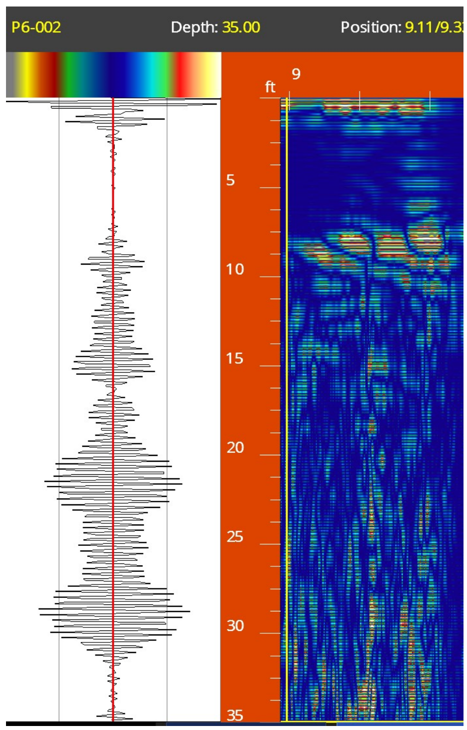
Report of Findings:
Three Additional Ground Penetrating Radar (GPR) Surveys of the Ft. Loudoun, Winchester, Virginia Site (44FK0593): GPR Survey of a Short Depth of the Extant Mid-18th Century Ft. Loudoun Well, the Adjacent Well Area, and the South – West Side of the Historic House at 419 North Loudoun Street, Winchester, Virginia



Cover Figure: Radargram image. A Ground Penetrating Radar (GPR) Single Depth Slice c. 9+ feet across the top of the extant c. 20th century Concrete Well Cap of the extant historic mid-18th century Ft. Loudoun Well, from the Top of the Well Cover Concrete Slab to c. 35' in depth. Image by Mark Michael Ludlow RPA, 18 October 2023.

Surveys Conducted at the Request of The French and Indian War Foundation

French & Indian War Foundation

Three (3) Addendum Surveys on 18 October 2023

Author:

Mark Michael Ludlow RPA (Principal Investigator)

Survey Assistance from Hayden Mathews

Table of Contents

Introduction

The French & Indian War Foundation contracted with M3 Archaeology LLC (Mark Michael Ludlow RPA, Registered Professional Archaeologist, Registrant ID #16263) for additional Ground Penetrating Radar (GPR) survey work focused upon: 1) The top of the extant, c. 103' deep, Ft. Loudoun well (the Well) and immediately around the Well (Area #1 – **Purple Square** - below; 2) An irregular area, c. 30' X c. 40', a further distance out from around the Well (Area #2 – **Yellow Box** - below); and; 3) An area c. 20' X c. 50', (Area #3 – **Red Rectangular Box** – below. Two different GPR machines were used. Area #1 was scanned using a GSSI Utility Scan System described further elsewhere herein. Areas #2 and #3 were scanned using a Sensors & Software Ground Penetrating Radar (GPR) 'Noggin' system, also described elsewhere herein**.**

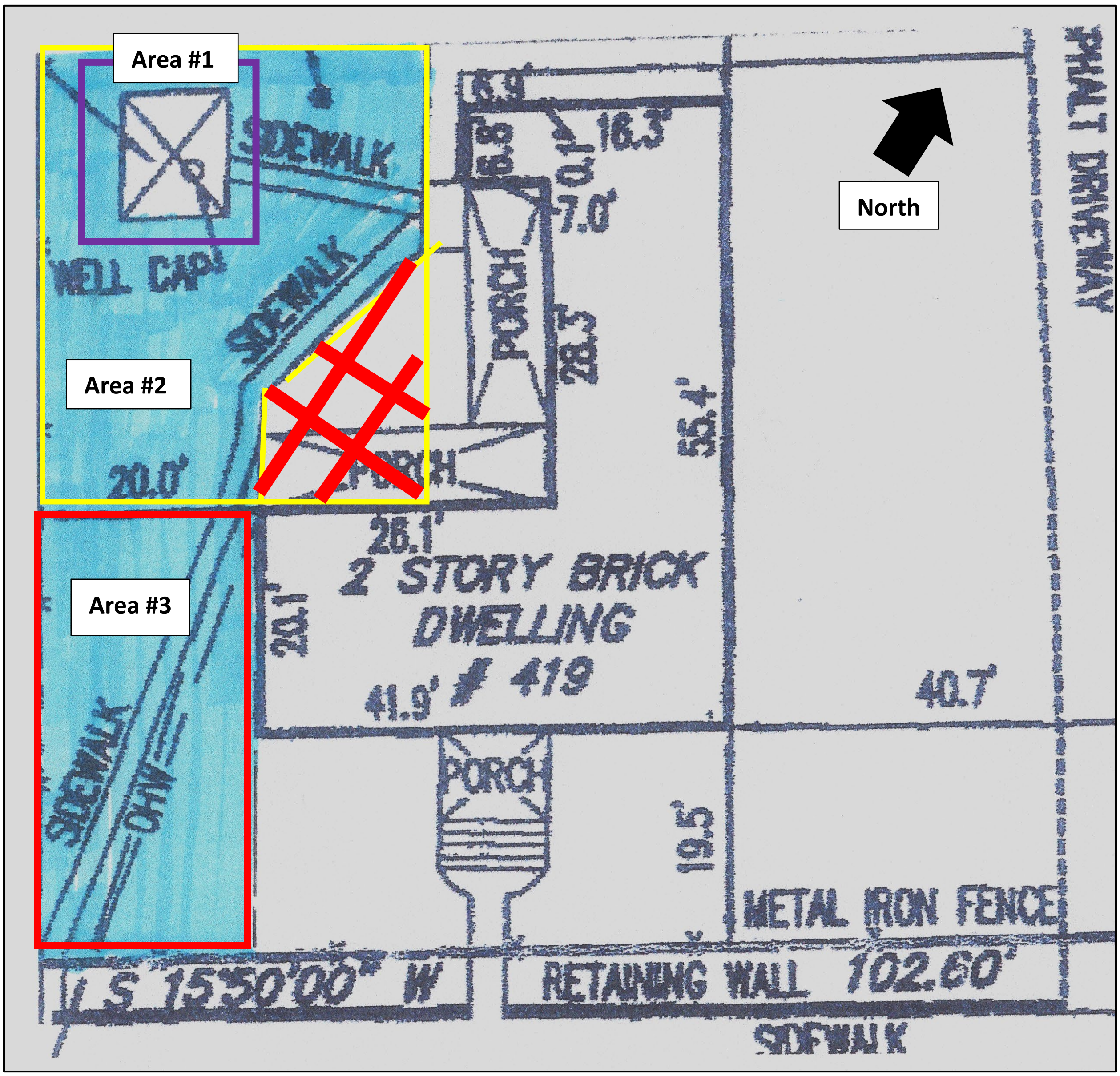


Figure 1: A portion of a Plan Map of the house and surrounding property at 419 North Loudoun Street, Winchester, Virginia 22601. The Headquarters of the French & Indian War Foundation. Within the property is the extant mid-18th century Ft. Loudoun Well and a portion of mid-18th century Ft. Loudoun - the North-

West Bastion and a portion of the interior of Ft. Loudoun. The map shows the three (3) areas subjected to Ground Penetrating Radar (GPR). **RED HASH MARKS**: A portion of the Area #2 Grid Survey that was not accessible and not included in the GPR Survey – a raised porch. Plan Map source: The French & Indian War Foundation. Map Modified by Mark Michael Ludlow RPA, 20 October 2023.

The Open Spaced Ground Penetrating Radar (GPR) Survey Method Used in Area #1, the Well and Well Cap Area Survey

Ground Penetrating Radar (GPR) is a non-destructive geophysical method that produces a continuous cross-sectional profile or record of subsurface features, without drilling, probing, or digging. Detecting levels with the GPR machine used in the Ft. Loudoun Well and Well Cap Survey was circa thirty-two feet (c. 32') deep. Otherwise, levels of depth depend upon soil conditions and the object types and sizes being detected.

The Ft. Loudoun Well and Well Cap Open Spaced Ground Penetrating Radar (GPR) Survey was conducted using a GPR cart that is pushed along the ground surface. It looks much like a small gas-powered lawn mower – It is not gas powered and has to be pushed or pulled (See Figure 2 below). A Geophysical Survey Systems, Inc., (GSSI) UtilityScan-B System with a Hyperstacking 350MHz antenna, integrated cart, and RADAN 7 Software for data processing, was used. Imaging was set to circa nine feet (c. 9') below ground surface because Well Cap information was sought relatively close to the surface.

Mark Michael Ludlow RPA, Registered Professional Archaeologist, Registrant ID# 16263, was the GPR cart operator and conducted the GPR post-processing and GPR analysis. Hayden Mathews assisted the GPR operator.

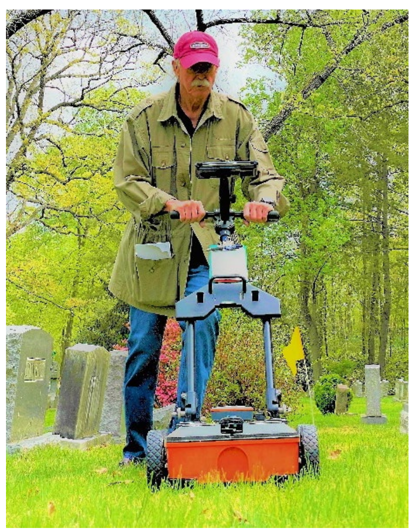


Figure 2: Photographic image (Not from the Ft. Loudoun GPR Survey) of the Geophysical Survey Systems, Inc., (GSSI) UtilityScan-B System with a Hyperstacking 350MHz antenna, integrated cart, and RADAN 7 Software for data processing, used in the Ft. Loudoun Open Spaced Ground Penetrating Radar (GPR) Survey. The individual in the image is the Ft. Loudoun GPR Survey Principal Investigator. Photograph by Lucy Goddin, Former Executive Director of the historic Ivy Hill Cemetery in Alexandria, Virginia, 2016.

