TRANSMITTED DRAWING.

PROFESSIONAL LAND SURVEYOR

L-3119
LICENSE NUMBER

REF. DEED BK. 1131 PG. 164 REF. DEED BK. 1131 PG. 167	REF. PLAT BK. PG. PARCEL ID # 76205 & 76204
SURVEY FOR : *LINCOLN COUNTY HISTORIC PROPERTIES COMMISSION* *BROKTON TOWNSHIP* *LINCOLN COUNTY, N.C.*	
FREEMAN SURVEYING W. BRADLEY FREEMAN, P.L.S. L-3119 1416 PLEASANT GROVE CHURCH ROAD CROUSE, N.C. 28033 PHONE (704) 732-0404	
SCALE : 1" = 50'	SURVEY BY : WBF & MM
CHECKED BY : WBF DRAWN BY : WBF	DATE OF SURVEY : AUG. 10, 2010
FD. BK. TDS	JOB NO. 1071 DRAW FILE 1071OVERLAY

Madison-Derr Furnace
Madison Furnace Trail
Lincolnton, Pumpkin Center Vicinity
Lincoln County
Photos taken by J. Harpe 9/03/07

Photo List for Contact Sheet 1

Photo 1	Looking West at Area of Charcoal Shed
Photo 2	Looking Southwest at Area of Slag Pile
Photo 3	Looking Southwest at Remnants of Stone Chimney
Photo 4	Looking North at Old Road Bed
Photo 5	Looking Southeast at West Face of Furnace
Photo 6	Looking Southwest at Northeast Corner of Furnace
Photo 7	Looking Northwest at Southeast Face of Furnace
Photo 8	Looking North at Southern Corner of Furnace
Photo 9	Looking Northwest at Southern Corner of Furnace
Photo 10	Looking Northeast at Southwest Corner of Furnace
Photo 11	Looking North at Stone Quarry

Photo 1: Looking West at Area of Charcoal Shed

Photo 2: Looking Southwest at Area of Slag Pile

Photo 3: Looking Southwest at Remnants of Stone Chimney

Photo 4: Looking North at Old Road Bed

Photo 5: Looking Southeast at West Face of Furnace

Photo 6: Looking Southwest at Northeast Corner of Furnace

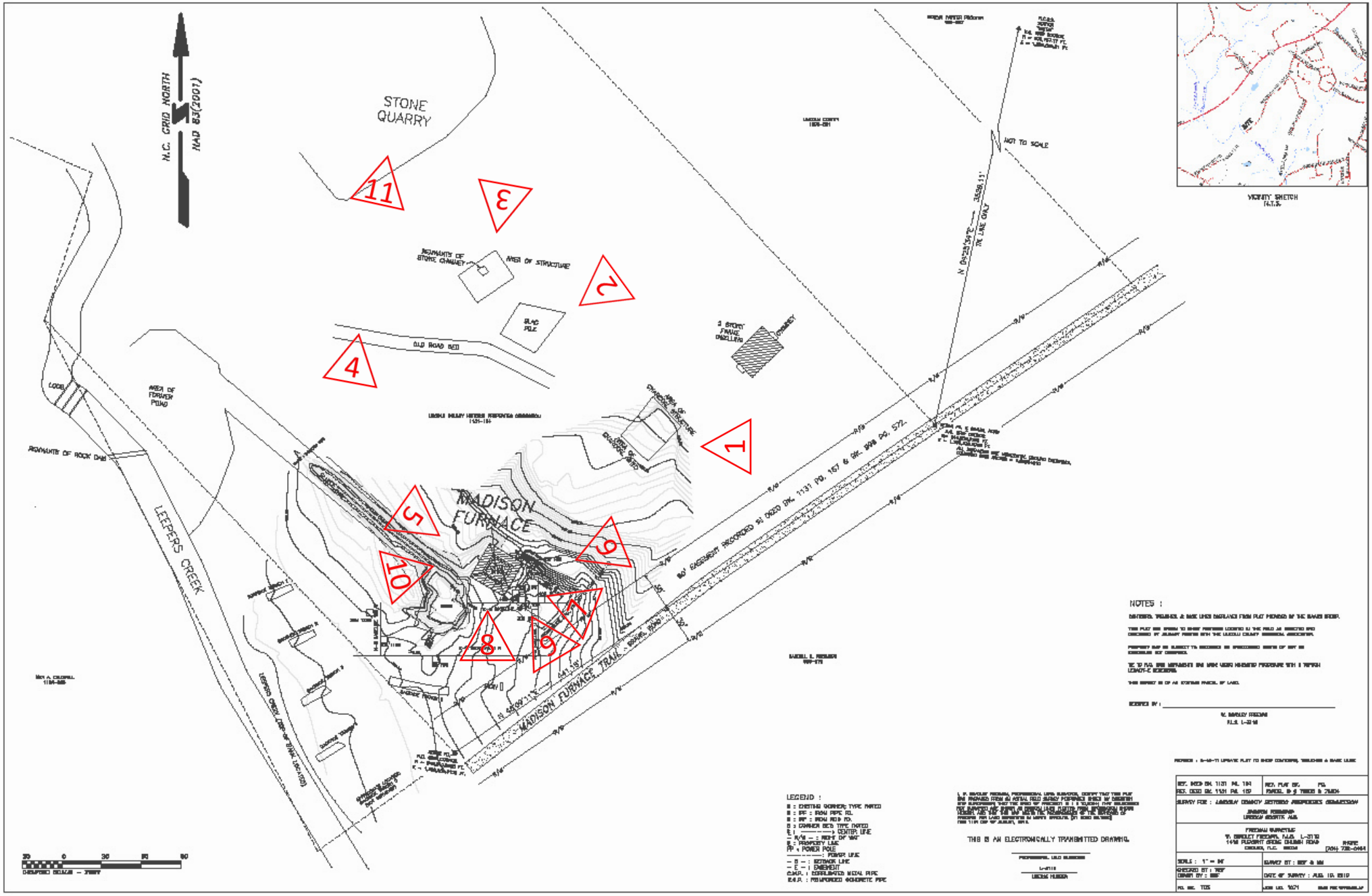
Photo 7: Looking Northwest at Southeast Face of Furnace

