GEOPHYSICAL SURVEY USING GROUND- PENETRATING RADAR

BLOCK 30, LOT 13.02
Mansfield Township, Burlington County
New Jersey

PREPARED FOR:
Elion Partners
3323 NE 163rd Street,
Suite 600
Miami, Florida 33160

March 2022

RICHARD GRUBB & ASSOCIATES, INC.
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Executive Summary

Richard Grubb & Associates, Inc. (RGA) conducted a geophysical survey using ground-penetrating radar (GPR) on Block 30, Lot 13.02 in Mansfield Township, Burlington County, New Jersey. Block 30, Lot 13.02 is at 3193 U.S. Route 206 and comprises 0.64-acres. Redevelopment is proposed for five lots on Block 30 and include warehouse, trucking, and/or distribution facilities, associated office spaces, appurtenances and the alignment of Mansfield Road West and Mansfield Road East at a signaled intersection on U.S. Route 206. The objective of the GPR survey was to identify the location of marked and potential unmarked burials within Block 30, Lot 13.02. The former First Mansfield Friends Meeting House (ca. 1733) and Old Friends Cemetery is situated on the lot. The GPR survey was confined to the accessible areas of the lot due to impediments. A site visit took place on September 22, 2021, and the GPR survey took place on September 23 and 24, 2021.

Approximately twelve (12) anomalies that represent potential burials were identified within the GPR survey area. Of these, two (2) are Probable Burials and ten (10) are Possible Burials. The potential burials are situated west of the former First Mansfield Friends Meeting House. Additional burials may be present beneath the earthen mounds on the west end of the lot. The GPR survey also identified a potential foundation or living surface, a buried driveway, two (2) possible utilities, and an undetermined anomaly in the northeast corner of the property. It is unknown whether the potential foundation or utilities are related to the historic occupation of the site or a later occupation.

The results of the GPR survey indicate a high probability for unmarked burials within the limits of disturbance on Block 30, Lot 13.02. Elion Partners requested an investigation of geophysical anomalies or ground truthing a sample of the possible burials to identify the presence or absence of a grave shaft. On March 1 and March 2, 2022, RGA conducted an archaeological survey to ground truth two probable burial anomalies and two possible burial anomalies identified during the GPR survey. One grave containing human remains was positively identified. A letter report detailing the results of the ground truthing survey will be submitted separately. RGA recommends the design for the proposed stormwater basin on the property be altered to avoid and protect the rear yard area of the former First Mansfield Friends Meeting House where the identified burial and possible other burials are located. Furthermore, RGA recommends the placement of fencing prior to construction, and archaeological monitoring of ground disturbing activities involved with removing the extant house on the property. Archaeological monitoring is recommended to as a precautionary measure to ensure the protection of the documented burial and other possible burials around the house.
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1.0 Introduction

Richard Grubb & Associates, Inc. (RGA) conducted a geophysical survey using ground penetrating radar (GPR) on Block 30, Lot 13.02 in Mansfield Township, Burlington County, New Jersey (Figure 1.1). Redevelopment is proposed for Block 30, Lots 9.02, 10, 11, 12, and 13.02 in Mansfield Township. The objective of the GPR survey was to identify the location of marked graves and potential unmarked burials within the limits of the approximately 27,739 square foot (0.64-acre) survey area (Figure 1.2).

The land use objectives of the proposed redevelopment comprise warehouse, trucking, and/or distribution facilities associated with office spaces, and the alignment of Mansfield Road West and Mansfield Road East at a signalized intersection on U.S. Route 206. The project includes the U.S. Route 206 and Mansfield Road West: Southeast Corner Redevelopment area. According to the Redevelopment Plan prepared for Mansfield Township (Environmental Resolutions, Inc. 2020), the former First Mansfield Friends Meeting House on Block 30, Lot 13.02 is proposed for removal (Plates 1.1 and 1.2). The installation of an infiltration basin in proposed for the property (MEH Consulting Engineers, Inc. 2020a).

It is the understanding of RGA that the GPR survey is a requirement under Mansfield Township Ordinance 2020-11. In the Redevelopment Plan dated June 23, 2020, an “Archaeological Survey” was required for Block 30, Lot 13.02 (Environmental Resolutions, Inc. 2020: 6). The archaeological survey was to include a GPR survey to ascertain the probability for unmarked burials within the limits of disturbance. As such, this work was conducted in support of Elion Partners’ application to Mansfield Township under the Redevelopment Plan. The GPR survey was performed consistent to ASTM D6432-19 (ASTM International 2019) and in accordance with standard approaches to archaeological geophysics in cemeteries (Conyers 2006b; Doolittle and Bellantoni 2009; Leach 2021; Lowry 2016).

Paul J. McEachen, MA, RPA served as Principal Investigator and meets the professional qualifications standards of 36 CFR 61 set forth by the National Park Service (Appendix A). Cayla Cannon, BA, served as the Geophysical Specialist, performed the fieldwork and post-processing of geophysical data and co-authored this report. Ms. Cannon produced the report graphics. Mr. McEachen edited and co-authored the report. Copies of this report and field data, notes, photographs, and project maps are on file at the offices of RGA in Cranbury, New Jersey.

This report includes a discussion of background research, environmental setting, GPR survey theory and methods, survey results and interpretations, and conclusions and management recommendations.

1.1 Background Research

The Mansfield Friends Meeting House Complex was researched and documented in a cultural resource survey for the U.S. Route 206 and Mansfield Road East and West intersection improvements project (RBA Group 2010). The complex includes the First and Second Mansfield Friends Meeting Houses, the Old and New Friends Cemeteries and the Mansfield Cemetery.

The First Mansfield Friends Meeting House, now a frame house at 3193 U.S. Route 206 (Block 30, Lot 13.02), dates to 1733. The original burying ground (called Old Friends Cemetery) lay west of the latter house. The First Mansfield Friends Meeting House and Old Friends cemetery were originally located on a 2.5 acre property (RBA Group 2010). The Old Friends Cemetery: “….is said to the oldest cemetery in Mansfield Township” RBA Group 2010: 44). A school house was erected in the southwest...
corner of the lot in 1786 and the building was used as school for over 100 years. A stable also stood at the front of the lot, facing modern day U.S. Route 206. A frame connector garage was then added to the meeting house by 1955. Based on a review of an August 2004 photograph, a minimum of eight and possibly as many as 10, marked graves were present in a row oriented parallel to and immediately west of the former meeting house (see Appendix B). The grave markers were surrounded by manicured grass. As observed by RBA Group (2010: 46): “Several headstones are visible directly behind the building and it seems likely that there are additional burials that were unmarked or that have had their stones removed”. The Dimension Plan for the property depicted six “grave headstones (typ)” behind the meeting house (MEH Consulting Engineers, Inc. 2021b). Block 30, Lot 13.02 was considered to have potential for eighteenth and nineteenth century archaeological deposits related to the meeting house and also grave sites (RBA Group 2010).

The Second Mansfield Friends Meeting was built in 1812 in a lot to the south of the original building. The New Friends Cemetery included the purchase of a 0.3-acre parcel in 1862 to expand the cemetery. The Mansfield Cemetery included a 0.5-acre lot adjoining the burial grounds that was purchased in 1864. Two twenty-foot wide strips of land were acquired in 1876 and 1921, respectively, for additional burial space. The entire complex was recommended eligible for listing in the National Register of Historic Places (RBA Group 2010). Further information is available in the architectural survey forms prepared for the First Mansfield Friends Meeting House and Second Mansfield Friends Meeting House (3191 U.S. Route 206; Block 30, Lots 13 and 13.01) (Appendix B; RBA Group 2010).

The First Mansfield Friends Meeting House is a contributing element to the Mansfield Friends Meeting House Complex, which received an Opinion of Eligibility for listing in the National Register of Historic Places on October 30, 2007 from the New Jersey Historic Preservation Office (NJHPO) (Guzzo 2007). The complex was determined eligible under Criteria A and C based on its association with the history of the Friends movement in New Jersey, its role in the development of the Mansfield area and architecture. It was also indicated that the cemeteries possessed historical significance as they include the interments of individuals who played important roles in the development of the Friends community in the Mansfield area. The period of significance for the resource is ca. 1733-1984, starting with the date of construction of the First Mansfield Friends Meeting House and the sale of the meeting house as a private residence (Guzzo 2007).

