Ground Penetrating Radar Survey To Detect Possible Graves At the Waters Family Cemetery Site Germantown, Maryland

Submitted to:

Dewberry Consultants, LLC
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Prepared By:

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September 2017

Introduction

From August 14 to 16, 2017, GeoModel, Inc. conducted a Ground Penetrating Radar (GPR) survey for Dewberry Consultants, LLC, at the Waters Family Cemetery Site in Germantown, Maryland (See Figure 1). The purpose of the GPR survey was to locate any possible unmarked graves outside and inside of the fenced Waters family cemetery. The GPR survey area was delineated in the field with white wooden stakes placed by Dewberry Consultants, LLC.

GPR Equipment

The survey area was scanned with a GSSI SIR-3000 GPR digital computer control unit and a 400 MHz (megahertz) antenna. Subsurface reflections at the site, that may represent marked and unmarked graves, were observed on the computer screen of the SIR-3000 field computer in real time.

Field Reference Grid and GPR Transect Locations

To reference the results of the GPR survey, GeoModel, Inc. established a 100-foot center reference grid in the GPR survey area with orange survey flags. The reference origin of the 100-foot grid system was the northeastern corner of the Waters family cemetery fence line (Figure 1). The perpendicular fence lines were used to orient the grid system.

A GeoModel, Inc. licensed Professional Geologist with over 20 years of cemetery grave detection and grave mapping experience conducted the GPR survey. GPR transects were generally made across the site in parallel lines, perpendicular to the long direction of the graves (where accessible).

Results

The ground penetrating radar (GPR) data was examined and interpreted in the field by the GeoModel, Inc. Professional Geologist. The GPR data were examined for anomalies that represent possible graves.

Twelve possible GPR grave anomalies were detected in the survey area outside of the fenced area (see Figure 1). The location of each of the twelve GPR grave anomalies outside the fenced area was painted on the ground with orange paint and a numbered yellow flag was placed in the grave anomaly. Photographs of the twelve anomaly locations are included with this report.

Four graves were located and marked out with paint inside the fenced area with a possible fifth grave located under a tree (see Figure 1). A photograph is included in the report showing these graves.

The GeoModel, Inc. geologist also included in his field observations other features on the ground surface for possible grave identification. These features included such evidence as ground disturbance, ground subsidence, small collapse holes in the ground, and remnants of stones that could have been possible headstones.

The locations of the GPR anomalies representing possible graves were plotted on an AutoCAD map of the survey area (Figure 1). Each anomaly location was drawn and numbered on the AutoCAD map as it was in the field.

Limitations

Over time, graves deteriorate and become difficult to detect. Ground Penetrating Radar (GPR) typically detects the top of the buried coffin or casket. When the top collapses or deteriorates, the coffin or casket becomes hard to detect by GPR. The GPR then usually detects any remains of the grave burial. These remains include coffin remains, soil disturbance, soil subsidence, and bones and bone fragments that may also be difficult to detect.

