

September 12, 2007

Mr. Theodore Smith  
Mail Stop: T-7F27  
Division of Waste Management  
U.S. Nuclear Regulatory Commission  
11545 Rockville Pike  
Rockville, MD 20852

**SUBJECT: REVISED-CONFIRMATORY SURVEY RESULTS OF OPEN LAND AREA SURVEY UNITS FOR PHASES V, VI AND VII AT THE CONNECTICUT YANKEE HADDAM NECK PLANT, HADDAM, CONNECTICUT [DOCKET NO. 50-0213; RFTA NO. 06-006]**

Dear Mr. Smith:

The Oak Ridge Institute for Science and Education (ORISE) performed confirmatory survey activities within Open Land Area Survey Units for Phases V, VI, and VII at the Connecticut Yankee Haddam Neck Plant in Haddam, Connecticut, on April 23 through 26 and June 4 through 7, 2007. These survey activities were requested and approved by the U.S. Nuclear Regulatory Commission (NRC). Confirmatory survey activities included gamma surface scans and soil sampling. The results of these survey activities were previously submitted to the NRC on July 13, 2007. The NRC requested that ORISE reanalyze samples 1698S0125 through 1698S0129 to lower the minimum detectable concentration (MDC) for the carbon-14 (C-14) results. These samples were reanalyzed and the revised C-14 concentrations are presented in this report. Please find enclosed the revised results for the confirmatory survey activities conducted in April and June, 2007:

If you have any questions or comments, please direct them to me at 865.576.0065 or Sarah Roberts at 865.241.8893.

Sincerely,

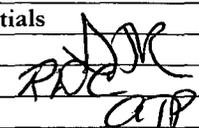


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Enclosure

c: T. Carter, NRC/FSME/DWMEP/DD/SP T-8F5      E. Abelquist, ORISE  
E. Knox-Davin, NRC/FSME/TWFN 8A23      S. Roberts, ORISE  
L. Kauffman, NRC/Region I      File/1698

Distribution approval and concurrence:	Initials
Technical Management Team Member	
Laboratory Manager	
Quality Manager	

**REVISED**  
**CONFIRMATORY SURVEY RESULTS OF**  
**OPEN LAND AREA SURVEY UNITS FOR**  
**PHASES V, VI AND VII AT THE**  
**CONNECTICUT YANKEE HADDAM NECK PLANT**  
**HADDAM, CONNECTICUT**

## **INTRODUCTION**

The U.S. Nuclear Regulatory Commission (NRC) requested that the Oak Ridge Institute for Science and Education (ORISE) perform confirmatory surveys at the Connecticut Yankee (CY) Haddam Neck Plant (HNP) in Haddam, Connecticut (Figure 1). During the periods of April 23 through 26 and June 4 through 7, 2007, ORISE conducted confirmatory surveys in Open Land Area Survey Units (SU) for Phases V, VI, and VII (Figure 2). Confirmatory survey activities were performed in 36 SUs and consisted of gamma surface scans and soil sampling. The SUs evaluated during the survey periods include: 9302-0000, 9304-0002, 9306-0000, 9312-0001 through 0010, 9313-0000, 9504-0000, 9506-0000, 9512-0000, 9514-0000 and 0001, 9520-0001 through 9520-0005, 9522-0001 through 9522-0006, 9527-0005 and 9527-0006, and 9530-0001 through 9530-0004. The NRC also requested that ORISE perform a scan of the new haul road which consisted of the former asphalt pile that had been located in SU 9520-0001. SUs 9530-0001 through 9530-0004 had been previously scanned during the August 2006 survey but were not sampled at that time at the direction of the NRC site representative.

## **PROCEDURES**

### **Document Review**

ORISE reviewed Connecticut Yankee Atomic Power Company's (CYAPCO) survey documentation to determine the appropriateness and adequacy of the final status survey (FSS) radiological instrumentation and procedures (CYAPCO 2006, 2007a and b). The FSS results for the Phase V and VI area were provided prior to ORISE's confirmatory survey activities; the FSS results for Phase VII were provided after ORISE's confirmatory survey activities. The NRC requested several teleconferences with NRC, CY and ORISE personnel to discuss surrogate ratio concerns for several survey units. ORISE provided comments on the surrogate ratios in an e-mail dated on April 20, 2007 (ORISE 2007a).

