



PHASE I REMEDIAL INVESTIGATION WORK PLAN
Chapel Hill Police Department Property
828 Martin Luther King Jr. Boulevard
Chapel Hill, Orange County, NC



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Chapel Hill Police Department Property
828 Martin Luther King Jr. Boulevard
Chapel Hill, Orange County, NC

Prepared for:
Town of Chapel Hill
Chapel Hill Town Hall
405 Martin Luther King, Jr. Blvd.
Chapel Hill, NC 27514

Submitted by:
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Firm: C-3193

Falcon Project Number | E13047.00

November 10, 2014
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Revision 3: April 14, 2015

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SECTION 1 SITE DESCRIPTION

1.1 Site Location and Description

The evaluated property is an approximately 10.24-acre property located at 828 Martin Luther King Jr. Blvd. in Chapel Hill, North Carolina. This property is currently owned by the Town of Chapel Hill. This site is generally located at geographic location of 35°55'36.56"N, 79° 3'10.86"W, which is generally the center of the existing structure on property. The site is located to the east of Martin Luther King Jr. Blvd., with development primarily focused in the northwest corner. The property is located immediately north of Bolin Creek, beginning approximately 200 feet north of the centerline of Hillsborough Street. Figure 1 (Appendix A) provides a general site location map of the subject property. Figure 2 (Appendix A) provides a USGS topographic map that generally locates the property.

The property is currently developed with a 2 story structure approximately 35,000 square feet in size. There are also two parking lots and a few cargo containers used for storage present on site. The site is currently occupied by the Chapel Hill Police Department. The building is located in the northwest corner, with the majority of parking in the center of the site. The eastern and southern portions of the site are wooded.

Site surface soils have been determined to be contaminated by coal combustion products (CCP) as explained in the information provided in the March 25, 2014 Site Characterization Report. These CCP materials were used as historical fill materials by previous owners.

1.2 Current Site Management Practices

There is a locked fence between the public greenway that parallels the southern property line of site. This fenced area sufficiently restricts public access to the area of concern due to the significant topography found present at this site. Due to these site access restrictions the entire area was not enclosed by fencing.

There have been no hazardous materials that have migrated off the subject property. All materials identified as CCP appear to remain restricted to the subject property. Additional engineered controls have been installed to ensure these materials remain within the restricted areas established on the subject property. These specific controls are the access control fencing, previously mentioned, and two rows of protective silt fencing (installed at the toe of the hill and at the perimeter of the access control fencing).

1.3 Surrounding Properties and Features

The property is located immediately adjacent to, and is surrounded by residential properties. The closest residential property, schools, day-care centers or other sensitive populations is a residential property located approximately 40 feet from the subject property line. This property is identified as 100 Bolinwood Drive, Chapel Hill NC.

The closest drinking water or other potable water well is located approximately 460 feet from the subject property. This well is located at 3 Mt Bolus Road and is up-gradient from the subject property. There is no known down-gradient drinking water well within 500 feet of site property line. Information was provided by Orange County Health Department on potable water wells that have been registered and are known to exist within this area. This information was confirmed via visual field observations made by Falcon staff of all properties located within this search radius. Orange Water and Sewer Authority (OWASA) also provides municipal services within this area which was also field confirmed by Falcon staff for each property within this search radius. The closest down-stream water supply system is Jordan Lake. The closest public water supply intake for this lake is located approximately 12.5 miles away from the subject property. Figure 3 (Appendix A) provides a map of the property with respect to the surrounding properties, waterways, and public water supply wells.

1.4 Surrounding Sensitive Environments

Based upon current information there are no known environmentally sensitive areas located on or adjacent to the subject property. Also, based on current information, no materials from the subject property have migrated to any sensitive environments located off property. These sensitive environment areas are defined by NCDENR Inactive Hazardous Sites Branch and include the following areas:

- State Parks
- Areas Important to Maintenance of Unique Natural Communities

- Sensitive Areas Identified Under the National Estuary Program
- Designated State Natural Areas
- State Seashore, Lakeshore and River Recreational Areas
- Rare Species (state and federal Threatened and Endangered)
- Sensitive Aquatic Habitat
- State Wild and Scenic Rivers
- National Seashore, Lakeshore and River Recreational Areas
- National Parks or Monuments
- Federal Designated Scenic or Wild Rivers
- Designated and Proposed Federal Wilderness and Natural Areas
- National Preserves and Forests
- Federal Land designated for the protection of Natural Ecosystems
- State-Designated Areas for Protection or Maintenance of Aquatic Life
- State Preserves and Forests
- Terrestrial Areas Utilized for Breeding by Large or Dense Aggregations of Animals
- National or State Wildlife Refuges
- Marine Sanctuaries
- National and State Historical Sites
- Areas Identified Under Coastal Protection Legislation
- Coastal Barriers or Units of a Coastal Barrier Resources System
- Spawning Areas Critical for the Maintenance of Fish/Shellfish Species within River, Lake or Coastal Tidal Waters
- Migratory Pathways and Feeding Areas Critical for Maintenance of Anadromous Fish Species within River Reaches or Areas in Lakes or Coastal Tidal Waters in which such Fish Spend Extended Periods of Time
- State Lands Designated for Wildlife or Game Management
- Wetlands

SECTION 2 SITE HISTORY

2.1 Historical Property Ownership

Falcon previously completed a Phase I Environmental Site Assessment dated July 18, 2013. As a result of these efforts, a deed search of the subject property was performed. Based upon Orange County Records, three owners have possessed deeds on this property as follows:

Prior to 1951	Fred B. Hartness
1951 to 1980	Richard W. Sparrow
1980 – Present	Town of Chapel Hill

2.2 Current and Historical Land Uses

Sanborn Fire Insurance Maps were not available for this site. Historical United States Geological Survey (USGS) topographical maps and historical aerial photographs were obtained and reviewed to determine historic land use at and adjacent to the subject property. The observations from these maps and photographs are as follows:

- 1946 USGS topographic map shows the subject property with no development. A single family residence is constructed across Martin Luther King Jr. Blvd. to the northwest.
- 1960 Aerial photograph shows excavation activity on the subject property along the west central portion of the site and across Martin Luther King Jr. Blvd. to the northwest. A dump truck can be seen on site, along with another on Martin Luther King Jr. Blvd. Residential development exists west of the site. The property to the south of the site appears to have been cleared for development.

1969 Aerial photograph shows significant dumping on site across the central portion. Significant piles of material can be seen in the photograph. Residential development exists to the east of the site, and the gas station has been constructed to the south.

1975 Aerial photograph shows a cleared and leveled area along the western border of the site. The remaining areas of filling have become overgrown with vegetation. There is development on the property to the northwest of the site.

1978 USGS topographic map shows the residential development to the east, but few of the other changes.

1981 USGS topographic map shows little change from the previous topographic map.

1993 USGS topographic map and aerial photograph both reflect the construction of the police station on the subject site, and additional commercial development to the south.

1998 Aerial photograph shows little change to the subject and surrounding properties.

2002 USGS topographic map and aerial photograph show little change to the subject and surrounding properties.

2004 Aerial photograph shows little change to the property. Cargo containers appear at the east end of the south parking lot.

2006 Aerial photograph shows little change to the property. It appears that a utility shed has been constructed at the east end of the north parking lot, and the area northeast of the building has been cleared for construction.

2008 Aerial photograph shows little change to the property. It appears that the emergency generator exists in the area northeast of the building.

2010 Aerial photograph shows little change to the property. The subject site and surrounding properties generally appear as they exist today.

These historical maps and photographs can be found in Appendix B of this work plan.

2.3 Previously Completed Environmental Reports

The table below provides a chronological listing of all completed environmental investigations/reports for this property. All these reports have been previously submitted to NCDENR.

