



North Carolina Department of Natural and Cultural Resources  
State Historic Preservation Office

Ramona M. Bartos, Administrator

Governor Roy Cooper

Secretary D. Reid Wilson

July 29, 2021

**MEMORANDUM**

TO: Vanessa E. Patrick [vepatrick@ncdot.gov](mailto:vepatrick@ncdot.gov)  
N.C. Department of Transportation  
Environmental Analysis Unit, Historic Architecture Group

FROM: Renee Gledhill-Earley *RGE for Ramona M. Bartos*  
Environmental Review Coordinator

SUBJECT: Superstreet conversion of US 17 at intersection with Wildwood/Main Street at the  
Lehew/Chapel Hill Cemetery, PA 18-07-0028, Brunswick County, ER 21-1372

Thank you for your May 24, 2021, memorandum concerning the above-referenced report for which we had to request additional information. Having received that information, we provide the following comments.

We concur that the Lehew/Chapel Hill Cemetery (BW0415) does not appear to be eligible for listing in the National Register of Historic Places, although it was placed on our State Study List in 2010 under Criterion C for Funerary Art. However, it appears that most of the remaining wooden grave markers, that made it eligible for listing have since been lost or extremely deteriorated and, collectively, they no longer retain the integrity to convey significance under the criterion.

Your archaeological survey resulted in the following statements:

New South recommends that all 183 probable and possible graves should be treated as such unless/until the identifications of these graves can be verified with archaeological testing. This is important for the four grave anomalies in the ROW. Care should be taken if any ground within the cemetery is to be disturbed to avoid damaging any graves that might be present but not detected because of poor preservation and ground conditions. If impacts to the cemetery cannot be avoided, relocation will be necessary in accordance with North Carolina G.S. 65-12, Abandoned and Neglected Cemeteries, or G.S.70-3, Unmarked Human Burial and Human Skeletal Remains Protection Act. Consultation with the OSA would be required to determine the exact legal path for disinterment.

Based on the information provided, we concur with your determination. We also concur with your recommendation that if impacts cannot be avoided, our office be consulted in creating a proper disinterment plan.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919-814-6579 or [environmental.review@ncdcr.gov](mailto:environmental.review@ncdcr.gov). In all future communication concerning this project, please cite the above referenced tracking number.

cc: Mary Pope Furr, NCDOT

[mpfurr@ncdot.gov](mailto:mpfurr@ncdot.gov)



Due 07/01/2021

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

ROY COOPER  
GOVERNOR

J. ERIC BOYETTE  
SECRETARY

To: Renee Gledhill-Earley, NCHPO

From: Vanessa E. Patrick, NCDOT

Date: May 24, 2021

Subject: *Historic Structures Survey Report for T.I.P No. R-5857, Superstreet Conversion of US 17 at Intersections with Wildwood/Main Streets and Main Street (both US 17 Business) near Shallotte, Brunswick County, North Carolina. WBS No. 47545.1.1. PA Tracking No. 18-07-0028.*

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The North Carolina Department of Transportation (NCDOT) is conducting planning studies for the above-referenced project. Enclosed for your review is a report presenting the evaluation of historic architectural resources in the R-5857, Brunswick County project area (one hard copy and one CD-ROM). Survey photographs, GIS data, and site forms are also included on the CD-ROM, and hard copies of the site forms and contact sheet are also provided.

The report considers one resource – the Lehew/Chapel Hill Cemetery (BW0415/31BW866) -- and recommends it as not eligible for listing in the National Register of Historic Places. Initial screening of the project area by NCDOT Historic Architecture identified which resources warranted additional study.

We look forward to receiving your comments on the report. Should you have any questions, please do not hesitate to contact me at [vepatrick@ncdot.gov](mailto:vepatrick@ncdot.gov) or 919-707-6082. Thank you.

A handwritten signature in blue ink, appearing to be "V.E.P.", written over a light blue circular stamp.

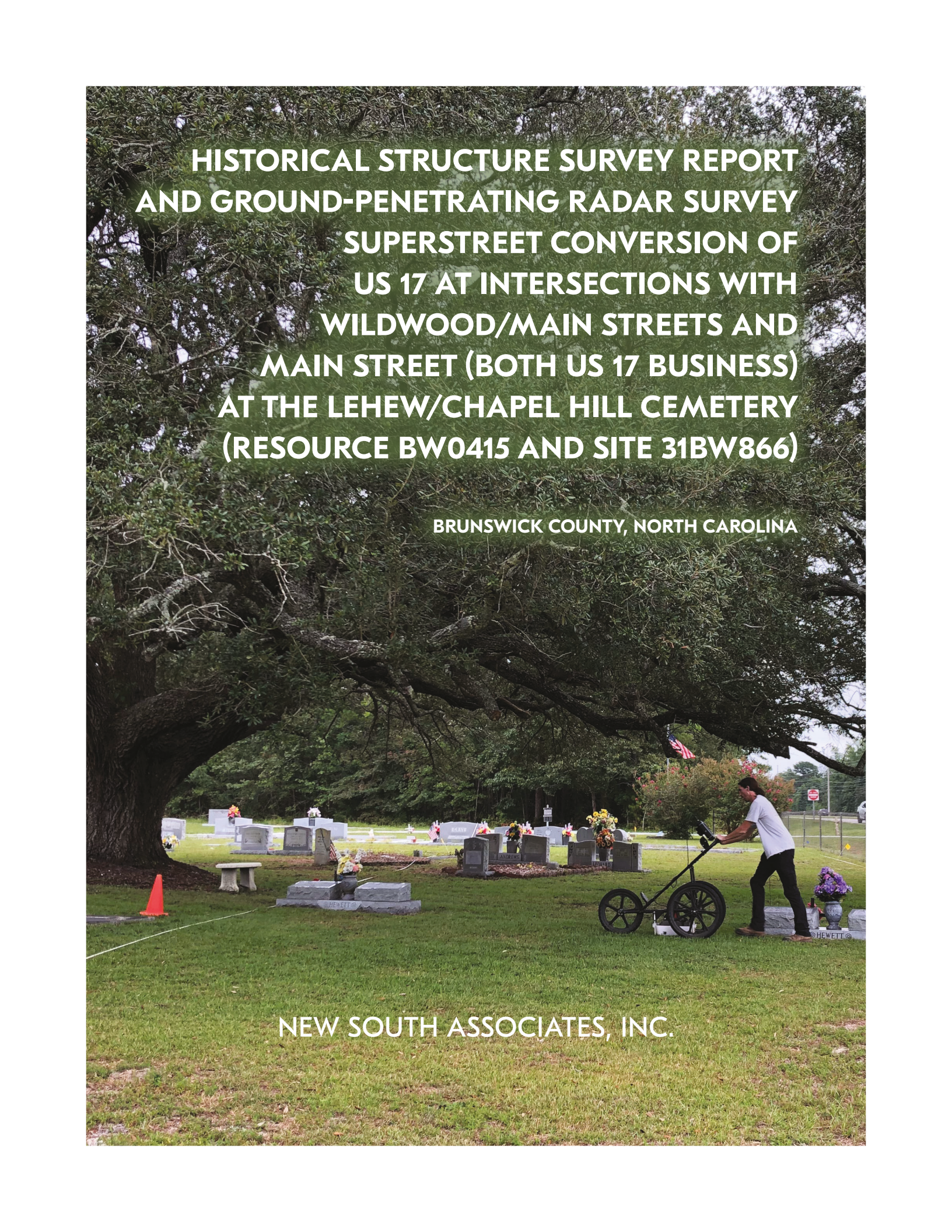
V.E.P.

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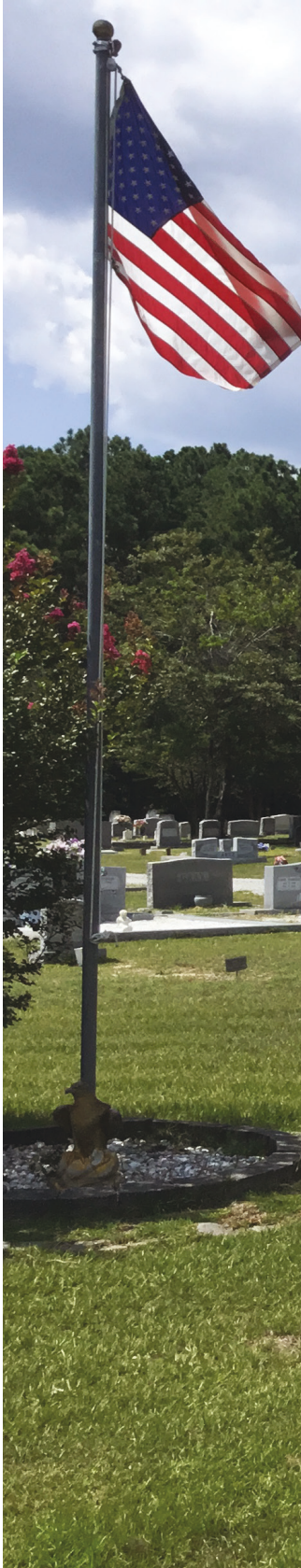
A large, spreading oak tree dominates the left and center of the image. In the background, a cemetery with several headstones is visible. A person in a white shirt and dark pants is pushing a black, two-wheeled ground-penetrating radar (GPR) device across the grass. An orange traffic cone is on the left. The text is overlaid on the top half of the image.

**HISTORICAL STRUCTURE SURVEY REPORT  
AND GROUND-PENETRATING RADAR SURVEY  
SUPERSTREET CONVERSION OF  
US 17 AT INTERSECTIONS WITH  
WILDWOOD/MAIN STREETS AND  
MAIN STREET (BOTH US 17 BUSINESS)  
AT THE LEHEW/CHAPEL HILL CEMETERY  
(RESOURCE BW0415 AND SITE 31BW866)**

**BRUNSWICK COUNTY, NORTH CAROLINA**

**NEW SOUTH ASSOCIATES, INC.**





Historical Structure Survey Report and Ground-Penetrating Radar Survey Superstreet Conversion of US 17 at Intersections with Wildwood/Main Streets and Main Street (Both US 17 Business) at the Lehigh/Chapel Hill Cemetery (Resource BW0415 and Site 31BW866)

Brunswick County, North Carolina

TIP No. R-5857  
WBS No. 47545.1.1  
PA No. 18-07-0028

Report submitted to:

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North Carolina Department of Transportation  
Environmental Analysis Unit  
1598 Mail Service Center  
Raleigh, North Carolina 27699-1598

Report prepared by:

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Mary Pope Furr – Supervisor  
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North Carolina Department of Transportation

*Mary Beth Reed*

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Mary Beth Reed – Principal Investigator

Sarah Lowry, MA – Geophysical Archaeologist and Co-Author  
J. Faith Meader, MA – Senior Historian and Co-Author



May 13, 2021 • Final Report  
New South Associates Technical Report 4140

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# MANAGEMENT SUMMARY

This project is subject to review under the Section 106 Programmatic Agreement for Minor Transportation Projects between the North Carolina Department of Transportation (NCDOT), the North Carolina State Historic Preservation Office (NCHPO), the Federal Highway Administration (FHWA), the United States Army Corps of Engineers (USACE), and the United States Forest Service (USFS) of 2020. NCDOT architectural historians defined an Area of Potential Effects (APE) and conducted preliminary research and a reconnaissance-level survey to identify and assess all resources of approximately 50 years of age or more within the APE. Following this initial survey, NCDOT staff identified one resource that warranted an intensive evaluation of eligibility for the National Register of Historic Places (NRHP). This individual resource, the Lehew/Chapel Hill Cemetery, is the subject of this report. NCDOT architectural historians determined that all other resources and districts are not worthy of further study and evaluation due to lack of historical significance and/or integrity.

New South Associates, Inc. (New South) conducted a historic structure survey and archaeological analysis of the Lehew/Chapel Hill Cemetery on behalf of the NCDOT. This survey included an assessment of the cemetery's eligibility for the National Register of Historic Places (NRHP), photography, updates to the architectural survey forms, completion of a cemetery site form for the Office of State Archaeology (OSA), and an archaeological remote sensing survey to identify unmarked graves. Remote sensing was completed using ground-penetrating radar (GPR) and followed the North Carolina OSA's, *Archaeological Investigation Standards and Guidelines* in compliance with Section 106 of the National Historic Preservation Act (NHPA). Sarah Stephens and John Kimes conducted the fieldwork from August 27-28, 2019. Faith Meader conducted the architectural survey in August of 2019. As the cemetery underwent both architectural and archaeological analysis, it received an architectural resource number (Resource BW0415) and an archaeological site number (Site 31BW866).

The Lehew/Chapel Hill Cemetery was established as a family burial ground by the Lehew Family in the late nineteenth century. The first inscribed grave markers are the headstones of two Lehew daughters that date to 1873 and 1878 and the cemetery is still in active use. The cemetery was expanded to include community use shortly after the first burials. There are an estimated 350-400 markers, with unmarked graves identified during this survey possibly increasing this number to 450-500 total individuals. The Lehew/Chapel Hill Cemetery was previously documented by the Works Progress Administration (WPA) in 1940 and a NCHPO survey form was prepared by Landmark Preservation Associates during the 2010 Comprehensive Historical/Architectural Site Survey of Brunswick County, North Carolina (Landmark Preservation Associates 2010). As a result of the 2010 survey, the cemetery was added to the North Carolina Study List. Placement on the North Carolina Study List does not automatically nominate a resource for the NRHP.



The GPR survey used three data collection grids covering 0.30 acre (1,230 sq. m and 13,245 sq. ft.) to include the APE and a buffer. All identified cemetery markers and features within the GPR survey area were mapped. There were 183 probable and possible graves identified in the GPR results; 25 probable graves are associated with a marker. Two probable and two possible graves are located within the right-of-way (ROW). There are no markers within the ROW.

Since it has a common layout and composition as a community cemetery in the region, contains no historically significant persons or significant funerary architecture, and has little significant information potential, the cemetery is recommended not eligible for the NRHP under Criteria A, B, C, and D. However, New South recommends that all 183 probable and possible graves should be treated as graves until the interpretations can be verified, as necessary, with archaeological testing. Care should be taken if any ground within the cemetery is to be disturbed to avoid damaging any graves that might be present but not detected because of poor preservation and ground conditions. If impacts to the cemetery cannot be avoided, relocation will be necessary in accordance with North Carolina G.S. 65-12, *Abandoned and Neglected Cemeteries*, or G.S.70-3, *Unmarked Human Burial and Human Skeletal Remains Protection Act*. Consultation with the OSA would be required to determine the exact legal path for disinterment.

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# I. INTRODUCTION

The North Carolina Department of Transportation (NCDOT) plans to perform a superstreet conversion of Ocean Highway (US 17) at intersections with Wildwood/Main Streets and Main Street (both US 17 Business) near Shallote, Brunswick County, North Carolina (Figure 1). This project is subject to review under the Section 106 Programmatic Agreement for Minor Transportation Projects (NCDOT/North Carolina Historic Preservation Office [NCHPO]/Federal Highway Administration [FHWA]/United States Army Corps of Engineers [USACE]/ and United States Forest Service [USFS] 2020). During the current survey, NCDOT architectural historians defined the Area of Potential Effects (APE) as the project site, adjacent parcels, and all properties within the viewshed that may be impacted by the project. The historians conducted a site visit to identify and assess all properties with resources of approximately 50 years of age or more within the APE. The area was previously surveyed in 2010 by Landmark Preservation Associates during the 2010 Comprehensive Historical/Architectural Site Survey of Brunswick County, North Carolina (Landmark Preservation Associates 2010). NCDOT determined that one property warranted an intensive National Register of Historic Places (NRHP) eligibility evaluation, the Lehew/Chapel Hill Cemetery (Table 1) and determined that all other resources are not worthy of further study and evaluation due to lack of historical significance. The 2010 survey identified the cemetery, which is located at the northern intersection between Main Street (US 17 Business) and Ocean Highway (US 17), and the NCHPO assigned it the architectural resource number BW0415 (Landmark Preservation Associates 2010).