### **Health and Safety Overview**

A safety walkdown of the remaining Open Land Areas for Phases V, VI and VI was performed to evaluate the area for potential health and safety hazards. Additionally, the proposed survey and sampling procedures were evaluated to ensure that any hazards inherent to the procedures themselves were addressed in current job hazard analyses (JHAs). As part of this required safety walkdown, safety concerns were identified by ORISE personnel and discussed with the Connecticut Yankee (CY) personnel. The concerns were for Lyme disease prevention, snake bites and for the possibility of using safety harnesses if needed along the ledges of the mountainside. There was also the potential for heat stress. CY personnel provide snake chaps and tick repellent; safety harnesses were not needed since NRC deemed it was not necessary to perform gamma scans on the mountainside ledges. Adequate rest and re-hydration periods were observed to combat heat stress.

## **Radiological Survey Procedures**

Confirmatory surveys performed by ORISE were in accordance with a site-specific survey plan that was submitted to and approved by the NRC (ORISE 2007b). Confirmatory survey activities were implemented per the guidance provided in the ORISE Survey Procedures and Quality Program Manuals (ORISE 2006a and 2007c). Survey activities consisted of gamma surface scans and soil sampling.

The gamma surface scan density performed in Class 1 field SUs ranged from 30% to 100%, from 20% to 80% in Class 2 SUs, and from 25% to 30% in Class 3 SUs. SU scan densities are provided in Table 1; accessibility to some areas was restricted due to safety concerns for ORISE personnel. Sodium iodide (NaI) scintillation detectors coupled to ratemeters with audible indicators were used for scanning. Locations of elevated gamma activity were marked for further investigation.

ORISE collected 104 surface (0 to 15 cm) soil samples at both random and judgmental locations in 23 of the 36 SUs. Included in the sampling effort were the previously scanned SUs 9530-0001 through 9530-0004 (ORISE 2006b). Sample locations are shown in Figures 3 through 25.

## **SAMPLE ANALYSIS AND DATA INTERPRETATION**

Radiological data and sample media were returned to ORISE's laboratory in Oak Ridge, Tennessee for analysis and interpretation. Radioassays were performed in accordance with the ORISE Laboratory Procedures Manual (ORISE 2007d). Soil samples were analyzed by gamma spectroscopy for the primary radionuclides of concern (ROC), Co-60 and Cs-137. However, spectra were also reviewed for other gamma-emitting fission and activation products associated with the HNP and other identifiable total absorption peaks. Analyses for Sr-90, Tc-99 and C-14 were performed on selected soil samples based on the potential for the presence of these contaminants in the associated SUs. Soil sample results were reported in units of picocuries per gram (pCi/g).

## **FINDINGS AND RESULTS**

Scans identified elevated radiation levels in at least one location in three SUs (9520-0004, 9527-0006, and 9522-0004) and in two locations in SU 9312-0009. For the five SUs scanned during the August 2006 survey, no areas of elevated radiation were detected with the exception of a location identified in SU 9304-0002. The elevated radioactivity was suspected to be attributable to naturally occurring radioactive material (NORM) from a rock found in that location. A soil sample was collected from underneath the rock to verify this assumption.

ORISE collected a total of 104 soil samples, including 101 soil samples from randomly-generated locations and three samples from areas of elevated radiation identified during the scans. The three judgmental samples were collected from SUs 9520-0004, 9527-0006, and 9304-0002 (sample numbers 1698S0053, 1698S0042 and 1698S0135, respectively). Judgmental samples from elevated gamma activity locations were not deemed necessary from SUs 9522-0002 and 9312-0009 since it was determined that the elevated gamma activity was attributable to NORM in granite rock. Random sample locations were generated using the visual sampling plan (VSP) software.

The concentrations reported for the primary ROCs ranged from -0.02 to 0.26 pCi/g for Co-60 and -0.01 to 2.66 pCi/g for Cs-137. Samples analyzed for Sr-90, Tc-99, and C-14 had concentrations that ranged from -0.20 to 0.39 pCi/g, -0.06 to 0.14 pCi/g and 0.19 to 0.85 pCi/g, respectively.