Date	Description
July 18, 2013	Phase I & Limited Phase II Environmental Site Assessment Report
March 25, 2014	Environmental Site Characterization Report
September 2, 2014	Updated Groundwater Sampling Results
September 2, 2014	Site Conditions Questionnaire
January 6, 2015	Abandonment of MW-3 and MW-4

SECTION 3

PROPOSED METHODS OF INVESTIGATION

Based upon previously completed investigative efforts, NCDENR has requested further investigations of potential groundwater impacts at the subject property. In particular, these investigations will focus on potential metals present within groundwater present on site. To accomplish this, two (2) previously installed monitoring wells will be abandoned (MW-3 and MW-4) and two (2) new monitoring wells will be installed within the same general location of these abandoned wells. Figure 4 (Appendix A) provides a map showing the approximate location of these proposed monitoring wells.

3.1 Monitoring Well Abandonment

Due to site conditions present at this site two (2) previously installed monitoring wells are exhibiting high turbidity. Specifically, groundwater monitoring wells MW-3 and MW-4. All well abandonment will follow NCAC 15A Subchapter 2C.0113 Abandonment of Wells. Specifically this well abandonment will be performed pursuant to the following procedures:

1. All casing and screen materials will be left in place as not to cause or contribute to contamination of the groundwaters, due to potential surrounding materials being identified as CCP.
2. The entire depth of the well will be ensured to be in sound condition to ensure there are no obstructions that may interfere with sealing operations.
3. Per NC DENR, the well(s) will not be shocked with chlorine to disinfect. Per NCAC 15A Subchapter 2C.0113(b)(3), monitoring wells are exempted from disinfection during abandonment.
4. Given the previous construction of these wells and the depth of previous installation, these wells will be tremie grouted (with a cement bentonite grout) to the surface. These wells will be grouted from the bottom of the casing to the top.

5. All casing and vaults extending above ground surface will be removed to ground surface.

All well abandonment will be performed by Trigon Drilling, a NC certified well contractor.

3.2 Monitoring Well Installation

Following abandonment of previously installed MW-3 and MW-4, two (2) newly installed groundwater monitoring wells will be installed within the same general area of these abandoned wells (MW-3A and MW-4A). Given the site constraints and the need for the use of an air drill, these well locations will be installed just outside of the currently fenced area adjacent to Bolin Creek Greenway. All well installations will follow NCAC 15A Subchapter 2C.0108 Standards of Construction: Wells Other Than Water Supply. Based upon previously completed site activities, it is anticipated that these wells will be installed up to twenty (20) feet each. The boreholes will be advanced with 4½ inch air drills. There has also been observed to be an unconsolidated geological layer that is persistent along this portion of the property. As a result of this layer, an under reamer bit will also be used to advance a 4 inch well screen section to prevent layer collapse and bridging from occurring during the well installation. When the terminal depth is reached, a 2 inch diameter schedule 40 PVC pipe will be installed. It is anticipated that approximately fifteen (15) feet of pre-packed finely slotted screen will be installed. This pre-packed screen will contain a fine filter sand pack (#1 or #00) around the screen up to one foot above the screened zone. Following the installation of the sand filter pack, a bentonite seal (one foot thick) will be placed on the sand filter material. Distilled water will be poured on the bentonite and allow it to hydrate. The well will then be grouted to the ground surface, with a cement/bentonite grout mixture. A protective well cover will be installed to complete the installation.

Each of the installed monitoring wells will have, permanently affixed, an identification plate. The identification plate will be constructed of a durable, waterproof, rustproof metal or other material and will contain the following information:

1. Well contractor name and certification number;
2. Date well completed;
3. Total depth of well;

4. A warning that the well is not for water supply and that the groundwater may contain hazardous materials;
5. Depth(s) to the top(s) and bottom(s) of the screen(s); and
6. The well identification number or name assigned by the well owner.

Each monitoring well will be developed such that the level of turbidity or settleable solids does not preclude accurate chemical analyses of any fluid samples collected or adversely affect the operation of any pumps or pumping equipment.

All well installation will be performed by Trigon Drilling, a NC certified well contractor.

3.3 Monitoring Well Sampling

Following installation and development of these groundwater monitoring wells, environmental sampling will be conducted. Prior to sample collection, each well will be adequately purged in accordance with the November 2014 Inactive Hazardous Sites Program's Guidelines for Assessment and Cleanup and the USEPA Science and Ecosystem Support Division's Operating Procedure on Groundwater Sampling. Specifically Section 3 and Section 4 of this USEPA Guidance will be followed for all purging and sampling activities, respectively. It is anticipated that a traditional multiple volume purge will be completed. To accomplish this, the amount of standing water within the water column will be determined with a water level meter. The diameter of the well casing will also be recorded. Once this information has been obtained, the volume of water to be purged will be determined based upon the volume factors provided per Table 3.2.1 based upon three (3) water columns. For a 2 inch well casing, this factor will be 0.48 multiplied by the height of the record water column. To demonstrate that adequate purging has been completed, both pH and turbidity measurements will be recorded. No further sampling activities will be completed unless the turbidity is below 10 Nephelometric Turbidity Units (NTUs) and pH readings remain constant for at least three separate readings.

Once adequate purging has been confirmed, groundwater sampling will be completed via low flow sampling via a peristaltic pump and directly from pump head tubing. Based upon the anticipated installation depths of the monitoring wells (~10 feet bgs) and then constituents of concern (metals), sampling will be collected from the pump head tubing. The pump head tubing will be changed between sampling locations. The pump head tubing will be new unused

tube that has been certified clean. An equipment rinsate blank will be collected by pumping de-ionized water through a piece of the tubing.

All monitoring well purging and sampling will be completed by Falcon staff under the direct supervision of Josh Dunbar, PE.

3.4 Groundwater Sample Analytical Methods

Following sampling collection, all samples will be properly preserved and transported to a certified analytical laboratory. Each of the collected samples will be analyzed for metals via the following methods:

- US EPA Method 7470A
- US EPA Method 6010C
- US EPA Method SM3500-Cr B

All analytical methods will be performed by Prism Laboratories, Inc. (NC Certification No. 402).

SECTION 3 PROPOSED SCHEDULE

Following approval of this work plan, Falcon proposes to complete these activities per the following schedule:

- November 12, 2014: Submission of work plan to NCDENR Inactive Hazardous Sites Branch
- December 3, 2014: Receipt of Approval of Work Plan from NCDENR (per December 3, 2014 email from Amy Axon)
- January 6, 2015: Abandon previously installed wells (MW-3 and MW-4)
- March 31, 2015: Submit revised work plan to NCDENR
- May 4 - 7, 2015: Install and develop groundwater monitoring wells (MW-3A and MW-4A)
- May 11-12, 2015: Purge groundwater monitoring wells (MW-1, MW-3A, and MW-4A)
- May 12-13, 2015: Collect groundwater samples from wells (MW-1, MW-3A, and MW-4A)
- May 27, 2015: Receive analytical results
- June 5, 2015: Submit Sampling Report to NCDENR

The proposed schedule is an estimated schedule and can be influenced by field conditions beyond Falcon's control.

