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AERIAL PHOTOGRAPHIC ANALYSIS OF ELKTON FARM FIREHOLE SITE

Elkton, Maryland

Interim Report

by

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NOTICE

As an interim product, this document has not gone through the complete EPA quality assurance cycle. Any errors that are discovered during preparation of the final report will be corrected therein.

METHODOLOGY

This report was prepared using a standard methodology that includes the following steps:

- data identification and acquisition,
- photographic analysis and interpretation, and
- graphics and text preparation.

These steps are described below. Subsections also address details related to specific kinds of analyses that may be required to identify environmental features such as surface drainage and wetlands. All operational steps and processes used to perform this work (including data identification and acquisition, photographic analysis and interpretation, and graphics and text preparation) adhere to strict QA/QC guidelines and standard operating procedures (SOPs). These guidelines and procedures are documented in the Master Quality Assurance Project Plan (QAPP) prepared for Remote Sensing Support Services Contract No. 68-D-00-267 (LMS, 2002).

Data identification and acquisition included a search of government and commercial sources of historical aerial film for the study area. Photographs with optimal spatial and temporal resolution and image quality were identified for acquisition. In addition, U.S. Geological Survey (USGS) topographic maps were obtained to show the study area location and to provide geographic and topographic context.

To conduct this analysis, the analyst examined diapositives (transparencies) of historical aerial photographs showing the study area. Diapositives are most often used for analysis instead of prints because the diapositives have superior photographic resolution. They show minute details of significant environmental features that may not be discernible on a paper print.

A photographic analyst uses a stereoscope to view adjacent, overlapping pairs of diapositives on a backlit light table. In most cases, the stereoscope is capable of various magnifications up to 60 power. Stereoscopic viewing involves using the principle of parallax (observing a feature from slightly different positions) to observe a three-dimensional representation of the area of interest. The stereoscope enhances the photo interpretation process by allowing the analyst to observe vertical as well as horizontal spatial relationships of natural and cultural features.

The process of photographic analysis involves the visual examination and comparison of many components of the photographic image. These components include shadow, tone, color, texture, shape, size, pattern, and landscape context of individual elements of a photograph. The photo analyst identifies objects, features, and "signatures" associated with specific environmental conditions or events. The term "signature" refers to a combination of components or characteristics that indicate a specific object, condition, or pattern of environmental significance. The academic and professional training, photo interpretation experience gained through repetitive observations of similar features or activities, and deductive logic of the analyst as well as background information from collateral sources (e.g., site maps, geologic reports, soil surveys) are critical factors employed in the photographic analysis.

The analyst records the results of the analysis by using a standard set of annotations and terminology to identify objects and features observed on the diapositives. Significant findings are annotated on overlays attached to the photographic or computer-reproduced prints in the report and discussed in the accompanying text. Annotations that are self-explanatory may not be discussed in the text. The annotations are defined in the legend that accompanies each print and in the text when first used.

Objects and features are identified in the graphics and text according to the analyst's degree of confidence in the evidence. A distinction is made between certain, probable, and possible identifications. When the analyst believes the identification is unmistakable (certain), no qualifier is used. Probable is used when a limited number of discernible characteristics allow the

analyst to be reasonably sure of a particular identification. Possible is used when only a few characteristics are discernible, and the analyst can only infer an identification.

The prints in this report have been reproduced, either by photographic or computer methods, from the original film. Reproductions are made from the original film and may be either contact (the same size) prints or enlargements, depending on the scale of the original film. Any computer-produced prints used in this report are generated from scans of the film at approximately 1,300 dots per inch (dpi) and printed at 720 dpi. Although the reproductions allow effective display of the interpretive annotations, they may have less photographic resolution than the original film. Therefore, some of the objects and features identified in the original image and described in the text may not be as clearly discernible on the prints in this report.

Study area boundaries shown in this report were determined from aerial photographs or collateral data and do not necessarily denote legal property lines or ownership.

Surface Drainage

The surface drainage analysis produced for this report identifies the direction and potential path that a liquid spill or surface runoff would follow based on the topography of the terrain and the presence of discernible obstacles to surface flow. The analyst determines the direction of surface drainage by stereoscopic analysis of the aerial photographs and by examining USGS topographic maps. Site-specific surface drainage patterns are annotated on the map or photo overlay. Where the direction of subtle drainage cannot be determined, an indeterminate drainage line symbol is used. Regional surface flow is ascertained from the USGS topographic maps.

PHOTOGRAPHIC ANALYSIS

The Elkton Farm Firehole site is located immediately northwest of Elkton, Cecil County, Maryland. The ~~plant~~ SITE covers *** hectares (**** acres). Elevations range from approximately ** meters (*** feet) above sea level along *********Road, North Bridge Street, and on several small hills to less than 3 meters (10 feet) at Little Elk Creek (USGS, 1992 and 1997). Surface runoff is directed into Little Elk Creek and Laurel Run. Approximately *** kilometers (**** miles) to the south of the Elkton Farm Firehole site, Little Elk Creek empties into Big Elk Creek which forms the headwaters of the Elk River.