**Table 1. Intensively Surveyed Resources**

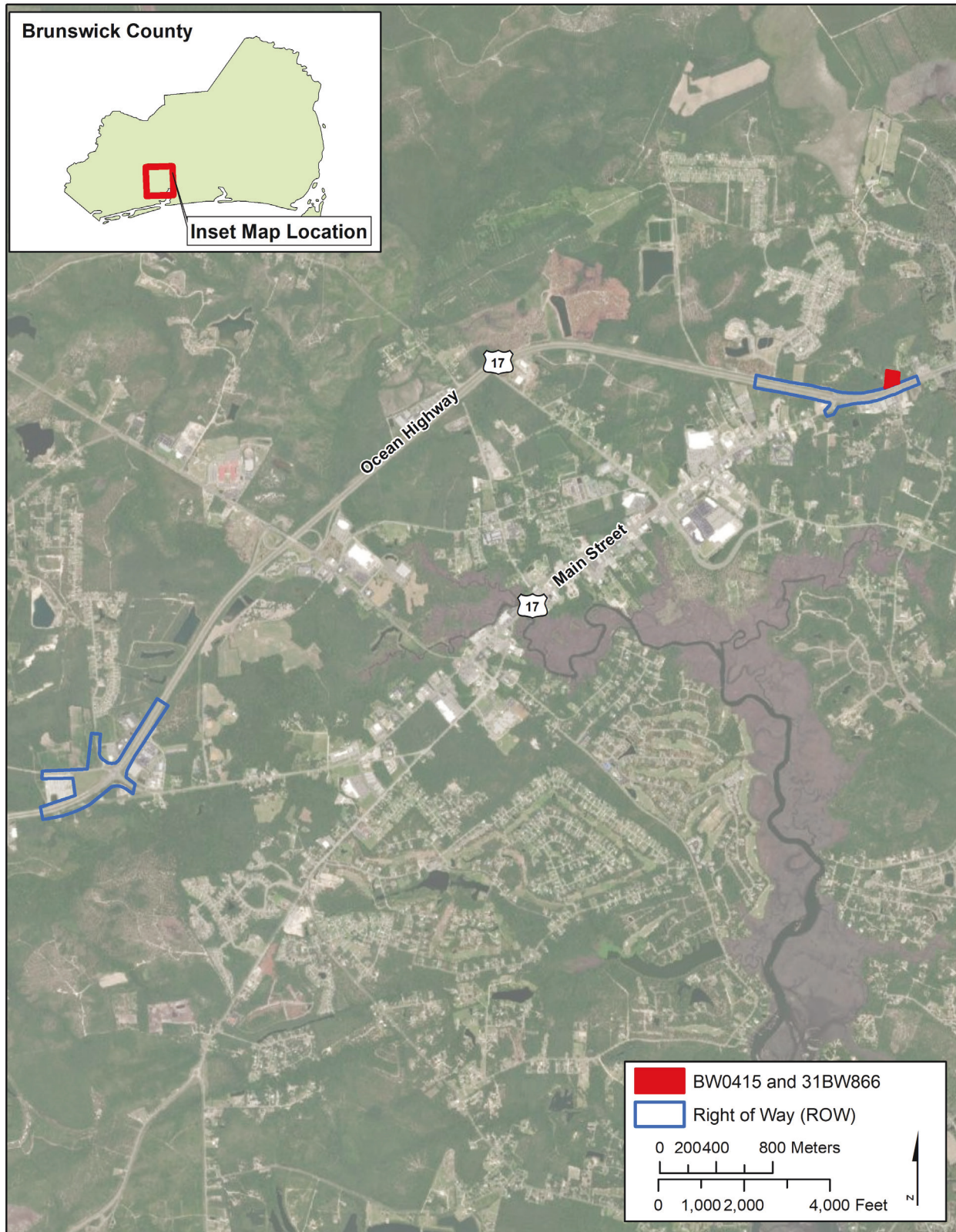
Survey Site #	Resource Name/Address	NRHP Eligibility Recommendation
BW0415/31BW866	The Lehew/Chapel Hill Cemetery, N. side of Ocean Highway West (U.S. 17) at junction with Red Bug Rd.	Not Eligible

New South Associates, Inc. (New South) conducted the NRHP evaluation. Specific tasks completed as part of this work included an assessment of the cemetery’s eligibility for the National Register of Historic Places (NRHP), photography, updates to the architectural survey forms, completion of a cemetery site form for the Office of State Archaeology (OSA), and an archaeological remote sensing survey to identify unmarked graves. Remote sensing work was completed using ground-penetrating radar (GPR). In addition to the architectural resource number assigned by NCDOT, the OSA assigned the cemetery archaeological site number 31BW866 during this survey.

The Lehew/Chapel Hill Cemetery is located on the north side of U.S. 17 in a 1.78-acre deeded plot of land. The survey area included the two cemetery parcels (PIN 109810471077 and 109810472265) where they overlap the APE along with an approximately 32.8-foot (10-m) buffer. Sarah Stephens and John Kimes conducted the fieldwork from August 27-28, 2019. Faith Meader conducted the architectural survey in August of 2019. The project was suspended by the NCDOT in September 2019 and resumed during March 2021.



Figure 1. Lehev/Chapel Hill Cemetery Location and Right of Way (ROW)



Imagery Source: Vivid Maxar 2019

The LeheW/Chapel Hill Cemetery was established as a family burial ground by the LeheW Family in the late nineteenth century. The oldest inscribed grave markers are the headstones for two LeheW daughters that date to 1873 and 1878 and the cemetery is still in active use. The cemetery was expanded to include community use shortly after the first burials. The LeheW/Chapel Hill Cemetery was previously documented by the Works Progress Administration (WPA) in 1940, when a WPA researcher recorded 102 marked graves and 249 unmarked graves (Landmark Preservation Associates 2010:D-8). Unmarked graves were likely defined as ephemerally or temporarily marked graves. These unmarked graves were common during the late nineteenth and twentieth century, especially in rural areas. There are an estimated 350-400 markers, with unmarked graves identified during this survey possibly increasing this number to 450-500 total individuals.

Subsequently, a NCHPO survey form was prepared during the 2010 survey (Landmark Preservation Associates 2010). As a result of the 2010 survey, the cemetery was added to the North Carolina Study List. Placement on the North Carolina Study List does not automatically nominate a resource for the NRHP.

For the current evaluation, the GPR survey used three data collection grids covering 0.304 acre (1,230 sq. m and 13,245 sq. ft.), which included the right of way (ROW) and a buffer. All identified cemetery markers and features were mapped within the GPR survey area. All results were recorded using real world coordinates and plotted for accurate placement, with grave anomalies and grave markers clearly mapped. The cemetery is mostly covered by lawn and has three mature trees along with many young trees. Soils are well-drained Baymeade fine sand (BaB) with one to six percent slope (Soil Survey Staff 2021). GPR data resolution in these soils was excellent.

The results of the survey and NRHP eligibility evaluation are presented in the following chapters of this technical report. This report complies with the basic requirements of Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended; the Department of Transportation Act of 1966, as amended; the Department of Transportation regulations and procedures (23 CFR 771 and Technical Advisory T 6640.8A); the Advisory Council on Historic Preservation regulations on the Protection of Historic Properties (36 CFR 800); NCDOT's current *Historic Architecture Group Procedures and Work Products*; and the NCHPO's *Report Standards for Historic Structure Survey Reports/Determinations of Eligibility/Section 106/110 Compliance Reports in North Carolina*. The GPR survey followed the North Carolina OSA's, *Archaeological Investigation Standards and Guidelines*.

The report is divided into seven chapters. Chapter I introduces the investigation and describes the project setting. Chapter II discusses the project methods. A historic context for the cemetery is provided in Chapter III. Chapter IV outlines the setting and history of the cemetery. Chapter V presents the results of the mapping and GPR survey. Chapter VI is the NRHP evaluation. Finally, Chapter VII provides a conclusion and recommendations. Appendix A is a table with probable and possible grave locations.

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## II. METHODS

### ARCHITECTURAL EVALUATION AND ARCHIVAL RESEARCH

#### METHODS

New South intensively surveyed the Lehev/Chapel Hill Cemetery, which included taking photos and recording cemetery features. Historic topographic maps, county maps, and aerial photographs were viewed at [historicaerials.com](http://historicaerials.com), the Library of Congress Website, the North Carolina Maps collection online at the University of North Carolina, NCDOT online mapping resources, and the U.S. Geological Survey's (USGS) historical topographic map collection. Property information was obtained from the Brunswick County Register of Deeds website. The *Comprehensive Historical/Architectural Site Survey of Brunswick County, North Carolina and Unincorporated Communities*, which were both prepared for the Brunswick County Board of Commissioners, provided local and site history. The Brunswick County North Carolina Genweb website contained area cemetery locations and inventories, and newspapers and federal census records were also consulted. Per NCDOT, two other comparable resources were identified and visited to help determine the NRHP eligibility of the Lehev/Chapel Hill Cemetery.

#### GROUND-PENETRATING RADAR METHODS

GPR is a remote sensing technique frequently used by archaeologists to prospect for potential subsurface cultural features, including marked and unmarked graves. It is non-invasive, non-destructive, and provides data for visualizing what is below the ground surface. GPR works through transmitting pulses of electromagnetic energy into the ground from a surface antenna, where the waves reflect off contrasting materials (e.g. buried objects, features, or bedding contacts) (Conyers 2004a, 2004a, 2006). The strength of these reflections and the time it takes the energy to travel from the antenna to the source of the reflection and back (two-way travel time) are recorded by the antenna (Patch and Lowry 2018:30; Utsi 2017:4). Travel time is used as a proxy for depth. Relative reflection strength is used to map subsurface anomalies, which can be interpreted by trained practitioners.

To successfully apply GPR, there are two basic requirements: 1) the ground surface must be accessible to the GPR antenna and 2) the features to be imaged must contrast with the surrounding soils (Utsi 2017:4, 32–33). GPR can be used in many environments, including in wooded areas and on grass, mulch, and asphalt. In some situations, vegetation may need to be cleared to provide ground access. Coupling errors occur if the antenna is constantly lifted from the ground, which lowers the data quality (Patch and Lowry 2018:14; Utsi 2017:32–33). If an

archaeological feature does not contrast sufficiently with the surrounding soil, it will not reflect electromagnetic energy and will be impossible to image with GPR (Utsi 2017:5). Contrast can range from subtle to abrupt and it can be difficult to determine if sufficient contrasts are present prior to beginning a survey.

The basic configuration for a GPR system consists of an antenna (which includes both a transmitter and receiver), a computer, a harness or cart, and a wheel for calibrating distance (Utsi 2017:3–4). The operator collects data by pulling or pushing the antenna across the ground surface along transects systematically in a grid. These data are stored by the receiver and saved for post-collection processing. New South uses a Geophysical Survey Systems, Inc. (GSSI) SIR 4000 computer with a 350 megahertz (MHZ) digital hyperstacking antenna. The depths to which radar energy can penetrate, and the amount of resolution that can be expected in the subsurface, are partially controlled by the frequency of the radar energy transmitted (Conyers 2004a; Utsi 2017). Standard GPR antennas emit radar energy varying from about 10-1,000 MHz in frequency. A low frequency antenna (e.g. below 200 MHz) can penetrate up to 50 meters in certain conditions, but resolves only very large buried features (Patch and Lowry 2018:31; Utsi 2017:13–14). In contrast, a high frequency antenna (e.g. above 900 MHz) has a maximum depth of penetration of about one meter or less, but can resolve features with a maximum dimension of a few centimeters (Patch and Lowry 2018:31; Utsi 2017:13–14). The 350 MHz antenna is a center frequency antenna with an excellent compromise between depth penetration and resolution. The hyperstacking antenna has a digital acquisition system that allows for a more detailed signal and filters out more air wave noise. It is the best antenna for use in less ideal conditions and is the preferred antenna to use in areas with coupling problems.

## FIELD METHODS

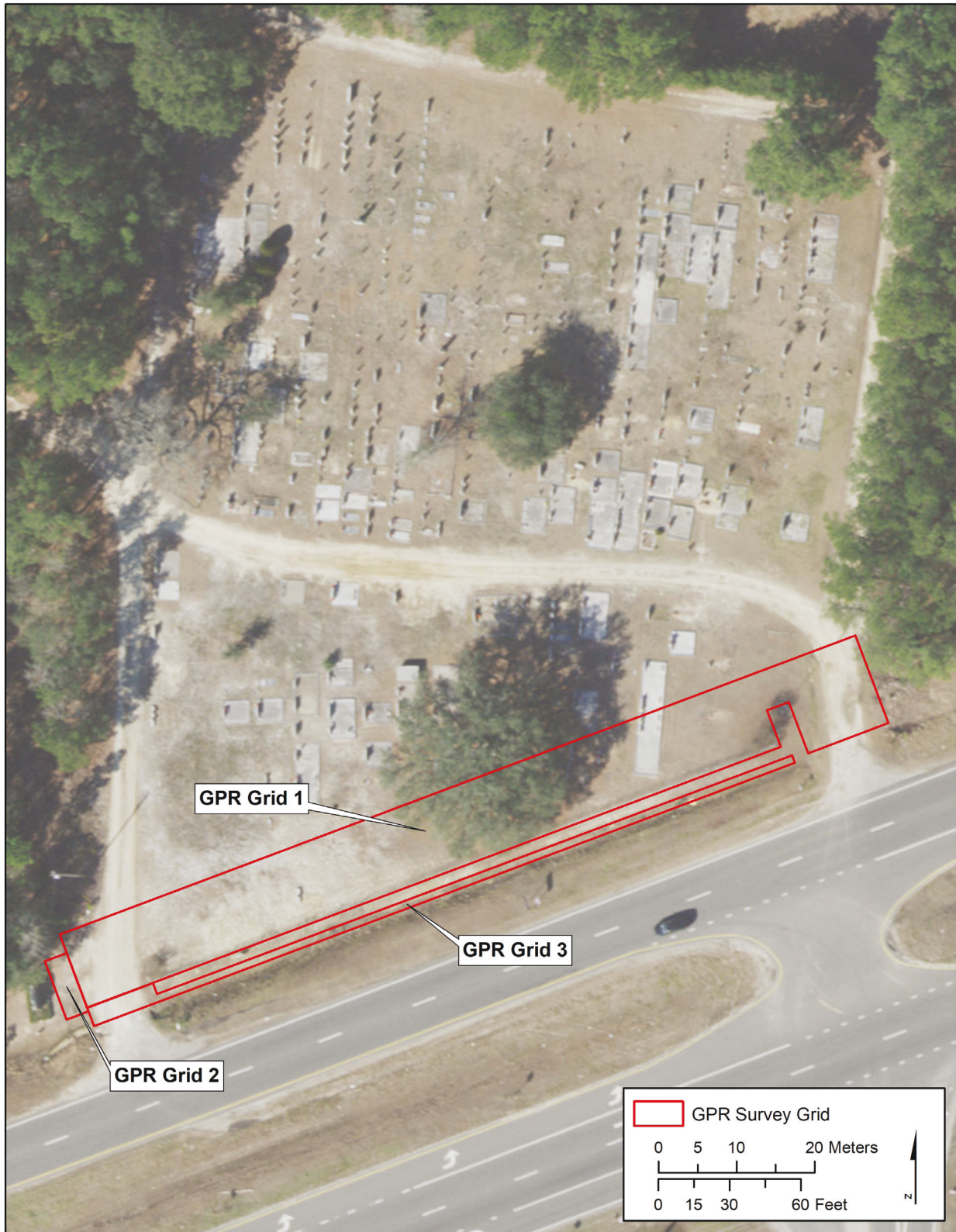
The first step of the survey was to set up the rectilinear grids using metric measuring tapes (Figure 2, Table 2). The grid was placed to cover the 0.304-acre (1,230-sq. m or 13,245-sq. ft.) cemetery with an estimated 10-meter buffer. The area immediately adjacent to US 17 was not surveyed due to obvious disturbance from a storm drain and road construction (Figure 3a). Each grid corner and all visible surface features and grave markers were mapped using a Trimble RTK GPS system. All spatial data were downloaded from the RTK GPS and imported into ArcMap 10, ESRI's geographic information system (GIS) program. Separate shapefiles were then created for the mapped surface features (e.g. grave markers, grid corners).