How Open Spaced Line Scan Ground Penetrating Radar (GPR) Works

Ground Penetrating Radar (GPR) data profiles, also known as radargrams, are used for evaluating the location and depth of buried objects such as internments/graves and to investigate the presence and continuity of natural subsurface conditions and features.

Ground Penetrating Radar (ground radar) operates by transmitting pulses of ultra-high frequency radio waves (microwave electromagnetic energy) down into the ground through a transducer (also called an antenna). The GPR antenna (transducer) is pulled or pushed along the ground by hand or behind an ATV or a vehicle. The transmitted energy is reflected from various buried objects or distinct contacts between different earth materials. The antenna then receives the reflected waves and stores them in the digital control unit. The control unit registers the reflections against two-way travel time in nanoseconds and then amplifies the signals. The output signal voltage peaks are plotted on the GPR profile as different color bands or gray scales by the digital control unit.

A ground penetrating radar (GPR) cross-section (Example below) shows the ground surface at the top of the profile, and the reflections of sub-surface geologic units and objects to a certain pre-selected depth at the bottom. The depth scale is on the left.

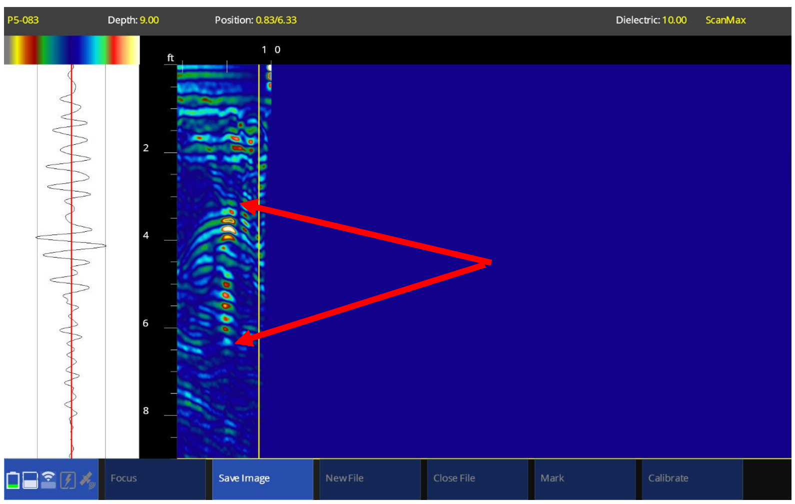


Figure 3: Radargram image. As an example, above is a Ground Penetrating Radar (GPR) single scan slice image using GSSI Color Table #4. A single hyperbola (**TOP RED ARROW POINTS TO THAT HYPERBOLA – A 'C' on its side**) indicates the presence of a large anomaly consistent with a burial and a casket of some substance. The top of the hyperbola/a presumed casket, is circa 3¼' below the surface and proceeds (**BOTTOM RED ARROW**) to a depth of circa 6' below the surface. The image of the GPR processed colored scan slice was taken by Mark Michael Ludlow RPA, using a GSSI UtilityScan-B System with a Hyperstacking 350MHz antenna, integrated cart, and RADAN 7 Software for data processing. This is the same system used at the Ft. Loudoun Well and Area #1 Open Spaced Ground Penetrating (GPR) Survey. Image further modified by Mark Michael Ludlow RPA, 1 September 2023.

GPR Theory: Understanding the Dielectric Constant

GPR works by transmitting and receiving a high frequency electromagnetic wave through the ground, whether it's soil, concrete, gravel, or other material. Radar waves travel at different velocities depending on what material it's traveling through; anything 'different' that it interacts with will produce a reflection, to be received by the GPR device. Upon receiving the reflection, a GPR device will take note of the amount of time it takes for the signal to return and the strength of that reflection. The system will take these two

(2) pieces of information and convert them into a depth reading; in order to do so, they must be programmed with what's known as the Dielectric Constant. This constant describes the speed at which electromagnetic waves move through a particular material.

The Importance of the Dielectric Constant

The Dielectric Constant is critically important to getting accurate depth readings with GPR systems. Dielectric Constants, also known as relative dielectric permittivity, are measured on a scale of one to eighty-one (1 to 81), where one (1) is the Dielectric Constant for air (through which radar waves travel most quickly) and eighty-one (81) the constant for water (through which radar waves travel most slowly). Metallic objects exist outside the scale, since radar waves cannot penetrate them at all; they are described as having an infinite Dielectric Constant.

In order to convert the variable that is produced by a radar reading – time – into the desired product of the reading – depth – GPR systems must be accurately programmed with the correct Dielectric Constant for the ground material in question. This enables GPR systems to produce meaningful depth readings, instead of timed reflection readings; these time reflection readings are transformed in an equation with the proper Dielectric Constant. As a result, depth readings from GPR systems are only as accurate as the Dielectric Constant with which they are programmed for each particular ground material. There are three (3) key methods for determining an accurate Dielectric Constant, each with their own benefits and drawbacks.

Methods of Determining the Dielectric Constant

One way of determining the Dielectric Constant is by utilizing a published reference, available from GSSI in manuals and products documentation, as well as online. Using a published reference is the quickest and easiest way to obtain a Dielectric Constant because it doesn't require field analysis if ground material type is known. It's not the most accurate, though, because published references are averages and not site specific.

Area #1: Well, Well Concrete Slab Area: GPR and Visual Findings Related to the Well & Well Cap

The extant 18th century Ft. Loudoun Well and Well Cap were explored visually with severe limitations through uncovered concrete borings done some time ago. They were explored using Ground Penetrating Radar (GPR) and via three (3) photographs taken some time ago. Below is the GPR machine used in this portion of the three (3) GPR Surveys. A different GPR machine was used to survey two (2) other associated areas.

Figure 4: Photograph image of a portion of the Ft. Loudoun concrete Well Cap. Seven (7) covered and open bore holes in the concrete slab are visible. Note the two (2) parallel lines inscribed into the concrete Well Cap. A Geophysical Survey Systems, Inc., (GSSI) UtilityScan-B System with a Hyperstacking 350MHz antenna, integrated cart, and RADAN 7 Software for data processing is also shown in the image. It was used in the Ground Penetrating Radar (GPR) Survey of the extant c. 103' Ft. Loudoun Well and the area immediately around the Well Cap, Area #1. Photograph by Mark Michael Ludlow RPA, October 2023.

Well Parameter Edge Search for Supporting Structures

The objective of this portion of the GPR Surveys was to try to determine what supported the concrete Well Cap. Through limited visual inspections though the many uncovered concrete bore holes (Concrete Core Drilling), previously mechanically cut through the concrete Well Cap, and through GPR Single Slice GPR Line Scans, and three (3) photographs, it was determined what supported the five (5) short sections of railroad track running generally crossing the well in a circa East-West direction as well as determining what was supporting the existing concrete well cap at its edges.

The concrete Well Cap Slab was found to be c. 6" thick with no rebar and no wire mesh. It was sitting on five (5) short lengths of steel railroad track. The railroad track lengths are estimated to be c. 10' in length (And may vary in lengths). The diameter of the extant well is believed to be, after rough measurements, c. 8'5" across and it was found to be circular.

The GPR imagery below (Figures 8 through and including 18) suggests that the supporting railroad ties sit upon a number of man-made layers. some somewhat crude, c. five (c. 5), of different materials.

Again, he Well Cap was c. 6" thick. Again, here was no rebar or wire mesh visible within it for structural support. The primary purpose for rebar and wire mesh is to increase the tensile strength of concrete, helping to resist cracking and breaking. The circa 6" thickness of the Ft. Loudoun Well cap is possibly technically considered too thin for rebar. Wire mesh is often used as the alternative (6X6X10/10 mesh is typical). There are seven (7) or more previously drilled bore hole holes c. 4" estimated wide through the concrete Well Cap which afforded some visibilities and the ability to measure the depth of the Well from the top of the Well Cap to the top of the water in the well on 18 October 2023. On that date the water level was c. 12' fellow the top of the concrete Well Cap. The was a slight ledge of unknown nature protruding from the West side if the Well.

The concrete Well cap currently sits on five (5) short lengths of steel railroad track. Presumptively, there was a wooden support such as plywood on top of the five (5) steel railroad tracks (and a form with sides) upon which, and into, which the wet concrete for the Well Cap was originally poured to give form until the concrete dried and cured.

Multiple man-made layers, some somewhat crude, c. five (5), around the sides of the Well support the five (5) railroad track segments spanning the width of the Well and slightly beyond. The railroad track segments run generally East-West across the well (Parallel to the side of the house and the adjacent asphalt driveway and are partially visible via the bore holes (See Figures 10, 11, and 12) previously made in the Well Cap.

There was a marked grid inscribed in the top side of the concrete Well slab composed of two (2) parallel lines on each of the four (4) sides of the concrete slab (See Figure 4). It is believed that these defined/marked the interior edges of the round Well and upon which the five (5) railroad track segments rested. Through one (1) or more bore holes, some of the curving sides of the Well were visible. A length of fiberglass rod was used to confirm what could not be seen or GPR imaged clearly on most sides of the circular well.

Real time visual, as well as older photographic images, combined with GPR imaging confirmed the above details. Those GPR images and photographic images follow.