*** of the figures in this report are mosaics of photographs. Photomosaicking is the process by which a set of photographic images--which collectively, but not individually, comprise a given scene or geographic area--are "stitched" or pieced together either by digital or mechanical techniques. Figures created using this procedure are documented when applicable.

MAY 2, 1938 (FIGURE 3)

The majority of land on the Elkton Farm Firehole site is used for agricultural (AG) purposes. Forest (FOR) stands are located adjacent to Little Elk Creek and Laurel Run. A north-south oriented access road (AR-1) extends south from Zeitler Road south, to Little Elk Creek. During times of low water, Little Elk Creek can be crossed as is evidenced by an extension of access road AR-1 noted terminating in the agricultural field south of the site.

A farmstead is located in the far-northeastern part of this site. Immediately to the south a small building (B) and two probable drainage ditches are noted. The probable ditches appear to channel runoff toward Little Elk Creek.

NOVEMBER 8, 1942 (FIGURE 4)

Stereoscopic coverage is not available for this analysis year.

The majority of land on the Elkton Farm Firehole site continues to be used for agricultural purposes. The farmstead and small building remain in the far-northeastern part of this site. Immediately south of the farmstead, two linear ground scars (GS) are noted at approximately the same locations as the two probable drainage ditches seen on the 1938 photograph. North-south oriented access road AR-1 continues to bisect the site, cross Little Elk Creek, and terminate in the field off site. Probable ice is observed at several locations throughout the site.

MARCH 12, 1947 (FIGURE 5)

Stereoscopic coverage for Elkton Farm Firehole site is again available.

In the western part of this site, three new access roads (AR-2, AR-3, and AR-4) extend south from Zeitler Road. Access roads AR-2 and AR-4 turn toward each other and connect at access road AR-3, which continues south and terminates in an agricultural field. Visible adjacent to this access road network are several circular (CIR) and irregularly shaped ground scars, two patches of disturbed ground (DG), areas of light-toned material (LTM), an area of light-toned mounded material (LTMM), and a possible object (OBJ). A probable trail extends west from access road AR-4 and terminates east of Laurel Run near a patch of light-toned material and a possible ground scar. A ground scar is noted at the southern terminus of access road AR-3. No visible connection (e.g., trail or dirt road) is observed linking the ground scars in the agricultural field to the east to either access road AR-3 or access road AR-1.

The northern segment of access road AR-1 remains visible and appears to be partially vegetated (PV), suggesting minimal or infrequent use. Much of the southern segment of this access road is difficult to discern (now annotated as a possible access road) including the segment located in the forested area adjacent to Little Elk Creek. Possible light-toned mounded material is observed immediately west of possible access road AR-1 and may represent vegetation cuttings from the agricultural field. At the terminus of this possible access road is a small patch of possible light-toned material. The extension of this possible access road across Little Elk Creek seen on previous photographs cannot be identified on this image.

The majority of land on this site continues to be used for agricultural purposes. The farmstead and small building remain in the far-northeastern part of this site. A saturated area is also noted.

APRIL 11, 1952 (FIGURE 6)

In the western part of Elkton Farm Firehole site, access roads AR-3 and AR-4 remain visible extending south from Zeitler Road. Access road AR-2 is now covered with vegetation and is no longer discernible, except for a ground scar noted just east of access road AR-3. Access road AR-4 curves east and connects to access road AR-3, which continues south into the agricultural field. Adjacent to this access road network are several ground scars, several areas of light-toned material, one area of dark-toned material (DTM), and a possible depression (DEP). West of, and connecting to, access roads AR-3 and AR-4 is a secondary network of dirt roads and possible dirt roads. In the forest adjacent to these dirt roads, there are a probable and a possible ground scar, a possible cleared area (CA), and a probable circular-shaped pit adjacent to light-toned mounded material, which may indicate excavated material. At the southern terminus of access road AR-3 another probable circular-shaped pit and a patch of light-toned material are noted. East of access road AR-3, near the central section of the agricultural field, there are three patches of light-toned material, a ground scar, a possible ground scar, and a possible depression. No visible connection (e.g., trail or dirt road) is seen linking these features to either access road, or to the new dirt road seen extending south from Zeitler Road. Only the extreme southern segment of this access road AR-1 remains visible in the forest adjacent to Little Elk Creek. At the southern terminus of this road is a small possible ground scar.

The majority of land on the Elkton Farm Firehole site continues to be used for agricultural purposes. The farmstead in the far-northeastern part of this site remains visible, but the small building has been removed. A small ground scar is noted in the former location of the building.

AUGUST 13, AND AUGUST 16, 1957 (FIGURE 7)

This photograph is a mosaic of two individual photographs acquired on different days.