**APPENDIX A
FIGURES**



FIGURE 1 | GENERAL SITE LOCATION

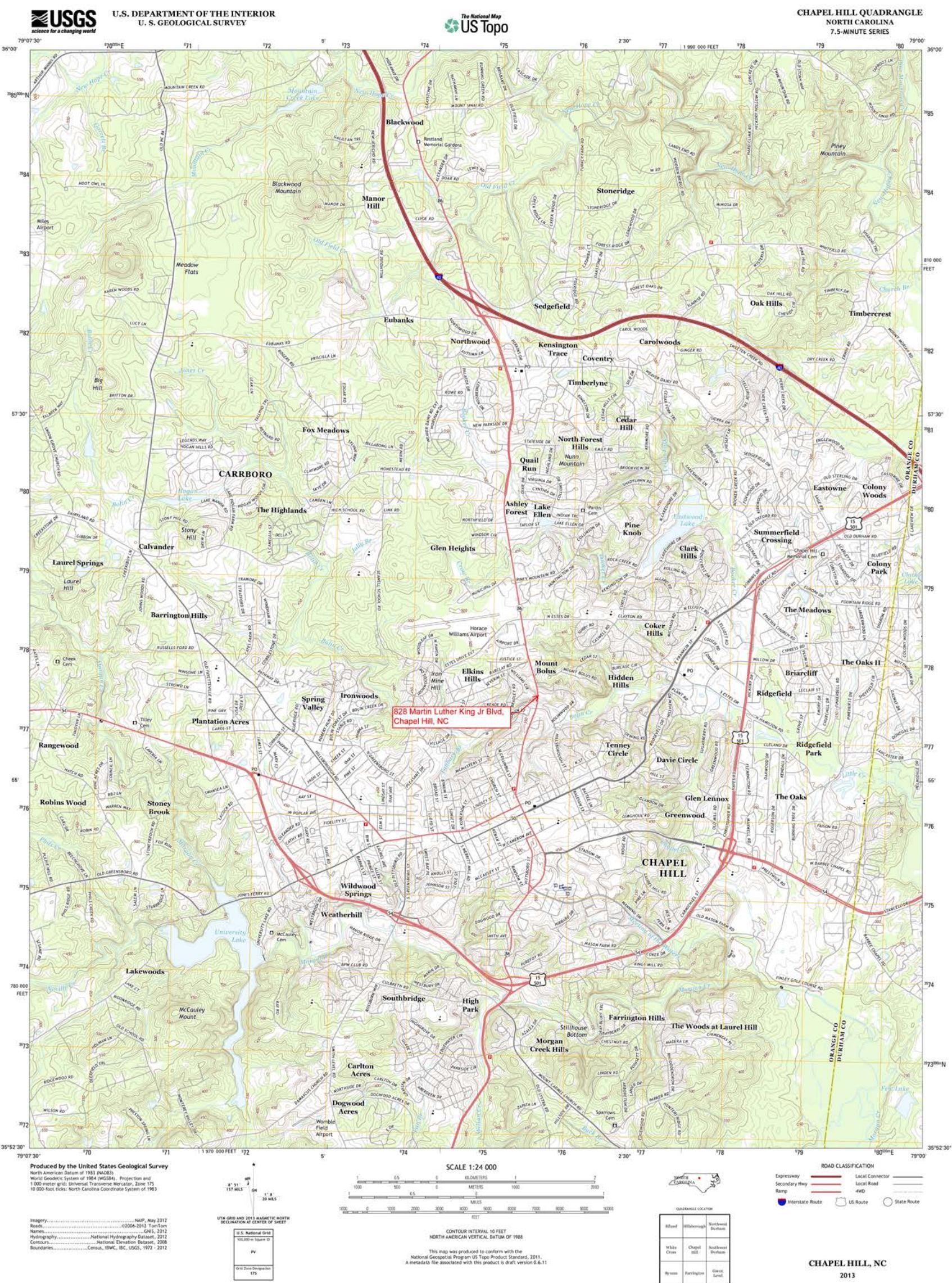


FIGURE 3 | USGS LOCATION MAP

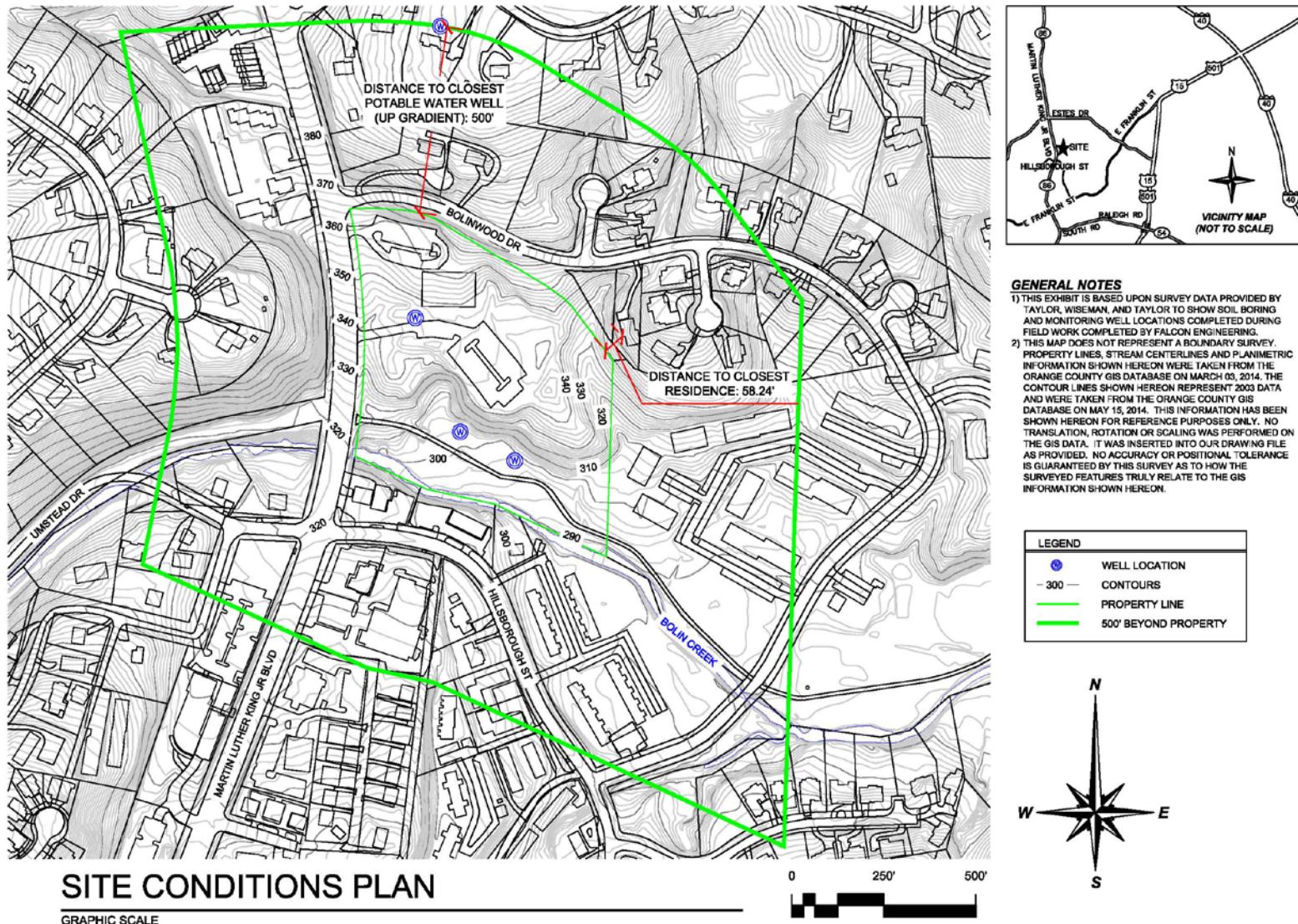
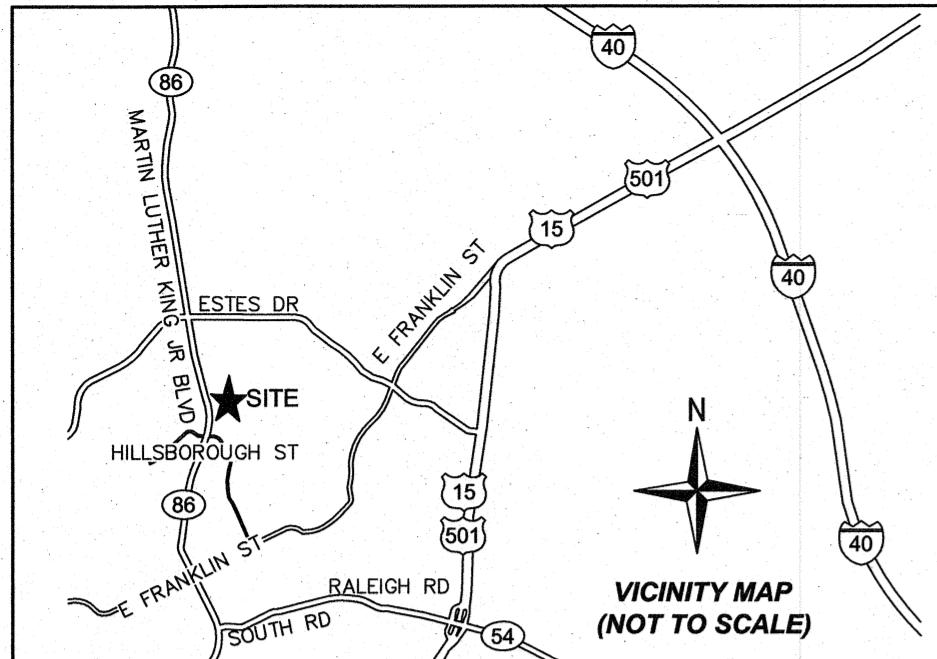


