

Subject: Ground-penetrating radar Assistance;
Awbury Arboretum, Philadelphia

Date: 21 January 1999

To: Janet Oertly
State Conservationist
USDA-NRCS,
Suite 340, One Credit Union Place
Harrisburg, PA 17110-2993

Purpose:

The purpose of this study was to assist the Awbury Arboretum Association locate subsurface remains of a house and outbuildings dating back to the colonial era. Site selection was based on information obtained by Tom Mishler (Executive Director, Awbury Arboretum Association, Germantown, PA). Natural Resource Conservation Service is providing assistance to the Arboretum as part of the Philadelphia Urban Resource Partnership Program.

Participating Agencies:

Awbury Arboretum Association
Natural Resource Conservation Service

Participants:

John Chibirka, Soil Scientist, USDA-NRCS, Leesport, PA
Jim Doolittle, Research Soil Scientist, USDA-NRCS, Radnor, PA

Activities:

All field activities were on 20 January 1999.

Equipment:

The radar unit used in this study was the Subsurface Interface Radar (SIR) System-2, manufactured by Geophysical Survey Systems, Inc.* The SIR System-2 consists of a digital control unit (DC-2) with keypad, VGA video screen, and connector panel. A 400 mHz antenna were used in this investigation. A 12-volt battery powered the system. The radar profile included in this report has been processed through the WINRAD software package.* Processing was limited to signal stacking and horizontal scaling.

To help summarize the results of this study, the SURFER for Windows program, developed by Golden Software, Inc.*, was used to construct the two-dimensional simulation of the survey area.

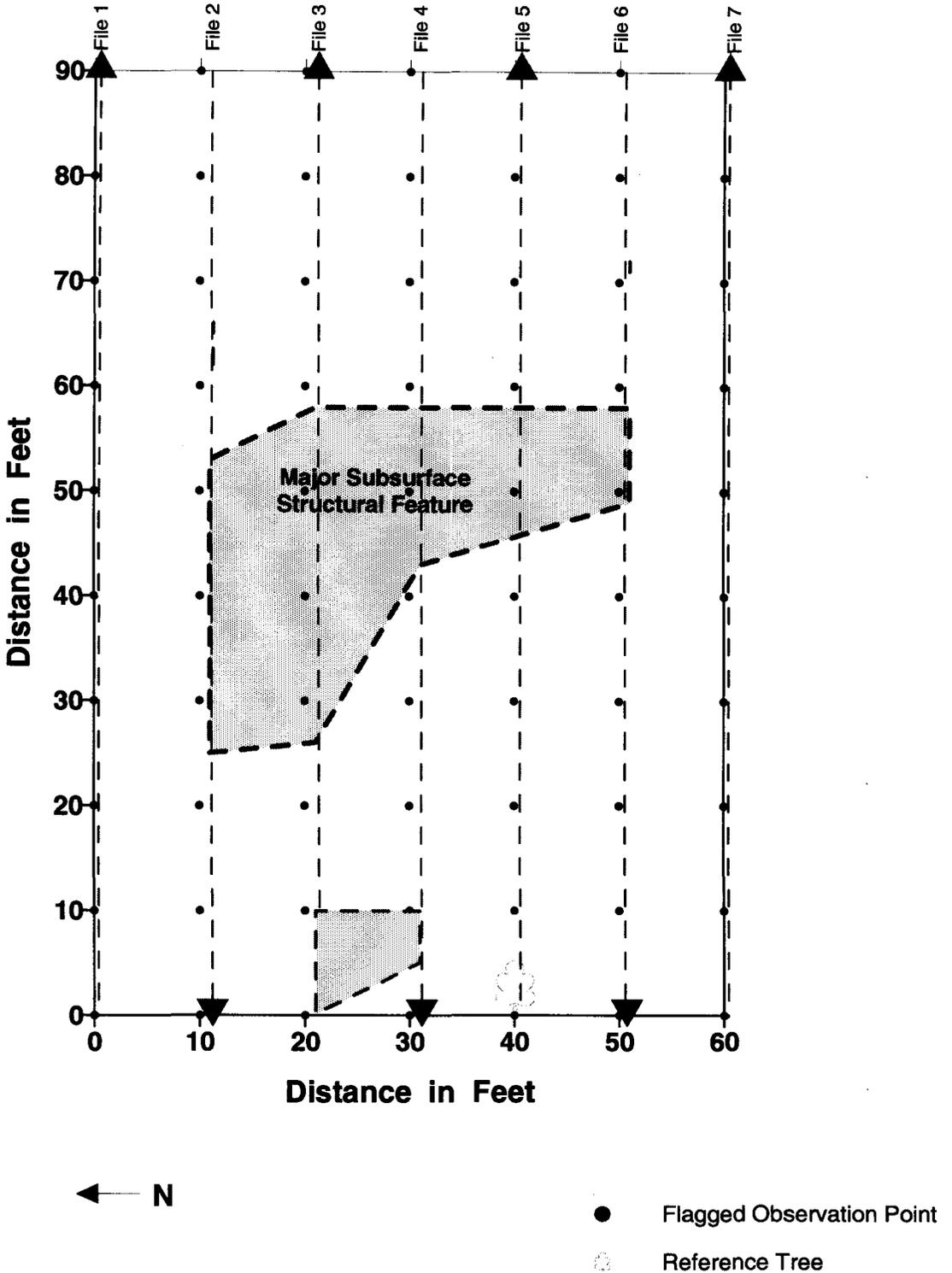
Field Procedures:

The Arboretum is located in the Germantown and Morton areas of Philadelphia. The selected site is located in an open meadow. The area is suspected to contain the subsurface remnants of a former house and outbuildings dating back to the colonial era. These structures have left on surface indications of their presence.

The dominant soils within the Arboretum are members of the Chester and the Manor series. Chester is a member of the fine loamy, mixed, mesic Typic Hapludults family. Manor is a member of the coarse-loamy, micaceous, mesic Typic

* Trade names are used to provide specific information. Their mention does not constitute endorsement by USDA-NRCS.

**Location of Major Subsurface Cultural Features
Detected with GPR
Awbry Arboretum
20 January 1999**



Dystrochrepts family. These very deep, well-drained and somewhat poorly drained soils formed in materials weathered from micaceous schist on uplands. Previous studies (my trip report of 8 July 1998) have documented the suitability of these soils for GPR archaeological studies.

A 60 by 90-foot rectangular grid (0.12 acres) was established across the suspected site (see Figure 1). A large tree was used as a field reference for the location of the grid. The grid interval was 10 feet. The 10-foot grid interval helped to economize time and was considered suitable for determining the general locations of major, buried structural features occurring within the study site. At each of the seventy-grid intersections survey flags were inserted in the ground and served as observation points. A radar survey was completed by pulling the 400 MHz antenna along each of the seven, parallel, east-west trending, grid lines. The location and direction of travel along each line have been shown in Figure 1. This procedure produced about 630 feet of continuous radar imagery. Each radar profile was reviewed for major subsurface anomalies that would indicate the location of former structures or the presence of cellars. Relative distances were recorded and, if presence, major structural anomalies were identified on each radar profile.