In the western part of the Elkton Farm Firehole site, access roads AR-3 and AR-4 remain visible extending south from Zeitler Road. Access road AR-4 continues to bend east, connecting to access road AR-3, which continues south into the agricultural field. Adjacent to this access road network to the west there are numerous ground scars, and in the agricultural field to the east, there are also numerous ground scars, as well as possible ground scars and light-toned material. At the terminus of access road AR-3, the probable circular pit seen on the 1952 photograph is noted as a possible pit. Farther south near the forested area, there is a dirt road. A connection between this dirt road and access road AR-3 is not discernible on this photograph. It also cannot be determined if this dirt road terminates at the forest edge or is obscured from view due to the dense tree canopy. Two additional dirt roads are noted to the north. The dirt road in the center of the site connects to a collection of ground scars and terminates in the agricultural field to the east. The northernmost dirt road originates at Zeitler Road, and also but also becomes difficult to discern as it extends south into the site.

The majority of land continues to be used for agricultural purposes. The farmstead in the far-northeastern part of this site remains visible.

APRIL 8, 1969 (FIGURE 8)

This image is a mosaic of two individual photographs acquired on the same day. Due to an increase in activity and the excellent film resolution, two enlargements (Figures 9 and 10) have been produced which cover the west-central and southern extents of the Elkton Farm Firehole site.

In the far-western part of the Elkton Farm Firehole site, along the forest edge, possible and probable debris (DB) are noted. Farther south are two unidentified objects (UO) and a light-toned (LT) unidentified object.

To the east there is a ground scar located in the former location of access road AR-4. Access road AR-3 remains visible extending south from Zeitler Road into the agricultural field. Adjacent to this access road there are a ground scar, probable ground scars, dark-toned mounded material (DTMM), light-toned mounded material, and a possible guard house. Two cleared areas are noted, the northernmost of which, adjacent to Zeitler Road, is rectangular-shaped. The second cleared area is observed along the east side of access road AR-3. This cleared area includes possible standing liquid (SL) within a possible depression (not annotated), light-toned mounded material, and an area comprised of dark-toned material, dark-toned mounded material, probable solid waste (SW), and possible crates (CR).

The majority of land continues to be used for agricultural purposes. Two north-south oriented dirt roads are located in the central and east-central parts of the site. Both dirt roads connect at Zeitler Road and in the southern part of the site (see Figure 10). The easternmost dirt road also connects to the farmstead in the far-northeastern part of this site.

APRIL 8, 1969 (FIGURE 9)

This image is a mosaic of two individual photographs acquired on the same day, and is an enlargement of Figure 8. It covers the west-central part of the Elkton Farm Firehole site.

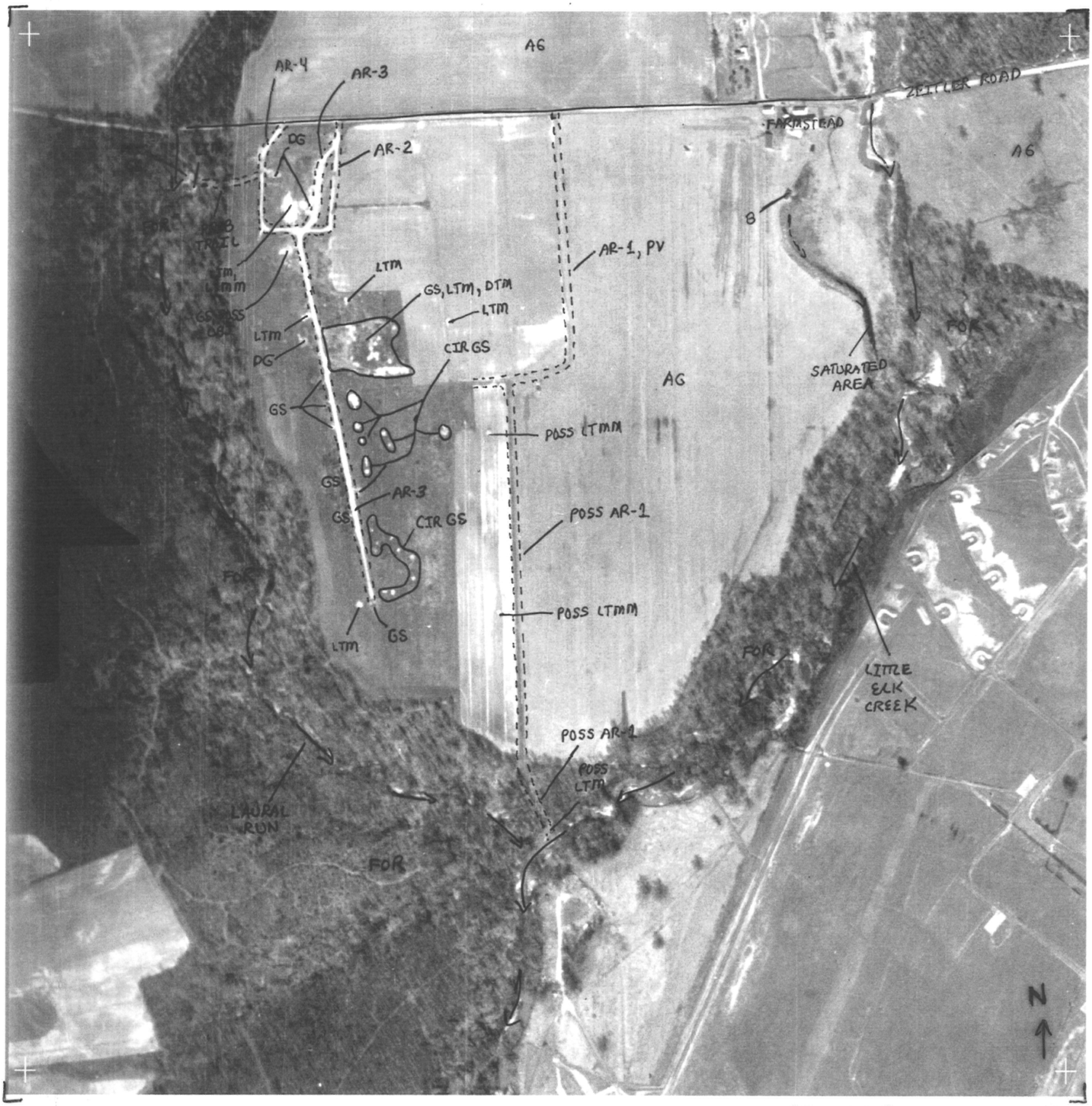
Along the west side of access road AR-3, there is a collection of individual mounds of material (MM) which appears to be covered with vegetation (VEG). Farther south a diamond-shaped area of the agricultural field has been enclosed with a fence. Three sheds (Shed-1, Shed-2, and Shed-3) are visible within the fenced area. Adjacent to Shed-2, there are a possible horizontal storage tank (HT) and a possible vertical storage tank (VT). Shed-3 appears constructed on, or is directly adjacent to, a berm. A possible gantry is also noted attached to this shed. Immediately southeast of Shed-3, there is a recessed structure. The northern part of the structure is at or near ground level; from that point the base of the structure gradually slopes downward and is deepest at its southern extent. To the west there are three pads and a probable pit which contains possible standing liquid. Disturbed ground is noted just north of the probable pit. Outside the fence line, there are three possible transformers adjacent to access road AR-3. In the agricultural field east of the access road, there are numerous ground scars and probable ground scars. The largest and most prominent of these ground scars is visible in the former location of the possible pit noted on the 1957 photograph. However, access road AR-3 no longer extends south to this former area, but now curves west and then south along the forest edge, where possible ground scars are noted in the forest.