**Table 2. GPR Grids**

Grid	Acres	Square Meters	Square Feet
GPR 1	0.271	1,097	11,808
GPR 3	0.027	109	1,179
GPR 2	0.006	24	258
Total	0.304	1,230	13,245

HISTORICAL STRUCTURE SURVEY REPORT AND GROUND-PENETRATING RADAR SUPERSTREET CONVERSION OF US 17 AT INTERSECTIONS WITH WILDWOOD/MAIN STREETS AND MAIN STREET (BOTH US 17 BUSINESS) AT THE LEHEW/CHAPEL HILL CEMETERY (RESOURCE BW0415 AND SITE 31BW866) BRUNSWICK COUNTY, NORTH CAROLINA

Figure 2. GPR Grid Locations



Imagery Source: Vivid Maxar 2019

Figure 3. Photographs of Lehev/Chapel Hill Cemetery



A. Shoulder of US 17 Where GPR Survey Was Not Conducted Due to Disturbance



B. GPR Data Collection in Progress

After the survey grid was established, the GPR system was calibrated to local conditions. First, the “time window,” the time during which the system is “listening” for returning reflections, is set. Because the time in nanoseconds (ns) can later be converted to depth, the larger the time window, the deeper the depth penetration. Below ground conditions and above ground interference can reduce the quality of the electromagnetic energy, so the time window varies depending on specific site conditions. The time window at the Lehev/Chapel Hill Cemetery was 60 nanoseconds (ns). Next, the instrument’s gain settings were adjusted based on local conditions. The gain settings control the scale at which the strength of the recorded data is measured, which makes it possible to visualize deeper and more subtle reflections. This is especially true for those from later in the time window, which tend to be weaker.

Finally, data collection was conducted within the grid as a series of transects, with all transects in a grid parallel to each other (see Figure 3b). It is generally standard practice to orient transects perpendicular to the long axis of suspected features. In this case, data were collected roughly north-south, as Christian graves are generally oriented east-west. The marked graves and depressions in the cemetery are also oriented east-west. Transect spacing was 50 centimeters, an interval that has been demonstrated to generate the best resolution possible while maintaining field efficiency (Pomfret 2005). Transects were collected in a zig-zag pattern, alternating starting direction.

## DATA PROCESSING

All data were downloaded from the control unit to a computer for processing using RADAN 7 (Geophysical Survey Systems 1994). The first data processing step is to set “time zero,” which tells the software where to place the true ground surface in profile (Conyers 2004a:90–91; Patch and Lowry 2018:57). This is critical to getting accurate results when time is converted to depth. A background filter was applied to the data, which removes the consistent horizontal banding that can result from antenna energy “ringing” and outside frequencies (e.g. cell, radio) (Patch and Lowry 2018:57). Range gains were also applied to amplify weaker reflections and make them easier to see (Conyers 2004a:91–95; Patch and Lowry 2018:57).

The velocity of electromagnetic energy traveling through the ground is calculated so that travel time in nanoseconds can be converted to distance in centimeters. The velocity of the electromagnetic energy varies depending on physical and chemical characteristics of the subsoil, including the retention and distribution of water in the soil (Conyers 2004a:45; Patch and Lowry 2018:13–14; Pringle et al. 2015; Schultz and Martin 2012). The general ability of a material to reflect and transmit electromagnetic energy is recorded using a dielectric constant, or relative dielectric permittivity (RDP). RDP values vary based on several physical and chemical factors and, once known, can be directly converted to the velocity. At the Lehev/Chapel Hill Cemetery, the average RDP of the subsurface was calculated using the hyperbola fitting method. Hyperbolas are created in the profile data when electromagnetic energy reflects off of single points and their geometry



is a function of the speed at which energy moves in the ground (Patch and Lowry 2018:30–31; Utsi 2017:6–8). This geometry can be used to calculate the velocity of the waves that produced that hyperbola (Conyers 2004b; Conyers and Lucius 1996; Utsi 2017:8). The average RDP for soils in the survey area was approximately 14.3, which, when converted to velocity, is approximately 7.9 centimeters/nanosecond. All profiles were converted from time in nanoseconds to depth in centimeters using this average velocity.

Once velocity is known, amplitude slice maps can be generated. Amplitude slice maps are a three-dimensional tool for viewing differences in reflected amplitudes across a survey grid at arbitrary depths (Conyers 2004a:148–159). They are generated using computer software that takes the reflected amplitudes in each profile and puts those values together in the data collection grid. The amplitudes of all reflection traces are compared to the amplitudes of all nearby traces along each profile and data between profiles can be interpolated using this information. The result is a three-dimensional block of data. This database can then be “sliced” horizontally and displayed to show the variation in reflection amplitudes at a sequence of depths in the ground.

After the data were sliced, they were exported to a mapping program, Surfer 8 (Golden Software 1993). This software program was used to generate high quality images for interpretation. In Surfer, the slice maps were interpolated using the Inverse Distance Weighted method, then image maps were generated from the resulting files (Golden Software 2018). The resulting slice images were exported as image files.

## GEOPHYSICAL CHARACTERISTICS OF EXPECTED FEATURE TYPES

Most Judeo-Christian cemeteries share common characteristics with respect to burial of the dead. In general, bodies are oriented east-west, with the head facing east to face the rising sun on Judgment Day (Baugher and Veit 2014:41; Matternes et al. 2012:105). Typically, graves are between two and six feet (0.61 and 1.83 m) deep, depending on local conditions and customs (Conyers 2012:132; Matternes et al. 2012:296). Depths can vary greatly depending on the type of soil in the cemetery, the time of year in which the burial occurred, if the grave shaft was excavated using shovels or machinery, and post-burial site conditions.

Generally, graves are visible in GPR profiles as a series of point-source hyperbolas. Point-source hyperbolas are produced by single objects buried in the ground. Graves can produce these types of reflections when radar waves reflect off the side or bottom of the shaft, a coffin or casket, or void spaces within the grave. In plan view, graves tend to be oblong to accommodate both the use of coffins and caskets and burial in prone positions. Sizes can vary considerably, particularly between adults and infants, with most adults measuring approximately six feet long and two feet wide (Matternes et al. 2012:301).

Several factors influence the overall effectiveness of geophysics for detecting anomalies that match expectations for individual graves. Contrast between the remains, grave shaft, coffin, or casket and the surrounding soils is the most important variable (Conyers 2012:137–139). Remains that have a chemical or physical contrast from the subsurface materials surrounding them will cause GPR reflections of electromagnetic energy. Age of the graves is critical to this contrast. Older graves typically have less contrast and are harder to detect because they have had more time to decompose and are less likely to have intact coffins or caskets (if they were present to begin with) (Conyers 2012:137–140).

The burial “container” that the physical remains may have been placed in is also important. This includes simple linen or cloth shrouds, pine boxes or wooden coffins, lead or other metal caskets, and burial vaults (Baugher and Veit 2014:36–39, 2014; Conyers 2012:132–140). In certain cases, hardware such as nails, hinges, and handles may be present, but not necessarily all the time (Baugher and Veit 2014:36–39; Matternes et al. 2012:319–320). Although there is a high degree of variation in specific container types among different geographical regions, each of these tends to have been used at certain times throughout history and correlates with the presumed age of the grave. For example, burial shrouds were common throughout the seventeenth and early eighteenth centuries before being replaced by wooden coffins (Baugher and Veit 2014:36–39).

Cultural trends and patterns also tended to persist much longer in rural and/or economically depressed areas than in urban centers (Matternes et al. 2012:315–316, 318). The Lehw/Chapel Hill Cemetery is in a rural area, and it is possible that some of the people buried here did not have access to formal funerary materials such as caskets, coffins, or professionally made memorials (Patch and Lowry 2018:19). Burial containers made of less substantial material, such as wood or cloth shrouds, can make the GPR data harder to interpret.

The age of the graves also impacts the strength of the reflection visible in GPR imagery. An older grave will produce more subtle contrast in the GPR profiles since it will have had more time to decompose and take on the characteristics of the surrounding soils. There is evidence of many unmarked and poorly marked graves or graves with displaced markers in the cemetery and the age of these unmarked graves is unknown.

## MARKER MAPPING

The Lehw/Chapel Hill Cemetery is a mowed cemetery. Graves are marked by formal headstones, funeral home markers, wooden markers, fieldstones, and depressions. Cemetery features were mapped using an RTK GPS system and were digitized in ArcGIS Software as shapefiles. This project did not include a full marker inventory. Marker corners were recorded for the purpose of classifying anomalies as marked or unmarked. The locations of markers were compared to the results of the GPR survey to determine if the GPR anomalies were associated with above-ground features.

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### III. HISTORIC CONTEXT

The first European reference to the area of the Lehev/Chapel Hill Cemetery came from a traveler crossing the "Little Charlotte" River in 1734 (Lewis 2002). By 1747, the French were including the Shallot (Shallotte) River on their maps of the coast of the Carolinas. By 1762, families from New Jersey and New England had settled in southern Brunswick County to fish the Atlantic Ocean and tidal rivers (Sprunt 1914:539). They established settlements along Lockwood's Folly River and the Shallotte River. Living in small, modest cabins and frame buildings in their "sleepy fishing villages," inhabitants in the area also farmed and produced naval stores (Johnson 2006; Wilson 2011).

At the northern end of Shallotte Point, where the Shallotte River bends toward the west, the Chapel Hill community emerged. "C.H." on John Reid's 1796 map of North Carolina stands for Chapel Hill, and two roads are shown through it, one leading to Wilmington and Georgetown, South Carolina, and its naval stores, and another to Brunswick on the Cape Fear River. River travel, however, was the preferred mode of transportation, as the sandy roads hindered overland travel (Lewis 2002). In 1837, residents founded a post office and the Chapel Hill Baptist Church, located near the Lehev/Chapel Hill Cemetery (Miles 2016; Pope 2016). Shallotte, Brunswick County, first appeared in the 1850 census, suggesting Chapel Hill had become known as Shallotte by then.

In 1845, the State of North Carolina deeded 100 acres just northeast of Shallotte to Benjamin Lehev (Brunswick County, NC Registrar of Deeds 1845). By the mid-nineteenth century, settlement in Brunswick County grew due to the boom of naval store production. A network of roads that had not existed earlier in the century are shown on the *Map of a Part of Brunswick County*, drawn by William H. James for the Confederate Army in 1863 (Figure 4). Georgetown Road ran just to the north of the Lehev/Chapel Hill Cemetery, established by 1873 at the earliest.

The town of Shallotte, incorporated in 1899, had not taken the form of a town until the 1890s. Newspaper descriptions then described its public bridge, several "good buildings" and small residential lots, and its population of 100 people within a one-mile radius (Landmark Preservation Associates 2010:23). Shallotte contained five stores, two saw and grist mills, two turpentine distilleries, a large cotton gin, a blacksmith shop, and a shoe shop (Landmark Preservation Associates 2010:23). Both the town of Shallotte and the Lehev/Chapel Hill Cemetery were located within the Lockwoods Folly Township, not the Shallotte Township, which lay west of the Shallotte River.

In 1910, the *Map of Brunswick County N.C.* by Charles Henry Smith showed that the main roads around Shallotte remained the Georgetown Road, which led through the town, and New Britten Road, which ran from Shallotte to the northwest (Figure 5). Lower Shallotte Road headed northeastward from Georgetown Road in the vicinity of Chapel Hill Church to Supply. The Lehev/Chapel Hill Cemetery was situated in between the Georgetown and Lower Shallotte roads. In 1929, State Highway 30 was constructed to connect Wilmington to Little River, South Carolina via Bolivia,

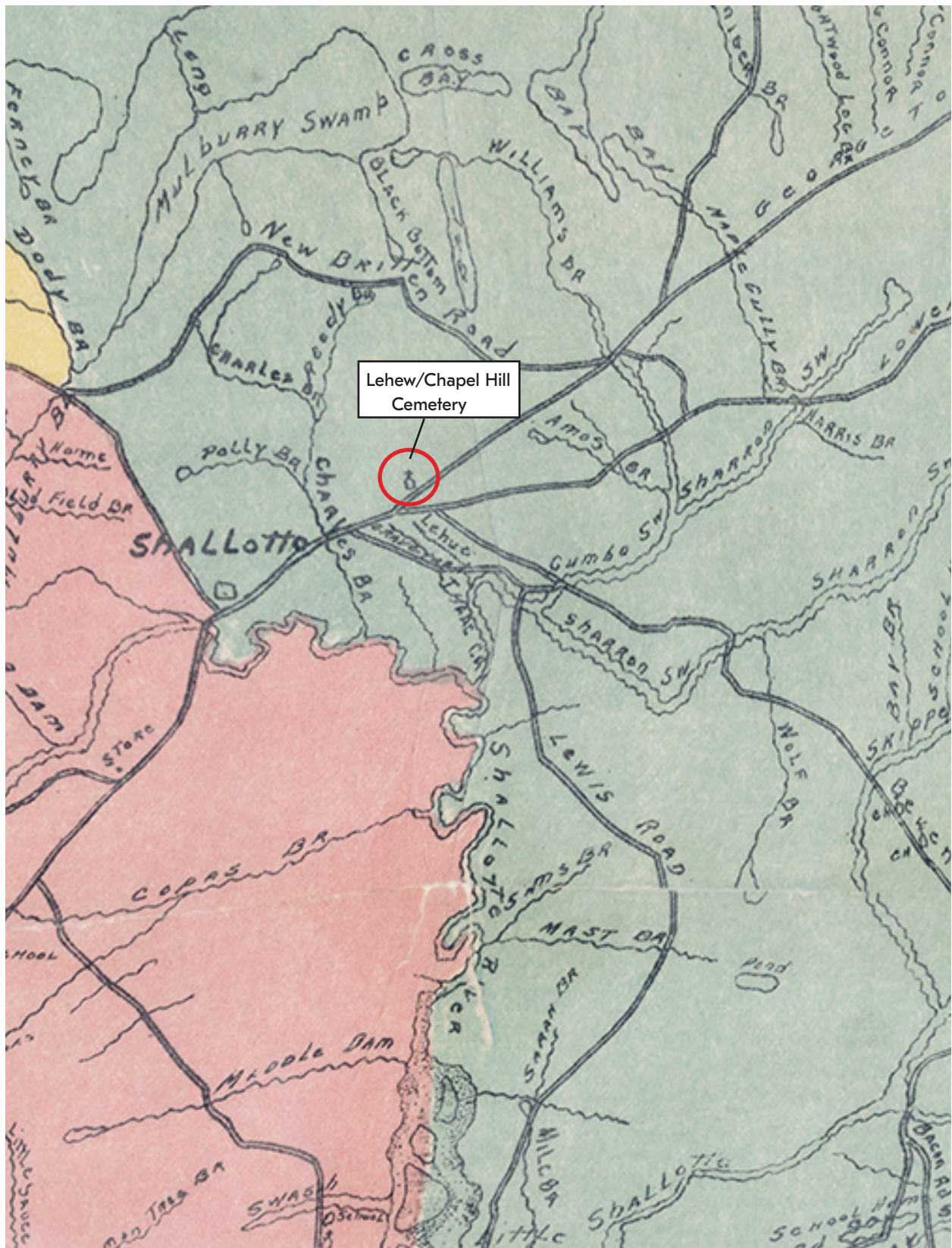
Figure 4. Map of a Part of Brunswick County, North Carolina



Source: James 1863

HISTORICAL STRUCTURE SURVEY REPORT AND GROUND-PENETRATING RADAR SUPERSTREET CONVERSION OF US 17 AT INTERSECTIONS WITH WILDWOOD/MAIN STREETS AND MAIN STREET (BOTH US 17 BUSINESS) AT THE LEHEW/CHAPEL HILL CEMETERY (RESOURCE BW0415 AND SITE 31BW866) BRUNSWICK COUNTY, NORTH CAROLINA

Figure 5. 1910 Brunswick County Map



Source: Smith 1910

Supply, and Shallotte, and it replaced Georgetown Road. From the northeastern end of Shallotte's Main Street (the former Georgetown Road), State Highway 30 extended straight to the northeast, passing immediately to the south of and bordering the cemetery. State Highway 30 was renamed U.S. Highway 17 only four years later in 1934.