Photo 8: Looking North at Southern Corner of Furnace

Photo 9: Looking Northwest at Southern Corner of Furnace

Photo 10: Looking Northeast at Southwest Corner of Furnace

Photo 11: Looking North at Stone Quarry



NOTES :

BEARINGS, MEASURES & BASE LINES ENGLAND FROM PLAT RECORDED IN THE NAMES BOOK.

THIS PLAT WAS DRAWN TO SHOW FEATURES LOCATED IN THE FIELD AS DIRECTED AND DESCRIBED BY JOHNNY PERRIN WITH THE LINCOLN COUNTY HISTORICAL ASSOCIATION.

PROPERTY MAY BE SUBJECT TO RESTRICTIONS OR ENCUMBRANCES NOT SHOWN OR EXISTING BUT NOT DISCLOSED BY SURVEYOR.

THE TIE TO N.G. GRID MONUMENTS WAS MADE USING HIGHEST PRECISION WITH 1 FOOTH LOWEST-C ACCURACY.

THIS SURVEY IS OF AN ENTIRE PARCEL OF LAND.

SIGNED BY : _____

W. BARCLEY FREEMAN
R.L.S. L-3118

LEGEND :

E = EXISTING CORNER; TYPE NOTED
S = SF : IRON PIPE SET
S = RF : IRON ROD FD.
S = CORNER DESCRIPTION TYPE NOTED
L = ——— : CENTER LINE
R/W — : RIGHT OF WAY
P = PROPERTY LINE
PP = POWER POLE
———— : POWER LINE
— S — : SETBACK LINE
— E — : EASEMENT
C.M.P. : CORRUGATED METAL PIPE
R.C.P. : REINFORCED CONCRETE PIPE

I, W. BARCLEY FREEMAN, PROFESSIONAL LAND SURVEYOR, CERTIFY THAT THIS PLAT WAS PREPARED FROM AN ACTUAL FIELD SURVEY PERFORMED UNDER MY DIRECTION AND SUPERVISION; THAT THE ERROR OF PRECISION IS 1 IN 10,000+; THAT THE BOUNDARIES NOT SURVEYED ARE SHOWN AS BROKEN LINES PLOTTED FROM INFORMATION FOUND IN BOOK AS NOTED; THAT THE RATIO OF PRECISION AS CALCULATED BY COMPUTED LATITUDES AND DEPARTURES IS 1:10,000+; THAT THIS MAP WAS PREPARED IN ACCORDANCE WITH G.S. 47-30 AS AMENDED. WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER AND SEAL THIS 11th DAY OF AUGUST, 2010.

THIS IS AN ELECTRONICALLY TRANSMITTED DRAWING.

PROFESSIONAL LAND SURVEYOR
L-3118
LICENSE NUMBER

REVISED : 8-18-10 UPDATE PLAT TO SHOW CONTOURS, TRAILHEAD & BASE LINE

REF. DEED BK. 1131 PG. 184 REF. DEED BK. 1131 PG. 157	REV. PLAT BK. PG. PARCEL ID # 73605 & 73604
SURVEY FOR : LINCOLN COUNTY HISTORICAL ASSOCIATION	
JOHNSON ROBINSON LINCOLN COUNTY, N.C.	
FREEMAN SURVEYING W. BARCLEY FREEMAN, P.L.S. L-3118 1418 PLEASANT GROVE CHURCH ROAD CROUSE, N.C. 28033	PHONE (704) 735-0464
SCALE : 1" = 80' CHECKED BY : WBF DRAWN BY : BBF	SURVEY BY : BBF & MM DATE OF SURVEY : AUG. 10, 2010
FB. NO. 705	JOB NO. 1021