APRIL 8, 1969 (FIGURE 10)

This image is a mosaic of two individual photographs acquired on the same day, and is an enlargement of Figure 8. It covers the south-central part of the Elkton Farm Firehole site.

Access road AR-3 traverses the southern extent of the agricultural field along the edge of the forest. This access road forks into two roads near a stand of widely spaced trees (not annotated). Two solid waste disposal areas (SWDA) are visible between the southern fork of this access road and the forest, and a third solid waste disposal area is visible abutting the confluence of where the north fork of this road merges with the dirt road from the east. The solid waste products in these areas are composed of coarsely-textured, dark-toned material (possible castings from industrial processes; not annotated). Also noted alongside the southern fork of access road AR-3 are possible debris, scattered solid waste, and a possible stain (ST). A vehicle (VEH) is located near the westernmost solid waste disposal area and appears to be depositing additional material. Access road AR-3 continues south through the forested area and is observed terminating at Little Elk Creek. The continuation of this road is visible south of the site where, during times of low water, Little Elk Creek is likely crossed at this point, allowing access to the site from the south.

The dirt connecting to the north fork of access road AR-3 extends east for a short distance before it splits into two dirt roads, both of which provide access to Zeitler Road, and the eastern fork also to the farmstead (see Figure 8). Near the fork of this dirt road, a possible solid waste disposal area is noted in the forest along the north bank of Little Elk Creek. Farther west, near the intersection of the dirt road and the north fork of access road AR-3, uniform medium-toned mounded material (MTMM), light-toned mounded material, a probable shed, a vehicle, and farm equipment (EQ) are observed.