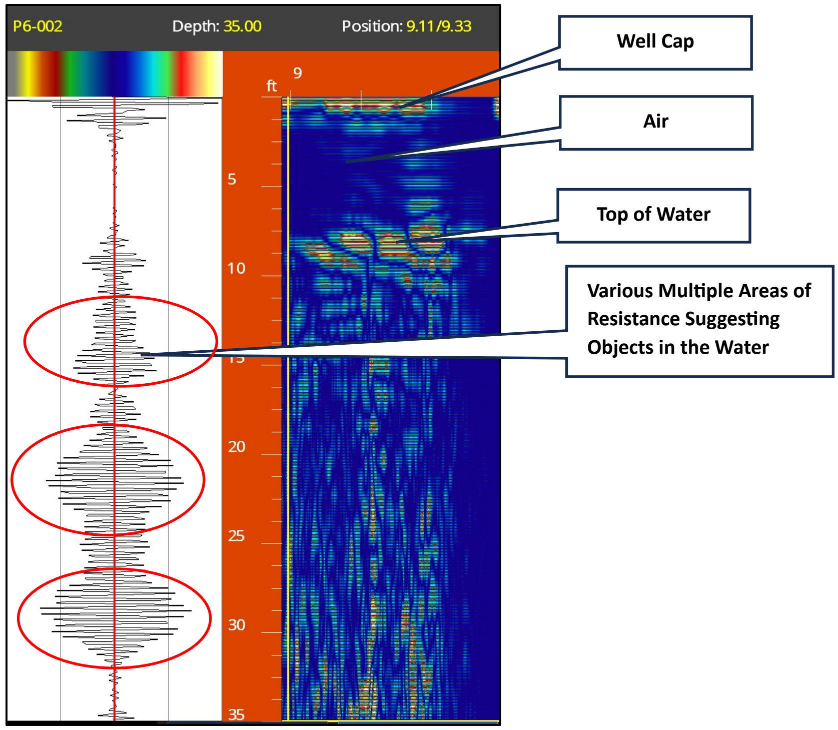


Figure 5: Radargram image 2B. Image Over Top of Well, East -West. Depth 35', Dielectric 30.00, Zoom 2, Color Table 4. The Dielectric Constant was changed for two (2) sets of images – This image was at a Dielectric Constant of thirty (30). Image by Mark Michael Ludlow RPA, 18 October 2023.

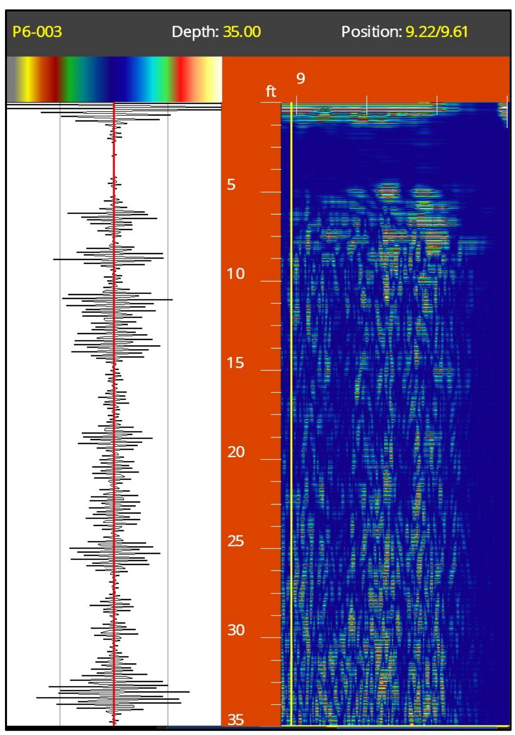


Figure 6: Radargram image 3A. Image Over Top of Well, East -West. Depth 35', Dielectric 80.00, Zoom 2, Color Table 4. The Dielectric Constant was changed for two (2) sets of images – This image was at a

Dielectric Constant of eighty (80). Eighty is the Dielectric Constant of water. Image by Mark Michael Ludlow RPA, 18 October 2023.

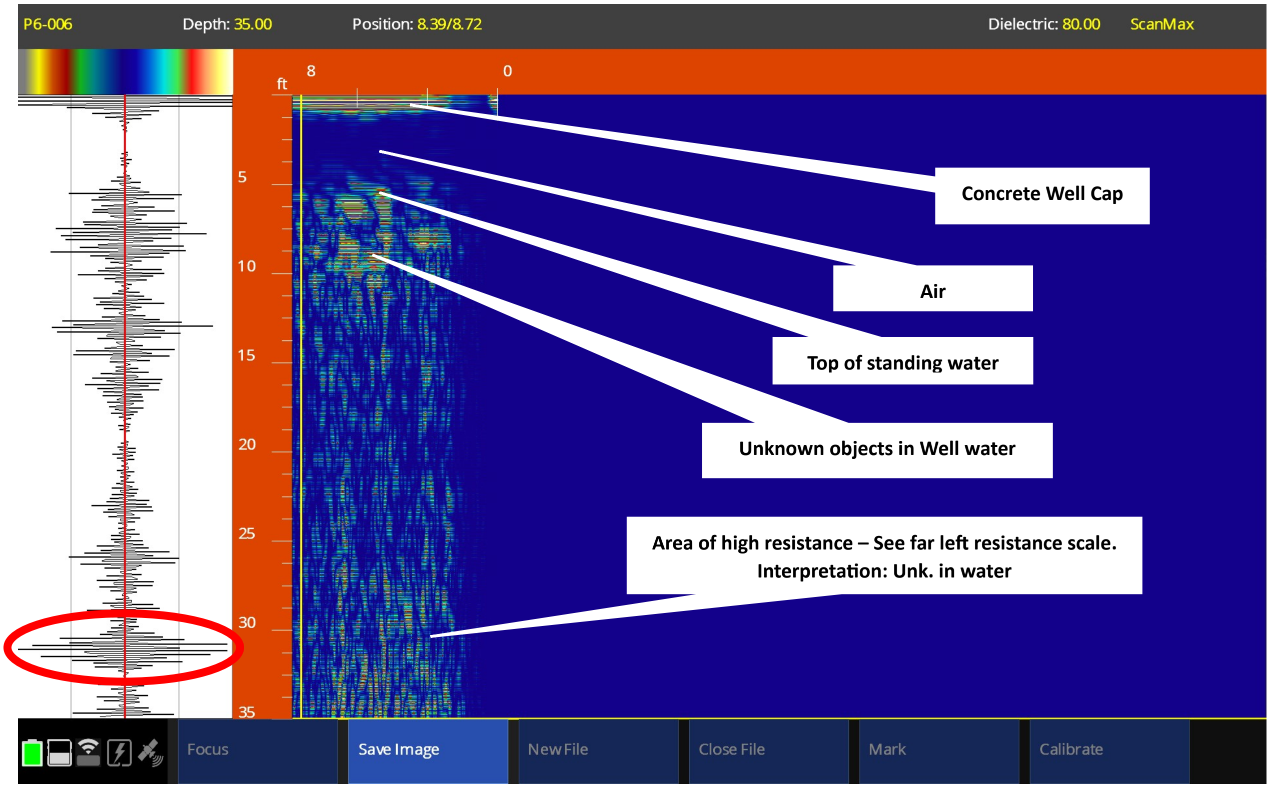


Figure 7: Radargram image 9A. Image Over top of Well, East -West. Depth 35', Dielectric 30.00, Zoom 2, Color Table 4. Image by Mark Michael Ludlow RPA, 18 October 2023.

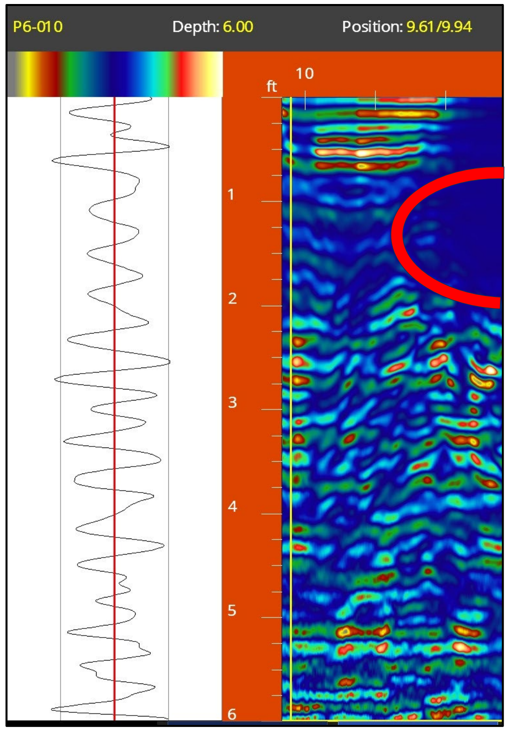


Figure 8: Radargram image 10A, Edge of Well Search. North-West edge on Soil. **RED CRESCENT**: An apparent void in the side of the Well. Possibly this is showing a difference in the Well diameter at the top of the Well versus c. 2’ down and thereafter where it is more consistently narrow. Void circa 1¼’. Image by Mark Michel Ludlow, 18 October 2023.