The farming community of "Red Bug," to the northeast of Shallotte and southwest of the Lehw/Chapel Hill Cemetery, was developed in the early twentieth century around the Red Bug school and the Lettie's Grove Church (later the First Holiness Church), both built on land of the former Lehw (also spelled Lehue) family estate. The church was located on the south side of U.S. Highway 17, directly across from the Lehw/Chapel Hill Cemetery.

The U.S. Army Corps of Engineers dredged the Intracoastal Waterway in the 1920s and 1930s, attracting postwar development along the barrier islands in Brunswick County. Later, in the 1950s and 1960s, the coastal area transformed into a vacation and recreational spot full of beachfront homes. Despite the nearby development, the area surrounding Shallotte kept its rural, agricultural setting of mostly farm fields and farmsteads.

By 1962, Red Bug Road was established, running south from the Lettie's Grove Church and U.S. Highway 17 to Holden Beach Road. Brunswick County named the town of Bolivia, situated along U.S. 17 northeast of Shallotte, the new county seat in 1977. The stretch of U.S. 17 through Shallotte to the Lehw/Chapel Hill Cemetery was a federal-aid primary highway system, according to the 1980 Brunswick County map.

Traffic from Wilmington to Myrtle Beach steadily increased along this main corridor through the county, and by the early 1990s, Shallotte had developed into the central shopping and social hub of southwestern Brunswick County. A four-lane bypass was needed around the northern periphery of Shallotte to handle the traffic (*Star-News* 1998:34). The former Georgetown Road/U.S. 17 through downtown Shallotte then became the business route to the new parent highway. Shallotte has experienced a continued population boom. Its residents numbered 4,092 in 2017, a 196 percent increase since 2000 (*City-data.com* 2019).

## IV. LEHEW/CHAPEL HILL CEMETERY

Resource Name	The Lehev/Chapel Hill Cemetery
HPO Survey Site	BW0415
Location	N. side of Ocean Highway West (U.S. 17) at junction with Red Bug Rd.
PIN	109810471077 and 109810472265
Date(s) of Construction	c. 1873
Recommendation	Recommended Not Eligible

### DESCRIPTION AND SETTING

The Lehev/Chapel Hill Cemetery is located on the north side of U.S. 17 at its intersection with Red Bug Road and is approximately 1,200 feet from the intersection of U.S. 17 and Main Street (Business 17) (Figure 6). It is just outside of the eastern city limits of Shallotte by about 600 feet. The two 2.34-acre parcels (PIN 109810471077 and 109810472265) are bound on the west and north by Bozeman Loop, on the south by U.S. 17, and on the east by a gravel drive leading to private property on Bozeman Loop. Bozeman Loop and the gravel road encompass the cemetery, and just beyond that a tree line of deciduous and coniferous trees surrounds the cemetery.

Approximately 200 feet north and northeast of the cemetery are a barn, a residence, and several other outbuildings. To the south of the cemetery, across U.S. 17, several non-historic buildings that function as businesses, a school, and a church are present. The setting of the cemetery is otherwise wooded to the northwest and mixed residential commercial to the east.

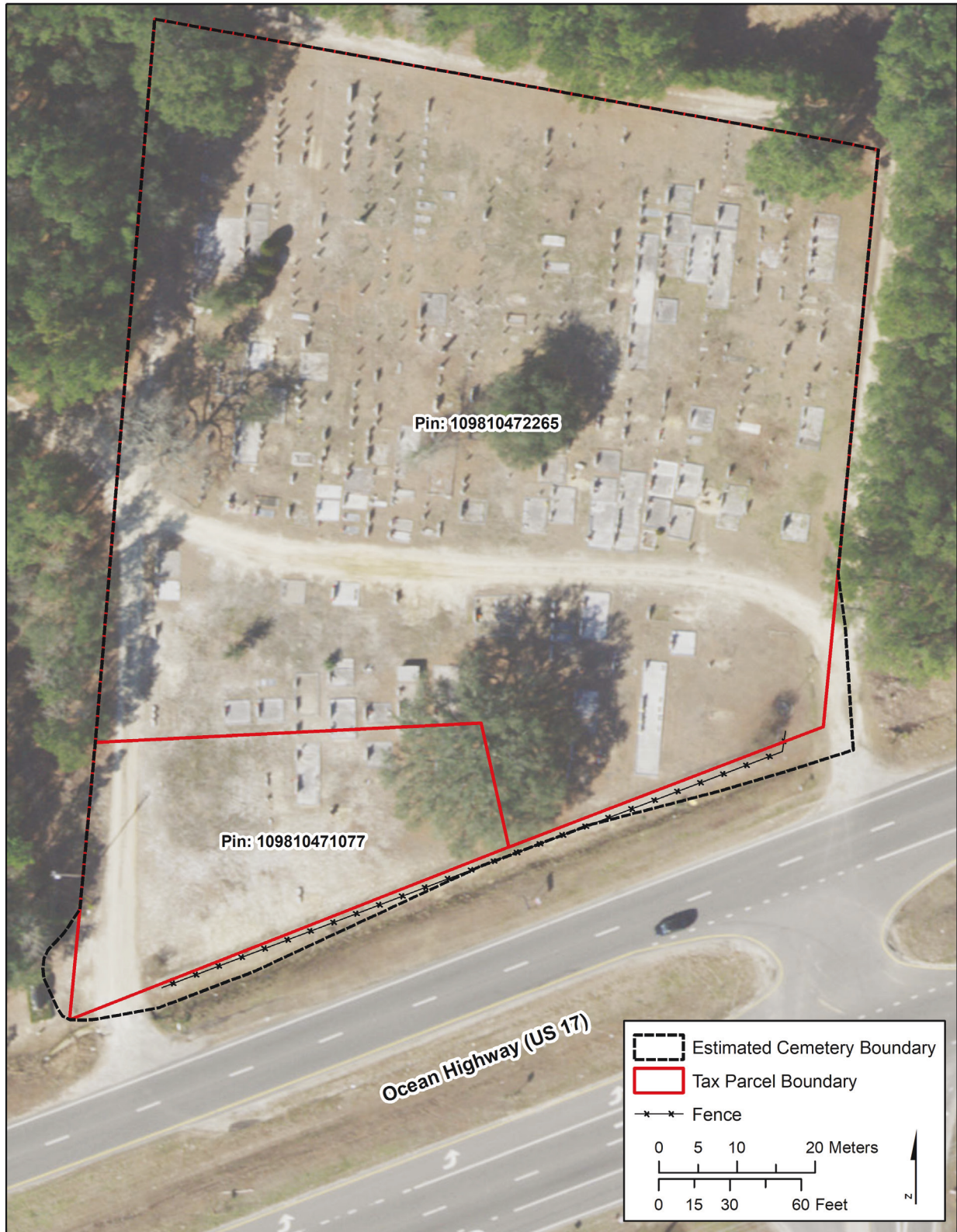
### THE LEHEW/CHAPEL HILL CEMETERY

The Lehev/Chapel Hill Cemetery has two entrances/exits off U.S. 17 and a gravel-paved drive that loops around the cemetery. A flagpole stands at the southeast entrance and there is a chain link fence that marks the boundary of the cemetery along the US 17 ROW (Figure 7). An east-west gravel drive also bisects the cemetery, separating the oldest portion of the cemetery from the newest. Three mature trees planted before the 1950s stand within the cemetery, two pine trees at the northern corners of the older section and one large tree in the newer section (Figure 8). Several other mature and young trees are present throughout, but the cemetery is mostly open. Crepe myrtle shrubbery grows at the two cemetery entrances.

The cemetery consists of both unmarked and marked graves with headstones and footstones made of stone, poured concrete, cinder blocks, and wood. Gravel, bricks, and both large and small stone and poured concrete slabs, one with tiles, also mark graves. The graves are oriented east-west (Figure 9).



Figure 6. The Lehev/Chapel Hill Cemetery, Parcels, and Aerial Site Plan



Imagery Source: Vivid Maxar 2019

Figure 7. The Lehev/Chapel Hill Cemetery at the Entrance, Looking Northwest



Figure 8. The Lehev/Chapel Hill Cemetery at the Northwest Corner (Older Section), Looking Southeast

Figure 9. Headstones, Looking Southwest



According to marker names, dates, and descriptions, the northwest quadrant of the Lehw/Chapel Hill Cemetery contains the Lehw family with 12 graves and is the oldest portion of the burial ground (Figure 10). The two oldest marked graves within this section of the cemetery, with dates of 1873 and 1878, belong to two daughters of Benjamin and Julia Lehw (Figure 11). Benjamin W. Lehw, who purchased the property, was buried next to his daughters in 1898 (Figure 12). Markers just west, east, and south of the two original graves contain the surnames Hawes, Lewis, Stanland, Holden, and White and date to the 1880s and 1890s. West of this nineteenth-century section, the graves of the Holmes, Swain, Danford, and Rabew families date to the 1910s and 1920s, while east of the Lehw section, graves of the Mooney, Turner, Kirby, Pittman and Hewett families also date to these decades. The cemetery first expanded out in parallel rows. It then grew toward the south with each row extended in the 1930s and 1940s and farther to the edges of the cemetery at the gravel drive through the 1960s. In the early 1970s, the southern portion of the cemetery nearest to the road was opened, and it continues to receive interments (Figure 13). Other interments within the past 50 years have occurred in the northern portion of the cemetery, filling in space in between rows or included with plots established decades ago.

A WPA researcher in 1940 recorded 102 marked and 249 unmarked graves (Landmark Preservation Associates 2010:D-8). The unmarked examples may have once been marked with wooden stakes, carved headboards and footboards linked by wooden grave-rails, cinder blocks, or other markers without inscriptions. In both white and Black family cemeteries, and rural church graveyards in North Carolina, a long tradition of creating homemade grave markers out of economic necessity continued well into the mid-twentieth century (Little 1998). When inhabitants of rural Brunswick County could not afford permanent, inscribed markers for their loved ones, simple stones, shells, gravemounds, wooden stakes, or carved wood headboards and footboards were commonly used. In fact, the 1940 survey found that wooden or other uninscribed markers outnumbered stone and concrete markers in some Brunswick County cemeteries by 10 to one (Landmark Preservation Associates 2010:42).

At the Lehw/Chapel Hill Cemetery, one intact three-part wooden grave marker remains (Figure 14). It features a discoid headboard and footboard with square "bed knob" shoulders, connected by a horizontal wooden grave-rail fitted into slots. Another grave nearby contains the headboard and footboard, but is missing the grave-rail (Figure 15). The graves immediately surrounding the two remaining carved wooden marker graves date to the 1880s and 1890s, suggesting a similar date of construction and placement. These graves with the headstones, footstones, and grave-rails are known as "bedstead" graves. In England as well as America, wooden "bedstead" markers were fashionable during the mid-nineteenth century and in use in North Carolina through at least the 1940s (Little 1998). Some bedstead graves in cities with wealthy residents were elaborate, made of stone, and resembled cradles or actual beds. However, in rural areas, the three wood components

Figure 10. Lehew Family Section, Looking Northwest



Figure 11. Oldest Lehew Family Graves (1873 and 1878), Looking Northwest

Figure 12. Benjamin Lehew Grave, Looking Southwest



Figure 13. Newer Section of Cemetery, Expanded in the Early 1970s, Looking Northeast



Figure 14. Wooden Markers, Looking South-Southwest

Figure 15. Wooden Markers, Looking Northwest



as seen in the LeheW/Chapel Hill Cemetery represented the same idea of eternal rest, albeit simplified. Other still extant wooden bedstead graves can be found in Brunswick County as well as in Cumberland and Lee counties, North Carolina and the coastal plain of Georgia (Landmark Preservation Associates 2010; Little 1998).

Diamond-head wood markers, now collapsed from decay and lying on the ground, are also evident at the cemetery. Some of the larger, more unique grave markers in the LeheW/Chapel Hill Cemetery include two white marble obelisks for Jackson Stanland (1908) and John H. White (1916) (Figure 16). The cemetery also has a few memorial markers, such as the one in honor of Julia Hewitt LeheW's brothers, both prisoners of war who died in 1863 and 1865, and the "Woodmen of the World" tree stump memorial marker for J.H. Long (1912) (Figure 17). In the northern and eastern parts of the cemetery, unmarked graves are present (Figure 18).

Existing graves in the cemetery with visible but not necessarily inscribed markers currently number between 350-400 markers and a possible 450-500 individuals interred. However, unmarked graves increase this number. FindaGrave.com lists 739 grave entries for the cemetery, but many of these entries are labeled as unmarked stones, contain unknown death dates, or may be inaccurate burial site locations.

A NCHPO survey form was prepared for the LeheW/Chapel Hill Cemetery by Landmark Preservation Associates during the 2010 Comprehensive Historical/Architectural Site Survey of Brunswick County, North Carolina. As a result of the 2010 survey, the cemetery was added to the North Carolina Study List.

## HISTORY

When farmer Benjamin W. Lehue purchased his 100-acre lot from the state in 1845, there is no indication of a cemetery on the land prior to then. Church records from that time do not exist, but local history claims the Chapel Hill Baptist Church was founded in 1837, and a church was built near the cemetery. In 1886, a new Chapel Hill Baptist Church was built on the north side of Georgetown Road closer to Shallotte and about a mile southwest of the cemetery (North Carolina State Historic Preservation Office 1990).

The 1863 James map (see Figure 4) shows a cleared area and building stood along a branch running north from Sharon Creek. Although the owner is not labeled on the map, this house and surrounding farmland is presumed to be the LeheW estate. The 1910 Brunswick County map (see Figure 5) shows "Lehue Creek" in this vicinity. This cleared area along the creek corresponds to the general area of the current intersection of Main Street and U.S. 17. The location of the cemetery was just northeast of the Lehue homestead.