FIGURE 3 | 500 FOOT SURROUNDING PROPERTIES AND FEATURES



ABBREVIATIONS

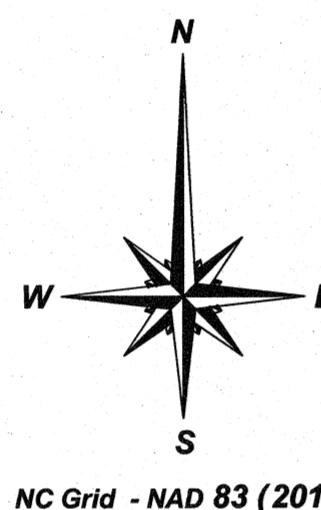
BLVD BOULEVARD
DR DRIVE
ELEV ELEVATION
ST STREET

GENERAL NOTES

- 1) THE PURPOSE OF THIS PLAT IS TO SHOW MONITORING WELLS AND BUILDINGS IN RELATION TO THE CONTROL LINE ESTABLISHED FOR THIS SURVEY.
- 2) ALL BEARING, DISTANCES, AND COORDINATES SHOWN HEREON ARE BASED UPON THE NORTH CAROLINA STATE PLANE COORDINATE SYSTEM, NAD 83 (2011), WITH NAVD88 (GEOD 12) ELEVATIONS, PER A GPS SURVEY PERFORMED BY TAYLOR WISEMAN AND TAYLOR ON FEBRUARY 25, 2014. THE N.C. STATE PLANE COORDINATE SYSTEM SHOWN FOR CONTROL POINTS HEREON WERE ESTABLISHED UTILIZING GLOBAL POSITIONING SYSTEMS (GPS) IN CONJUNCTION WITH THE NORTH CAROLINA GEODETIC SURVEY'S VIRTUAL REFERENCE SYSTEM (VRS), WHICH IS BASED UPON THE CONTINUALLY OPERATING REFERENCE STATIONS (CORS).
- 3) PROPERTIES SHOWN HEREON ARE SUBJECT TO EASEMENTS AND RESTRICTIONS OF RECORD THAT WOULD BE REVEALED BY A THOROUGH TITLE SEARCH. THIS PLAT SHOULD NOT BE RELIED UPON AS A COMPLETE RECORD OF ALL EASEMENTS THAT MAY EFFECT THESE PROPERTIES.
- 4) THIS MAP DOES NOT REPRESENT A BOUNDARY SURVEY. PROPERTY LINES, STREAM CENTERLINES AND PLANIMETRIC INFORMATION SHOWN HEREON WERE TAKEN FROM THE ORANGE COUNTY GIS DATABASE ON MARCH 03, 2014 AND THIS INFORMATION HAS BEEN SHOWN HEREON FOR REFERENCE PURPOSES ONLY. NO TRANSLATION, ROTATION OR SCALING WAS PERFORMED ON THE GIS DATA. IT WAS INSERTED INTO OUR DRAWING FILE AS PROVIDED. NO ACCURACY OR POSITIONAL TOLERANCE IS GUARANTEED BY THIS SURVEY AS TO HOW THE SURVEYED FEATURES TRULY RELATE TO THE GIS INFORMATION SHOWN HEREON.
- 5) ALL DISTANCES AND COORDINATES SHOWN HEREON ARE LOCALIZED, GROUND INFORMATION, UNLESS SPECIFICALLY NOTED AS "GRID".

FEATURE TABLE					
ID	NORTHING	EASTING	TOP CASE ELEV	GROUND ELEV	
MW-1	792206.53	1984238.25	346.12	346.52	
MW-3	791897.55	1984360.36	304.95	301.47	
MW-4	791819.55	1984508.46	301.42	297.79	
MW-5	792377.87	1984299.80	-	362.76	

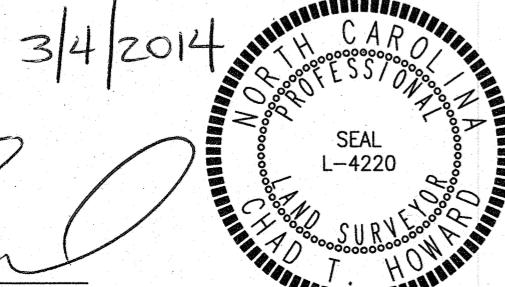
NOTE MW-5'S LOCATION IS AT GROUND ELEVATION
MW-5 WAS DRILLED, BUT NOT SET



SURVEY CONTROL / GRID TIE NOTES	
DATUM DESCRIPTION	
NC STATE PLANE COORDINATE SYSTEM	
NAD83 (2011) [EPOCH: 2010.00]	
NAVD88 (GEOD 2012a)	
UNIT OF MEASUREMENT: U.S. SURVEY FOOT	
GPS FIELD PROCEDURE: REAL TIME NETWORK (VRS)	
DATE OF GPS SURVEY: 2/26/2014	
GPS ANTENNA: TRIMBLE R8-3 (SN: 5005414918)	
PUBLISHED / FIXED CONTROL USED:	
STATION NAME: DURH	
PID: DG9328	
LATITUDE: 35°59'46.12941"N	
LONGITUDE: 78°53'58.03641"W	
ELLIPSOID HEIGHT: 385.386	
GEOD HEIGHT: -102.789	
ADJUSTMENT:	
SURVEY DATA WAS POST PROCESSED WITH TRIMBLE GEOMATICS OFFICE (TGO) USING A NETWORK LEAST SQUARES ADJUSTMENT AT THE 95% CONFIDENCE LEVEL.	
CLASS OF SURVEY: CLASS A (URBAN)	
POSITIONAL ACCURACY: 0.05	
POINT OF LOCALIZATION: TWT# 2	
COMBINED FACTOR: 0.99993127	

I, CHAD T. HOWARD, CERTIFY THAT THIS MAP WAS DRAWN UNDER MY SUPERVISION, FROM AN ACTUAL GROUND (CONVENTIONAL) AND GPS SURVEY MADE UNDER MY SUPERVISION;
THAT THE GPS SURVEY INFORMATION (METADATA) HAS BEEN REPORTED HEREON UNDER THE "SURVEY CONTROL / GRID TIE NOTES".
THAT THE BOUNDARIES NOT SURVEYED ARE CLEARLY INDICATED AS SUCH AND ARE BASED UPON THE DEEDS AND PLATS REPORTED HEREON;
THAT THE RATIO OF PRECISION OR POSITIONAL ACCURACY HAS BEEN REPORTED HEREON.

WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER AND SEAL THIS 4th DAY OF MARCH, IN THE YEAR OF OUR LORD 2014.



CHAD T. HOWARD LICENSE NO. L-4220



APPENDIX B
HISTORIC MAPS AND PHOTOGRAPHS

APPENDIX B
HISTORIC MAPS AND PHOTOGRAPHS

Certified Sanborn® Map Report

3/20/13

Site Name:

Town of Chapel Hill
828 Martin Luther King Jr Blvd
Chapel Hill, NC 27514

EDR Inquiry # 3549422.3

Client Name:

Falcon Engineering, Inc.
1210 Trinity Road
Raleigh, NC 27607-0000

Contact: Josh Dunbar



The complete Sanborn Library collection has been searched by EDR, and fire insurance maps covering the target property location provided by Falcon Engineering, Inc. were identified for the years listed below. The certified Sanborn Library search results in this report can be authenticated by visiting www.edrnet.com/sanborn and entering the certification number. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by Sanborn Library LLC, the copyright holder for the collection.

Certified Sanborn Results:

Site Name: Town of Chapel Hill
Address: 828 Martin Luther King Jr Blvd
City, State, Zip: Chapel Hill, NC 27514
Cross Street:
P.O. # E13026
Project: 828 Martin Luther King Blvd
Certification # 48FC-4E0B-A598



Sanborn® Library search results
Certification # 48FC-4E0B-A598

UNMAPPED PROPERTY

This report certifies that the complete holdings of the Sanborn Library, LLC collection have been searched based on client supplied target property information, and fire insurance maps covering the target property were not found.

The Sanborn Library includes more than 1.2 million Sanborn fire insurance maps, which track historical property usage in approximately 12,000 American cities and towns. Collections searched:

- Library of Congress
- University Publications of America
- EDR Private Collection

The Sanborn Library LLC Since 1866™

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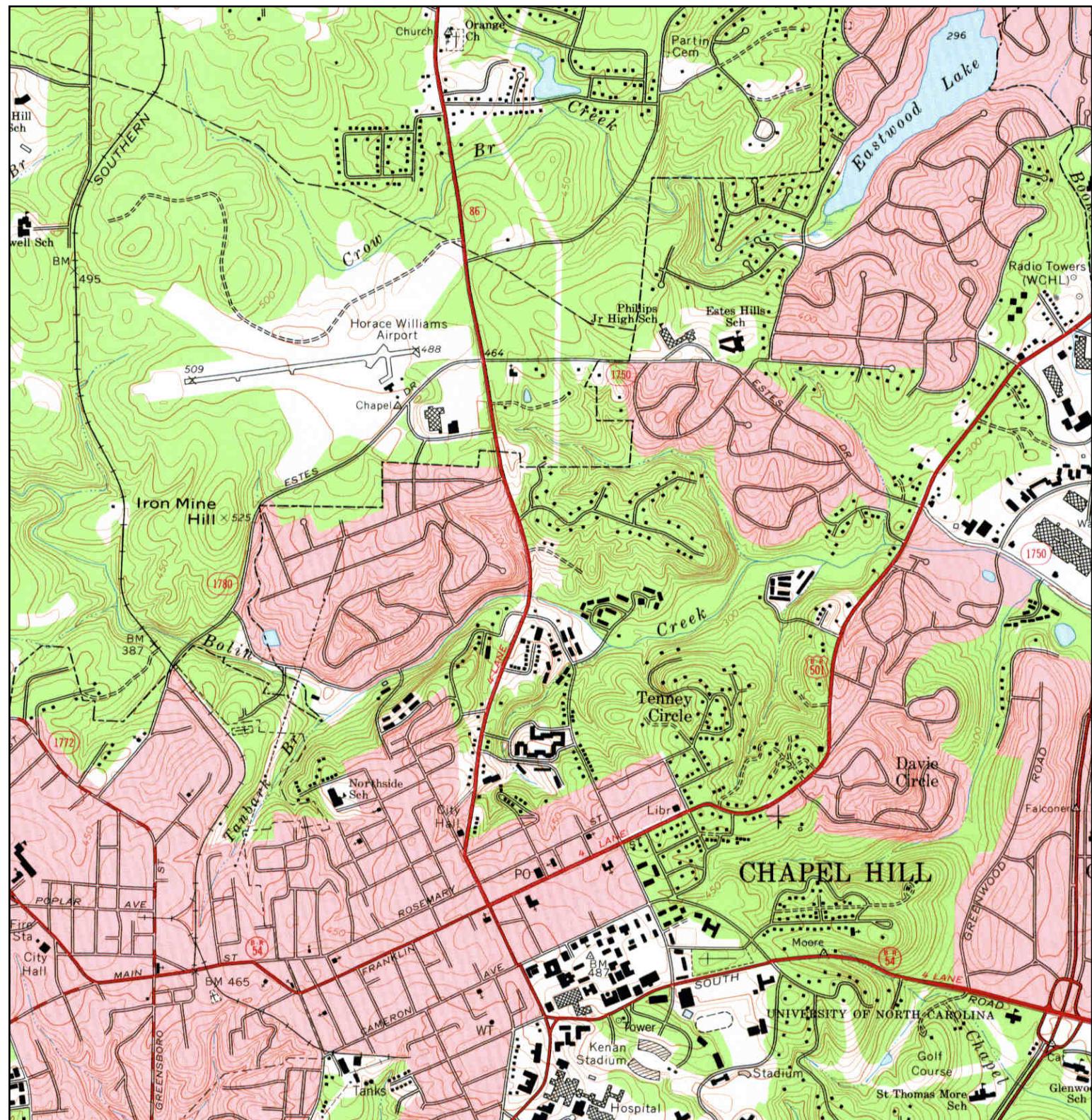
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Historical Topographic Map