3/31/47 ELKTON FARM KUT 24K 305, 306 81324, 81325

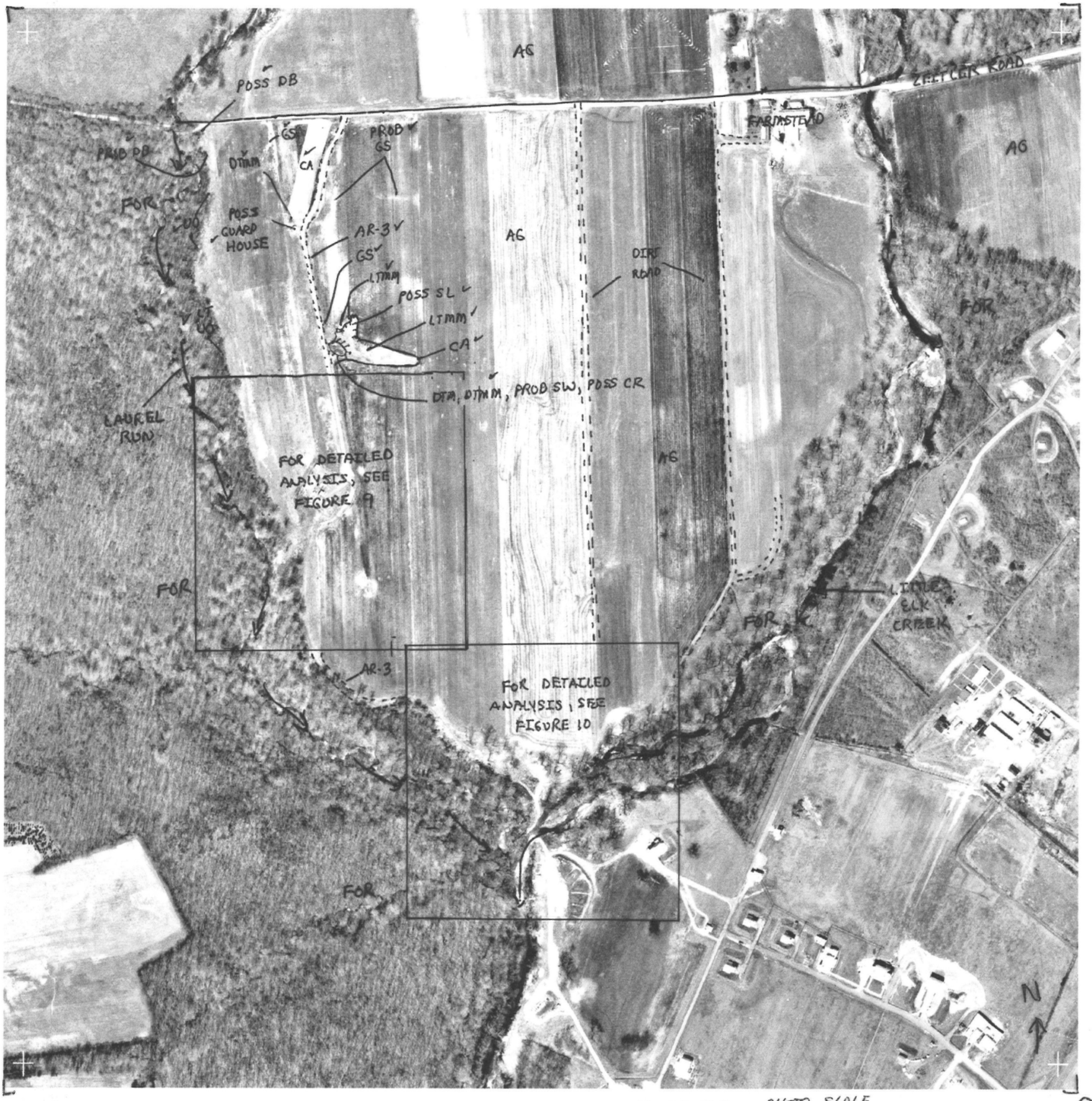
PHOTO SCALE

ELKTON FARM 5/2/38 ASCS 20R ANI 136, 137 12324, 25 PHOTO SCALE

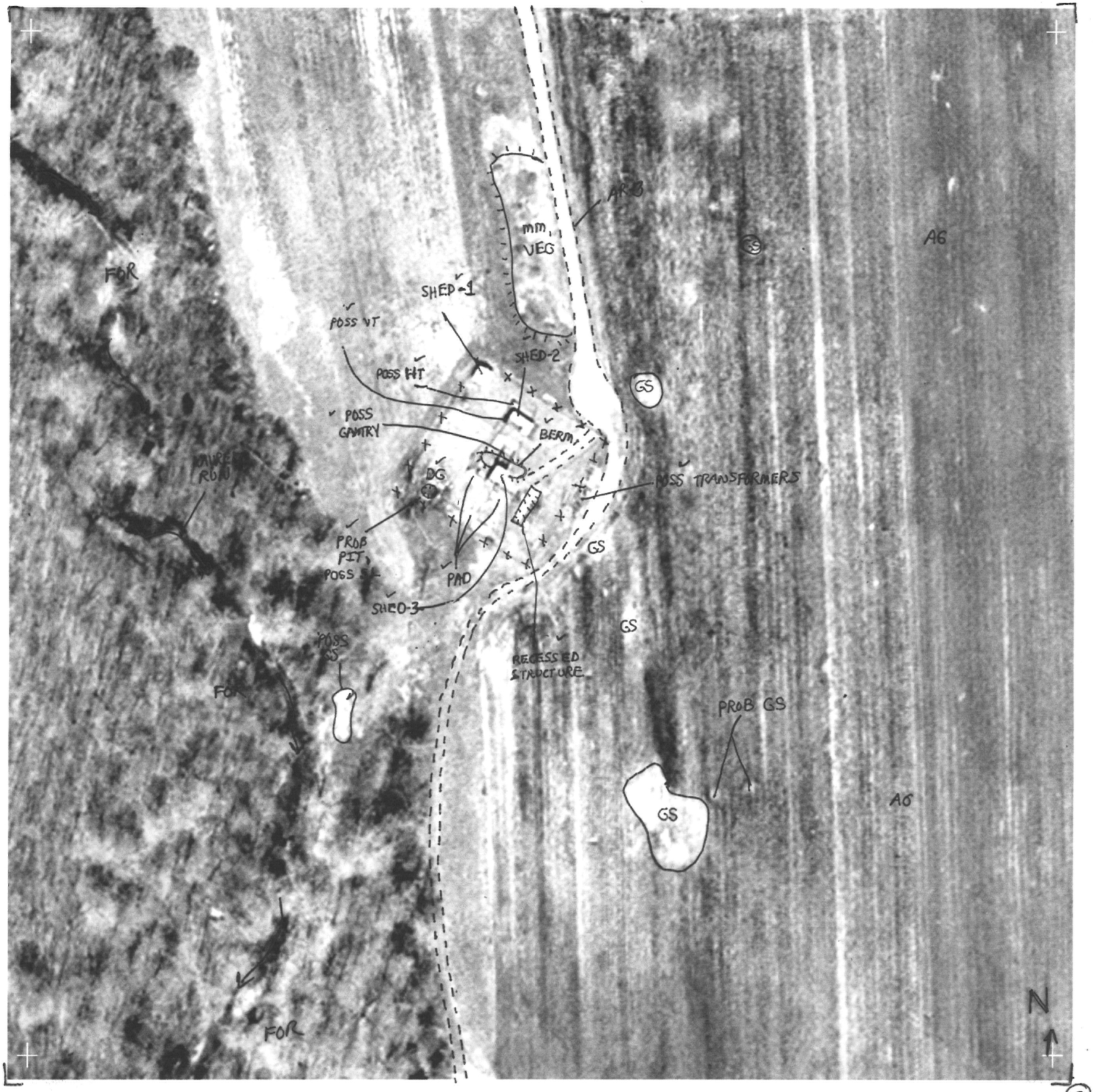
ELKTON FARM 11/8/42 KUT 20K 18A 1:30 81322 PHOTO SCALE