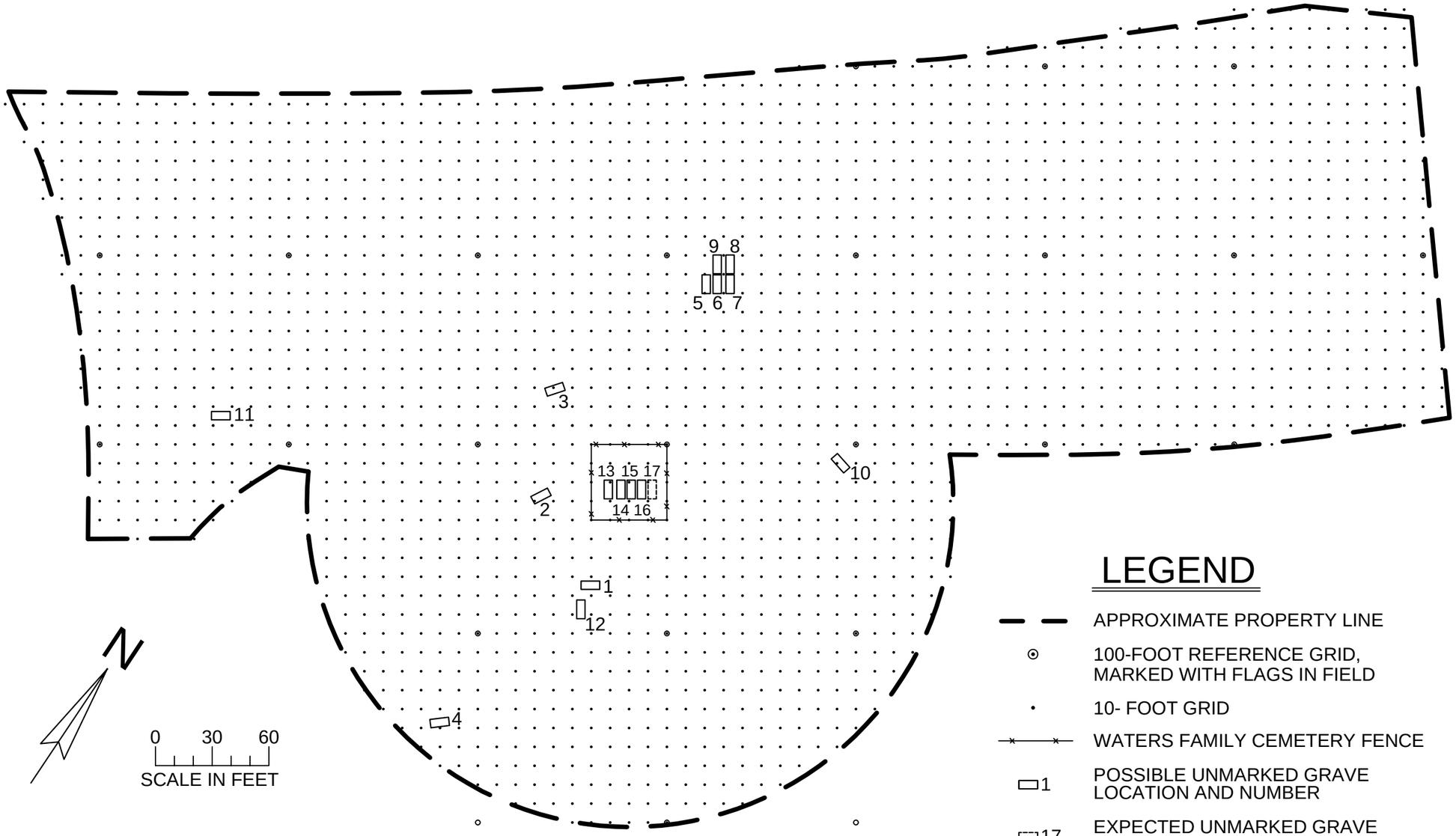
GeoModel, Inc. also used other observable physical evidence for its grave detection. This evidence includes such indicators as surface ground disturbance, ground subsidence, collapse holes in the ground, and remnants of stones that could have been possible headstones. However, these possible grave evidence features could also be caused by other means, including previous tree removal, former excavations, or natural rock formation.

As with any remote sensing tools, the results of this survey are, in part, interpretive. This survey was conducted using instrumentation considered in good working order and the interpretation provided uses our best judgments.

However, as with other remote sensing tools, we cannot guarantee the detectability of the GPR, nor can we accept responsibility for actions taken as a result of this survey. The results of this report represent the best information that can be determined from the data obtained from this GPR survey.

Recommendations

GeoModel, Inc. recommends that all of the GPR grave anomalies be further investigated to confirm that the GPR anomalies are graves and not other natural or manmade features. It is recommended that an archaeological firm be retained to examine each possible grave burial site to determine whether each GPR anomaly is a grave site.