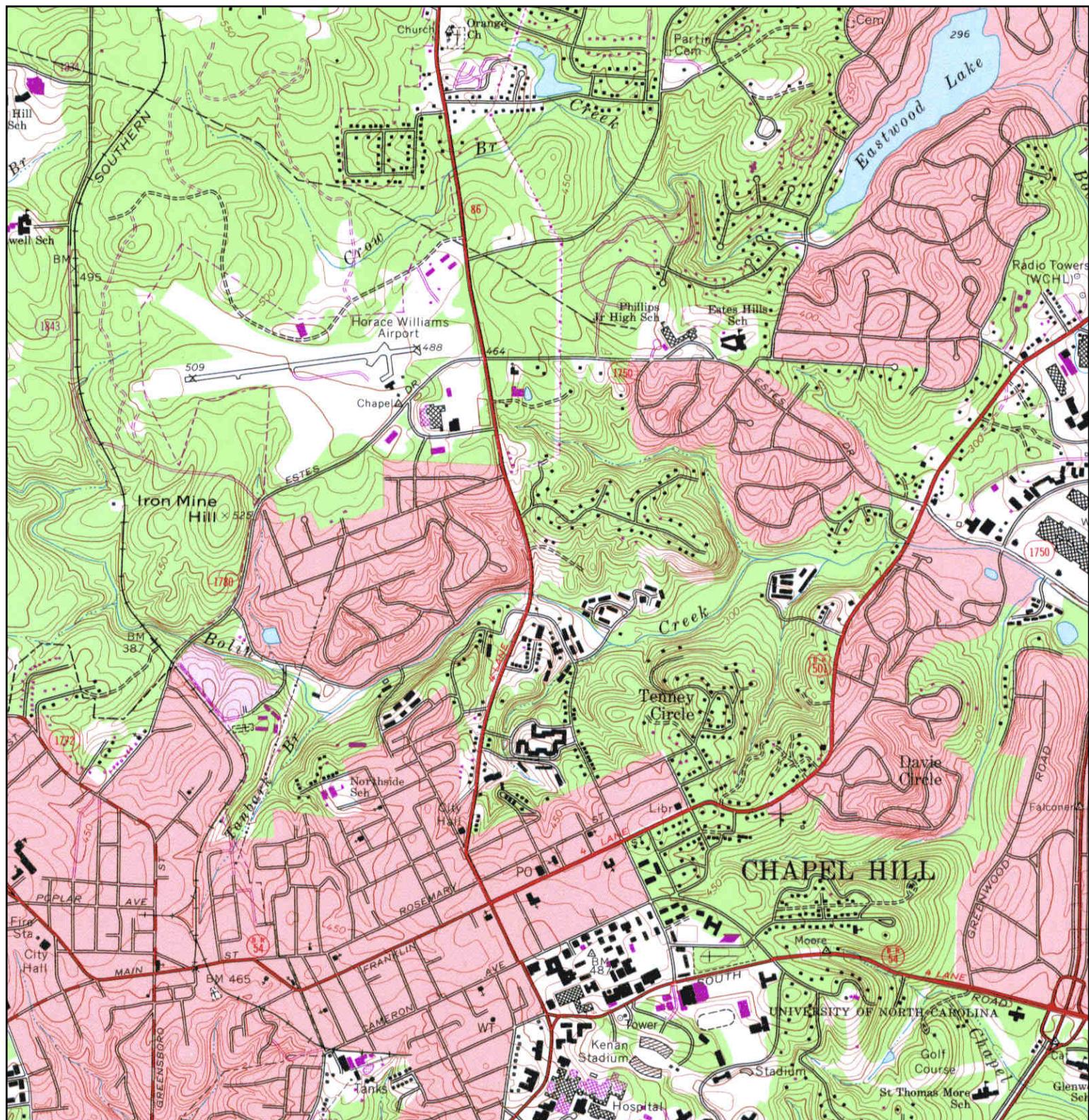
N ▲	TARGET QUAD NAME: CHAPEL HILL MAP YEAR: 1946 SERIES: 7.5 SCALE: 1:24000	SITE NAME: Town of Chapel Hill ADDRESS: 828 Martin Luther King Jr Blvd Chapel Hill, NC 27514 LAT/LONG: 35.9268 / -79.0529	CLIENT: Falcon Engineering, Inc. CONTACT: Josh Dunbar INQUIRY#: 3549422.4 RESEARCH DATE: 03/20/2013
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Historical Topographic Map



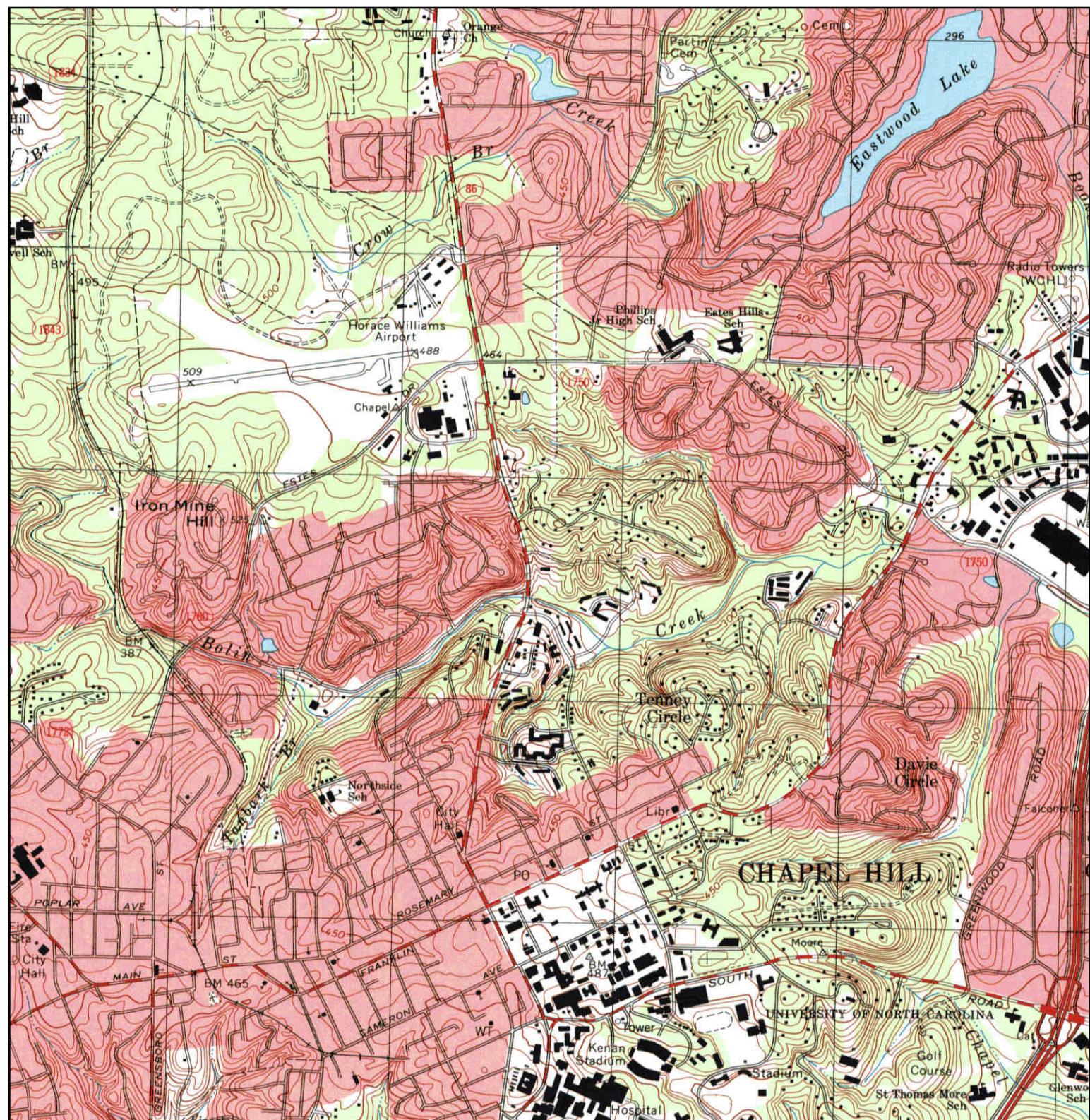
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Historical Topographic Map