4/11/52 ELKTON FARM USGS 20K GS-UI 136,137 43076, 5079 PHOTO SCALE

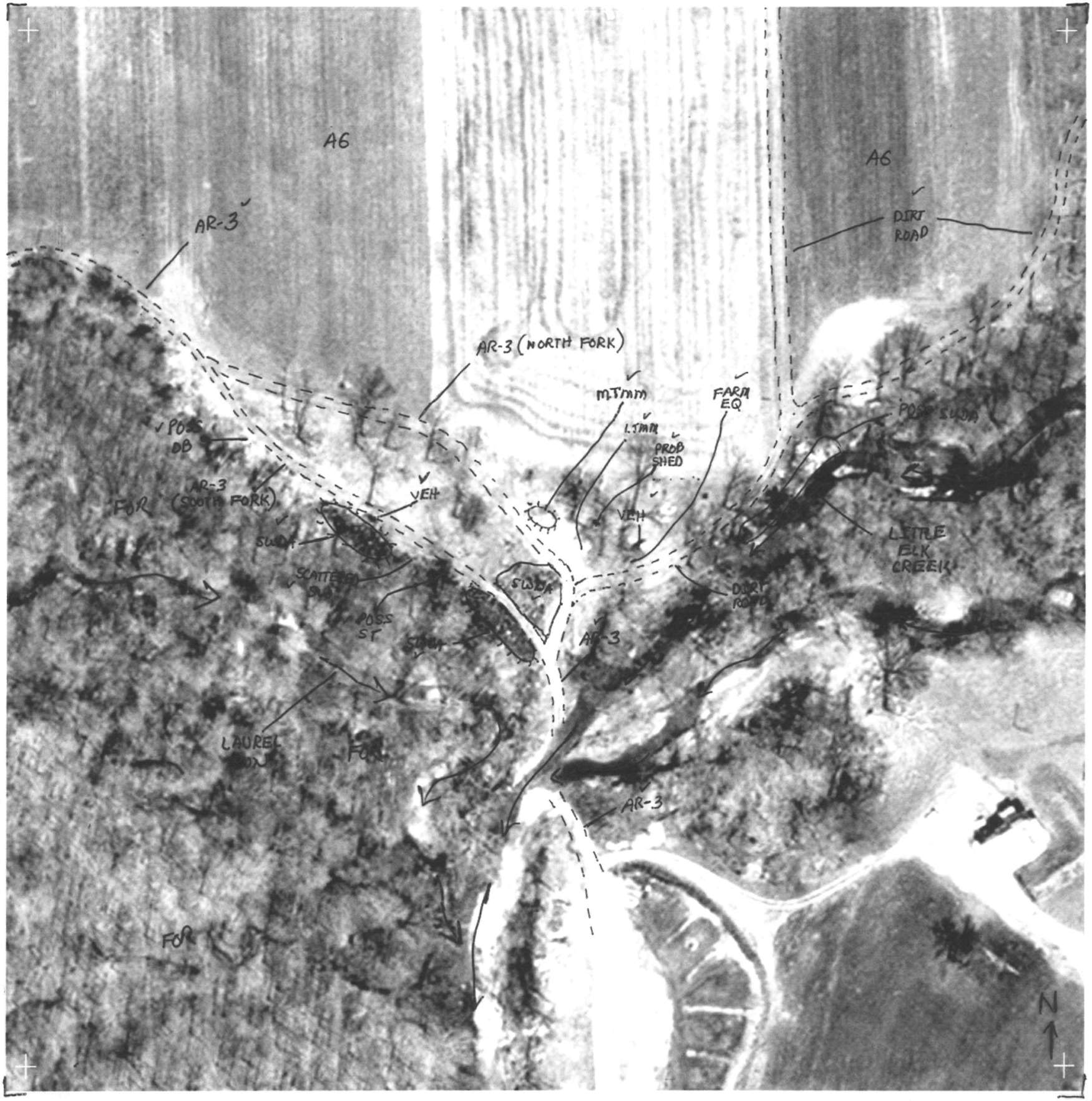
ELKTON FARM	8/13/57	ASCS	20K	ANI	80, 81	43079: 20, 21	PHOTO SCALE
	8/16/57	ASCS	20K	ANI	11, 12	105292, 105312	