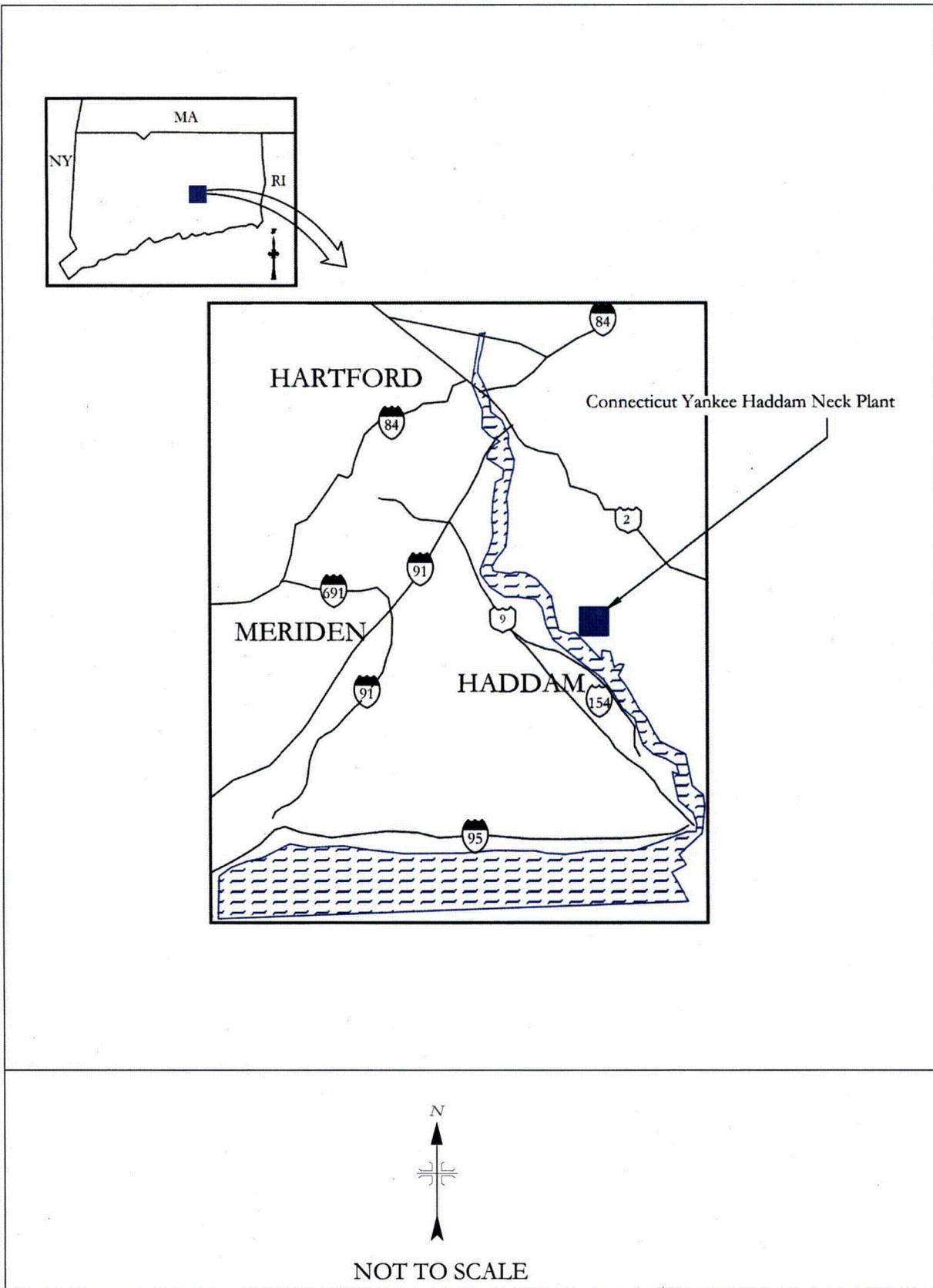
SU scan percentages are provided in Table 1, the range of radionuclide concentrations within each SU are provided in Table 2, and the individual sample results are provided in Table 3.