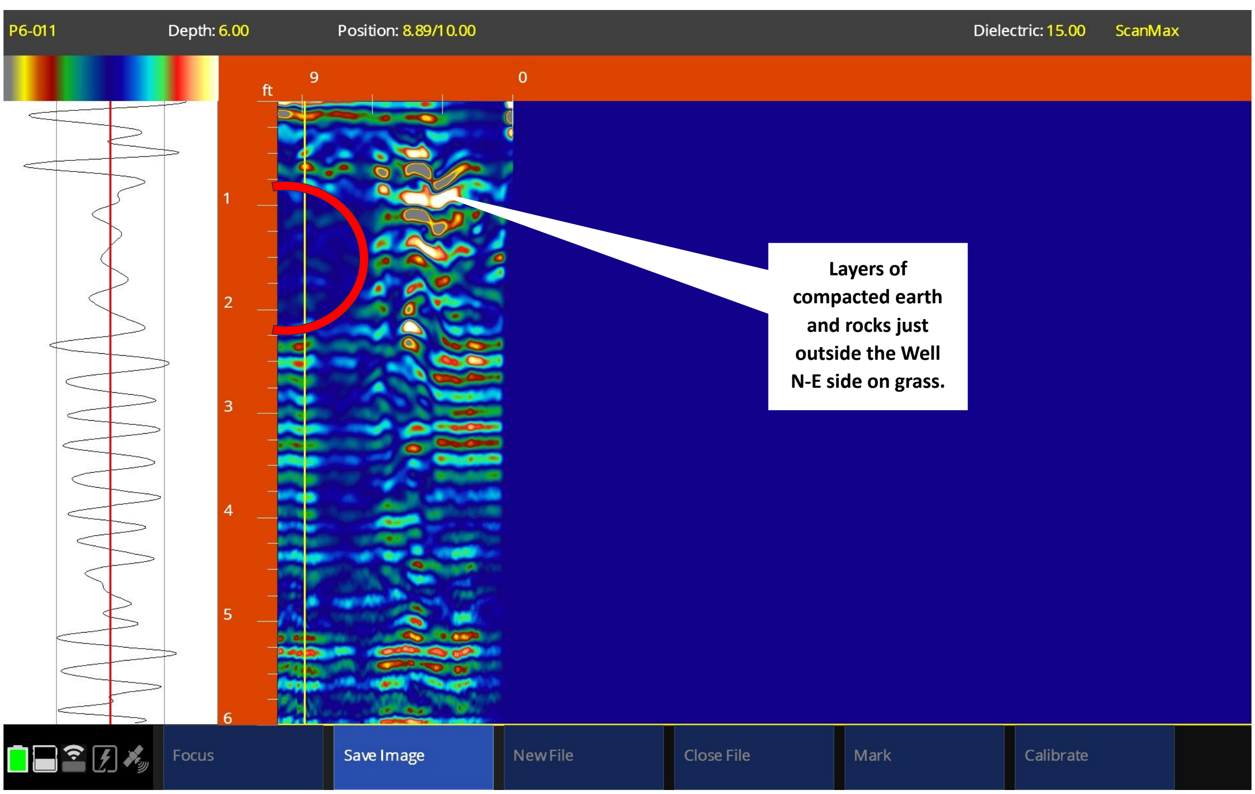


Figure 9: Radargram image 11A, Edge of Well Search. N-E Edge on Soil. **RED CRESCENT**: Apparent void in side of Well. Possibly this is showing a difference in the Well diameter at the top of the Well versus c. 2' down and thereafter where it is more consistently narrow. c. 1 ¼'. Image by Mark Michel Ludlow, 18 October 2023.

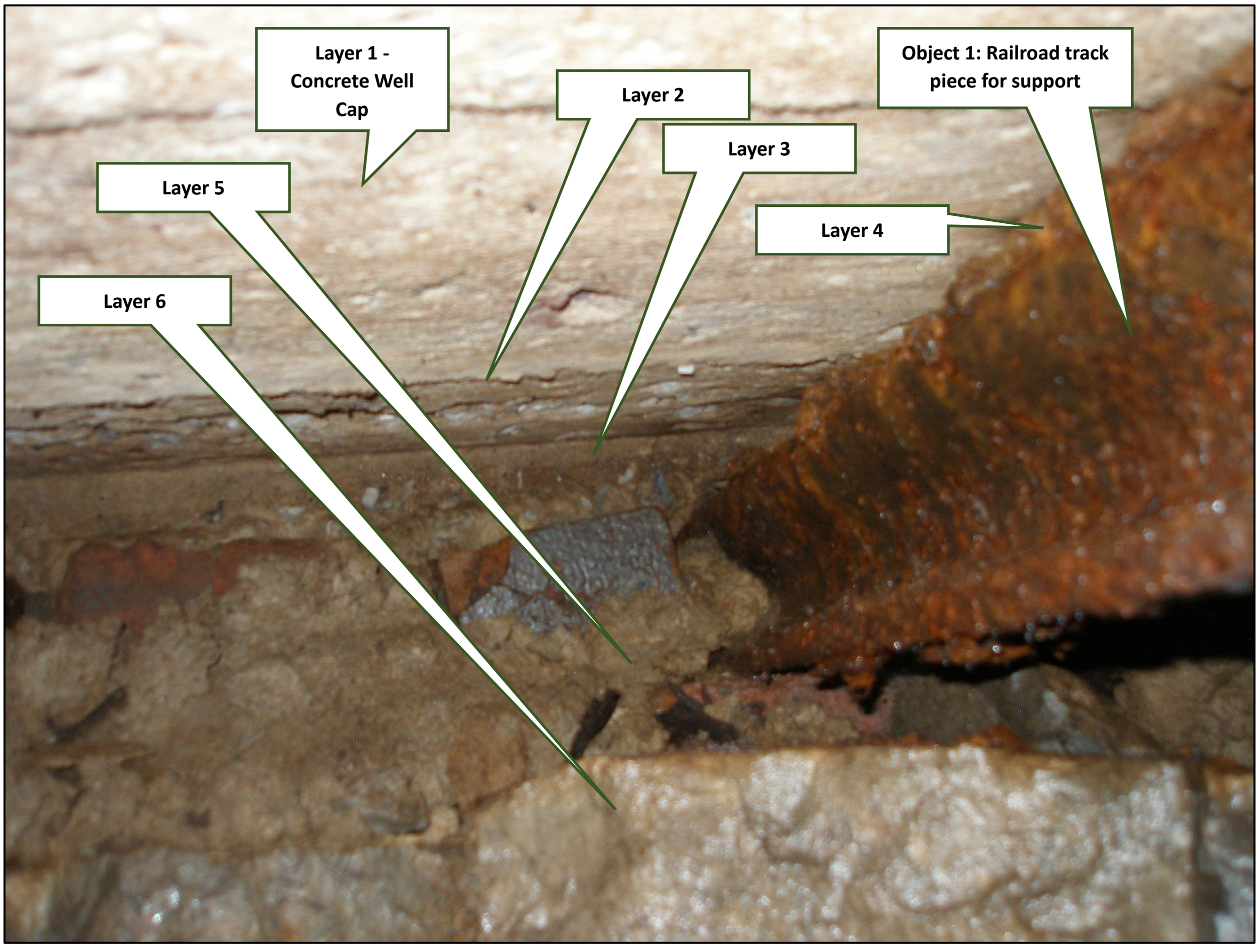


Figure 10: Photographic image of a portion of the underside of the Ft. Loudoun Concrete Well Cap showing six (6) distinct layers, (Some quite crude), most are not related to the 18th century Well but rather the construction of a c. 20th century concrete Well Cap. Layer 1: The underside of the concrete Well Cap; Layer 2: Unknown, possible concrete and small stones; Layer 3: An apparent well-formed concrete border/wall; Layer 4: Decomposed elements of a wet concrete pour support, possible wooden; Layer 5: Concrete and rubble rocks; Layer 6: Large blocks of stone and concrete. Object 1: short length of railroad track, one (1) of five (5) spanning the Well width. Photograph provided by The French & Indian War Foundation, October 2023.

Figure 11: Photographic image. Another view of some of the six (6) layers (Some quite crude) and the short section of railroad track. Photograph provided by The French & Indian War Foundation, October 2023.

Figure 12: Photographic image. Another view of some of the five (5) layers and the short section of railroad track. Photograph provided by The French & Indian War Foundation, October 2023.

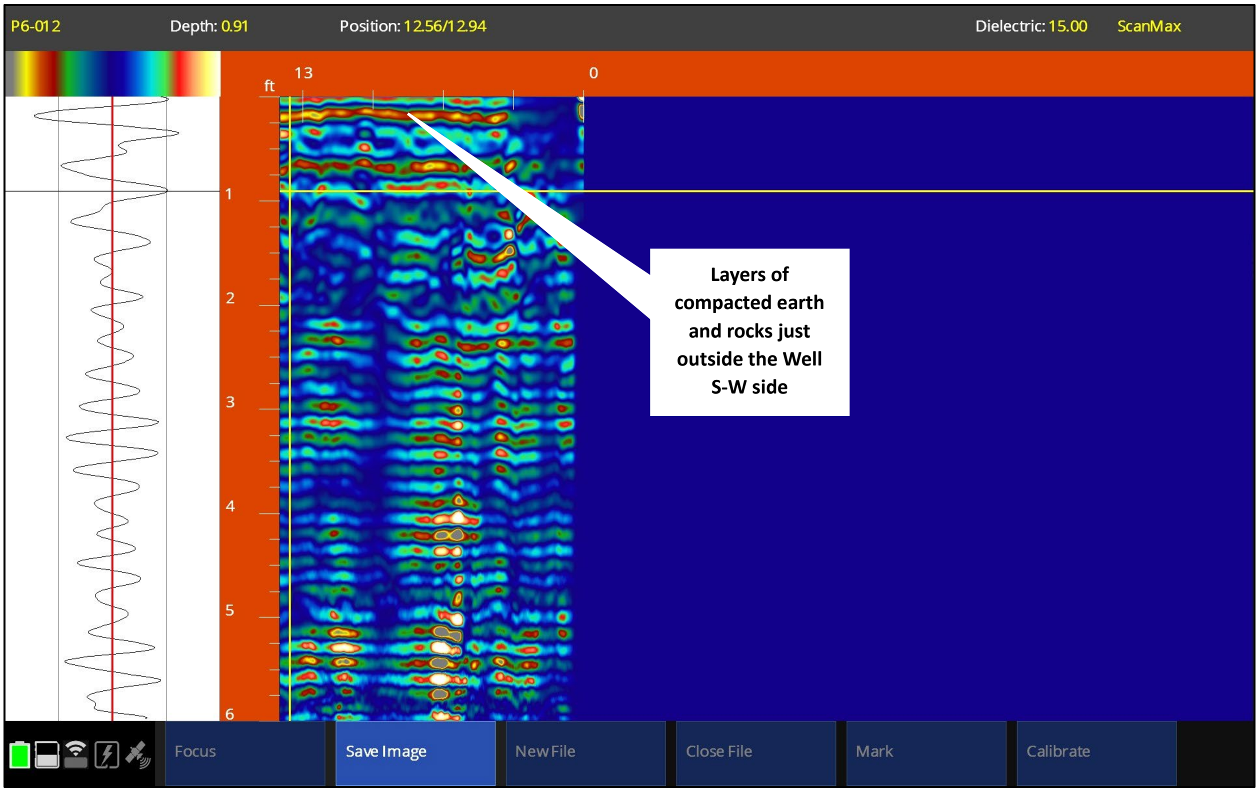


Figure 13: Radargram image 12A, Edge of Well Search. Outside of Well Pad near Driveway, S-W side = Facing next door house. **NOTICE**: Quite well defined and relatively uniform layers of soils and rocks. Image by Mark Michel Ludlow, 18 October 2023.