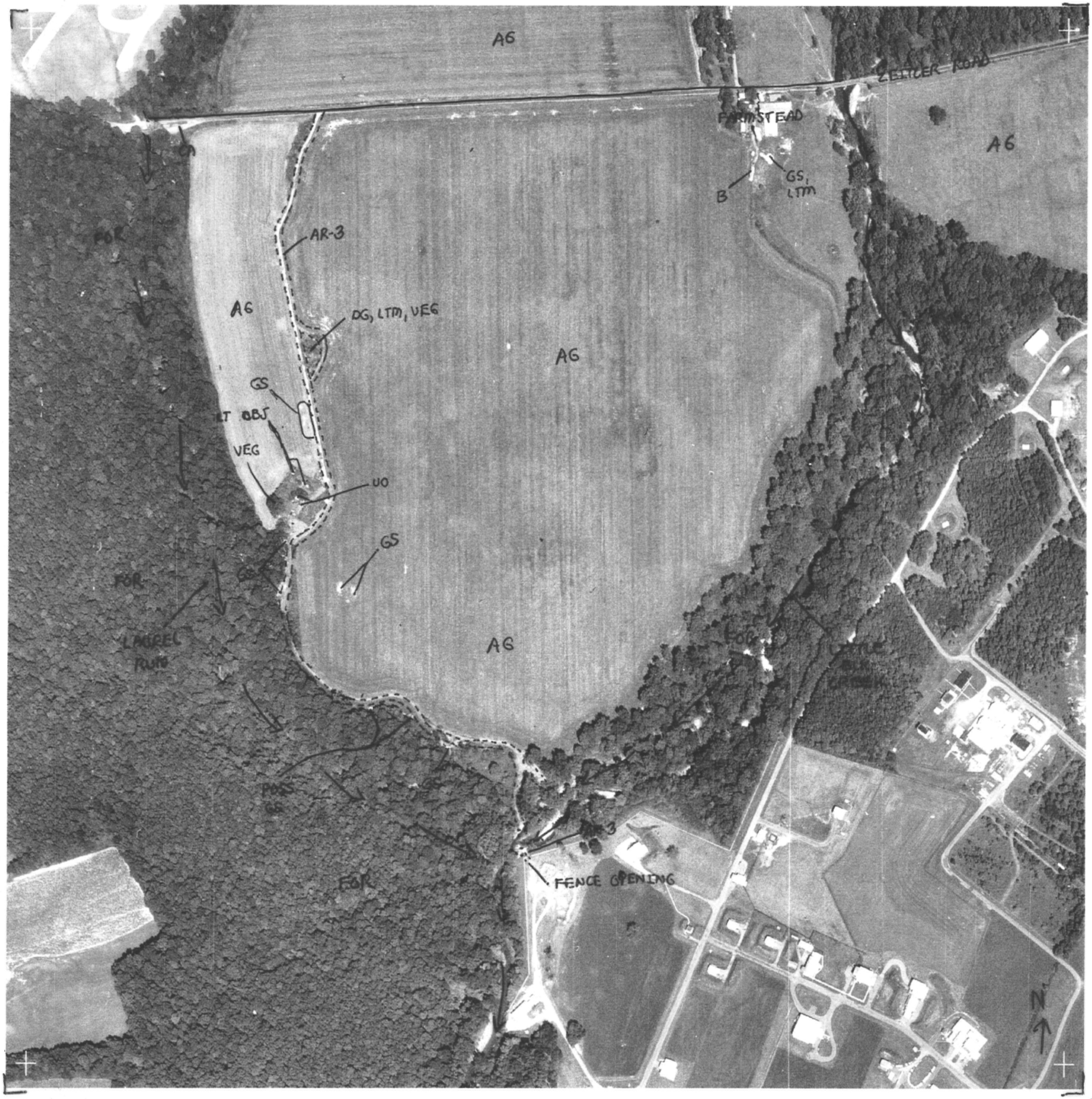
4/8/69 SLIKTON FARM EPA 1:9.7K MD-BL 69-026: 130, 131, 148, 149 PHOTO SCALE