According to Environmental Resolutions, Inc. (2020:6): “Historical research indicates that some grave markers may have been moved by the property’s previous occupants and that the property may contain several unmarked graves....”.

1.2 Environmental Setting

The survey area is situated within the Coastal Plain Physiographic Province (Wolfe 1977). The Coastal Plain is divided into two subprovinces, the Inner Plain and the Outer Plain. The survey area is located within the Inner Plain, which consists of gently rolling to level lowland terrain that dips slightly to the southeast. The Inner Coastal Plain is underlain by unconsolidated clays, marls, silts, and sands of Late Cretaceous and Tertiary Age, capped in places by Pleistocene interglacial gravels (Wolfe 1977:276). Mapped surficial sediments include sand, clay, cobbles and boulders associated with the Pensauken Formation that may date from the Pliocene to upper Miocene (Newell et al. 2000). The survey area is underlain by quartz, sand, and gravel interbedded with clays and silts associated with the Upper Cretaceous Englishtown Formation (Owens et al. 1998).
The survey area occupies an intermediate topographic setting that is drained by Crafts Creek to the south. Crafts Creek empties into the Delaware River to the northwest of the survey area. The existing landform is relatively flat with a modest descent from northwest to southeast. Elevation of the survey area lies between 92 and 95 feet AMSL (see Figure 1.1; MEH Consulting Engineers, Inc. 2020a).

Soils in the survey area consist of Freehold fine sandy loam, 2 to 5 percent slopes (FrmB) (NRCS 2021). Freehold soils are well-drained and are primarily situated on flats and low hills. They formed in glauconitic marine deposits (Markley 1971). A typical Freehold soil profile consists of 0-11 inches of fine sandy loam topsoil (Ap-horizon) underlain by a 11-15 inch fine sandy loam E-horizon and multiple subsoil horizons (BA, Bt and BC horizons) of fine sandy loam and sandy clay loam up to a depth of 35 inches below grade. From 35 to 60 inches, a stratified loamy sand to fine sandy loam substratum (C-horizon) is present. Parent materials consist of glauconite bearing loamy eolian deposits and/or glauconite bearing loamy fluviomarine deposits (NRCS 2021). High clay content has the potential to impact signal attenuation and particularly after a significant rainfall (Ernenwein and Hargrave 2009: 41).
Mansfield Friends Meeting House Complex
Mansfield Township, Burlington County, New Jersey
Ground-penetrating Radar Survey

Figure 1.1: USA Topo Map of project location in Mansfield Township, Burlington County, New Jersey (Copyright: 2013 National Geographic Society, I-Cubed).
Figure 1.2: Aerial image of project location and parcel boundary in relation to nearby cemeteries (Esri, Maxar, Geoeye, Earthstar Geographics).
Plate 1.1: First Mansfield Friends Meeting House located on U.S. Route 206 in Mansfield Township. Photo view: West; Photographer: Cayla Cannon; Date: September 22, 2021.

Plate 1.2: First Mansfield Friends Meeting House from the back. Photo view: East; Photographer: Cayla Cannon; Date: September 22, 2021.
2.0 Ground Penetrating Radar

Ground penetrating radar has been successfully utilized on historic period archaeological sites, including cemeteries, for several decades in the eastern United States. Geophysical survey methods, including GPR, are non-invasive approaches to identifying and mapping below-surface objects and unmarked graves, and for visualizing the current topography of the ground surface in relation to these underground anomalies (Conyers 2006a). The method of remote sensing allows a glimpse into what may lie underground and can serve as one of many bases from which archaeological excavations can be undertaken. Geophysical survey methods are also used to identify possible prehistoric earthworks and monuments, large, buried soil features (i.e., fortifications and trenches) on battlefield sites, and spatial organization of early historic settlements, trading posts, farmstead and tavern sites, among others (Cornett and Ernenwein 2020; Ewen 2019; Heckman 2005; Horsley et al. 2014; Kvämm 2003).

The results from GPR and other remote sensing methods does not usually involve the identification of specific features, but rather the data provide differences in reflections from pulsed radar energy into the ground from the GPR antenna. Identifying potential graves in historic cemeteries does not usually involve the identification of physical human remains (i.e. skeletons) (Lowry 2016), but rather the difference in reflections from pulsed radar energy into the ground from the GPR antenna (Conyers 2006b). As the pulses encounter varying sub-surface features, they are reflected back to the GPR unit in varying degrees of strength and transmission time. Thus, changes in soil compaction and chemistry may transmit a contrasting signature than the surrounding matrix. For example, when using GPR to delineate cemeteries, usually a grave shaft, casket or coffin, spaces/voids, vaults, or burial goods which is detected as dissimilar from the surrounding natural strata (Lowry 2016). Transmission time is the amount of time it takes for the radar pulse to be reflected back to the receiving antenna and is interpreted as depth (i.e., the longer the transmission takes the deeper the object lies).

The shape of the reflection may also give clues to the nature of a below-surface object. A parabolic shape in the profile usually suggests a single object, while a planar reflection may indicate a flat surface such as a floor or a change in stratigraphy (Conyers 2006a).

GPR units vary by antenna frequency. While soil properties, surface condition (i.e., obstacles such as trees and shrubs) and water retention may affect transmission and data resolution, in general there is a relationship between antenna frequency and resolution. Low-range frequency antennas (50-100 MHz) may penetrate as much as 15 meters below surface under certain conditions. High-range frequency antennas (800-1000 MHz) may penetrate only a meter but have extremely high resolution, and are used to locate buried utilities, for example. Medium-range frequency antennas such as the 350 or 400 MHz are typically used in archaeology and are reliable to a depth of up to 3 meters below the surface, depending on the surface conditions (Conyers 2006a). The 350 MHz HyperStacking (HS) antenna is known to reduce noise via high-speed interpolated sampling (Kruske 2020).

In comparison with other archaeological features, burials can be a challenging target for geophysical survey methods. In some cases, the burials may provide too little contrast to permit detection. Human remains (i.e. bones) are likely to evade detection due to their limited size. Potential graves are identified by prospection methods when disruptions appear in the natural stratigraphy of the soil. Air filled cavities or less-compact soils are examples of such disruptions. Since contrast in soils is reduced over time, older burials may be very difficult, if not impossible, to identify (Horsley 2014).
It is important to note that, “The results and subsequent interpretations of geophysical surveys should not be treated as an absolute representation of the underlying features. It is normally only possible to prove the nature of anomalies through intrusive means, such as trial excavations” (Horsley 2014:10). Therefore, geophysical anomalies must be subjected to ground-truthing methods in order to determine whether they represent cultural features or other subsurface manifestations (Hargrave 2006; Ewen 2016). A recent literature review indicates that there has been a general lack of ground truthing to test geophysical anomalies (WSP, Inc. and New South Associates, Inc. 2018).

A recent review of geophysical surveys in the Mid-Atlantic Region indicated that GPR survey was a successful and commonly utilized method for archaeological purposes (Chadwick and LaVigne 2019). Limitations include survey in urban areas where buried and overhead utilities can produce too much “noise” to effectively identify archaeological features. Moist or water-logged clay can impede GPR penetration or survey results (Kvamme 2003). Other limiting factors include natural anomalies such as iron deposits, soil composition and burn episodes, and wooded areas or large trees with extensive root systems that could trigger false positives (Chadwick and LaVigne 2019: 104).

2.1 GPR Theory and Application

The antenna of a GPR transmits an electromagnetic wave that operates in the microwave range of frequencies, into the ground. The frequency of an antenna, such as the 350 MHz used in this survey, represents the center frequency of the antenna while the actual transmission is made up of a wide range of frequencies ranging from 100 MHz to 800 MHz (Balanis 1997). This wave of energy is emitted from a transmitter in the shape of a cone and reflects off sediment, rock, or buried materials and back to a receiver in the antenna. The reflected waves continually bounce between the subsurface and the receiver at the speed of light until the energy has dissipated due to a loss of heat and energy (Balanis 1997). As a result, the GPR antenna gathers a log of positive and negative amplitude reflections measured in deciBels (dB) as well as a measurement of time nanoseconds (ns). Across a GPR transect, each individual line scan is divided into 512 or 1024 samples, depending on the unit’s settings, displaying the change in the amplitude of a reflection as depth, or time, increases (Evans 2003). These changes in amplitude of reflection and the changing speed of the radar wave as it moves through the subsurface are due to changes in the dielectric constant of the materials or sediments of the subsurface. For instance, radar waves travel fastest through air, which has a dielectric constant of 1, and slowest through water, which has a dielectric constant of 81. Soils generally range from 10 to 40 in terms of dielectric constant given changes in clay, silt, and sand content as well as conductivity and moisture content (Daniels 2004). Given this knowledge, GPR application and data interpretation relies on identifying strong reflective anomalies and hyperbolas during a survey. These black-white-black (negative-positive-negative amplitude reflections) and white-black-white (positive-negative-positive amplitude reflections) series of reflective bands represent significant changes in the dielectric constant of materials and potential anomalies or targets such as utilities, storage tanks, buried features, structures, or graves.