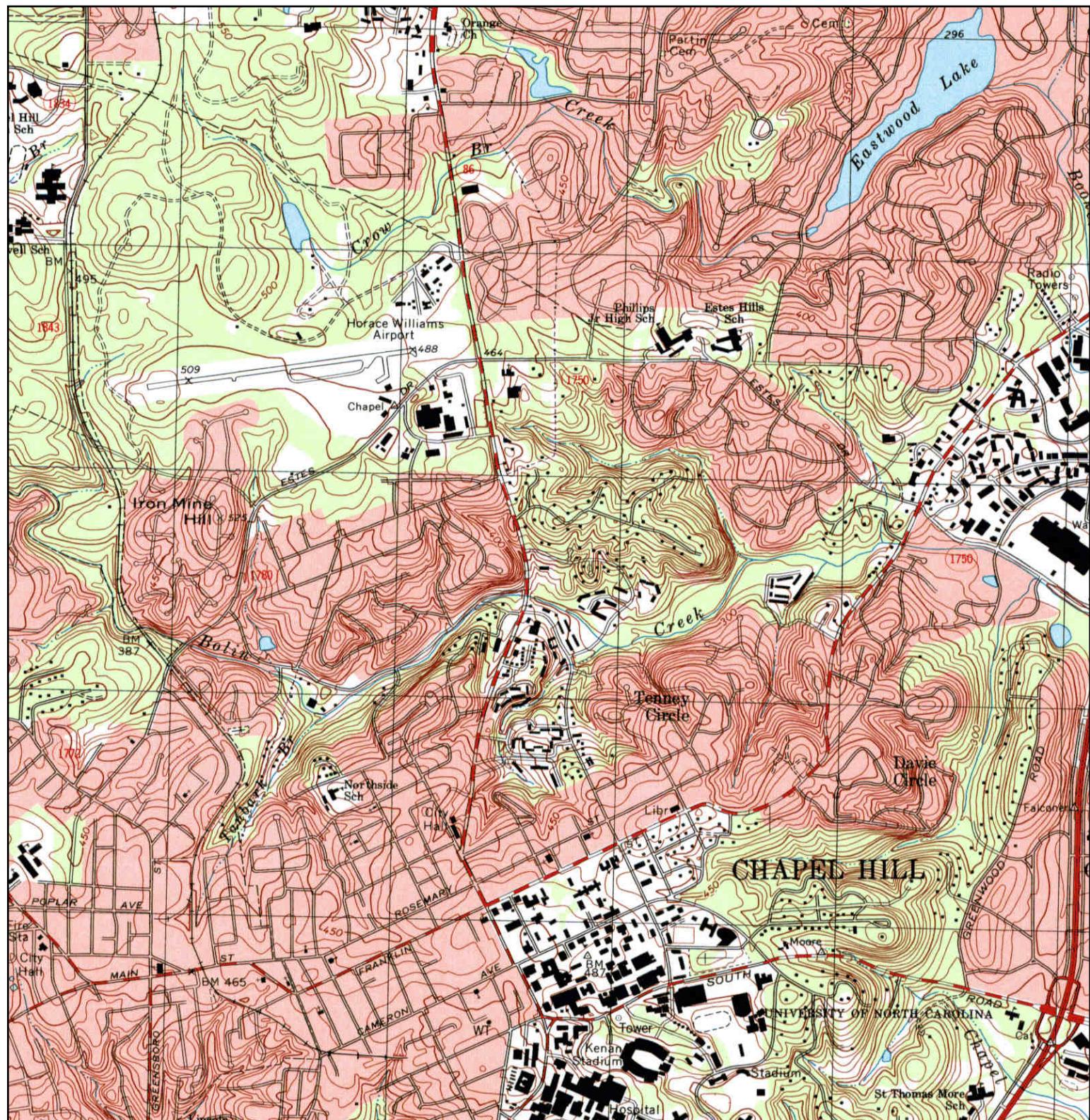
<p>N</p>	<p>TARGET QUAD NAME: CHAPEL HILL MAP YEAR: 1981 PHOTOREVISED FROM : 1978 SERIES: 7.5 SCALE: 1:24000</p>	<p>SITE NAME: Town of Chapel Hill ADDRESS: 828 Martin Luther King Jr Blvd Chapel Hill, NC 27514 LAT/LONG: 35.9268 / -79.0529</p>	<p>CLIENT: Falcon Engineering, Inc. CONTACT: Josh Dunbar INQUIRY#: 3549422.4 RESEARCH DATE: 03/20/2013</p>
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Historical Topographic Map



N ▲	TARGET QUAD NAME: CHAPEL HILL MAP YEAR: 1993 SERIES: 7.5 SCALE: 1:24000	SITE NAME: Town of Chapel Hill ADDRESS: 828 Martin Luther King Jr Blvd Chapel Hill, NC 27514 LAT/LONG: 35.9268 / -79.0529	CLIENT: Falcon Engineering, Inc. CONTACT: Josh Dunbar INQUIRY#: 3549422.4 RESEARCH DATE: 03/20/2013
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Historical Topographic Map



N ↑	TARGET QUAD NAME: CHAPEL HILL MAP YEAR: 2002 SERIES: 7.5 SCALE: 1:24000	SITE NAME: Town of Chapel Hill ADDRESS: 828 Martin Luther King Jr Blvd Chapel Hill, NC 27514 LAT/LONG: 35.9268 / -79.0529	CLIENT: Falcon Engineering, Inc. CONTACT: Josh Dunbar INQUIRY#: 3549422.4 RESEARCH DATE: 03/20/2013