Figure 16. Obelisk Markers,  
Looking Northeast



Figure 17. Woodmen of the World  
Memorial Marker, Looking East

Figure 18. Open Unmarked Area  
in Northern (Older) Section,  
Looking South



An unknown amount of the western portion of the Lehue acreage was deeded to Enoch Robbins in 1852, and in 1875, Benjamin W. Lehue deeded 27 acres to John Mooney (Brunswick County, NC Registrar of Deeds 1875). In 1897, Benjamin and his wife Julia deeded their son, Benjamin M. Lehue, 13 acres from which was excepted "one acre for the graveyard" (the Lehue Cemetery) (Brunswick County, NC Registrar of Deeds 1897). Benjamin M. operated a store in Shallotte at that time. That year, Benjamin W. and Julia Lehue also deeded to their children a 26-acre tract and two other 13-acre tracts along the west and south sides of Amos Branch (which then ran west from the present Williams Branch) to the northeast, east, and southeast of the cemetery. In these and subsequent deed transactions from the early twentieth century, "two pines south of the graveyard" is used as a boundary reference point for the neighboring parcels of land.

The granite slab for Benjamin W.'s grave in the Lehue section of the cemetery contains text regarding the "late 1800's" Lehue family donation of land. This land was donated for the school in Red Bug, as well as The First Holiness Church, which was changed in the late 1930s or early 1940s to Lettie's Grove Church in honor of the Rev. Lewis' wife (Planning & Community Development Department 2010:76). This church stood at the site of the current Highest Praise Church across from the cemetery. It is unclear when exactly this land donation occurred. Benjamin and Julia had six children under the age of 15 in 1870, and none of them were listed as able to read or write in the federal census. By the 1880 census, three of his children were attending school. It is possible that the Red Bug school was established as early as the 1870s. Benjamin and Julia may have donated the land for the school and church in 1897, when they also deeded their land to their children, or Julia may have donated the land after Benjamin passed away a year later in 1898.

The Lehue/Chapel Hill Cemetery was not included in the deeds of sale from Benjamin and Julia Lehue to their children in 1897, so the cemetery itself may have been "donated" to the Chapel Hill Baptist Church (and later the First Holiness Church) by then. The cemetery only served as a family cemetery in the 1870s. By the 1880s and 1890s, other members (perhaps extended family) of the community were interred there. The first known survey to inventory the graves and stone inscriptions in the cemetery took place in 1940, recorded by WPA worker Eleanor S. Niernsee.

With the construction of State Highway 30 in 1929, the Lehue/Chapel Hill Cemetery transformed from an out-of-the-way rural cemetery outside of Shallotte to a visible, accessible cemetery along a major artery through Brunswick County. As the area saw growth in the 1960s and 1970s, the cemetery also grew. The interments increased southward to meet the boundary of U.S. 17.

## ARCHITECTURAL CONTEXT

In the nineteenth century, the agricultural economy and sparse population of Brunswick County led families with small farms to establish cemeteries on their own land. While churches existed, the common custom was to bury loved ones near home. Other local cemeteries in the Shallotte area developed similarly to the Lehue/Chapel Hill Cemetery, originating as family cemeteries in the



early to mid-nineteenth century before expanding to community cemeteries toward the end of the century. Two comparable nearby properties were visited and examined for comparison: the Parker (Brooks) Cemetery and the Mintz Cemetery (Figure 19). They are not in the NCHPO database, but the grave markers at both cemeteries were inventoried in 2006 for the North Carolina Genweb website.

The Parker (Brooks) Cemetery is similar to the Lehew/Chapel Hill Cemetery in that it started as a mid-nineteenth century family cemetery then grew into a community cemetery, expanding outward. Although it does not contain wooden markers, many of the 182 stone and concrete markers for approximately 200 individuals resemble those at the Lehew/Chapel Hill Cemetery. The Mintz Cemetery is about the same size as the Lehew/Chapel Hill Cemetery in the number of people interred (about 480 individuals), and several burial areas are listed as unmarked. The oldest marker in the Mintz Cemetery dates to 1880, but unmarked graves could indicate an earlier date of establishment. These unmarked graves may have originally contained wooden markers that have since deteriorated. As with the Lehew/Chapel Hill Cemetery, no structures or buildings are present on the two comparable cemetery properties.

Figure 19. Photographs of the Parker/Brooks and Mintz Cemeteries



A. Parker/Brooks Cemetery, Looking East



B. Mintz Cemetery, Looking Northeast

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## V. GPR RESULTS AND INTERPRETATIONS

### MARKER MAPPING

New South identified 47 individual cemetery features in the surveyed area. No inventory was completed, so it is unknown how many individual graves this represents, but it is assumed to be approximately 20-30. (Figure 20). These cemetery features are roughly arranged in rows of graves oriented east-west. Markers indicate family plots and individuals. Very few grave markers were identified and most of the area surveyed, as well as the ROW, had none visible.

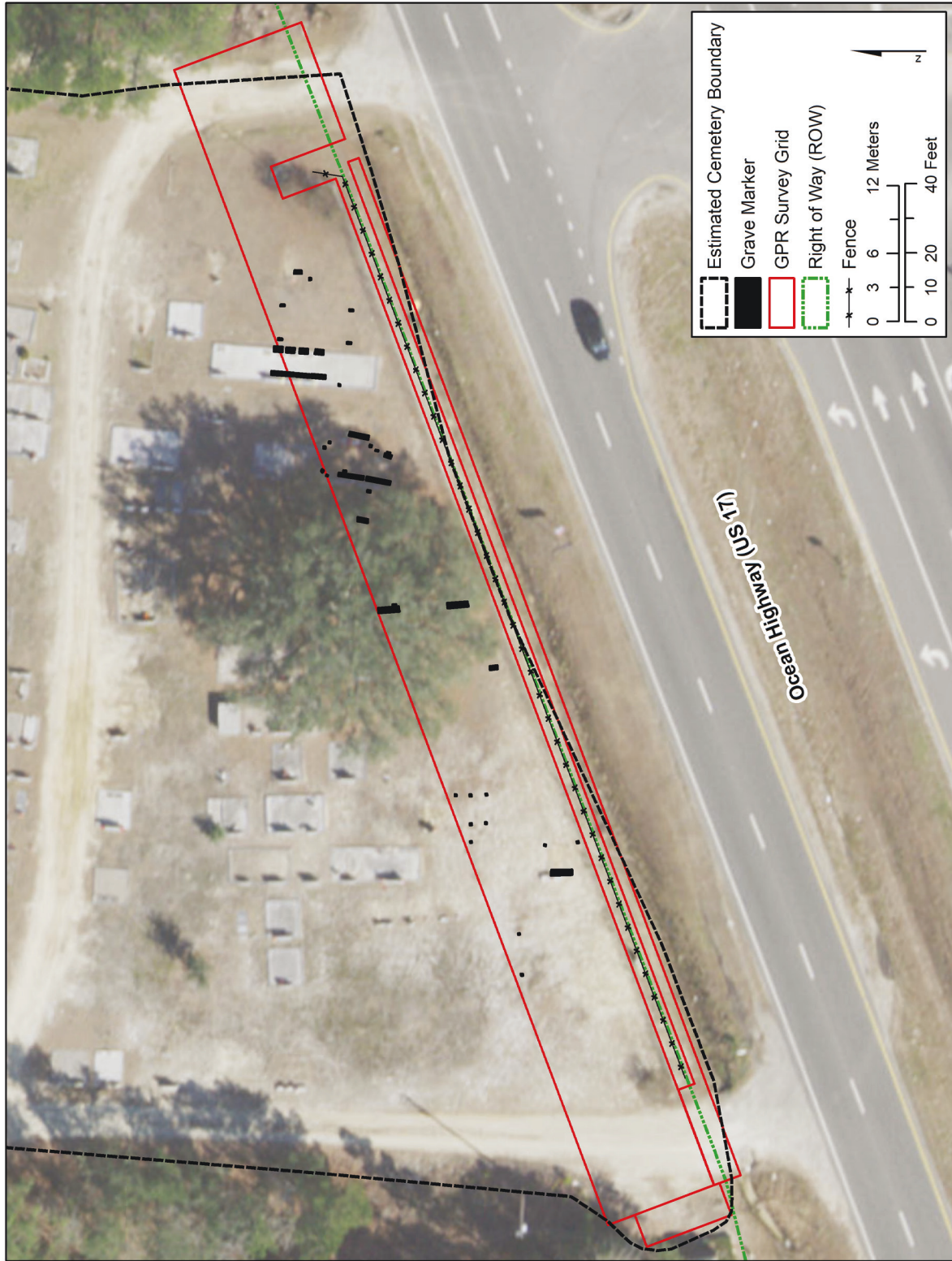
New South takes a conservative approach to the identification of graves detected with geophysical data. In this case, conservative means that if an anomaly has any of the attributes of a grave, it is marked as a probable or possible grave. The distinction is made based on multiple variables, including strength of reflection, depth, and location, and represents different confidence levels. In short, probable = high confidence and possible = lower confidence, but still cannot be excluded without further study. Because of this, it is likely that some of the probable and possible graves are false positives. It is impossible to conclusively ascertain the presence of graves without excavation, and caution is used in all interpretations made with GPR.

### GROUND-PENETRATING RADAR RESULTS

The GPR results were based on analysis of the 350 MHz data, including individual reflection profiles and amplitude slice maps (Figures 21-26). In the GPR results, 128 probable graves and 55 possible graves were identified (Figure 27, Table 3, Appendix A). Of these, 25 probable graves are marked. All markers within the surveyed area appear to be associated with GPR anomalies. The remaining 158 probable and possible graves are unmarked. There are four grave anomalies (2 probable grave and 2 possible graves) located outside of the cemetery fence within the ROW north of US 17. Marker alignment and grave anomalies suggest that the graves are aligned east-west in the manner of Christian cemeteries.

**Table 3. Summary of Graves Identified with GPR**

Feature	Marked	Not Marked (Out-side of ROW)	Not Marked (Within ROW)	Total
Probable Grave	25	101	2	128
Possible Grave	0	53	2	55
Total (Probable and Possible)	25	154	4	183



Imagery Source: Vivid Maxar 2019

Figure 20. Marker Map

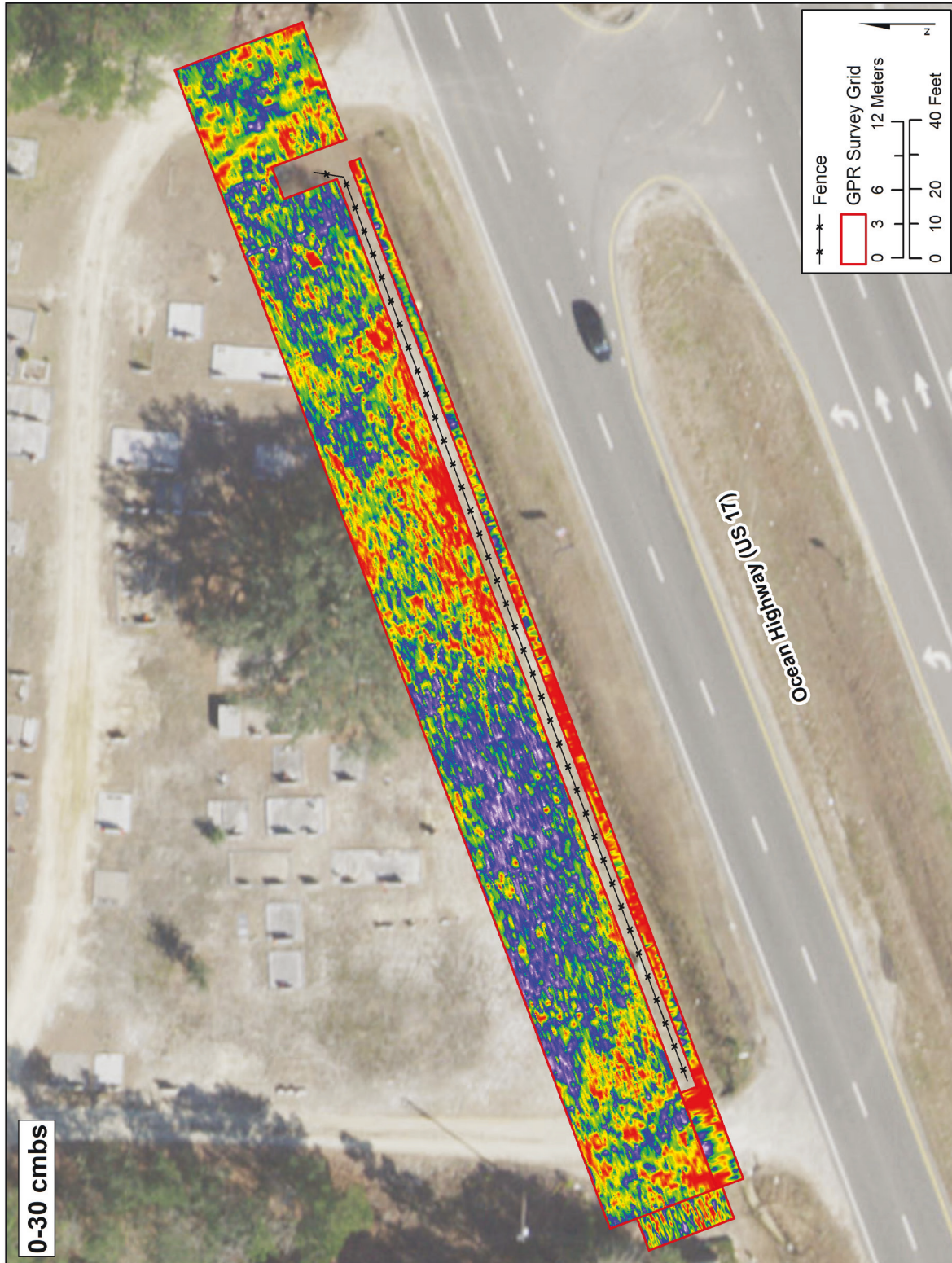
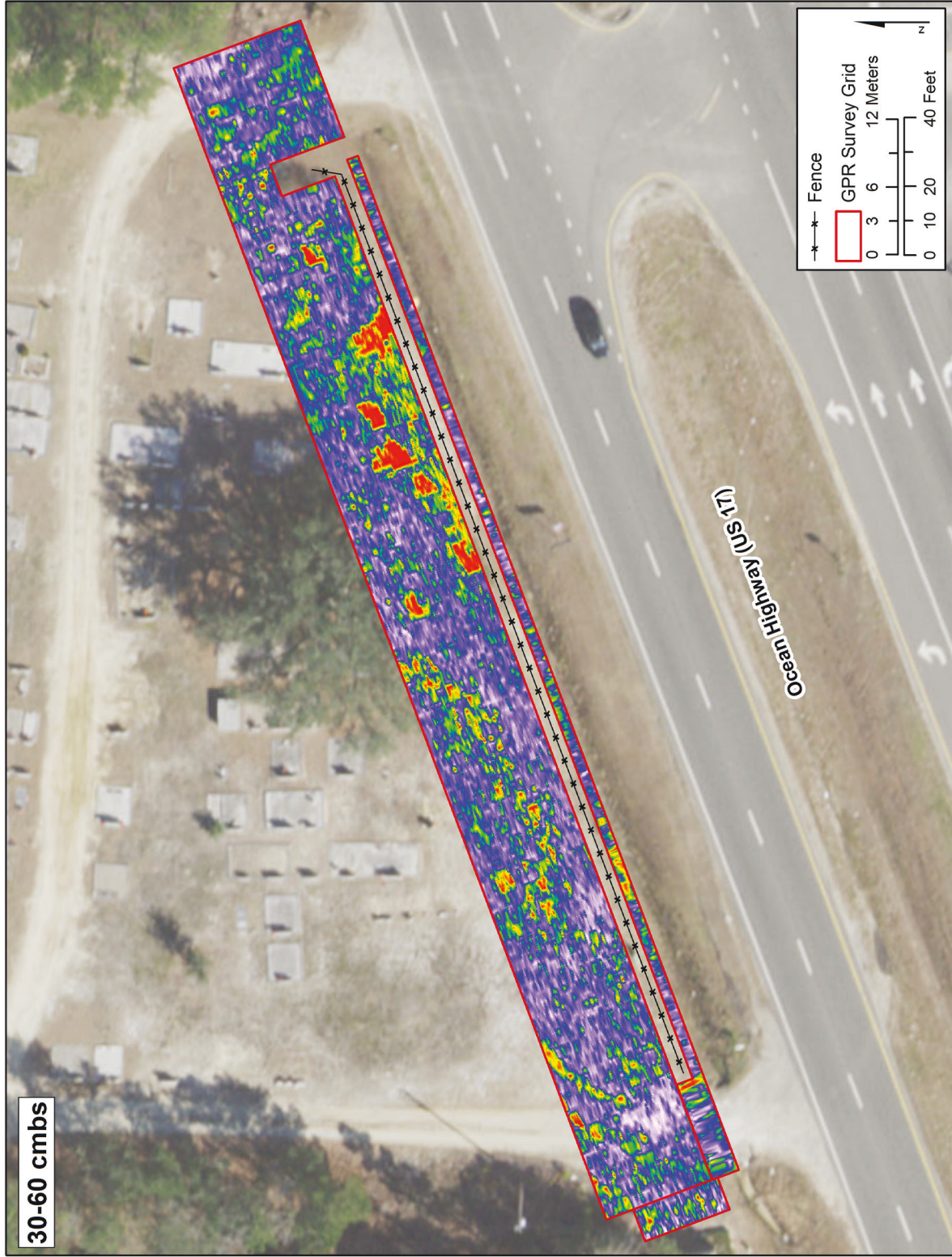