2.2 Methodology

Prior to fieldwork, background research and planning were performed to determine the best practices for the GPR survey. Based on aerial imagery and photos of the site, it was determined that multiple survey grids would be needed to navigate around impediments, such as trees, bushes, tanks, and landscape features. Once on site, a portion of the survey area was deemed inaccessible for geophysical
data collection due to surface impediments. Two grids (Figures 2.1 and 2.2) were set up over the survey area with measuring tapes, plastic stakes, pin flags, and spray paint. Transects were collected in a bidirectional pattern from south-north at 0.5-meter line spacing (Leach 2021: Figure 4-10). Grid lines were adjusted in the field to avoid trees, shrubs, dirt mounds, and other surface impediments (Figure 2.2). Exposed roots, uneven surfaces, and debris challenged data collection and created unintended anomalies in the radar data which were removed or diminished in post-processing.

GPR data was collected using a Geophysical Survey Systems, Inc. (GSSI) SIR 4000 control unit with a 350 MHz digital HyperStacking (HS) antenna (transmitter and receiver) mounted on a three-wheeled cart with a survey wheel for distance calibration. Grid corners and grave markers were mapped and recorded with a Nikon NPR 332 Series Total Station with sub-centimeter accuracy, along with measuring tapes, plastic stakes and pin flags, and spray paint.

A total of 178 GPR transects were collected across two (2) grids at a 0.5-meter interval. Grids were laid out to efficiently maneuver across the terrain and around impediments. Grid 1 was 51 x 14 meters with 102 transects (Figure 2.3) and Grid 2 was 38 x 24 meters with 76 transects (Figure 2.4). Starting in the southeast (SE) corner, all transects were collected south to north in the Y-direction. Following the fieldwork, the GPR data was copied onto a GSSI SIR 4000 flash drive, processed using GPR-SLICE v7.MT imaging software, assembled with ArchaeoFusion, and mapped in ArcMap v10.8.1.

Using GPR-SLICE, the GPR data was appended into a 2D batch of files. File information was then created and edited based on collection parameters set in the field. The manufacturers’ data was converted to GPR-SLICE format and dc-drift and wobble noise were removed from the converted radargrams. Transects were not reversed since data was collected unidirectional, and navigation was set to artificial markers since the survey wheel was employed. A time-zero adjustment was performed to remove the direct wave and some horizontal banding associated with the surface conditions. A vertical high pass/low pass filter was performed to remove horizontal banding and reduce graininess in the reflection profiles or radargrams. A background removal filter was then applied to further remove banding associated with surface conditions. A range gain was applied to the radargrams to compensate the signal attenuation, amplifying the appearance of the hyperbolic anomalies and reducing contrast near the surface and bottom on the profiles outside the area of focus. Hyperbola matching was performed to calculate velocity and identify the true dielectric constant, increasing the accuracy of depth. Grids were processed separately. After filtering, the data was interpolated to create time slice grids which are downloaded as surfer files (GPR-SLICE User’s Manual v7.MT 2019).

Surfer files from both GPR grids were then imported into ArchaeoFusion which assembles and integrates multiple geophysical datasets collected at an archeological site or cemetery. After the grids are assembled, a standardize function is performed to facilitate matching between the datasets so they are on the same scale (ArchaeoFusion User Manual v1.0 2011). The assembled grids were then exported as GeoTiffs to be displayed and viewed in ArcMap.

The results of the GPR survey are best viewed in selected radargram profiles associated with transects and in an interpolated 3D grid of all transects which displays time slices or depth. While viewing the radargrams, it became clear that the strongest positive and negative reflections appear roughly 15 to 150 centimeters (0.15 to 1.50 meters) below surface. A time variable range gain was applied to amplify these areas of interest and minimize contrast near the surface and bottom of the radargram profiles. A variety of color palates and transformations were used to display the anomalies identified.
It is possible that not all potential burial anomalies were detected. Due to surface conditions and environmental variables (i.e., electrical conductivity of the ground and contrast of electrical properties of the target and surrounding soil), a certain number of anomalies may exist that could not be defined. It is possible that identified anomalies could also represent false positives, which means that they appear to be consistent with known signatures but are not archaeologically significant (Lowry 2016). Conclusive identification requires ground truthing (i.e. excavation).
Figure 2.1 Aerial image of the parcel boundary and the GPR survey area (Esri, Maxar, Geoeye, Earthstar Geographics).
Figure 2.2 GPR Grids 1 & 2 and proposed survey area (Esri, Maxar, Geoeye, Earthstar Geographics).
Figure 2.3 Grid 1 was 51 by 14 meters in length and width. Data was collected bidirectionally with 102 transects.

Figure 2.4 Grid 2 was 38 by 24 meters in length and width. Data was collected bidirectionally with 76 transects. Note: Survey transects were stopped at the house and dirt mounds.
3.0 Survey Results and Interpretations

Pedestrian Survey

A site visit was performed by Cayla Cannon, BA, on September 22, 2021. The weather was partly sunny and 84F with high humidity. Ms. Cannon examined the existing conditions of the property prior to survey. The survey area falls on relatively flat topography, with the meeting house and attached garage lying in the center of the property. A wood and wire fence lines the right front (i.e. north) and side yard but ends before it reached the rear yard. Mature pine trees line the left front (i.e. south) and side yards, ending at a hedge row running across the rear parcel boundary. Some fence posts are also situated at the western edge of the parcel.

Parking in the gravel drive in front of the meeting house, gives a clear view of the front and side yards. Smaller outbuildings, sheds, and large debris had once occupied these areas (MEH Consulting Engineers, Inc. 2020b), but had been removed. This left behind an undulating and in places uneven ground surface covered in twigs, leaves, refuse, and other small pieces of debris. The surface was obscured by the aforementioned material. A debris pile was observed in the northwest corner of the property (Plate 3.1). Upon closer inspection, nine displaced headstones were present in the latter area. Since some headstones were broken and underneath debris, not all inscriptions could be observed. However, three contained inscriptions with one attributed to Maria T. Robbins (Plate 3.2), and others to Sarah Boulton and “Black”. A fourth contained the inscription “M.T.R”.

Five earthen or fill mounds were present over much of the rear yard (Plate 3.3). These roughly meter high mounds made this portion of the property inaccessible for geophysical data collection. Other surface impediments observed in the rear yard include, large hardwood trees, wood and trash debris, large fallen tree limbs, an oil tank, and landscape features. Two headstones were spotted almost completely buried in the debris or grass directly behind the garage (Plate 3.4). The latter were broken at or very close to the ground surface. On the other side of the rear yard three headstones were located, with one being intact. The intact headstone was attributed to Charlotte Black. The ground around this side of the meeting house was unstable and was avoided during survey (Plate 3.5). Lining the west parcel boundary was a hedge row with several headstone lying underneath and undisturbed (Plate 3.6). This row of headstones lay within the parcel immediately west of the survey area (MEH Consulting Engineers, Inc. 2021b), and therefore were not included in the survey results (Figure 3.1).

Ground-penetrating Radar Survey

The GPR survey was performed on September 23 and 24, 2021, by Geophysical Specialist Cayla Cannon, BA, with assistance from Lex Vancko, MS (Plates 3.7 to 3.10). David Strohmeier, BA, PSM, performed grid set up with Ms. Cannon. The weather was between 70-80F and sunny with no precipitation but high humidity. The goal of this work was to identify the presence or absence of potential marked and unmarked burial anomalies associated with the Mansfield Friends Meeting House. The background research suggested the presence of burials in the rear yard of the property (RBA Group 2010; MEH Consulting Engineers, Inc. 2020b). A good faith effort was made to avoid impediments and identify potential burial anomalies. The data and interpretations presented herein were based on the site conditions at the time of survey.