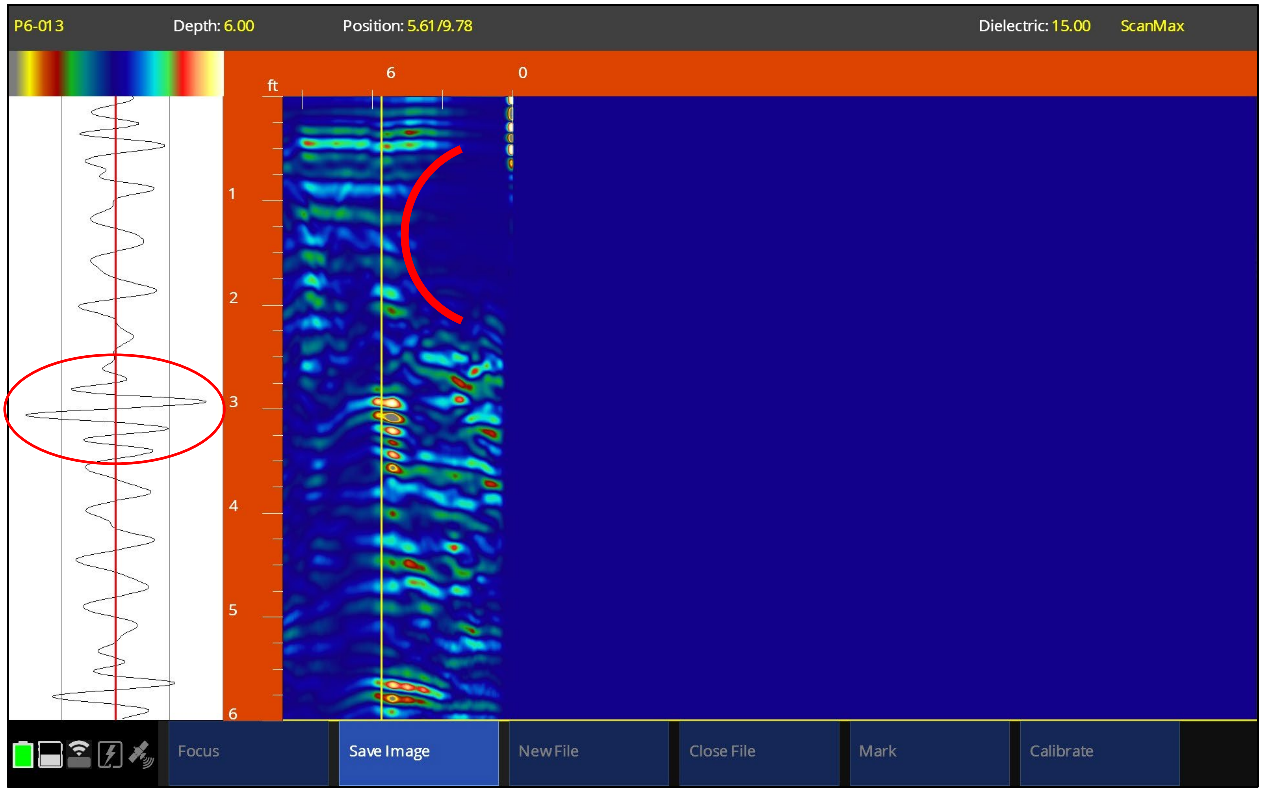


Figure 14: Radargram image 13A, Edge of Well search: GPR pass along Well slab edge, pass c. 2’ in from edge. North side of pump, Depth c. 6’, Dielectric 15, Color Table 4, Zoom 2. **RED CRESCENT**: Apparent void in side of Well. Possibly this is showing a difference in the Well diameter at the top of the Well versus c. 2’ down and thereafter where it is more consistently narrow. **RED OVAL**: Area or point of resistance indicating large rocks. Image by Mark Michel Ludlow, 18 October 2023.

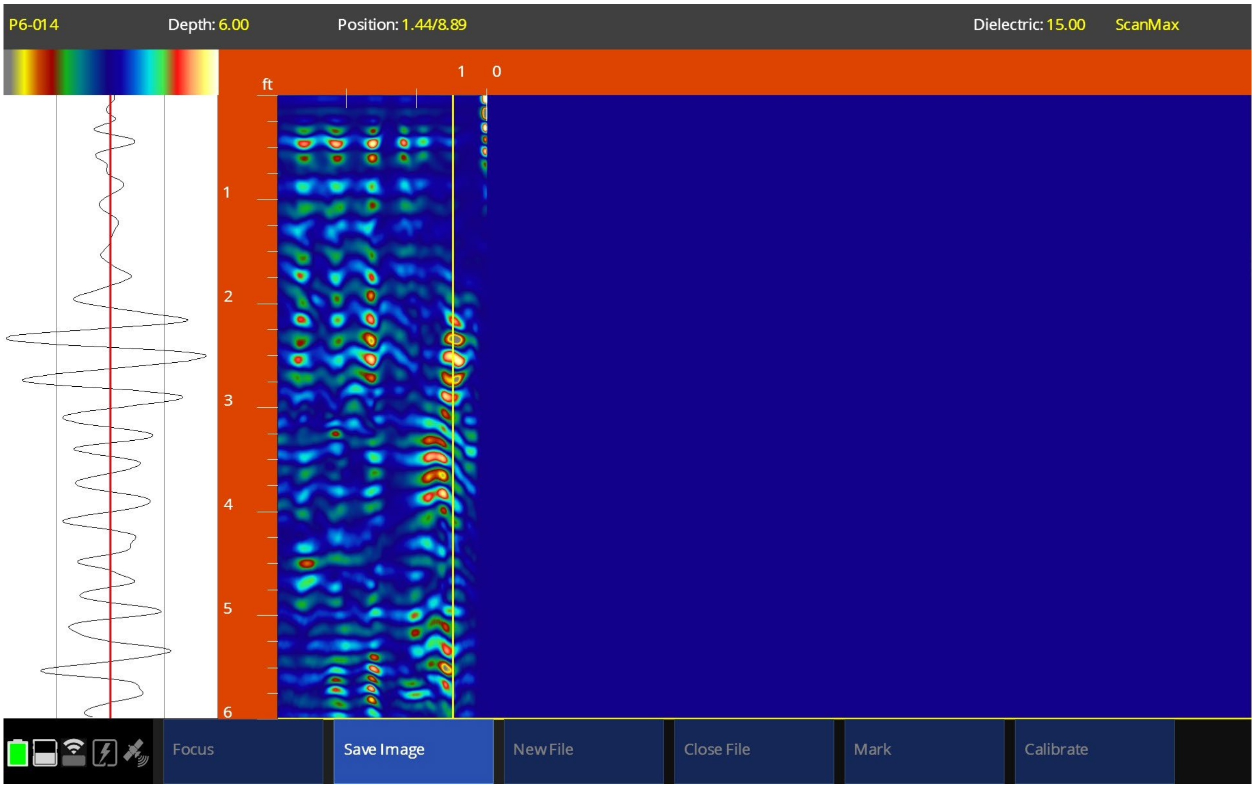


Figure 15: Radargram image 14A, Edge of Well search. Slab edge c. 2.5' in on North Loudoun Street side. Five (5) steel railroad rails near surface. Again, possibly this is showing a difference in the Well diameter at the top of the Well versus c. 2' down and thereafter where it is more consistently narrow. Depth: 6', Dielectric 15, Image by Mark Michel Ludlow, 18 October 2023