Figure 21. GPR Amplitude Slice Map, 0–30 Centimeters Below Surface (cmbs)



Imagery Source: Vivid Maxar 2019

Figure 22. GPR Amplitude Slice Map, 30–60 cmbs

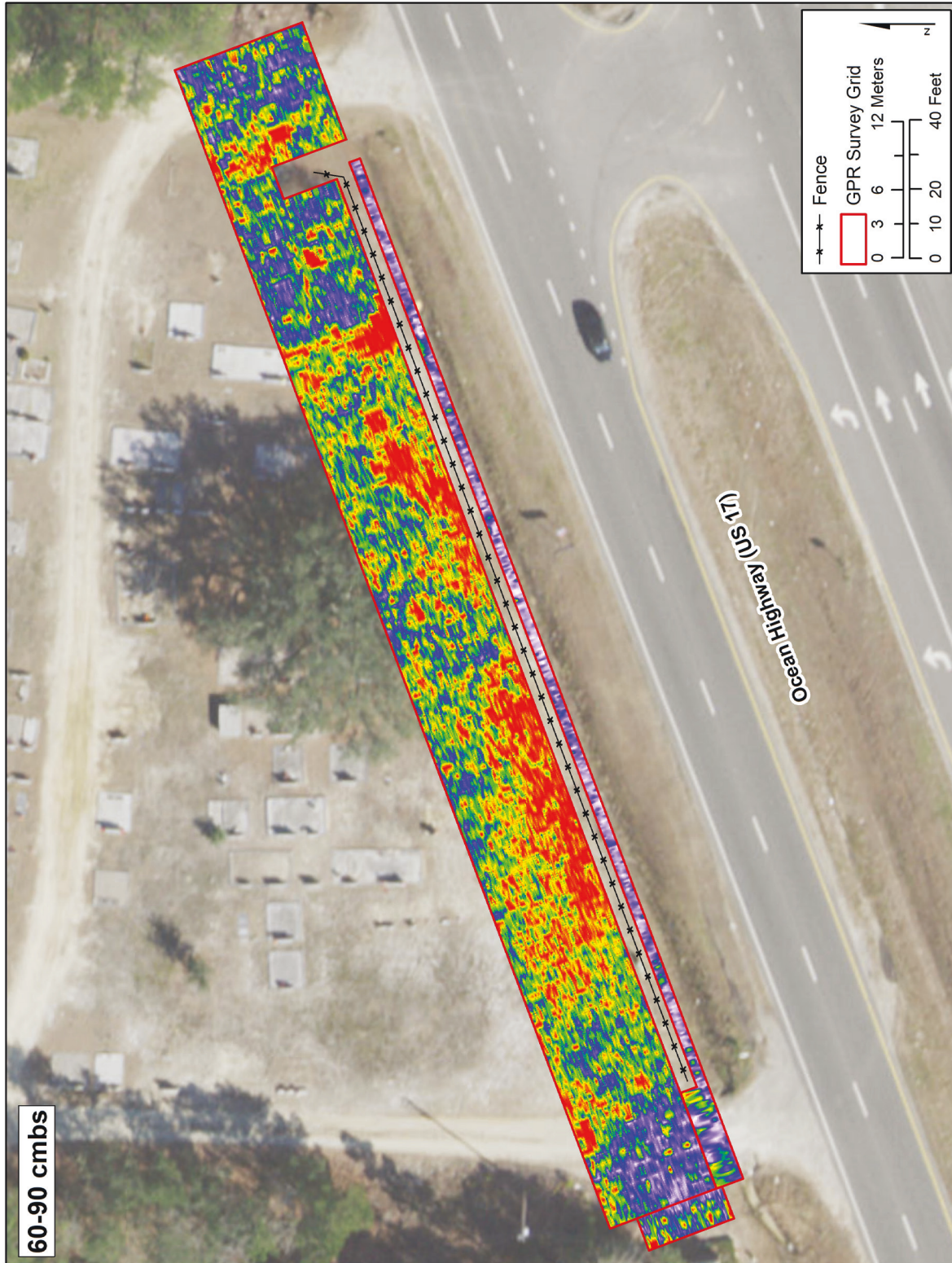


Figure 23. GPR Amplitude Slice Map, 60–90 cmbs



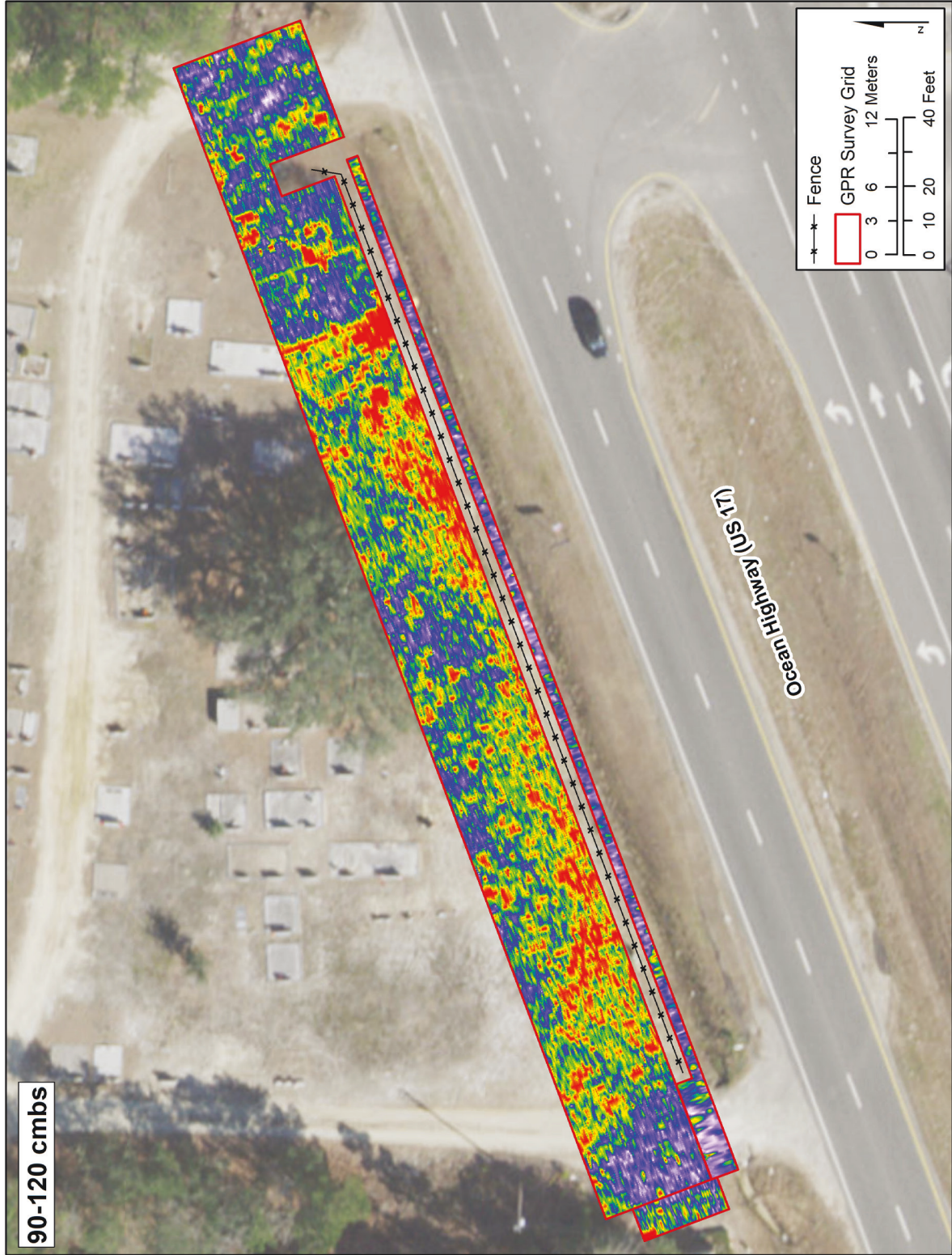
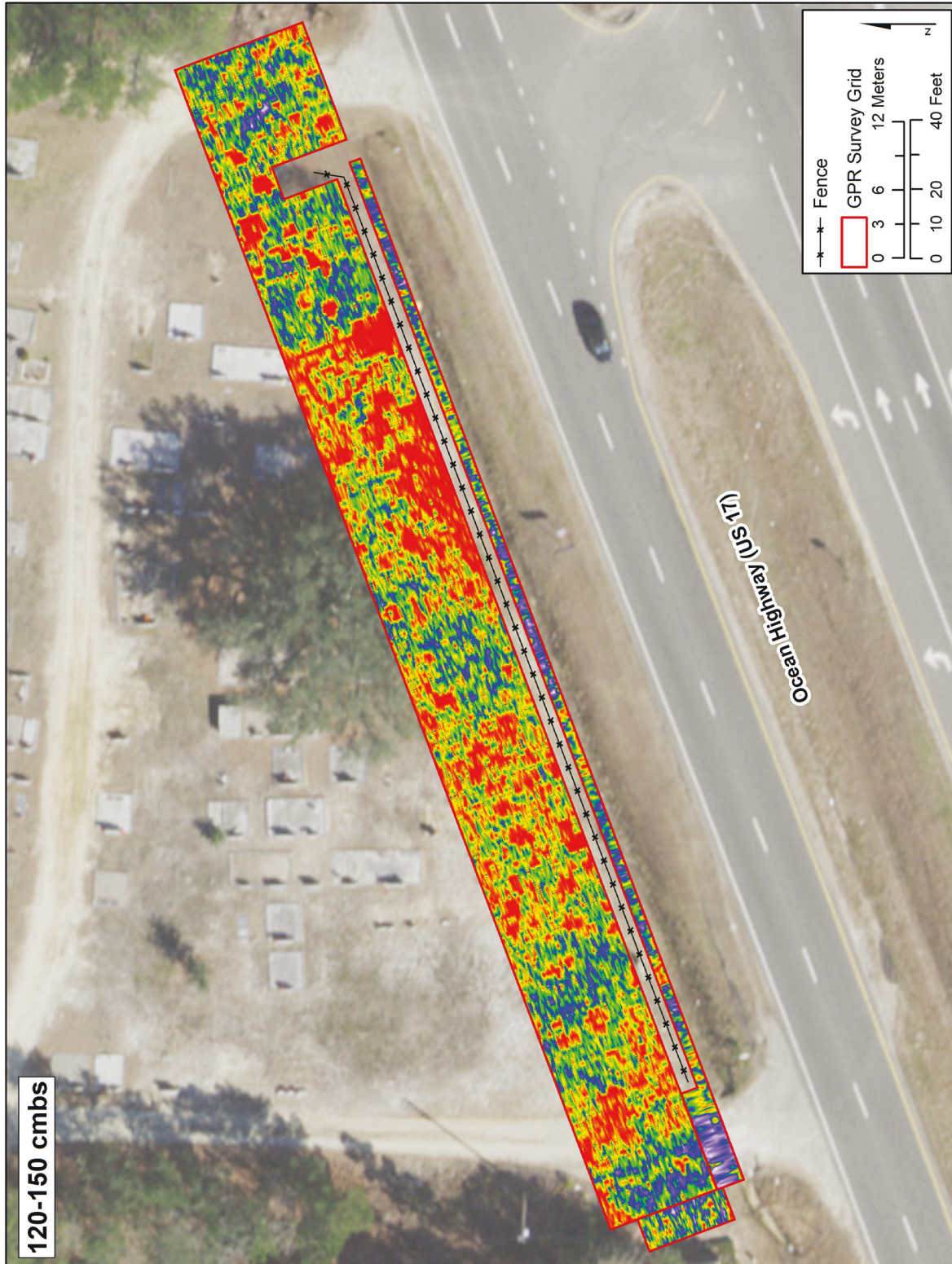
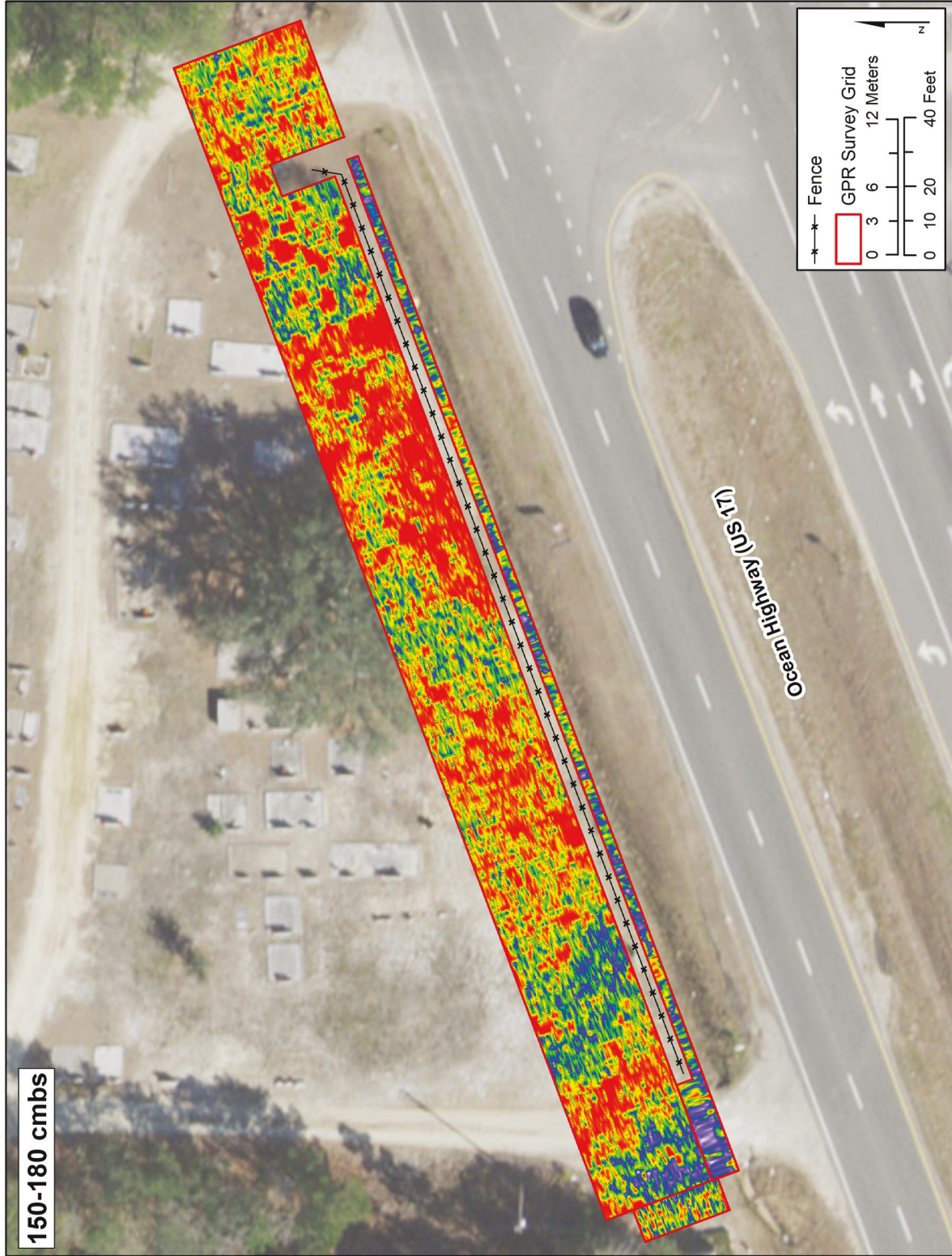