The GPR survey identified seventeen (17) anomalies through post-processing (Figure 3.2). Twelve (12) anomalies were identified as potential burials, with two (2) being Probable Burials (likely) and ten
being Possible Burials (less likely). The remaining five (5) anomalies identified do not appear to be related to potential burials but instead belong to the meeting house and/or property. These anomalies include: two (2) possible utilities, one (1) possible driveway, (1) possible foundation or buried living surface, and one (1) undetermined anomaly. High amplitude reflections associated with potential burial anomalies, utilities, foundation, and undetermined anomaly are depicted.

Figure 3.3 shows twelve (12) possible burial anomalies identified through post-processing of collected field data. Of these, two (2) were identified as Probable Burials (PB) and ten (10) were identified as Possible Burials (PSB). All Probable Unmarked Burials are associated with strong hyperbolic reflections seen in at least three consecutive radargrams or transects (Figures 3.4). These Probable Burials lie within a depth range of 50 to 100 centimeters (0.5 to 1.0 meters) below surface. Probable Burial 1 (PB1) might be associated with the headstone of Samuel Black which lies directly above the buried anomaly on the surface. However, Samuel Black’s headstone was not intact, and lay on the ground surface. The marker may have been re-oriented or could have been moved from its original location (Plate 3.11; see Appendix B). A few feet away, Charlotte Black’s headstone stands intact facing east/west. A high reflection is associated with Charlotte’s marker, but it is shallow and inconsistent with the other burial anomalies on the property (Plate 3.12). While the reflection is suggestive of a possible burial, additional data was necessary for it be mapped as such. Plates 3.13 and 3.14 show other displaced headstones on the lot. All Possible Burials are associated with weak hyperbolic reflections seen in one or two consecutive radargrams or transects (see Figure 3.4). Some of the signatures for Possible Burials were interrupted by impediments or extended outside the parcel boundary. The Possible Burials lie within a depth range of 30 to 150 centimeters (0.3 to 1.5 meters) below surface. The majority of the potential burial anomalies lie in parallel rows running south to north in Grid 2, meaning their headstones would have been facing east to west. Burials were situated in a similar orientation in Grid 1 as well. However, three (3) potential burials appear to be positioned east to west with their headstones facing north/south. This atypical cemetery arrangement is not uncommon for Friends/Quaker burying grounds (Chenoweth 2009; Newlands 2010).

Background research suggested that eight and up to 10 grave markers were present within the survey area (see Appendix B), and the possibility for additional burials at this location was acknowledged (RBA Group 2010). Due to the possible antiquity of interments (i.e. post-1733) and impediments such as the earthen mounds, it is possible that additional burials are present on the lot.

Figure 3.5 is a time slice maps showing all the non-burial anomalies identified through post processing. These anomalies do not appear to be associated with the potential burials, but instead related to the meeting house and property. A possible foundation or living surface located in Grid 1 was identified at a depth of approximately 0.2 meters below surface (Figure 3.6). This possible foundation measures approximately 10 by 12 meters in length and is represented by strong planar reflections suggestive of a buried foundation or living surface. This possibly foundation could be associated with the historic occupation of the property or a more modern footprint. Further work is necessary to ascertain its extent, age, and function.

Another domestic anomaly located in Grid 2 was identified at a depth of approximately 0.2 to 0.45 meters below surface and represented by strong planar reflections (see Figure 3.6). This anomaly is likely a driveway and located in the same place and orientation of the current grave drive.

An undetermined anomaly was identified in the northwest corner of Grid 1 at a depth of approximately 0.4-0.7 meters below surface. This anomaly lies in the vicinity of two Possible Burials.
but does not appear to be a burial. Based on the radar signature, the anomaly is possibly a utility or rodent burrow.

The remaining two (2) anomalies are potential utilities (see Figure 3.5). The possible utility located in Grid 1 was identified at a depth of approximately 0.7 meters below surface and measures 2 to 3 meters in length. This utility is represented by strong hyperbolic reflections likely associated with the manhole on the surface above (see Utility 2, Figure 3.2). The possible utility located in the southeast corner of Grid 2 at a depth of approximately 0.6 meters below surface and measures approximately 8 meters in length (see Utility 1, Figure 3.2). This utility anomaly is a potential pipe. It is unknown whether the possibly utilities are related to the historic or modern occupation of the site.

The results of this survey indicate a depth range from 15 to 150 centimeters (0.15 to 1.50 meters) below surface where the anomalies were detected. Data used to make the above interpretation was extracted from time slice maps that are available for review in Figures 3.7 through 3.20.
Plate 3.1: Headstones found in debris pile located in the northwest corner of the parcel; Photo view: Northwest; Photographer: Cayla Cannon; Date: September 22, 2021.

Plate 3.2: Headstone found broken in debris pile. Marked “Maria T. daughter of Edward & Amy Robbins, Born Feb 25, 1802, Died Jan 15, 1892; Photo view: North; Photographer: Cayla Cannon; Date: September 22, 2021
Plate 3.3: Five earthen mounds were found in the rear of the house, making these areas inaccessible for survey; Photo view: Southeast; Photographer: Cayla Cannon; Date: September 22, 2021.

Plate 3.4: Broken tree limbs and debris obscuring headstones HS4 and HS5; Photo view: Southeast; Photographer: Cayla Cannon; Date: September 22, 2021
Plate 3.5: The ground around the back of the house was soft and sinking in; Photo view: North; Photographer: Cayla Cannon; Date: September 22, 2021.

Plate 3.6: Row of headstones underneath hedge row; Photo view: West; Photographer: Cayla Cannon; Date: September 22, 2021.
Plate 3.7: Grid 1 survey in progress;  
Photo view: North; Photographer: Cayla Cannon; Date: September 23, 2021.

Plate 3.8: Grid 1 laid out in the north half of the parcel;  
Photo view: West; Photographer: Cayla Cannon; Date: September 23, 2021.
Plate 3.9: Grid 2 survey in process by geophysical specialist Cayla Cannon;
Photo view: Northwest; Photographer: Lex Vancko; Date: September 24, 2021.

Plate 3.10: Transects were laid out to maneuver around impediments including the headstone, earthen mounds, and trees;
Photo view: Northwest; Photographer: Lex Vancko; Date: September 24, 2021
Plate 3.11: Headstone (HS1) of Samuel Black; Photo view: North; Photographer: Cayla Cannon; Date: September 24, 2021.

Plate 3.12: Headstone (HS2) of Charlotte Black; Photo view: East; Photographer: Cayla Cannon; Date: September 24, 2021.
Plate 3.13: Headstone (HS6) of John Biddle found leaning up against Charlotte Black’s marker; Photo view: East; Photographer: Cayla Cannon; Date: September 24, 2021.

Plate 3.14: Headstone (HS3) underneath the hedge on the parcel border. Cayla Cannon; Photo view: Southwest; Photographer: Cayla Cannon; Date: September 24, 2021
Figure 3.1: GPR survey grids with surface impediments. The dirt mounds limited data collection in the rear of the house.
Figure 3.2: GPR survey grids with all anomalies in relation to one another at different depths.
Mansfield Friends Meeting House Complex
Mansfield Township, Burlington County, New Jersey
Ground-penetrating Radar Survey

Figure 3.3: GPR survey grids with all burial anomalies located at varying depths.
Figure 3.4: (Above) Radargram L045 in Grid 2 with Probable Burial behind the house. Probable Burials have strong hyperbolic reflections. (Below) Radargram L102 in Grid 1 with Possible Burials. The Possible Burials have weaker reflections compared to the Probable Burials. Burials are shown in the red boxes.
Figure 3.5: GPR survey grids with non-burial anomalies.
Figure 3.6: (Above) Radargram L028 in Grid 1 shows strong planar reflections which might represent a buried foundation or living surface. (Center) Radargram L022 in Grid 1 shows a strong hyperbolic reflection of a potential utility related to the manhole above. (Below) Radargram L096 in Grid 1 show strong hyperbolic reflections representing an undetermined anomaly, possibly a utility, burial, or rodent burrow.
Figure 3.7 GPR survey grids at approximately 0.0–0.15 meters below surface.
Figure 3.8: GPR survey grids at approximately 0.15–0.30 meters below surface.
Figure 3.9: GPR survey grids at approximately 0.30–0.45 meters below surface.
Figure 3.10: GPR survey grids at approximately 0.45–0.60 meters below surface.
Figure 3.11: GPR survey grids at approximately 0.60–0.75 meters below surface.
Figure 3.12: GPR survey grids at approximately 0.75–0.90 meters below surface.
Figure 3.13: GPR survey grids at approximately 0.90–1.05 meters below surface.
Figure 3.14: GPR survey grids at approximately 1.05–1.20 meters below surface.
Mansfield Friends Meeting House Complex
Mansfield Township, Burlington County, New Jersey
Ground-penetrating Radar Survey