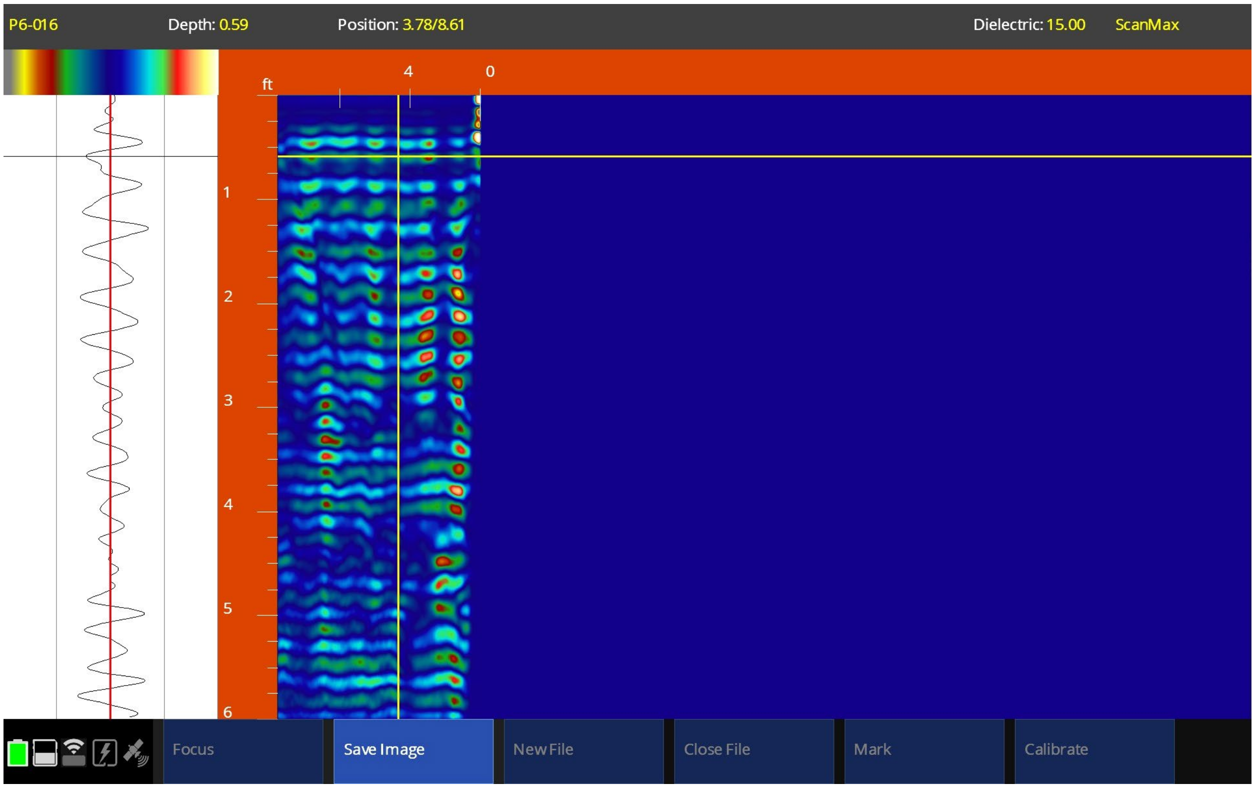


Figure 16: Radargram image 16A, Edge of Well search. Circa 18" in over incised parallel stripes-edge closest to North Loudoun Street in concrete Well Cap slab. Depth 6', Dielectric 15. Image by Mark Michel Ludlow, 18 October 2023.

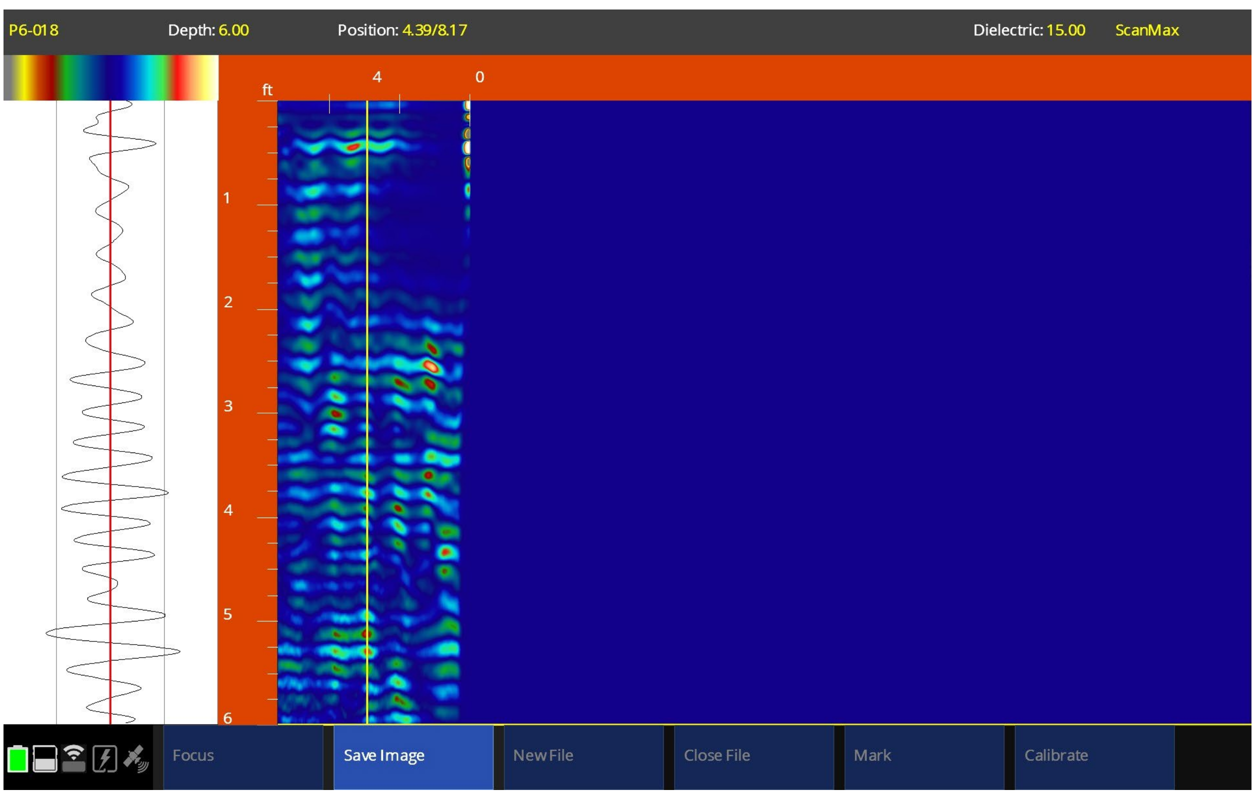


Figure 17: Radargram image 18A, Edge of Well search. On edge closest to North Loudoun Street. Depth 6', Dielectric 15. Possibly this is showing a difference in the Well diameter at the top of the Well versus c. 2' down and thereafter where it is more consistently narrow. Image by Mark Michel Ludlow, 18 October 2023.

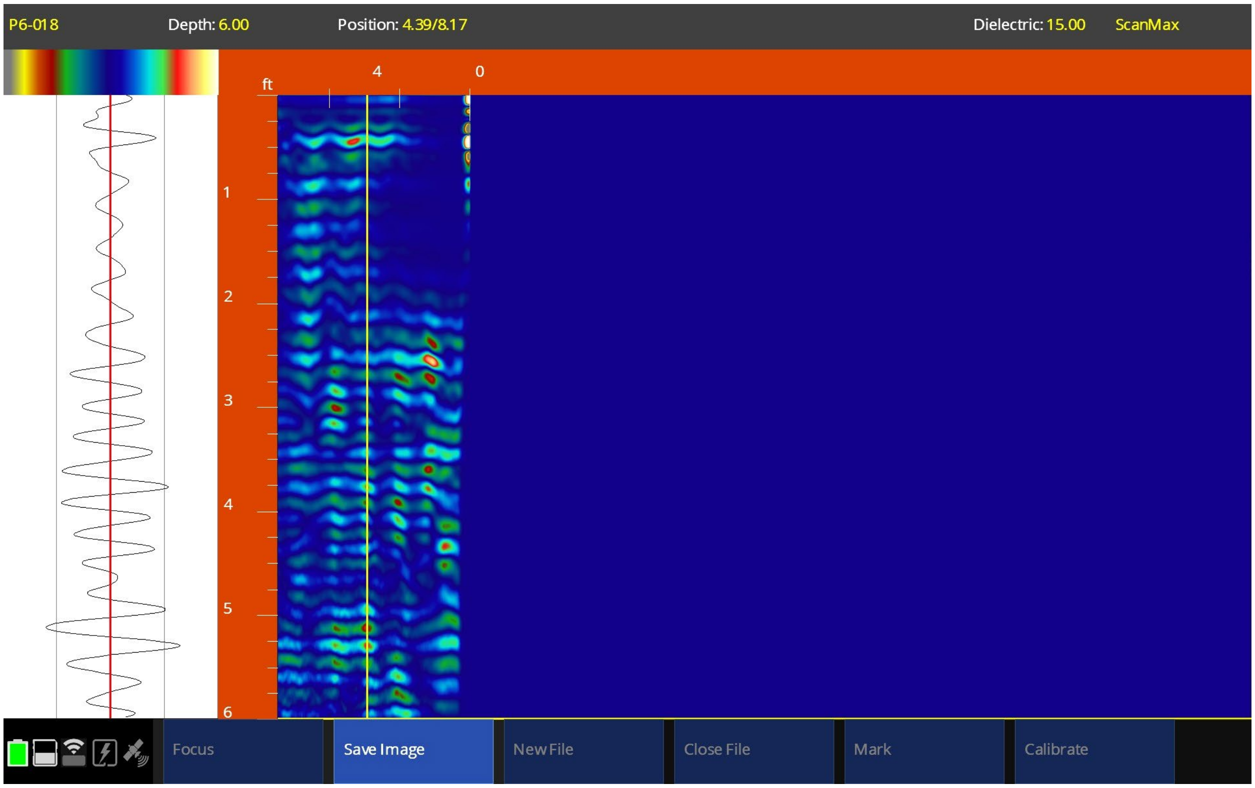


Figure 18: Radargram image 19A, Edge of Well Search. Edge of slab closest to North Loudoun Street. Depth 6', Dielectric 15. Possibly this is showing a difference in the Well diameter at the top of the Well versus c. 2' down and thereafter where it is more consistently narrow. Image by Mark Michel Ludlow, 18 October 2023.

How Ground Penetrating Radar (GPR) Works as Used in the Survey of Areas 2 and 3

Ground Penetrating Radar (GPR) is a non-destructive geophysical method that produces a continuous cross-sectional profile or record of subsurface features, without drilling, probing, or digging. Detecting levels with a 500 MHZ antenna as deep as circa one-hundred (c. 100) feet can be obtained depending upon soil conditions and the object types and sizes being detected.