Figure 24. GPR Amplitude Slice Map, 90–120 cmbs



Imagery Source: Vivid Maxar 2019

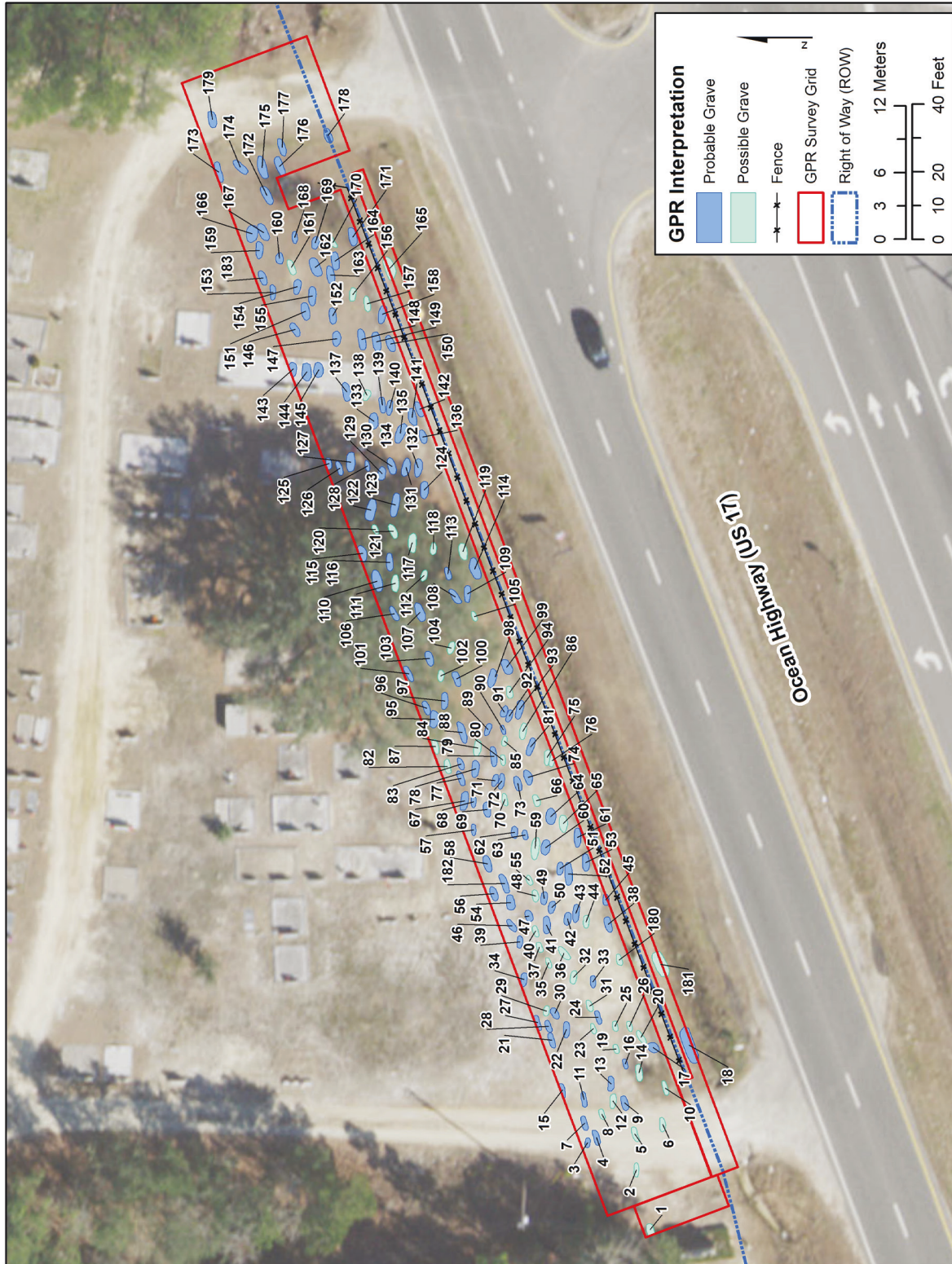
Figure 25. GPR Amplitude Slice Map, 120–150 cmbs



Imagery Source: Vivid Maxar 2019

Figure 26. GPR Amplitude Slice Map, 150–180 cmbs

HISTORICAL STRUCTURE SURVEY REPORT AND GROUND-PENETRATING RADAR SUPERSTREET CONVERSION OF US 17 AT INTERSECTIONS WITH WILDWOOD/MAIN STREETS AND MAIN STREET (BOTH US 17 BUSINESS) AT THE LEHEW/CHAPEL HILL CEMETERY (RESOURCE BW0415 AND SITE 31BW866) BRUNSWICK COUNTY, NORTH CAROLINA



Imagery Source: Vivid Maxar 2019

Figure 27. Map of Interpretations

## PROBABLE AND POSSIBLE GRAVES

Probable graves (N=128) are interpreted as likely to be graves based on characteristics in plan and profile and their location within the cemetery. Probable graves were typically identified as a series of point-source reflections in profile view (Figure 28). These reflections are typically produced by the grave shaft, casket, or voids. In plan view they were oblong and the approximate size and shape expected of adult graves (Matternes et al. 2012:301).

Twenty-five of the probable graves are associated with a marker and 103 are unmarked (see Figure 27, Table 3). Two of the unmarked probable graves (Anomalies 18 and 178) are located within the ROW. There are four unmarked probable graves located underneath cemetery roads (Anomalies 3, 4, 7, and 179). The remainder of the marked and unmarked probable graves are located within the marked cemetery and to the west and east of the road and driveway enclosing the cemetery.

Possible graves (N=55) are those where there is less certainty about the interpretation (see Figure 27, Table 3). These anomalies lack some of the characteristics of graves in profile or plan view, are outside of the marked cemetery area, and do not follow expected patterns (Figure 29). There are two possible graves located within the ROW (Anomalies 165 and 181). There are four probable graves located underneath the cemetery road (Anomalies 2, 5, 6, and 8). One probable grave is located west of the cemetery road near the tree line (Anomaly 1).

Depth estimates for the probable and possible graves range from 15-200 centimeters (0.5-6.5 ft.) below the ground surface (cmbgs). These depths reflect the extent of the ground disturbance and not necessarily the depth of the interment. The depth of reflections depends on which part of the grave is reflected. A grave shaft can extend nearly to the surface while the actual interment is deeper. If a portion of the shaft closer to the surface is reflected, the associated grave may appear quite shallow. The depth of a grave can also vary greatly depending on the type of soil in the cemetery. It is also possible that many of the older graves in this cemetery were dug by hand, so they might be shallower than more recently interred, machine-dug graves.

There is a mature tree in the center of the surveyed area that had an associated root system visible in the GPR results. Every effort was made to filter these from the data and interpret only probable or possible graves. However, some anomalies identified as probable or possible graves could be tree roots, or graves located near the tree roots might have been missed. Historically, the cemetery did not have dense vegetation within the surveyed area or along its edges (Figure 30). The standing tree was present in the 1961 NCDOT aerial, but no additional trees are visible in the survey area. This indicates that the GPR results should not contain extensive root systems.

Figure 28. Example of Probable Graves in Profile

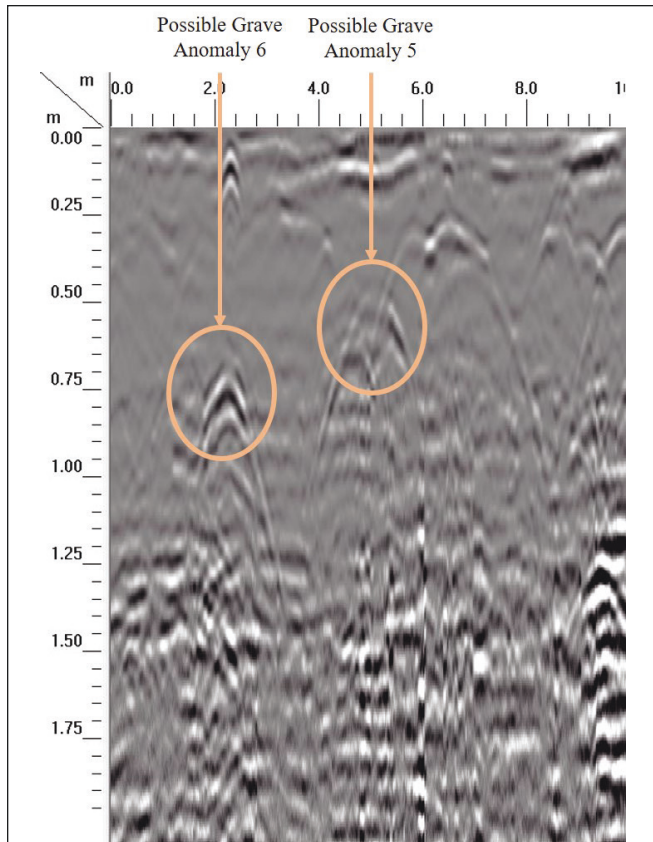
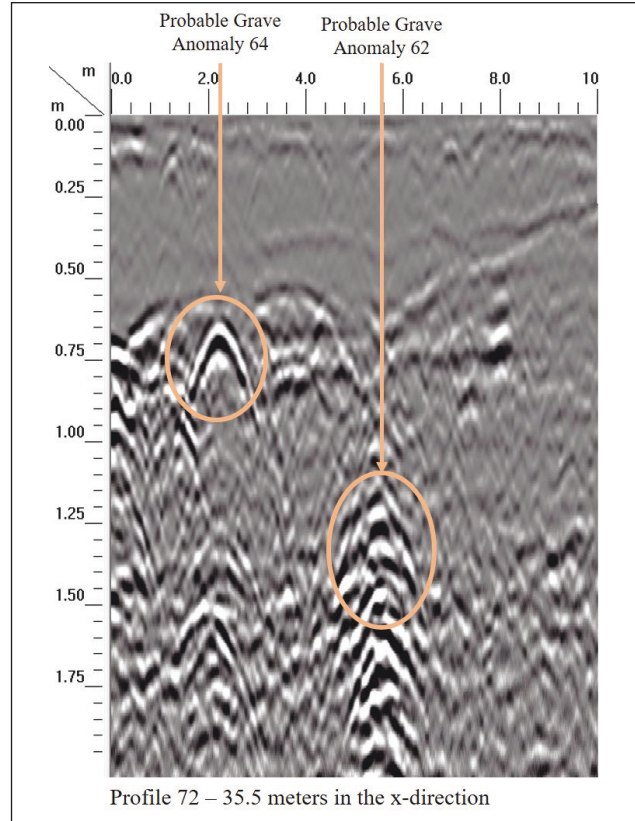
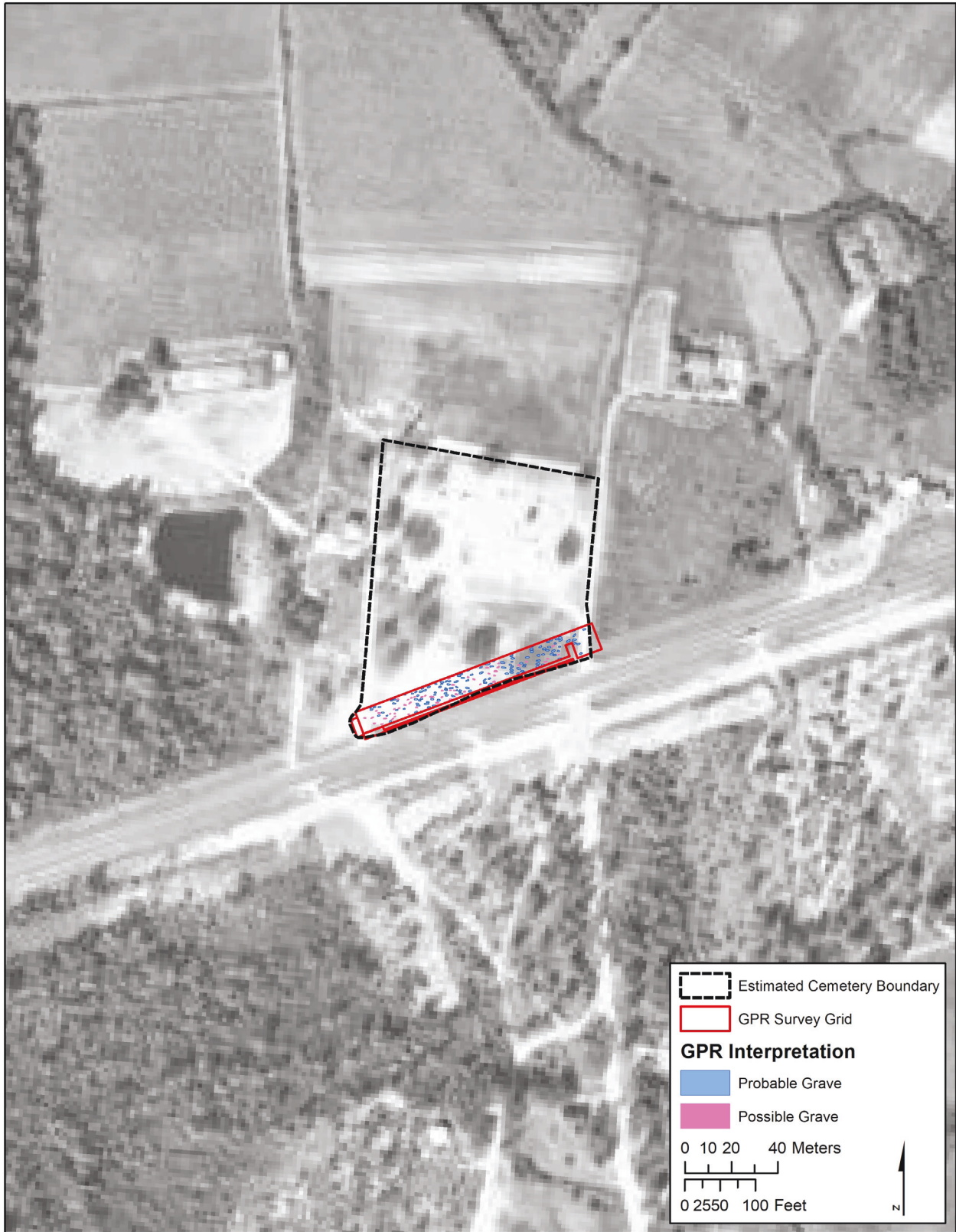


Figure 29. Example of Possible Graves in Profile

Figure 30. 1961 Aerial Imagery with GPR Anomalies and Cemetery Boundary



Imagery Source: 1961 NCDOT Aerial Imagery

## VI. NRHP EVALUATION

Properties can be eligible for listing on the NRHP under Criterion A if they are associated with events or patterns of events that have made a significant contribution to the broad patterns of our history at the local, state, or national level. Although the Lehev/Chapel Hill Cemetery is associated with the nineteenth-century development of Shallotte, it is one of many family and community cemeteries from a time when small farms and small naval store operations emerged throughout Brunswick County. Over time, the cemetery grew from about 100 grave markers in 1940 to nearly 400 markers as of 2019. With the significant modern component of the cemetery, its association is only partly historic. Therefore, the Lehev/Chapel Hill Cemetery is recommended not eligible for listing on the NRHP under Criterion A.