LEGEND

- APPROXIMATE PROPERTY LINE
- 100-FOOT REFERENCE GRID, MARKED WITH FLAGS IN FIELD
- 10- FOOT GRID
- WATERS FAMILY CEMETERY FENCE
- 1 — POSSIBLE UNMARKED GRAVE LOCATION AND NUMBER
- 17 — EXPECTED UNMARKED GRAVE LOCATION AND NUMBER

GeoModel™

Client: DEWBERRY CONSULTANTS, LLC
2101 GAITHER ROAD, ROCKVILLE, MD

Title: GROUND PENETRATING RADAR (GPR) SURVEY OF WATERS FAMILY CEMETERY SITE, GERMANTOWN, MD

Prepared By	SRD	08/18/2017	SIZE B	DWG NO. 16067-1	FIG. NO. FIGURE 1	REV A
Approved By	PPT	08/18/2017	SCALE 1" = 60'		SHEET 1 of 1	

GPR Anomaly #1

GPR Anomaly #2

GPR Anomaly #3

GPR Anomaly #4

GPR Anomaly #5

GPR Anomaly #6

GPR Anomaly #7

GPR Anomaly #8

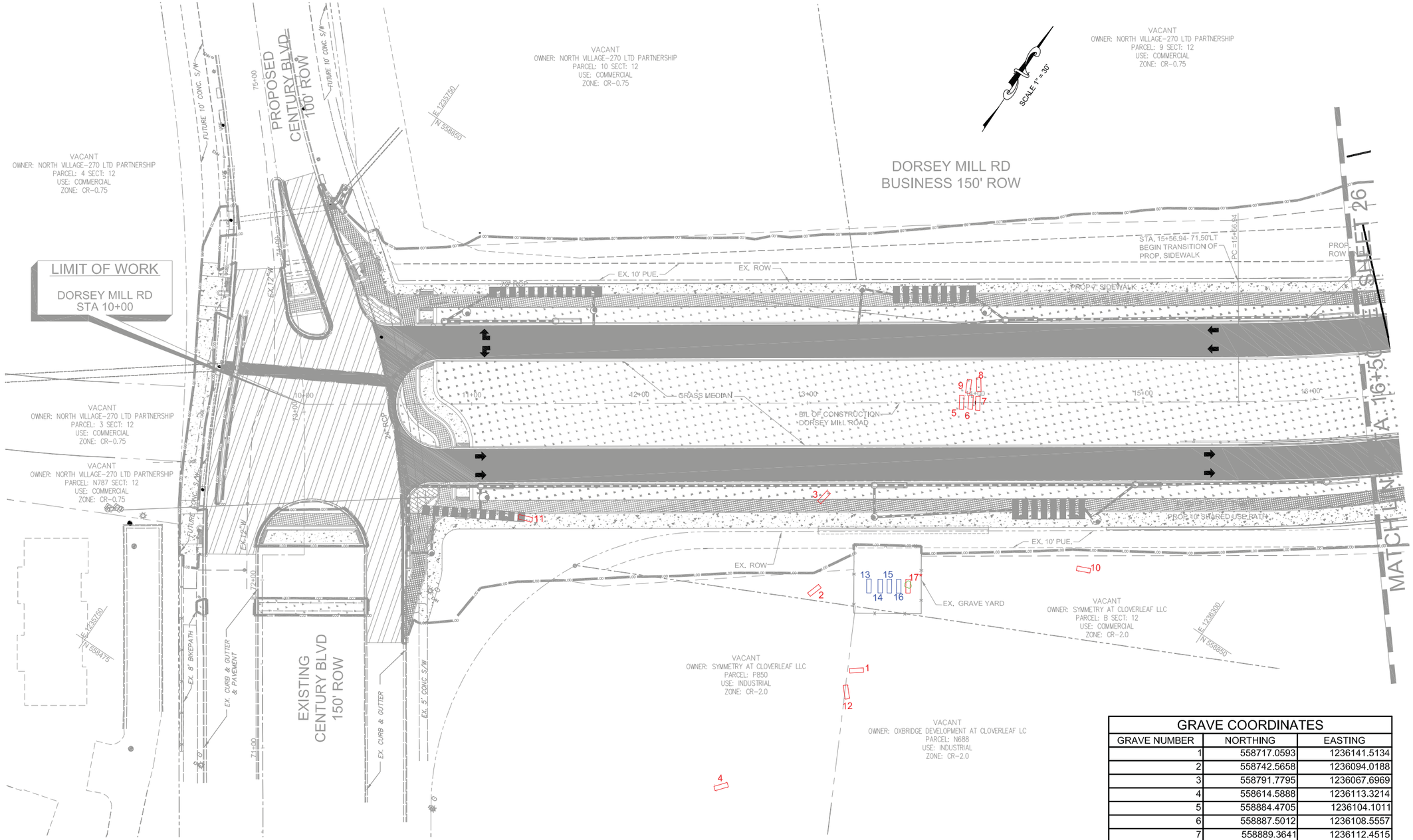
GPR Anomaly #9

GPR Anomaly #10

GPR Anomaly #11

GPR Anomaly #12

GPR Anomalies #13 to #17



0 30' 60'
SCALE: 1"=30'

LEGEND

1 — POSSIBLE UNMARKED GRAVE LOCATION AND NUMBER

14 — MARKED GRAVE LOCATION AND NUMBER

EXISTING TREE

* POSSIBLE LOCATION OF GRAVE SITE. EQUIPMENT READING MAY NOT BE ACCURATE DUE TO TREE IN THAT LOCATION.

GRAVE COORDINATES

GRAVE NUMBER	NORTHING	EASTING
1	558717.0593	1236141.5134
2	558742.5658	1236094.0188
3	558791.7795	1236067.6969
4	558614.5888	1236113.3214
5	558884.4705	1236104.1011
6	558887.5012	1236108.5557
7	558889.3641	1236112.4515
8	558898.8533	1236106.7518
9	558894.7255	1236102.2842
10	558842.5209	1236220.0107
11	558681.8596	1235927.2595
12	558703.0195	1236143.6724
13	558762.8747	1236119.5192
14	558766.6062	1236125.1004
15	558769.6411	1236129.6398
16	558772.7258	1236134.2536
17	558775.8104	1236138.8674

HORIZONTAL CONTROL IS BASED ON NAD 83/91.