Figure 3.15: GPR survey grids at approximately 1.20–1.35 meters below surface.
Figure 3.16: GPR survey grids at approximately 1.35–1.50 meters below surface.
Figure 3.17: GPR survey grids at approximately 1.50–1.65 meters below surface.
Figure 3.18: GPR survey grids at approximately 1.65–1.80 meters below surface.
Figure 3.19: GPR survey grids at approximately 1.80–1.95 meters below surface.
Figure 3.20: GPR survey grids at approximately 1.95–2.10 meters below surface.
4.0 Conclusions and Recommendations

Richard Grubb & Associates, Inc. (RGA) conducted a geophysical survey using ground-penetrating radar (GPR) within Block 30, Lot 13.02 in Mansfield Township, Burlington County, New Jersey. The objective of the GPR survey was to identify the location of marked graves and potential unmarked burials within the limits of the approximately 27,739 square foot (0.64-acre) survey area. The project is situated within the property of the former First Mansfield Friends Meeting House (ca. 1733) and Old Friends Cemetery. Gravemarkers were depicted on an existing conditions plan west of the former Friends Meeting House building on the lot (MEH Consulting Engineers, Inc. 2020b).

Approximately twelve (12) anomalies that represent potential burials were identified within the GPR survey area. Of these, two (2) are Probable Burials and ten (10) are Possible Burials. These potential burials were situated in the rear yard area, or to the west, of the former First Mansfield Friends Meeting House. It is possible that unmarked burials may be present beneath the earthen mounds on the west end of the lot. The GPR survey also identified a potential foundation or living surface, a buried driveway, two (2) possible utilities, and an undetermined anomaly in the northeast corner of the property. It is unknown whether the potential foundation or utilities are related to the historic occupation of the site or a later occupation.

Based on the results of the GPR survey, there is a high probability for unmarked graves within the limits of disturbance. RGA conducted an archaeological survey to ground truth four of the anomalies identified closest to the extant house, and confirmed the presence of at least one graven. The results of this survey will be submitted under a separate cover. Avoidance of the yard area behind for the former meeting house is recommended. A re-design of the stormwater retention basin proposed for the property to avoid and protect the rear yard of the parcel, the positively identified burial, and other possible burials is recommended. Furthermore, the placement of fencing prior to construction and archaeological monitoring is recommended during removal of the extant house on the property to ensure protection of the identified burial and other possible burials.
5.0 References

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Newlands, David L.  

Owens, James, Peter Sugarman, Norman Sohl, Ronald Parker, Hugh Houghton, Richard Volkert, Avery Drake, Jr., and Randall Orndorff  

RBA Group  

Wolfe, Peter E.  
WSP, Inc. and New South Associates, Inc.
Appendix A: Qualifications of the Geophysical Specialist and Principal Investigator
CAYLA M. CANNON

GEOPHYSICAL SPECIALIST/ARCHAEOLOGIST

Cayla M. Cannon’s experience includes conducting archaeological field investigations and geophysical surveys. Ms. Cannon specializes in ground penetrating radar (GPR) and magnetometer surveys, cemetery delineation and identification, historical archaeology, and archaeological prehistory of the southeastern United States. She has worked extensively in upper East Tennessee on late prehistoric and contact era sites. She has collaborated with the Eastern Band of Cherokee Indians Tribal Historic Preservation Office, Tennessee Valley Authority (TVA), and the Tennessee Historical Commission. She has also worked on archaeological sites in New Jersey, Pennsylvania, North Carolina, Utah, France, and Israel.

REPRESENTATIVE PROJECT EXPERIENCE

Arch Street Meeting House, City of Philadelphia, Philadelphia County, PA (Sponsor: Arch Street Meeting House Preservation Trust) Ms. Cannon performed a GPR survey at the Arch Street Meeting House in Philadelphia. New outdoor exhibits are proposed over what was once a Quaker burial ground. The goal of this work was to identify burial anomalies and provide a map showing their location. Interments were initiated on the property in the late seventeenth century, and ended in 1880. This work will ensure that potential burials are not inadvertently impacted during the installation of the exhibits, and educate meeting members about the history of the property.

Kiser-Huffstetler Cemetery, Cherryville Township, Gaston County, NC (Sponsor: Private Client) Ms. Cannon conducted a GPR survey of the Kiser-Huffstetler cemetery in western North Carolina. The family cemetery contains interments dating from the late 18th century through the early 20th century. Eighty (80) potential burial anomalies were identified through survey and post processing via GPR Slice. A map of burial anomalies was provided that will facilitate future preservation efforts.

Old Farmer Cemetery, City of Wilson, Wilson County, NC (Sponsor: City of Wilson) Geophysical specialist for a GPR survey at the Old Farmer Cemetery (WL0500). Approximately thirty-five (35) anomalies (unmarked) that represent potential burials were identified. A potential small structure was also identified that could be related to domestic use of the property by the Farmer family during the late 18th-early 19th century or a later occupation. If present, such resources could potentially contribute to the NR-listed Wilson Central Business-Tobacco Warehouse Historic District (WL0442). The preservation of the Old Farmer Cemetery area was recommended.

329 North Taylor Street Lot, Wake Forest, Wake County, NC (Sponsor: Town of Wake Forest) Ms. Cannon performed a GPR survey on a lot adjoining Wake Forest Cemetery. The goals this work was to identify subsurface anomalies, such as possible grave shafts, vaults, or coffins. The GPR survey was conducted with a GSSI Model SIR 4000 GPR unit with a 350 MHz Hyperstacked antenna. The survey results suggested that no potential unmarked burials were present within the survey area.

Brainerd Cemetery, Cranbury Township, Middlesex County, NJ (Sponsor: First Presbyterian Church of Cranbury) In partnership with the First Presbyterian Church of Cranbury, a geophysical survey was initiated at the historic Brainerd cemetery. The survey is focused on the African American section where there are presumed unmarked graves. This work was conducted to identify subsurface anomalies related to the African American interments. A map showing the location of potential unmarked burials will help facilitate site operations by cemetery caretakers.

Carter Mansion, Elizabethton, Carter County, TN (Performed with ETSU) Principal Investigator for Phase II geophysical and archaeological survey of a 2-acre State Historic site containing the oldest frame house in Tennessee. The site comprises historic and prehistoric components. GPR, magnetometry, and electromagnetic induction were performed to differentiate between the historic and prehistoric layers. Several anomalies were identified in the geophysical data, including the remains of the Carter family’s barn, prehistoric fire pits, and Native American and historic period burials. Test excavations followed to obtain AMS and OSL samples for dating.
PAUL J. MCEACHEN
PRINCIPAL SENIOR ARCHAEOLOGIST (36 CFR 61)

Paul J. McEachen, Director of Archaeological Services, provides technical oversight on archaeological projects undertaken in New Jersey and throughout the eastern United States. Mr. McEachen has served as a Principal Investigator on all phases of archaeological investigations and specializes in prehistoric archaeology. Mr. McEachen has prepared and directed cultural resources surveys in accordance with Section 106 of the National Historic Preservation Act, NEPA, and various municipal and state cultural resource regulations. He exceeds the qualifications set forth in the Secretary of Interior’s Standards for Archaeologists [36 CFR 61].

REPRESENTATIVE PROJECT EXPERIENCE

**Brainerd Cemetery, Cranbury Township, Middlesex County, NJ (Sponsor: First Presbyterian Church of Cranbury)**
In partnership with the First Presbyterian Church of Cranbury, a geophysical survey was initiated at the historic Brainerd cemetery. The survey is focused on the African American section where there are marked and presumed unmarked graves. The church desires to learn how many subsurface anomalies are potentially related to African American interments. This in-progress survey will provide new insights into an under-documented aspect of Cranbury history.