Properties can also be eligible for listing on the NRHP under Criterion B if they are associated with a person or persons that have made contributions significant to our past. Archival research has not revealed that the property is associated with individuals whose activities were demonstrably important within a local, state, or national historic context. Therefore, the Lehev/Chapel Hill Cemetery is recommended not eligible for listing on the NRHP under Criterion B.

Properties may be eligible under Criterion C if they embody the distinctive characteristics of a type, period, or method of construction, represent the work of a master, or possess high artistic value. With the exception of one intact wooden bedstead marker and remnants of other wooden markers at the Lehev/Chapel Hill Cemetery, there are no distinctive cemetery features that distinguish it architecturally or historically from the other nearby rural cemeteries. While the last remaining wooden bedstead marker does reflect a distinctive carved marker type, period, and construction, the fragile condition and state of deterioration of this marker places it at risk for collapse. The loss of the wooden bedstead and diamond-head markers results in a loss of integrity, and the Lehev/Chapel Hill Cemetery is therefore recommended not eligible for listing on the NRHP under Criterion C.

To meet eligibility requirements for Criterion D, a cemetery must have yielded or be likely to yield information important to history. The cemetery must have important information to contribute to archaeological, material culture, or social history research. The Lehev/Chapel Hill Cemetery is an important resource and place of remembrance for the community. The people buried here reflect the increasing population of the area and document the complex genealogical backgrounds of the residents. It is not, however, distinctive from other nearby rural cemeteries in terms of its potential to yield information not available from other documentary sources or archival records. The information in the cemetery is documented elsewhere and any study of the above- or below-ground material remains is unlikely to yield information not already known about the residents of the rural coastal areas of North Carolina. Therefore, Lehev/Chapel Hill is not recommended eligible for the NRHP under Criterion D.



## INTEGRITY

Properties may be eligible for listing on the NRHP if they possess integrity of location, design, setting, materials, workmanship, feeling, and association. The Lehigh/Chapel Hill Cemetery remains at its original location with its historic setting intact, despite commercial and transportation development to the south.

Other aspects of integrity, however, have been compromised at the cemetery. The collapse of all but one wooden bedstead markers over the past ten years in addition to broken, fallen, eroded, and illegible headstones has resulted in a loss of integrity with regard to materials and workmanship. Wooden bedstead features that otherwise add a unique, uncommon element to the cemetery are almost entirely gone, and the condition of the remaining wooden bedstead marker is extremely deteriorated. The historic design, feeling, and association of the cemetery is likewise impacted from such deterioration. The addition of nearly half of the gravestones throughout the cemetery that are not historic and three quarters of the headstones that show no distinctive design or association elements also compromise its integrity.

## VII. CONCLUSION AND RECOMMENDATIONS

The APE for the proposed undertaking intersects the southern end of the Lehev/Chapel Hill Cemetery (Resource BW0415 and Site 31BW866). New South performed an architectural survey, including an eligibility assessment for the NRHP and an archaeological remote sensing survey to identify unmarked graves. The architectural survey identified a rural family cemetery, which expanded to become a community cemetery in the late nineteenth and early twentieth century. There are approximately 350-400 visible markers with approximately 450-500 individuals interred. There was evidence of unmarked graves, displaced markers, and decaying markers. The remote sensing survey (conducted with GPR) focused only on the APE with a buffer and identified 183 probable and possible graves, 25 of which are associated with a marker. Two probable and two possible graves are located within the ROW. The cemetery was recommended not eligible for the NRHP under all criteria.

### RECOMMENDATIONS

New South recommends that all 183 probable and possible graves should be treated as such unless/until the identifications of these graves can be verified with archaeological testing. This is important for the four grave anomalies in the ROW. Care should be taken if any ground within the cemetery is to be disturbed to avoid damaging any graves that might be present but not detected because of poor preservation and ground conditions. If impacts to the cemetery cannot be avoided, relocation will be necessary in accordance with North Carolina G.S. 65-12, Abandoned and Neglected Cemeteries, or G.S.70-3, Unmarked Human Burial and Human Skeletal Remains Protection Act. Consultation with the OSA would be required to determine the exact legal path for disinterment.

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**APPENDIX A:  
POSSIBLE AND PROBABLE GRAVE  
LOCATIONS**



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Anomaly ID	GPR Interpretation	Estimated Depth	Marker (Yes/No)
1	Possible Grave	80-100 cmbs	No
2	Possible Grave	40-70 cmbs	No
3	Probable Grave	60-100 cmbs	No
4	Probable Grave	20-40 cmbs	No
5	Possible Grave	35-65 cmbs	No
6	Possible Grave	80-105 cmbs	No
7	Probable Grave	55-80 cmbs	No
8	Possible Grave	45-70 cmbs	No
9	Probable Grave	60-95 cmbs	No
10	Possible Grave	65-100 cmbs	No
11	Probable Grave	105-125 cmbs	No
12	Possible Grave	130-160 cmbs	No
13	Probable Grave	140-170 cmbs	No
14	Possible Grave	65-105 cmbs	No
15	Probable Grave	55-125 cmbs	No
16	Probable Grave	70-100 cmbs	No
17	Probable Grave	90-130 cmbs	No
18	Probable Grave	60-90 cmbs	No
19	Possible Grave	20-60 cmbs	No
20	Possible Grave	95-130 cmbs	No
21	Probable Grave	100-145 cmbs	No
22	Probable Grave	90-140 cmbs	No
23	Possible Grave	80-140 cmbs	No
24	Probable Grave	50-120 cmbs	No
25	Possible Grave	75-100 cmbs	No
26	Possible Grave	100-130 cmbs	No
27	Probable Grave	145-185 cmbs	No
28	Probable Grave	100-150 cmbs	No
29	Possible Grave	50-90 cmbs	No
30	Probable Grave	130-150 cmbs	No
31	Possible Grave	65-120 cmbs	No
32	Possible Grave	60-100 cmbs	No
33	Probable Grave	40-80 cmbs	No
34	Probable Grave	70-120 cmbs	Yes
35	Possible Grave	60-100 cmbs	No
36	Possible Grave	50-90 cmbs	No
37	Possible Grave	65-105 cmbs	No
38	Probable Grave	50-80 cmbs	No
39	Probable Grave	65-125 cmbs	No
40	Possible Grave	65-125 cmbs	No
41	Probable Grave	70-130 cmbs	No
42	Probable Grave	120-150 cmbs	No
43	Probable Grave	120-150 cmbs	No
44	Possible Grave	100-140 cmbs	No
45	Probable Grave	120-150 cmbs	No
46	Probable Grave	130-160 cmbs	Yes
47	Probable Grave	100-140 cmbs	No
48	Possible Grave	130-150 cmbs	No
49	Probable Grave	100-130 cmbs	No
50	Probable Grave	100-160 cmbs	No
51	Probable Grave	100-120 cmbs	Yes

<b>Anomaly ID</b>	<b>GPR Interpretation</b>	<b>Estimated Depth</b>	<b>Marker (Yes/No)</b>
52	Probable Grave	80-130 cmbs	Yes
53	Probable Grave	135-180 cmbs	No
54	Probable Grave	70-130 cmbs	No
55	Possible Grave	70-110 cmbs	No
56	Probable Grave	80-120 cmbs	No
57	Probable Grave	100-130 cmbs	Yes
58	Probable Grave	70-120 cmbs	No
59	Possible Grave	60-110 cmbs	No
60	Probable Grave	50-80 cmbs	No
61	Probable Grave	115-160 cmbs	No
62	Probable Grave	115-140 cmbs	No
63	Probable Grave	60-120 cmbs	No
64	Probable Grave	135-180 cmbs	No
65	Possible Grave	90-140 cmbs	No
66	Possible Grave	60-120 cmbs	No
67	Probable Grave	65-100 cmbs	Yes
68	Probable Grave	120-160 cmbs	Yes
69	Probable Grave	50-90 cmbs	Yes
70	Possible Grave	50-90 cmbs	No
71	Probable Grave	130-170 cmbs	No
72	Probable Grave	130-170 cmbs	No
73	Probable Grave	130-160 cmbs	No
74	Probable Grave	130-160 cmbs	No
75	Possible Grave	60-120 cmbs	No
76	Possible Grave	60-120 cmbs	No
77	Probable Grave	100-150 cmbs	No
78	Probable Grave	100-150 cmbs	No
79	Probable Grave	90-150 cmbs	No
80	Possible Grave	130-160 cmbs	No
81	Probable Grave	70-110 cmbs	No
82	Possible Grave	80-120 cmbs	No
83	Probable Grave	110-160 cmbs	No
84	Possible Grave	125-160 cmbs	No
85	Possible Grave	100-130 cmbs	No
86	Possible Grave	60-90 cmbs	No
87	Possible Grave	85-105 cmbs	No
88	Probable Grave	70-110 cmbs	No
89	Probable Grave	95-130 cmbs	No
90	Probable Grave	130-190 cmbs	No
91	Probable Grave	125-180 cmbs	No
92	Probable Grave	100-140 cmbs	No
93	Probable Grave	60-100 cmbs	No
94	Possible Grave	85-110 cmbs	No
95	Probable Grave	90-140 cmbs	No
96	Probable Grave	95-170 cmbs	No
97	Probable Grave	95-150 cmbs	No
98	Probable Grave	60-100 cmbs	Yes
99	Probable Grave	80-110 cmbs	No
100	Probable Grave	90-120 cmbs	No
101	Probable Grave	45-90 cmbs	No
102	Possible Grave	70-100 cmbs	No

<b>Anomaly ID</b>	<b>GPR Interpretation</b>	<b>Estimated Depth</b>	<b>Marker (Yes/No)</b>
103	Probable Grave	70-110 cmbs	No
104	Possible Grave	25-50 cmbs	No
105	Possible Grave	40-70 cmbs	No
106	Probable Grave	115-150 cmbs	Yes
107	Probable Grave	30-90 cmbs	No
108	Probable Grave	45-120 cmbs	Yes
109	Probable Grave	45-120 cmbs	Yes
110	Probable Grave	60-110 cmbs	No
111	Possible Grave	55-90 cmbs	No
112	Possible Grave	55-90 cmbs	No
113	Probable Grave	130-180 cmbs	No
114	Probable Grave	100-160 cmbs	No
115	Probable Grave	110-160 cmbs	No
116	Probable Grave	110-150 cmbs	No
117	Possible Grave	110-150 cmbs	No
118	Possible Grave	130-170 cmbs	No
119	Possible Grave	100-160 cmbs	No
120	Possible Grave	45-80 cmbs	No
121	Possible Grave	50-90 cmbs	No
122	Probable Grave	50-100 cmbs	Yes
123	Probable Grave	130-190 cmbs	No
124	Probable Grave	40-80 cmbs	No
125	Probable Grave	130-170 cmbs	Yes
126	Probable Grave	130-170 cmbs	Yes
127	Probable Grave	110-170 cmbs	Yes
128	Probable Grave	110-140 cmbs	Yes
129	Probable Grave	40-80 cmbs	Yes
130	Probable Grave	40-80 cmbs	Yes
131	Probable Grave	40-80 cmbs	No
132	Probable Grave	110-160 cmbs	No
133	Probable Grave	30-90 cmbs	No
134	Possible Grave	100-150 cmbs	No
135	Probable Grave	50-90 cmbs	No
136	Probable Grave	120-150 cmbs	No
137	Probable Grave	140-190 cmbs	Yes
138	Possible Grave	150-180 cmbs	No
139	Probable Grave	40-70 cmbs	No
140	Probable Grave	90-140 cmbs	No
141	Probable Grave	110-150 cmbs	No
142	Probable Grave	100-150 cmbs	No
143	Probable Grave	140-200 cmbs	Yes
144	Probable Grave	140-200 cmbs	Yes
145	Probable Grave	140-200 cmbs	Yes
146	Probable Grave	60-90 cmbs	No
147	Probable Grave	140-185 cmbs	No
148	Probable Grave	15-80 cmbs	No
149	Probable Grave	15-80 cmbs	No
150	Probable Grave	15-80 cmbs	No
151	Probable Grave	75-130 cmbs	No
152	Probable Grave	170-190 cmbs	No
153	Probable Grave	150-180 cmbs	No

<b>Anomaly ID</b>	<b>GPR Interpretation</b>	<b>Estimated Depth</b>	<b>Marker (Yes/No)</b>
154	Probable Grave	100-130 cmbs	Yes
155	Probable Grave	55-110 cmbs	Yes
156	Possible Grave	75-110 cmbs	No
157	Possible Grave	65-100 cmbs	No
158	Probable Grave	70-100 cmbs	No
159	Probable Grave	95-150 cmbs	No
160	Probable Grave	130-170 cmbs	No
161	Possible Grave	80-110 cmbs	No
162	Probable Grave	150-180 cmbs	No
163	Probable Grave	20-80 cmbs	No
164	Probable Grave	80-110 cmbs	No
165	Possible Grave	50-100 cmbs	No
166	Probable Grave	120-170 cmbs	No
167	Probable Grave	120-170 cmbs	No
168	Probable Grave	130-170 cmbs	No
169	Probable Grave	155-190 cmbs	No
170	Possible Grave	55-80 cmbs	No
171	Probable Grave	145-180 cmbs	No
172	Probable Grave	140-160 cmbs	No
173	Probable Grave	70-110 cmbs	No
174	Probable Grave	85-160 cmbs	No
175	Probable Grave	50-80 cmbs	No
176	Probable Grave	50-80 cmbs	No
177	Probable Grave	50-80 cmbs	No
178	Probable Grave	100-150 cmbs	No
179	Probable Grave	65-110 cmbs	No
180	Possible Grave	40-80 cmbs	No
181	Possible Grave	70-120 cmbs	No
182	Probable Grave	35-70 cmbs	No
183	Probable Grave	130-160 cmbs	No