#### **COMPARISON OF RESULTS WITH RELEASE CRITERIA**

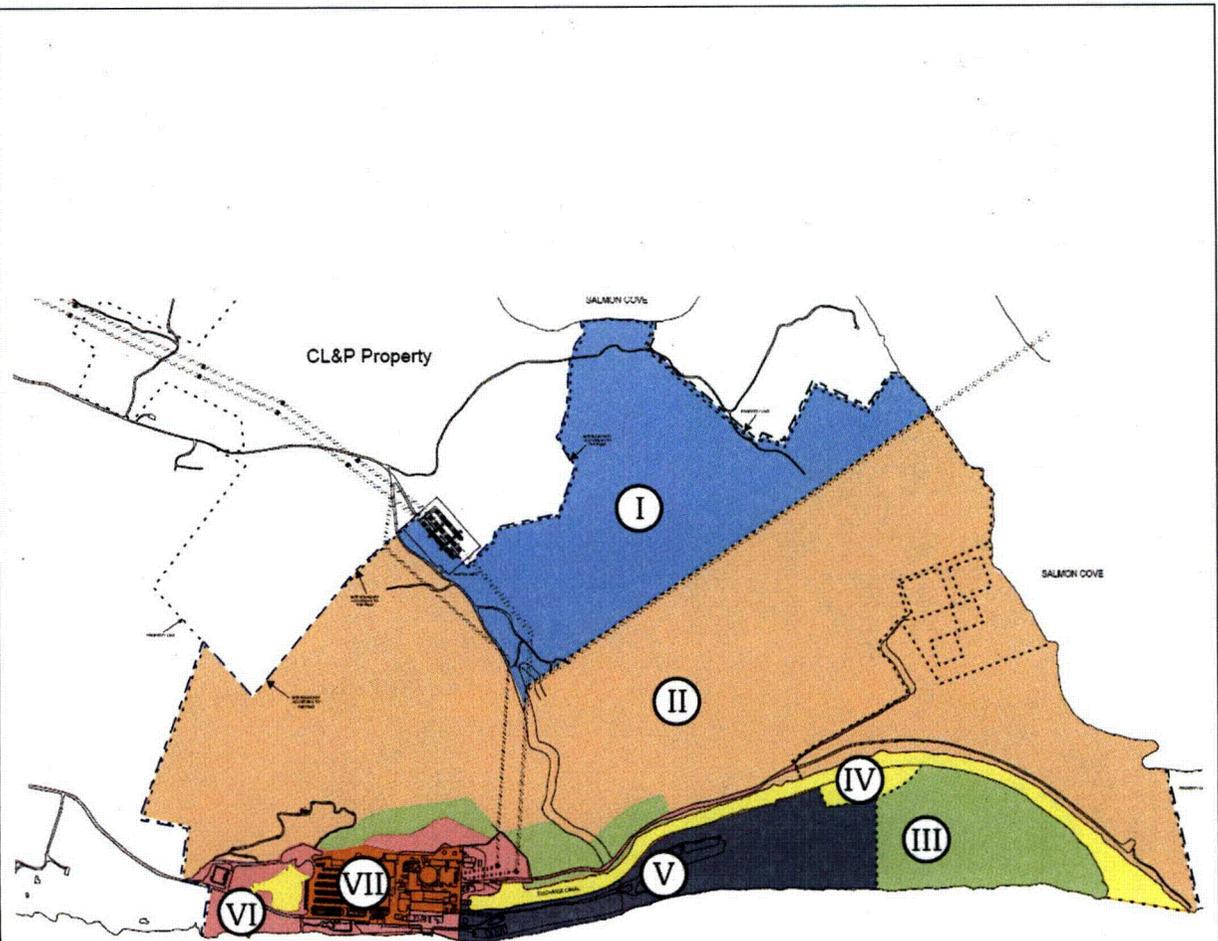
The results of soil samples collected by ORISE were evaluated and compared to the site-specific operational derived concentration guideline levels (DCGLs) for the primary ROCs (i.e., Co-60 and Cs-137). The DCGLs used for comparison are specified in the individual Final Status Survey (FSS) Release Records (CYAPCO 2006 and 2007a and b), and are provided in Table 3, footnote b. All soil sample results were less than the site-specific operational DCGLs.

#### **CONCLUSION**

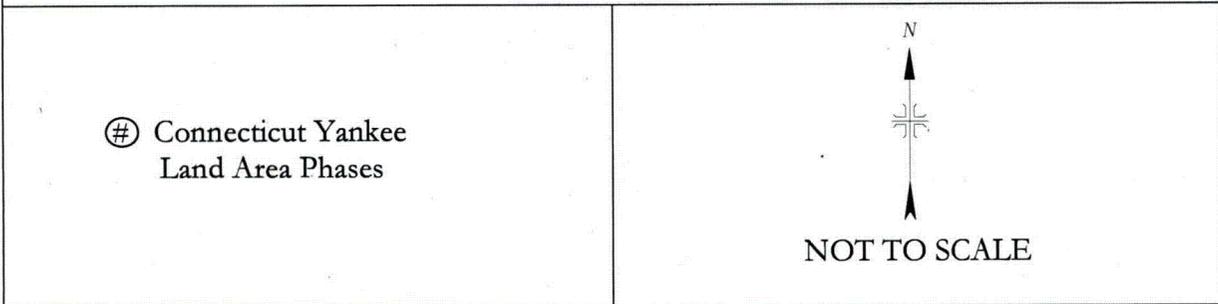
During the period of April 23 through 26 and June 4 through 7, 2007, ORISE conducted confirmatory survey activities that included gamma scans and soil sampling to assess the final site condition within Phase V, VI, and VII open land areas at the HNP site. The ORISE objective was to determine whether confirmatory sample results could independently confirm that surface soil areas met the established criteria. Based upon ORISE's confirmatory survey results, the radionuclide concentrations for the SUs evaluated are commensurate with the release criteria specified within their respective FSS Release Records. Therefore, based on data results, ORISE concludes that the radiological conditions for these SUs are in accordance with the clean-up criteria in the license termination plan [LTP (CYAPCO 2005)].