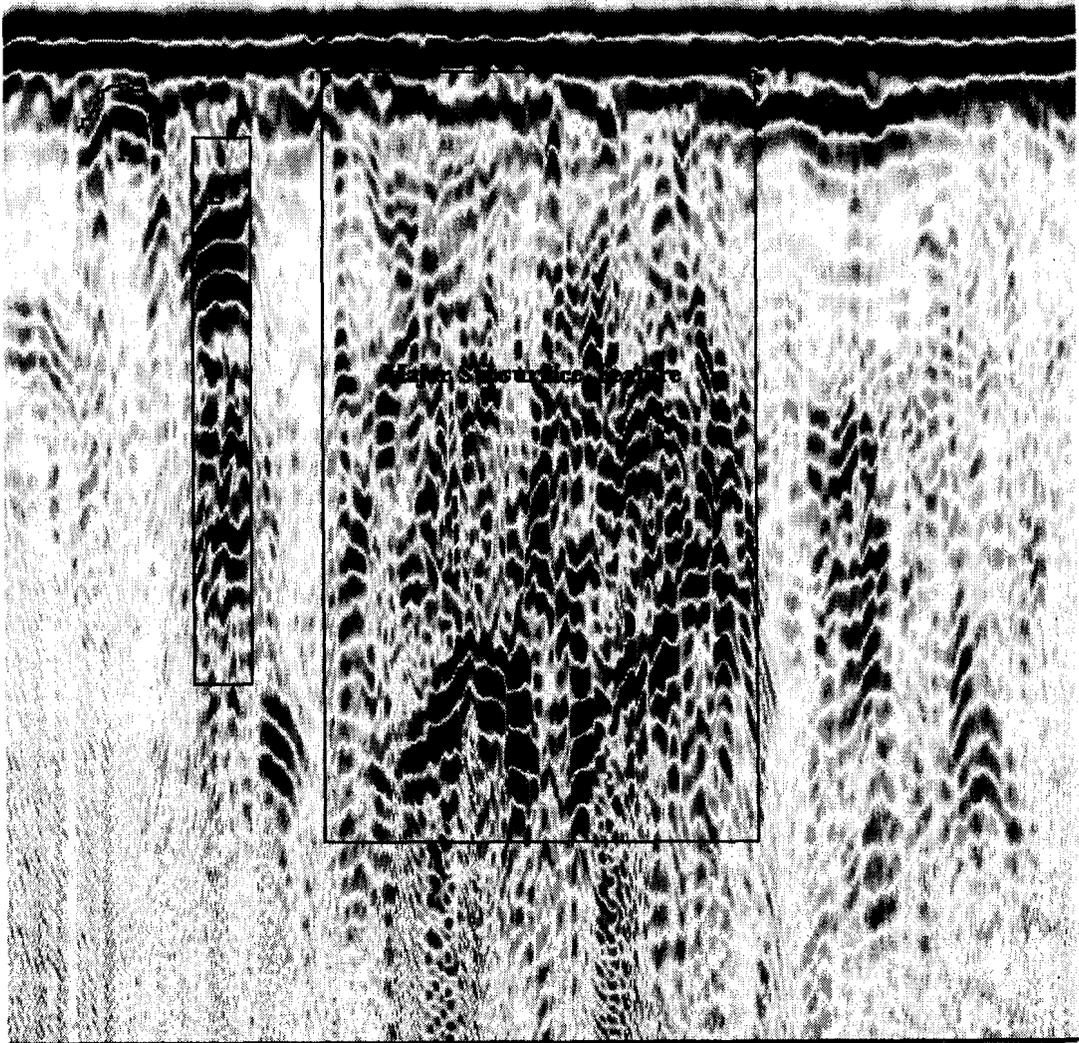


Figure 2
Representative Radar Profile from Survey Area

Radar Interpretations:

Along several radar traverse lines, a conspicuous, contiguous area of complex, high amplitude reflections was observed. The high amplitude subsurface reflections are believed to represent the remnants of a former cellar. Because of the relative coarse grid interval (10 feet) and the one-directional surface pattern, only the general locations of former foundations and structures could be inferred from the radar profiles.

Figure 2 is a representative radar profile (radar file #2; see Figure 1 for location of traverse) from the survey area. As no calibration studies were conducted, no depth scale can be provided. The horizontal scale is 90 feet. Figure 2 contain images from the major subsurface anomaly suspected of being the remains of a former structure. Images believed to represent major, buried structural features have been enclosed in a box. The box encloses images believed to represent several walls or pillars layers of structural rubble and cultural debris, and the cellar floor. Successive traverses with the antenna along parallel grid lines revealed the presence of, what appeared to be two buried structural features.

In Figure 2, two additional, conspicuous subsurface reflectors have been identified (“A” and “B”). These features are believed to be artifacts. Numerous, small, subsurface point anomalies were detected within the survey area. These anomalies may represent buried artifacts, cultural debris, rock fragments, or roots.

Results:

1. The radar survey revealed the general location of a major subsurface structural feature located within the study area. However, it is presently unclear whether the area marked as a “major subsurface structural feature” in Figure 1 represents one or more structural features.
2. If desired, more intensive sampling schemes (5-foot grid interval) can be used to more precisely define the location and extent of these buried structures. If so, an archaeologist should be present to provide field assistance and guidance.
3. Complete records of the radar profiles have been turned over to John Chibirka.

It was my pleasure to work with your staff.

With kind regards,

James A. Doolittle
Research Soil Scientist

cc:

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