4/8/69 ELKTON FARM

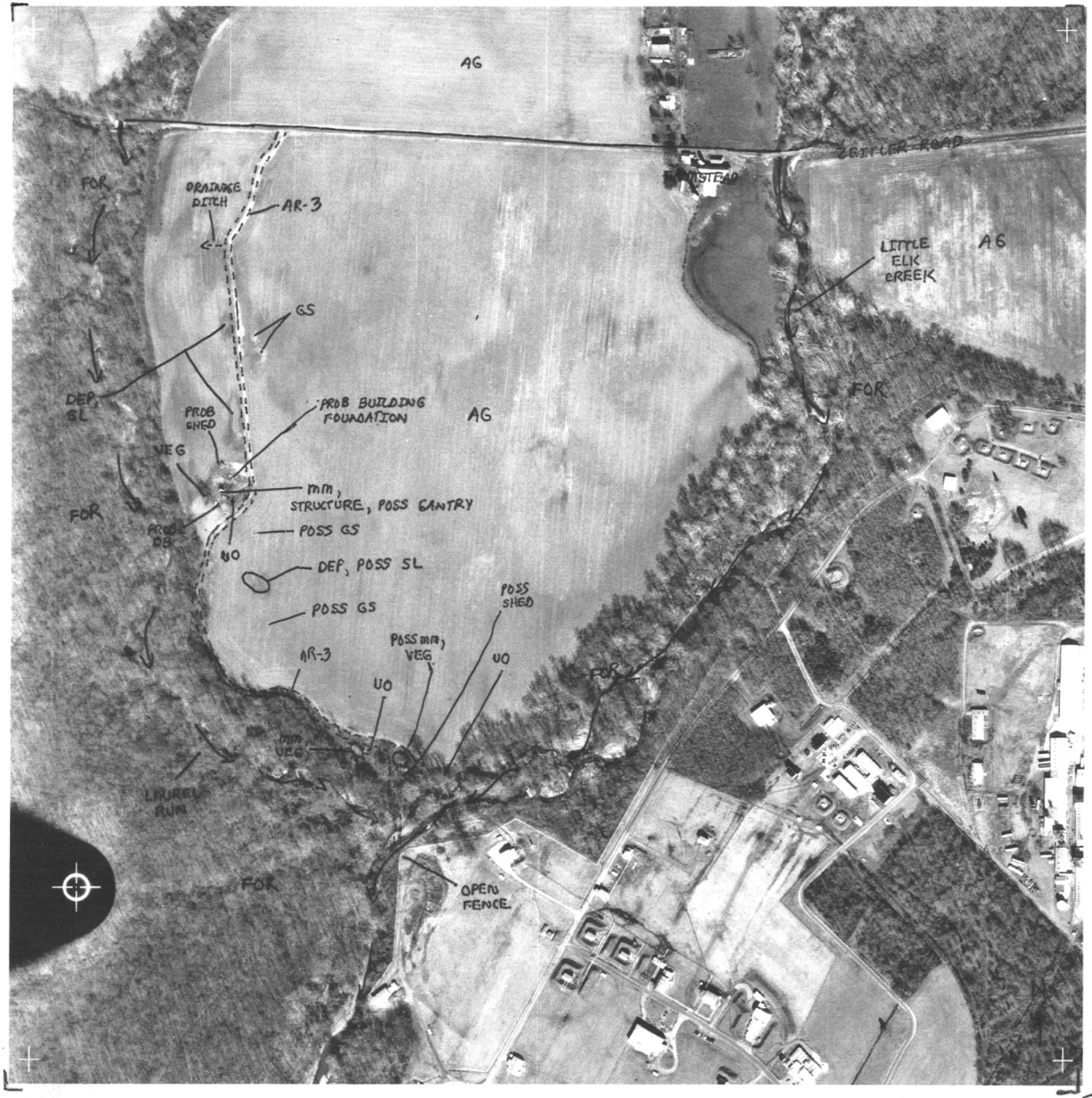


4/8/69 ELKTON FARM



9/10/79 ELKTON FARM EPA 1:24K CE-4 147. 43049. PHOTO SCALE

11



3/1/90 ELKTON FARM KEY 19K M3319 104, 105 43097, 81649 PHOTO SCALE

4/13/99 ELKTON FARM USGS 40K NAAP 84, 85, 244, 245 62217, 18, 19, 20 PHOTO SCALE