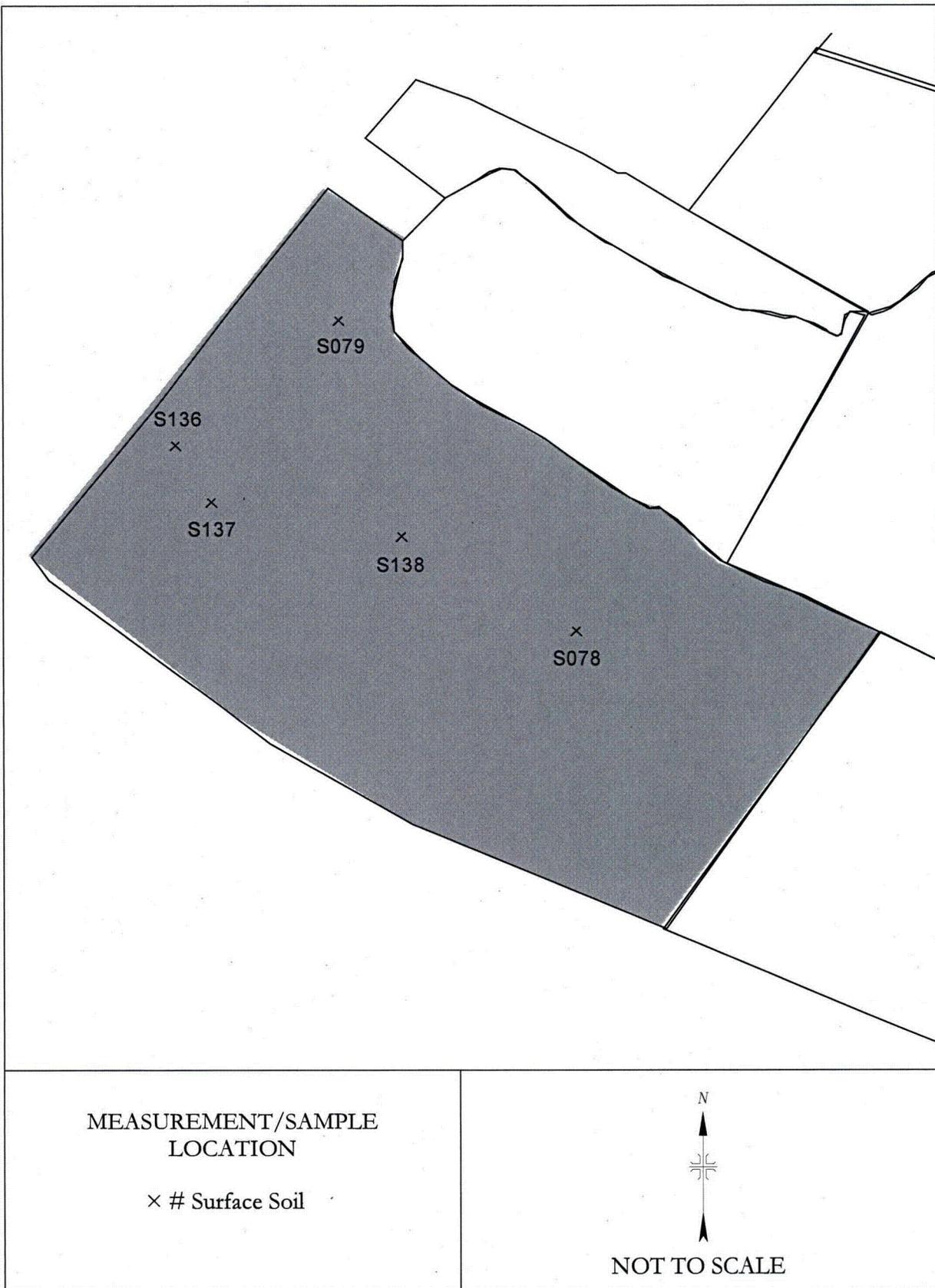
**Figure 1: Location of the Connecticut Yankee Haddam Neck Plant – Haddam, Connecticut**