The Grid Scan Ground Penetrating Radar (GPR) Survey was conducted using a GPR cart that is pushed along the ground surface. It was used to traverse Areas 2 and 3. Each Area was traversed separately in lanes c. 2' wide. The GPR machine looks much like a small gas-powered lawn mower – It is not gas powered and has to be pushed or pulled. It is not power assisted. A Sensors & Software 'Noggin' with a GPR 500 MHz Sensor, running ECCO-Project Software, and with an attached and integrated Geode GNS2 Multi-GNSS 1 Hz Receiver GPS unit, on a 'SmartCart' (See Figure below) was used. Mark Michael Ludlow RPA, Registered Professional Archaeologist, Registrant ID# 16263, was the GPR cart operator and conducted the GPR post-processing and GPR analysis. Hayden Mathews assisted.

Figure 19: Photographic image of a Sensors & Software 'Noggin' with a GPR 500 MHz Sensor, running ECCO-Project Software, and with an attached and integrated Geode GNS2 Multi-GNSS 1 Hz Receiver GPS unit, on a 'SmartCart'. This is the second piece of GPR equipment system used in the Ft. Loudoun GPR Survey. Used for Areas 2 and 3. Image source: Sensors & Software, September 2023.

How Grid Scan Ground Penetrating Radar (GPR) Works

Ground Penetrating Radar (GPR) data profiles, also known as radargrams, are used for evaluating the location and depth of buried objects such as internments/graves, walls, wells, and the like, and to investigate the presence and continuity of natural subsurface conditions and features.

Ground Penetrating Radar (aka ground radar) operates by transmitting pulses of ultra-high frequency radio waves (microwave electromagnetic energy) down into the ground through a transducer (also called an antenna). The GPR antenna (transducer) is pulled or pushed along the ground by hand or behind an ATV or a vehicle. The transmitted energy is reflected from various buried objects or distinct contacts between different earth materials. The antenna then receives the reflected waves and stores them in the digital control unit. The control unit registers the reflections against two-way travel time in nanoseconds and then amplifies the signals. The output signal voltage peaks are plotted on the GPR profile as different color bands or gray scales by the digital control unit.

The GPR system used also can produce other images, not just vertical depth images, but rather horizontal depth images (See example below).

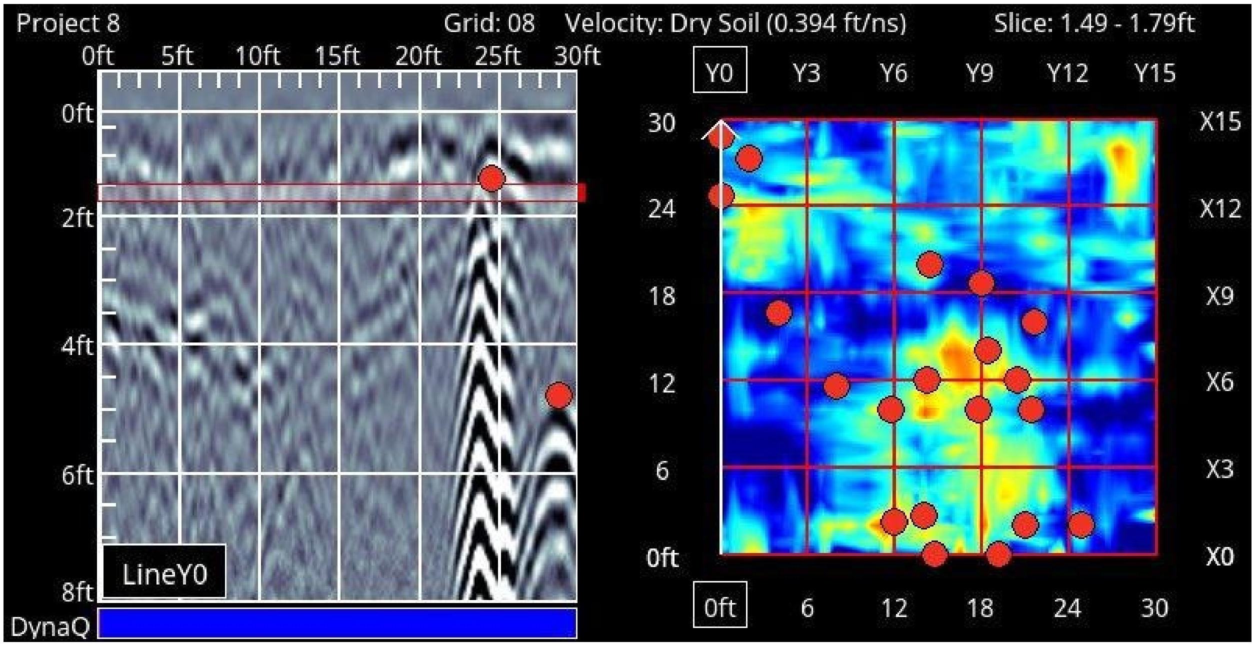


Figure 20: Ground Penetrating Radar (GPR) partial Mini Report, **NOT from Ft. Loudoun**, in both: 1) **LEFT** – Verticle Slice View and 2) **RIGHT** Horizontial Plan View at c. 1.79 feet deep. **Not** from the Ft. Loudoun GPR Survey. Image generated by Mark Michael Ludlow RPA, August 2023.

It is important to note and reiterate, that the GPR machine, a Sensors & Software 'Noggin' with a GPR 500 MHz Sensor, running ECCO-Project Software, and a Geode GNS2 Multi-GNSS 1 Hz Receiver GPS unit, on a 'SmartCart' had a Geode GNS2 Multi-GNSS 1 Hz GPS (Global Positioning System) Receiver attached to and integrated with the GPR machinery, was the machinery system used to survey Areas 2 and 3 of the Ft. Loudoun sites.

GPR Survey Area #2 & Findings Related to GPR Survey #2 – A Different GPR Machine was Used than in Area 1

Figure 21 below, explains the results of the GPR Plan View Survey of Area #2.

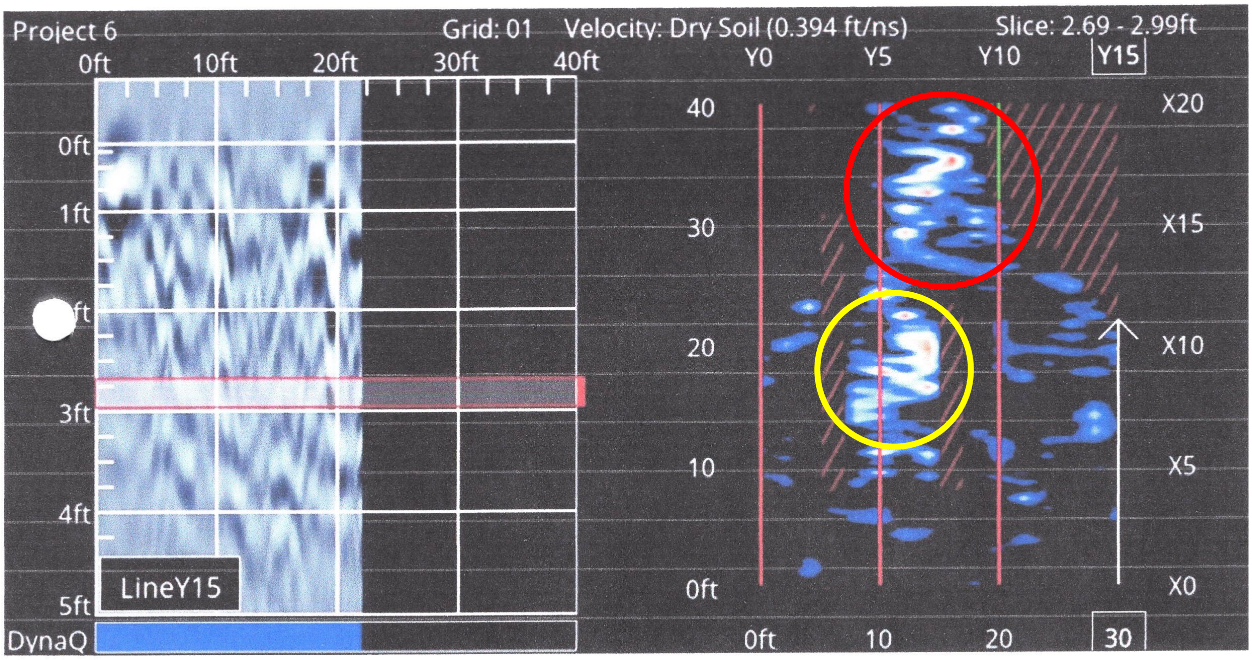


Figure 21: A radargram image of Area #2, including the extant c. 103' foot deep Well. This radargram image was made with a Sensors & Software 'Noggin' with a GPR 500 MHz Sensor, running ECCO-Project Software, and with an attached and integrated Geode GNS2 Multi-GNSS 1 Hz Receiver GPS unit, on a 'SmartCart'. This is one (1) of two (2) GPR machines used in the three (3) Survey areas to produce the radargram image above in a Grid Scan mode showing Level Slices for this portion of the Ft. Loudoun GPR Survey. **YELLOW CIRCLE**: The Well and Well Cap area. The radargram shows the Well and Well Cap area as rectangular but that is due to rocks around the Well Cap area and the two (2) GPR runs shown blanked out on two (2) sides of the Well due to machine access up against the concrete Well Cap. **RED CIRCLE**: An anomaly c. ten feet (10') wide by c. fifteen feet (c. 15') long at c. 2 ¾' deep. The anomaly starts to be visible at c. 1 ½' deep and persists to c. 5' deep (Figure below). The top portion of the anomaly is up against the porch of the house and the right side of the anomaly is up against the curving portion of the porch. Initially this suggested a former descending entrance into the basement of the house. After inspection of the closest wall in the basement to the anomaly, no former opening into that basement wall was apparent. This anomaly is a candidate for archaeology, perhaps a narrow archaeologically excavated trench for exploratory purposes. Radargram by Mark Michael Ludlow RPA, 18 October 2023.