**Edgewood Farm, Lower Makefield Township, Bucks County, PA (Sponsor: Private Client)**
Project coordinator for the Phase I/II archaeological survey focused around the ca. 1820 Richard Janney House. As part of this work, a GPR survey was performed to identify subsurface features associated with occupation spanning 200+ years. The GPR survey helped to focus archaeological work around a buried intact surface, refuse pit and structural remains that are contributing elements to this National Register eligible property. Mr. McEachen coordinated with PA SHPO project reviewer to resolve project adverse effects. The Phase I and II archaeological survey reports were completed in accordance with the PA SHPO’s archaeological survey guidelines.

**Davis Family Cemetery, Rural Retreat, Smyth County, VA (Sponsor: Harold Davis)**
Project Manager for a ground penetrating radar (GPR) survey of a 19th century family cemetery in southwestern Virginia. The goals of this work was to identify subsurface anomalies, such as possible grave shafts, vaults or coffins, and map existing grave markers. Over 60 anomalies representing potential burials were identified and a detailed cemetery map was created. Consultation with the Virginia Department of Historic Resources (DHR) was performed with respect to the applicability of the State’s burials laws. RGA recommended avoidance of the anomalies.

**Green Acres Cemetery, Mooresville, Iredell County, NC (Sponsor: Town of Mooresville)**
Co-Project Manager for a ground penetrating radar (GPR) survey of a municipal cemetery adjacent to the Watkins Chapel African Methodist Episcopal (AME) Zion Church. The goals of this work was to identify subsurface anomalies, such as possible grave shafts, vaults or coffins, and map existing grave markers. The survey included a 1.65-acre area, which consisted primarily of the historic 19th and early 20th century section of the cemetery. Over 280 anomalies representing potential burials were identified. Avoidance of the potential burial anomalies was recommended.

**Sunset Cemetery, Shelby, Cleveland County, NC (Sponsor: Diversity Project Committee, Earl Scruggs Center)**
Co-Project Manager for a ground penetrating radar (GPR) survey of the African American section of Sunset Cemetery. The cemetery was established in 1841 and the African American section spans approximately one acre. Only a few graves are marked in the African American section, and it is believed that hundreds of individuals are buried there according to a 1939 Works Progress Administration (WPA) survey report. The goals of the Diversity Project Committee are to better recognize the African American presence at Sunset Cemetery and the GPR fieldwork was performed to better understand the number and extent of burials.
Appendix B: Architectural Survey Forms: First and Second Mansfield Friends Meeting Houses (RBA Group 2010)
Property Name: Second Mansfield Friends Meeting House
Street Address: Street #: 3191 (Low) (High) Apartment #: (Low) (High)
Prefix: Street Name: State Hwy 206 Suffix:
County(s): Burlington Zip Code: 08022
Municipality(s): Mansfield Township Block(s): 30
Local Place Name(s):
Ownership:: Private Lot(s): 13 and 13.01
USGS Quad(s): Columbus
Description:
This two-story, four bay Friends Meeting House has a side-gabled, new standing seem metal roof with a small brick chimney at each gable end and at ridgeline. The exterior is composed of brick in Flemish bond. Two mirror image, symmetrically placed front doors of frame-and-panel construction under simple front-gabled entry porches provide access. First floor windows are filled with wood, twelve-over-twelve, double-hung sash and those on the second floor are wood, eight-over-eight, double hung sash.
Registration and Status Dates:
National Historic Landmark: SHPO Opinion:
National Register: Local Designation:
New Jersey Register: Other Designation:
Determination of Eligibility: Other Designation Date:
Photograph:

Survey Name: N.J. Route 206 And Mansfield Road Intersection Project
Surveyor: Rob Tucher
Organization: The RBA Group Cultural Resource Unit
Date: August 2004
Bibliography/Sources:
Bordentown Quadrangle 1906; Burlington County Deeds; Burlington County Roads; Mansfield Meeting House – NJ-612; New Jersey State Highway Department 1929a; 1929b; 1958; New Jersey Wills; Otley and Whiteford 1849; Parry, Sykes, and Earl 1858; 1859; Perinchief 1975; Philadelphia Yearly Meeting Records Committee 1989; Scott 1876; Trenton Historical Society 1929; Tusim 1972; 1976; West Jersey Deeds; West Jersey Surveys; Woodward and Hageman 1883.

Additional Information:
The Mansfield Friends Meeting House and the Friends Meeting House are effectively separate properties and are treated as such in these forms but historically are irrevocably linked and are linked in terms of their eligibility.

More Research Needed? □ Yes □ No

INTENSIVE LEVEL USE ONLY
Attachments Included:  □ Building □ Structure □ Object □ Bridge
□ Landscape □ Industry

Within Historic District?  □ Yes □ No

Status:  □ Key-Contributing □ Contributing □ Non-Contributing

Associated Archaeological Site/Deposit?  □ Yes
(known or potential sites – if yes, please describe briefly)
Potential for 17th and 18th century deposits associated with this Meeting House and the earlier Meeting House; grave sites.
Site Map:
**Common Name:** Second Mansfield Friends Meeting House, 3191 State Hwy 206

**Historic Name:** Friends Meeting House

**Present Use:**

**Historic Use:** Institutional Activities, Religious Activity

**Construction Date:** 1812

**Alteration Date(s):**

**Designer:**

**Builder:**

**Style:** Federal

**Form:** Other

**Type:**

**Roof Finish Materials:** Metal

**Exterior Finish Materials** Brick, Flemish Bond

**Physical Condition:** Good

**Remaining Historic Fabric:** High

**Stories:** 2

**Bays:** 4

**Exterior Description:**
This two-story, four bay Friends Meeting House has a side-gabled, new standing seam metal roof with a small brick chimney at each gable end and at ridgeline. The exterior is composed of brick in Flemish bond. It has brick footings that rise above ground level by a couple of feet and extend out two stepped courses. Two courses of header bricks, separated by a recessed stretcher course that is flush with the bond of the rest of the elevations, extend out slightly at second story floor level. Two mirror image, symmetrically placed front doors of frame-and-

**See Continuation Sheet**

**Interior Description:**
The interior of this structure was not examined as part of this investigation.

**Setting:**
The structure faces east and stands well back from the four lanes of ever widening State Highway 206. The region is agricultural in nature and is flat and relatively open. There is some commercial activity in the area and a small town, Columbus, lies to the south. Some residential developments have sprung up locally.
panel construction under simple front-gabled entry porches provide access. Both are three frames wide and double hung (parting one-third/two-thirds). Another door of similar construction enters from the south, and has the shadow of a removed entry porch gable. First floor windows are filled with wood, twelve-over-twelve, double-hung sash and those on the second floor are wood, eight-over-eight, double hung sash. Many windows have working wood shutters, though some windows are boarded up with shutters completely removed. First floor shutters tend to be solid frame-and-panel construction, while second floor shutters are mostly louvered. There is a date stone imbedded in the brick centered on the east front at second story window level that reads, "1812." A single story, shed roof addition is attached to the north side. The roof is clad in asphalt shingles. It has a solid synthetic clapboard exterior and aluminum, one-over-one double-hung sash and solid door. The roof extends the entire width of the elevation, yet the interior space has a smaller footprint, so the roof creates a large overhang at the northeast corner that is supported by a large, heavy square column. The entire addition is very recent and completely out of character.
LANDSCAPE ATTACHMENT

Common Name: Mansfield Cemetery Company
Historic Name: Old Friends Cemetery, New Friends Cemetery, Mansfield Cemetery
Present Use: Institutional Activities, Religious Activity
Historic Use: Institutional Activities, Religious Activity
Construction Date: C. 1740
Alteration Date(s): 1864
Source: Research
Source: Incorporation date (research and sign)

Primary Landscape Architect/Designer:

Type: Church yards and cemeteries
Style: Other
Acreage: 
Hardscape: Other
Plantings: Other

Physical Condition: Poor
Remaining Historic Fabric: High

Description:
A cemetery complex consisting of three separate, but closely related, burying grounds is sited to the rear of the meeting house. The first of these - the Old Friends Cemetery - is located immediately to the northwest of the meeting house (and to the west of the First Friends Meeting House) and is said to be the oldest cemetery in Mansfield Township. This cemetery dates to the initial development of this property by the Friends during the second quarter of the 18th century and is included within the bounds of the original property acquired by the Friends in 1745/6. It includes only a relatively small number of stones, with the majority either missing or very

See Continuation Sheet

Setting:
The Friends Meeting House faces east and stands well back from the four lanes of ever widening State Highway 206. This cemetery is integrated into the Mansfield Cemetery Company and rests to the rear of the Friends Meeting House and between the Meeting House and cultivated fields to the west. The region is agricultural in nature and is flat and relatively open. There is some commercial activity in the area and a small town, Columbus, lies to the south. Some residential developments have sprung up locally.