April 1960



January 1969



April 1975



Image U.S. Geological Survey

February 1993



Image U.S. Geological Survey

April 1998

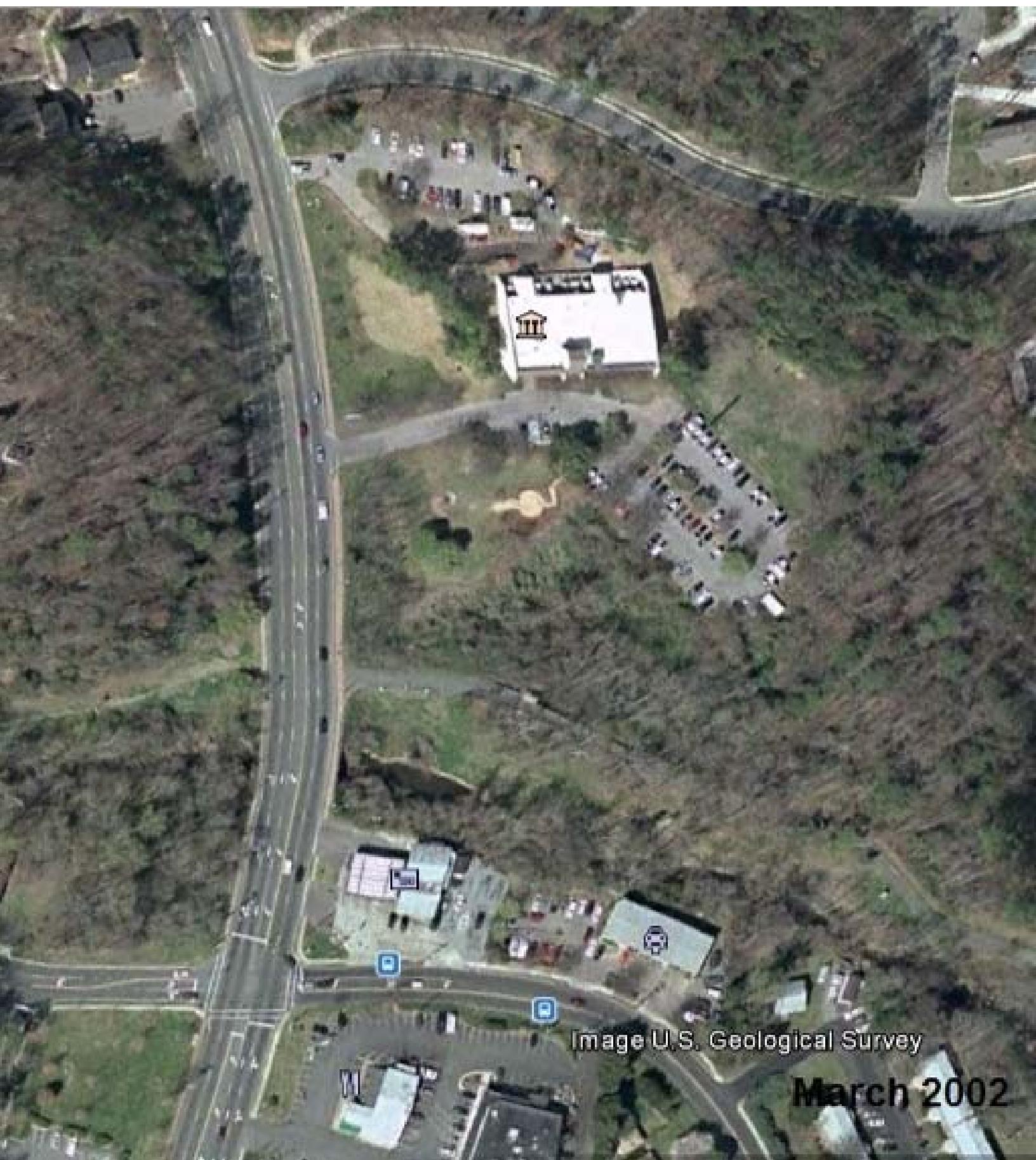


Image U.S. Geological Survey

March 2002

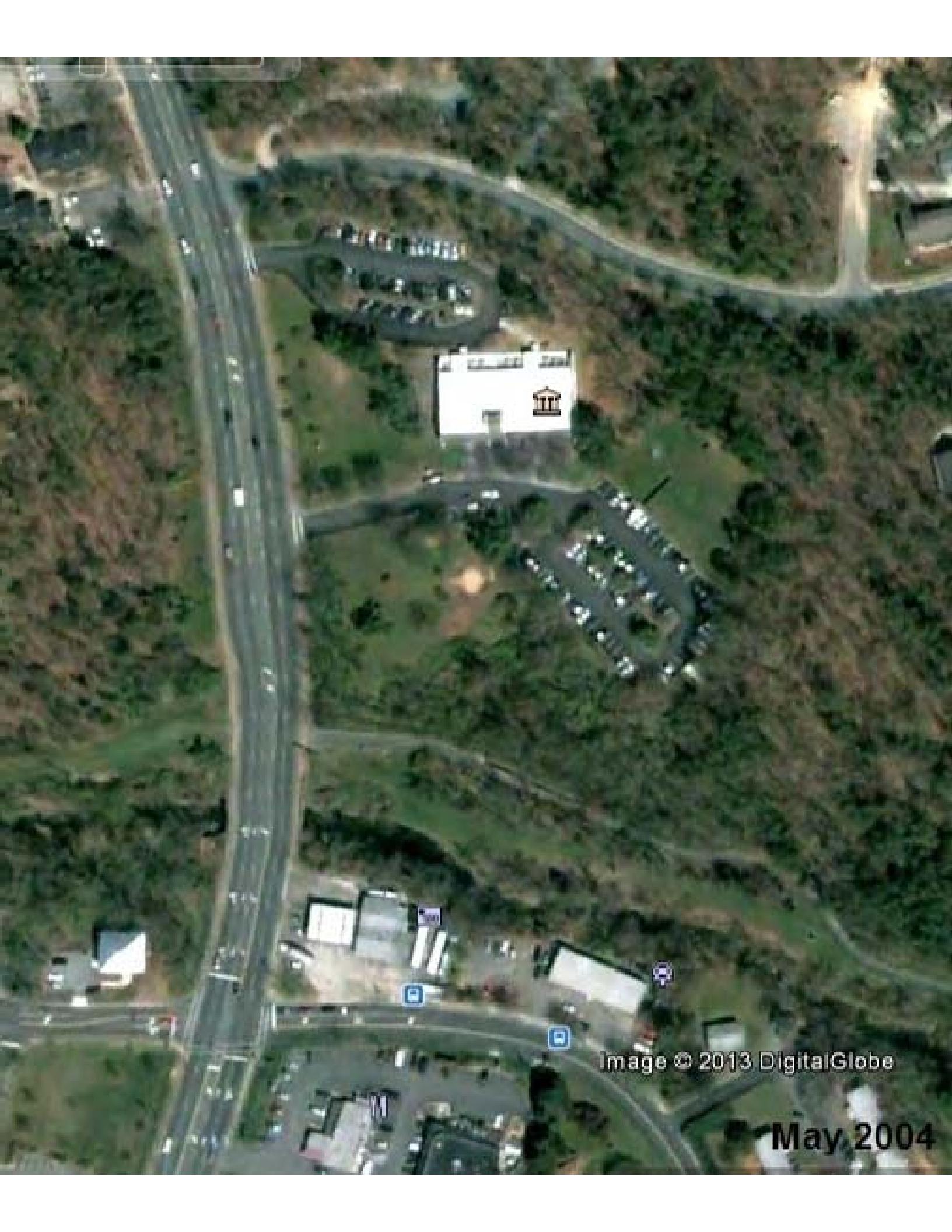


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March 2006

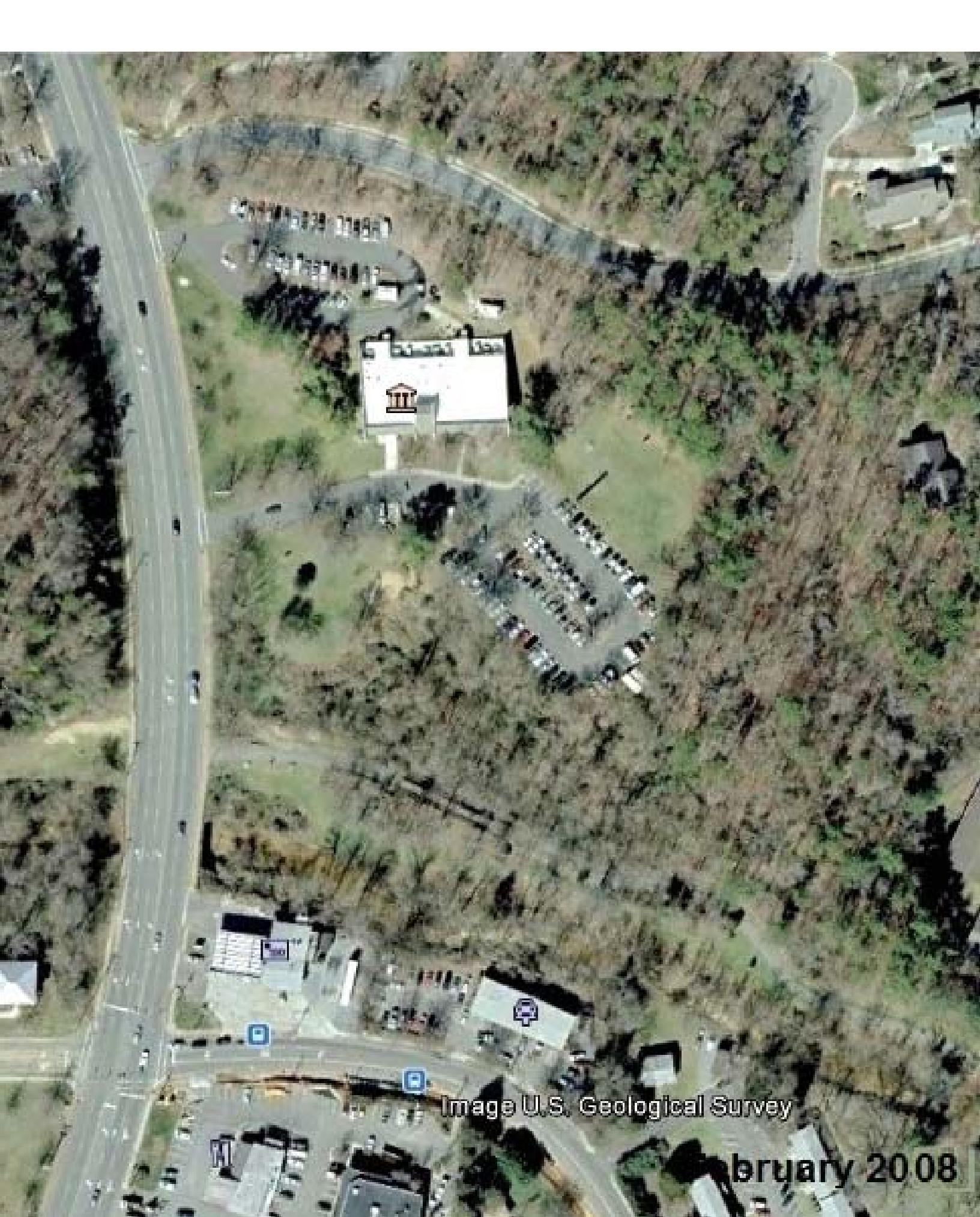


Image U.S. Geological Survey

February 2008