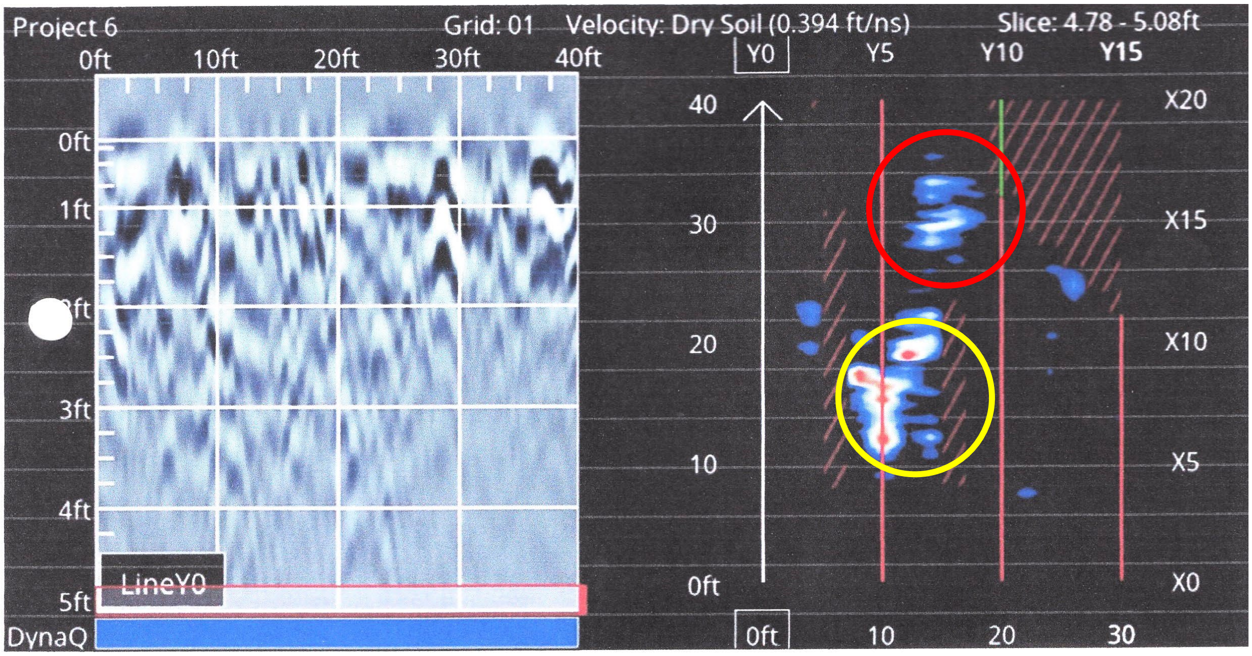


Figure 22: A radargram image of Area #2, including the extant c. 103' foot deep Well. This radargram image was made with a Sensors & Software 'Noggin' with a GPR 500 MHz Sensor, running ECCO-Project Software, and with an attached and integrated Geode GNS2 Multi-GNSS 1 Hz Receiver GPS unit, on a 'SmartCart'. This is one (1) of (2) GPR machines used to produce the radargram image above in a Grid Scan mode showing Level Slices for this portion of the Ft. Loudoun GPR Survey. **YELLOW CIRCLE**: The Well and Well Cap area. The radargram shows the Well and Well Cap area as somewhat rectangular but that is due to rocks around the Well Cap area and the two (2) GPR runs shown blanked out on two (2) sides of the Well due to machine access up against the concrete Well Cap. **RED CIRCLE**: The anomaly still remains in part at circa five feet (c. 5') deep. The anomaly started to be visible at c. 1 ½' deep and persisted to c. 5' deep as shown at that depth above. The top portion of the anomaly is up against the porch of the house and the right side of the anomaly is up against the curving portion of the porch (Red hash marks). Initially this suggested a former descending entrance into the basement of the house. After inspection of the closest wall in the basement to the anomaly, no former opening into that basement wall was apparent. This anomaly is a candidate for archaeology, perhaps a narrow archaeologically excavated trench for exploratory purposes. Radargram by Mark Michael Ludlow RPA, 18 October 2023.

GPR Survey Area #3 & Findings Related to GPR Survey #3 – A Different GPR Machine was Used than in Area 1

Area #3 was c. 20' X c. 50', as seen in Figure 1. It was up against the Southside of the extant house at 419 North Loudoun Street, Winchester, Virginia. This area was traversed with GPR scans c. 2' apart. Most of the GPR Depth Slice images were devoid of anomalies or they were varying degrees of the anomalies shown below in Figure 23. In the image in blue below, the long light blue stripe running along the bottom of the image is the edge of the adjacent asphalt driveway. The **RIGHT SIDE** of the image in blue is parallel to the adjacent street – North Loudoun Street. The diagonal light blue stripe is the extant walkway and its foundation materials. The short anomaly arising c. 5' up from the baseline is a relatively contemporary portion of a utility trench. There appear to be <u>no</u> Historic Period anomalies imageable to the depth of c. 5' and thereafter. Due to the similarity in the Dielectric Constants of the component materials below c. 5', there are insufficient difference in the soils and subsoils to produce imageable differences. Remember GPR only records differences or differentials between below ground materials and differentials between below ground objects and their surrounding soils/materials.

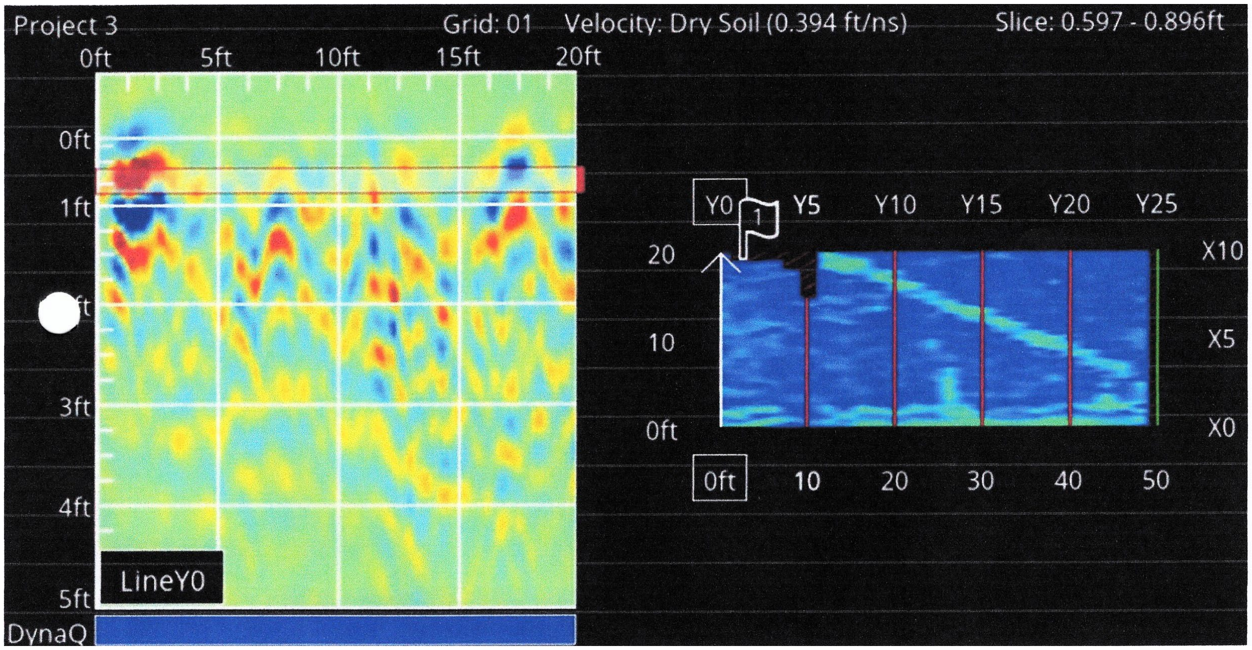


Figure 23: A radargram image of Area #3. This image is characteristic of most depth levels. The three (3) anomalies imaged and mentioned above are apparent and explicable at c. ¾" below the surface. All scanned depths thereafter these three (3) imageable anomalies show <u>no</u> anomalies at further depths. The image shows the edge of a driveway, a diagonal walkway, and part of a utility trench. Radargram by Mark Michael Ludlow RPA, 18 October 2023.

Recommendations

RE: Survey Area #1 - The Well – Remove the concrete Well Cap by lifting it with heavy equipment such as a backhoe using one or more of the existing bore holes and a chain inserted through one or more of the bore holes. The Well pump pipe would need to be cut prior to lifting and pipe cutting equipment should be on site to cut additional section(s) of attached pipe immediately upon slight lifting of the concrete cap, if necessary. Perhaps a better approach to avoid cutting the Well pump pipe, the remaining Well pump pipe may also need to have the concrete Well Cap cut in a wedge to release it. After the Well Cap is removed, photograph and probe the Well with a fiberglass telescoping measuring rod (c. 50' lengths are available). Immediately, recover the Well with a staked down wooden platform, for safety purposes, but easily accessible for further intermediate studies, in part supporting grants and preparations for fuller excavation.

RE: Survey Area #2 – Archaeologically excavate a narrow trench across the narrow width of the GPR detected anomaly shown in Figures 21 & 22.

RE: Survey Area #3 – In the absence of anomalies, no recommendations are made.

Acknowledgements

Hayden Mathews assisted in the GPR Surveys and Donna Leight of the French & Indian War Foundation was invaluable in the restricted well explorations and the interpretations thereof.

Mark Michael Ludlow RPA
Registered Professional Archaeologist
Registrant ID #16263
MMLBird@aol.com
703-350-3353