Survey Name: N.J. Route 206 And Mansfield Road Intersection Project
Surveyor: Rob Tucker
Organization: The RBA Group Cultural Resource Unit
Date: August 2004
The New Friends Cemetery, west of the brick meeting house. View looking west.

Description:
Insubstantial and now obscured beneath the grass lawn - the presence of unmarked burials also seems likely. Only a very few of the stones present in this yard are legible.

In 1862 the Friends purchased additional property to the west of the brick meeting house to allow for an expansion of their burying ground. This second yard - the New Friends Cemetery - is quite similar in its physical appearance to its predecessor, with stones visible in only about half of its extent, and with only a very few of the stones being legible. The third burying ground - the Mansfield Cemetery - was purchased and laid out to the west of the Old Friends Cemetery and the north of the New Friends Cemetery by the Mansfield Cemetery Company in 1864. This yard's simple, but formal, plan consisted of a short east-west avenue at its southern end that ran along the north line of the New Friends Cemetery and two north-south avenues that ran the length of the yard and divided three rows of twelve burial plots each (see Figure C.1). There are considerably more stones in this cemetery, exhibiting a wide range of marker types very different from the simpler stones within the two Friends yards. Both the New Friends Cemetery and the Mansfield Cemetery are now incorporated within the property on which the brick meeting house is sited.

See Continuation Sheet

Survey Name: N.J. Route 206 And Mansfield Road Intersection Project
Surveyor: Rob Tucher
Organization: The RBA Group Cultural Resource Unit
Date: August 2004
The Mansfield Cemetery Company, incorporated 1864, showing the Mansfield Cemetery to the right, and some of the stones in the New Friends Cemetery (left). View looking west.

Description:
As noted above, the original Friends burying ground - the Old Friends Cemetery (below) - is sited just to the west of the former frame meeting house. Portions of this cemetery are, in fact, included within the property now associated with this building as sold off by the Friends in 1984. The deed recording that transaction included several reservations designed to protect the burials known to be sited in what was to become the rear yard of the former meeting house. Several headstones are visible directly behind the building, and it seems likely that there are additional burials that were unmarked or that have had their stones removed.
The Old Friends Cemetery west of the hedgerow behind the First Mansfield Friends Meeting House. View looking west.

Old Friends Cemetery headstones directly behind the First Mansfield Friends Meeting House. View looking northeast.

Survey Name: N.J. Route 206 And Mansfield Road Intersection Project
Surveyor: Rob Tucher
Organization: The RBA Group Cultural Resource Unit
Date: August 2004
ELIGIBILITY WORKSHEET

History:
The second Mansfield Friends Meeting House was built in 1812, as recorded on the date stone in the brick façade. According to the 1883 historical account, when the new building went up "one end of the old house was removed to another part of the property and converted into a dwelling, which is still standing, and which was generally tenanted by the teacher... or by the sexton." The Hicksite/Orthodox separation within the Society of Friends resulted in assignment of the new, larger brick Meeting House to the Hicksite contingent, with the smaller

See Continuation Sheet

Significance:
The presence of the Friends on this site dates to the second quarter of the 18th century and continued into the latter part of the 20th century. The meeting house complex has always served as the central element of the hamlet that developed around it and was initially known as Mansfield Meeting House. Both meeting houses are architecturally significant and exhibit stylistic associations that reflect the religious life of the Friends and are characteristic in Friends meeting houses throughout the Delaware Valley region. The three cemeteries sited on this property include the burial places of numerous individuals who played important roles in various aspects of the Friends-dominated culture of the area. This property is also viewed to have a high potential for the presence of historic archaeological remains, including the former site of the Mansfield Friends School. In the event that eligible archaeological resources were to be identified, this property would also gain Criterion D significance.

Eligibility for New Jersey and National Registers: ☑ Yes ☐ No
National Register Criteria: ☑ A ☐ B ☑ C ☐ D
Level of Significance: ☐ Local ☐ State ☑ National

Justification of Eligibility/Ineligibility:
It is the conclusion of this survey that the Mansfield Friends Meeting House Complex - which includes the First and Second Mansfield Friends Meeting Houses, the Old and New Friends Cemeteries, and the Mansfield Cemetery - is eligible for inclusion on the National Register of Historic Places under Criteria A and C as a consequence of its association with the history of the Friends movement within the State of New Jersey, its association with the history of the Mansfield area, and its architectural significance.

For Historic Districts Only:
Property Count: Key Contributing: Contributing: Non Contributing:

For Individual Properties Only:
List the completed attachments related to the property’s significance:
1 - Base Form
2 - Building Attachment
3 - Landscape Attachment
5 - Continuation Sheets

Narrative Boundary Description:
The boundary consists of all lands legally associated with Block 30 and Lot 13 and 13.01.

Survey Name: N.J. Route 206 And Mansfield Road Intersection Project
Surveyor: Rob Tucher
Organization: The RBA Group Cultural Resource Unit
Date: August 2004
ELIGIBILITY WORKSHEET

History:
old frame Meeting House allotted to the Orthodox group. The 1859 Burlington County map labeled the buildings as the "H.F.M.H." and the "O. Friends M.H." respectively. The two groups and their properties would be reunited in 1924. 1929 plans for Route 206 (then Route 39) showed separate lanes leading to each Meeting House and a fence surrounding the older structure.

In 1862, the Upper Springfield Monthly Meeting at Mansfield purchased an additional .3-acre parcel for a new burial ground (the New Friends Cemetery), and in 1864 the Mansfield Cemetery Company was formed, purchasing another half-acre lot adjoining the existing burial grounds for a new "Mansfield Cemetery." A 20-foot wide strip of land adjacent to the Company property was purchased by John and Thomas Bishop in 1876, apparently for expansion of the cemetery, and in 1921 a second 20-foot strip bought by John I. Bishop provided additional burial space.
Property Name: First Mansfield Friends Meeting House
Street Address: Street #: 3193 (Low) State Hwy 206 (High)
Prefix: Suffix: Street Name: State Hwy 206 Type: 
County(s): Burlington Zip Code: 08022
Municipality(s): Mansfield Township Block(s): 30
Local Place Name(s): Lot(s): 13.02
Ownership: Private
USGS Quad(s): Columbus

Description:
This simple, one-and-a-half story cottage has a medium-pitched, side-gabled roof with no rake overhang, very slight eave overhang, and asphalt shingles. It has a replacement block chimney on the right (north) side and another added block chimney that pierces the center of the rear roof plane. It is three bays wide and is sheathed in wood clapboard. A shed roof corridor sheathed in asphalt shingles and punctuated with a nine-light metal door and an aluminum eight-over-eight double-hung sash unit connects the house to its side-gabled garage. The garage roof is clad in asphalt shingles. There is a scatter of headstones directly behind the 1827 Friends House.

Registration and Status Dates:
National Historic Landmark: 
National Register: 
New Jersey Register: 
Determination of Eligibility: 

SHPO Opinion: 
Local Designation: 
Other Designation: 
Other Designation Date: 

Photograph:

Survey Name: N.J. Route 206 And Mansfield Road Intersection Project Date: August 2004
Surveyor: Rob Tucher
Organization: The RBA Group Cultural Resource Unit
Bibliography/Sources:
Bordentown Quadrangle 1906; Burlington County Deeds; Burlington County Roads; Mansfield Meeting House – NJ-612; New Jersey State Highway Department 1929a; 1929b; 1958; New Jersey Wills; Otley and Whiteford 1849; Parry, Sykes, and Earl 1858; 1859; Perinchief 1975; Philadelphia Yearly Meeting Records Committee 1989; Scott 1876; Trenton Historical Society 1929; Tusim 1972; 1976; West Jersey Deeds; West Jersey Surveys; Woodward and Hageman 1883.