+ LOCATION COORDINATES TAKEN AT CENTER OF MARKING

NOTE

FOR LOCATION OF UTILITIES CALL
8-1-1 OR 1-800-257-7777
OR LOG ON TO
www.call811.com
http://www.missutility.net
48 HOURS IN ADVANCE OF ANY WORK IN THIS VICINITY

INFORMATION CONCERNING UNDERGROUND UTILITIES WAS OBTAINED FROM AVAILABLE RECORDS BUT THE CONTRACTOR MUST DETERMINE THE EXACT LOCATION AND ELEVATION OF THE MAINS BY DIGGING TEST PITS BY HAND AT ALL UTILITY CROSSINGS WELL IN ADVANCE OF THE START OF EXCAVATION.

MONTGOMERY COUNTY
DEPARTMENT OF TRANSPORTATION
ROCKVILLE,MARYLAND

RECOMMENDED FOR APPROVAL

Chief, Transportation Planning and Design Section — Date

APPROVED

Chief, Division of Transportation Engineering — Date

Designed by: ____ Drawn by: ____ Checked by: ____

CONTRACTOR SHALL VERIFY IN FIELD ALL LOCATIONS AND DIMENSIONS OF EXISTING FACILITIES OR STRUCTURES WHERE PROPOSED FACILITIES OR STRUCTURES WILL BE CONNECTED, PRIOR TO START OF STAKEOUT, CONSTRUCTION AND INSTALLATION.

Dewberry

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DORSEY MILL ROAD & BRIDGE
MONTGOMERY COUNTY, MARYLAND
2ND ELECTION DISTRICT

TAX MAP EV341
WSSC 200' SHEET 229NW13

STATE OF MARYLAND — CHRISTINE KA F. CROSS — NO. 28759 — REGISTERED PROFESSIONAL ENGINEER

Professional Certification: I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland,

License No. 28759,

Expiration Date: 5/14/2019,

No.	DATE	BY	Description

REVISIONS

DRAWN BY: JPL
APPROVED BY: CPO
CHECKED BY: AC
DATE: SEPT 2017

TITLE
GROUND PENETRATION RADAR SURVEY OF WATERS FAMILY CEMETERY SITE

PROJECT NO. 50072374

GEO-MAPPING EXHIBIT

PROJECT SET SHEET NO. OF