Additional Information:
The Mansfield Friends Meeting House and the Friends Meeting House are effectively separate properties and are treated as such in these forms but historically are irrevocably linked and are linked in terms of their eligibility.

More Research Needed?  ☐ Yes  ☑ No

INTENSIVE LEVEL USE ONLY
Attachments Included:  ☑ Building  ☐ Structure  ☐ Object  ☐ Bridge
☐ Landscape  ☐ Industry

Within Historic District?  ☑ Yes  ☐ No

Status:  ☑ Key-Contributing  ☐ Contributing  ☐ Non-Contributing

Associated Archaeological Site/Deposit?  ☑ Yes
(Known or potential Sites – if yes, please describe briefly)
Potential for 18th and 19th century deposits associated with the Meeting House; grave sites.
**BUILDING ATTACHMENT**

*Historic Sites #:*

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<th>Common Name:</th>
<th>First Mansfield Friends Meeting House, 3193 State Hwy 206</th>
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<tbody>
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<tr>
<td>Style:</td>
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<tr>
<td>Roof Finish Materials:</td>
<td>Asphalt Shingle</td>
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<tr>
<td>Exterior Finish Materials:</td>
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<tr>
<td>Stories:</td>
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</tr>
<tr>
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</table>

**Exterior Description:** This simple, one-and-a-half story cottage has a medium-pitched, side-gabled roof with no rake overhang, very slight eave overhang, and asphalt shingles. It has a replacement block chimney on the right (north) side and another added block chimney that pierces the center of the rear roof plane. It is three bays wide and is sheathed in wood clapboard. Fenestrations are wood, twelve-over-twelve double-hung sash, and the front entrance is comprised of double-hung, hinged sash doors with large lights. Front-gabled entry porches supported by chamfered square wood columns shield the front door and a secondary door on the left (south) elevation. Stone sill, porch floor, and approach provide access to the front entrance from the gravel drive. A shed roof corridor sheathed in asphalt shingles and punctuated with a nine-light metal door and an aluminum, eight-over-eight double-hung sash unit connects the house to its side-gabled garage.

**Interior Description:**
The interior of this structure was not examined as part of this investigation.

**Setting:**
The house faces east and stands close to the four lanes of ever widening State Highway 206. The region is agricultural in nature and is flat and relatively open. There is some commercial activity in the area and a small town, Columbus, lies to the south. Some residential developments have sprung up locally.

Survey Name: N.J. Route 206 And Mansfield Road Intersection Project
Surveyor: Rob Tucher
Organization: The RBA Group Cultural Resource Unit
Date: August 2004
**BUILDING ATTACHMENT**

<table>
<thead>
<tr>
<th>Common Name:</th>
<th>First Mansfield Friends Meeting House, 3193 State Hwy 206</th>
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<tr>
<td>Historic Name:</td>
<td>Friends Meeting House</td>
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<td>Present Use:</td>
<td>Transportation and Movement Activity, Vehicular parking</td>
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**Exterior Description:**
A shed roof corridor sheathed in asphalt shingles and punctuated with a nine-light metal door and an aluminum, eight-over-eight double-hung sash unit connects the house to its side-gabled garage. The garage roof is clad in asphalt shingles. It has a double-hung, hinged set of vertical plank doors and a wood, six-light fixed sash window unit on the front (east) elevation. To the north is an attached shed extension with a side-gabled roof clad in wood shingles, a vertical plank door, and a wood, six-light fixed sash window unit.

**Interior Description:**
The interior of this structure was not examined as part of this investigation.

**Setting:**
The house and its attached garage face east and stand close to the four lanes of ever widening State Highway 206. The region is agricultural in nature and is flat and relatively open. There is some commercial activity in the area and a small town, Columbus, lies to the south. Some residential developments have sprung up locally.

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**Survey Name:** N.J. Route 206 And Mansfield Road Intersection Project  
**Surveyor:** Rob Tucker  
**Organization:** The RBA Group Cultural Resource Unit  
**Date:** August 2004
Connector, garage, and shed associated with the First Mansfield Friends Meeting House. View looking west.
ELIGIBILITY WORKSHEET

History:
The first Mansfield Friends Meeting House was completed in 1733. In an 1883 history written by a Meeting elder who oversaw the Mansfield property, the first structure was described as "a long, narrow frame building." The burial ground (the Old Friends Cemetery) associated with the Meeting House was located to the rear of the building. The 2.5-acre property on which the Meeting House and cemetery stood was sold by Francis Gibbs to trustees of the Friends of the Burlington Quarterly Meeting in 1745/6. In 1786, the surviving trustee conveyed the

See Continuation Sheet

Significance:
The presence of the Friends on this site dates to the second quarter of the 18th century and continued into the latter part of the 20th century. The meeting house complex has always served as the central element of the hamlet that developed around it and was initially known as Mansfield Meeting House. Both meeting houses are architecturally significant and exhibit stylistic associations that reflect the religious life of the Friends and are characteristic in Friends meeting houses throughout the Delaware Valley region. The three cemeteries sited on this property include the burial places of numerous individuals who played important roles in various aspects of the Friends-dominated culture of the area. This property is also viewed to have a high potential for the presence of historic archaeological remains, including the former site of the Mansfield Friends School. In the event that eligible archaeological resources were to be identified, this property would also gain Criterion D significance.

Eligibility for New Jersey and National Registers: ☑ Yes ☐ No National Register Criteria: ☑ A ☐ B ☑ C ☐ D

Level of Significance: ☑ Local ☑ State ☐ National

Justification of Eligibility/Ineligibility:
It is the conclusion of this survey that the Mansfield Friends Meeting House Complex - which includes the First and Second Mansfield Friends Meeting Houses, the Old and New Friends Cemeteries, and the Mansfield Cemetery - is eligible for inclusion on the National Register of Historic Places under Criteria A and C as a consequence of its association with the history of the Friends movement within the State of New Jersey, its association with the history of the Mansfield area, and its architectural significance.

For Historic Districts Only:

Property Count: X

Contributing: ________ Non Contributing: __________

For Individual Properties Only:

List the completed attachments related to the property's significance:

1. Base Form
2. Building Attachments
3. Continuation Sheet

Narrative Boundary Description:
The boundary consists of all lands legally associated with Block 30 and Lot 13.02.

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Survey Name: N.J. Route 206 And Mansfield Road Intersection Project
Surveyor: Rob Tucher
Organization: The RBA Group Cultural Resource Group
Date: August 2004
ELIGIBILITY WORKSHEET

History:
tract to the Upper Springfield Monthly Meeting. A 1786 survey mentions both the Meeting House and a stable, and a 1787 deed for an adjoining property indicates that this stable stood at the front of the Meeting House lot, on the road. The congregation is said to have built the first schoolhouse in Mansfield Township on the property in 1786; the Mansfield Friends School House apparently stood in the southwest corner of the lot. The building was used continuously as a school for over one hundred years, housing the Mansfield public school by the late 19th-century, but would be demolished sometime around the turn of the 20th century.

The frame garage presently attached to the old frame Meeting House was depicted on 1956 plans for dualization of Route 206. In 1984, the frame Meeting House on a .65-acre lot was sold to Donald and Mary Gaff. The conveyance required that the new owners acknowledge the burial ground.
Appendix C: Annotated Bibliography

Authors: Cayla Cannon, and Paul J. McEachen
Title: Geophysical Survey Using Ground-Penetrating Radar, Block 30, Lot 13.02, Mansfield Township, Burlington County, New Jersey
Date: March 2022
RGA Database Title: Old Friends Cemetery, Mansfield Friends Meeting House Complex
RGA Project No: 2021-240
State: New Jersey
County: Burlington
Municipality: Mansfield Township
U.S.G.S. Quad: Columbus, NJ
Drainage Basin: Unnamed Tributary of Crafts Creek, Crafts Creek, Delaware River Delaware Bay, Atlantic Ocean
Regulation: Municipal
Project Type: Development: Commercial and Industrial
Project Sponsor: Elion Partners
Client: Elion Partners
Level of Survey: Geophysical Survey (i.e. GPR)
Cultural Resources: Old Friends Cemetery, Mansfield Friends Meeting House Complex (SHPO Opinion: 10/30/2007)