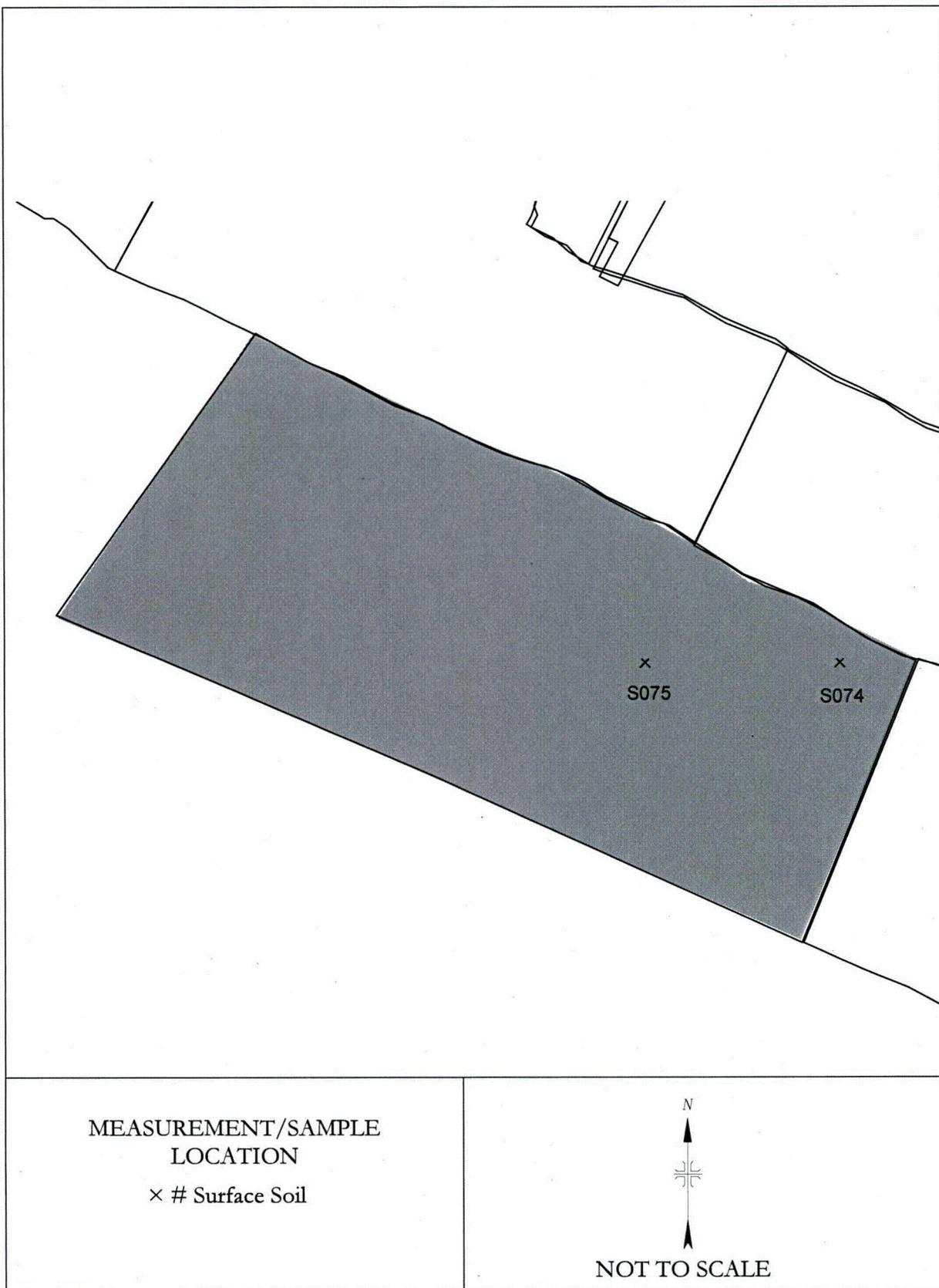
† image referenced from Connecticut Yankee Atomic Power Company, Haddam Neck Plant, Final Status Survey Report – Phase V, December 2006.



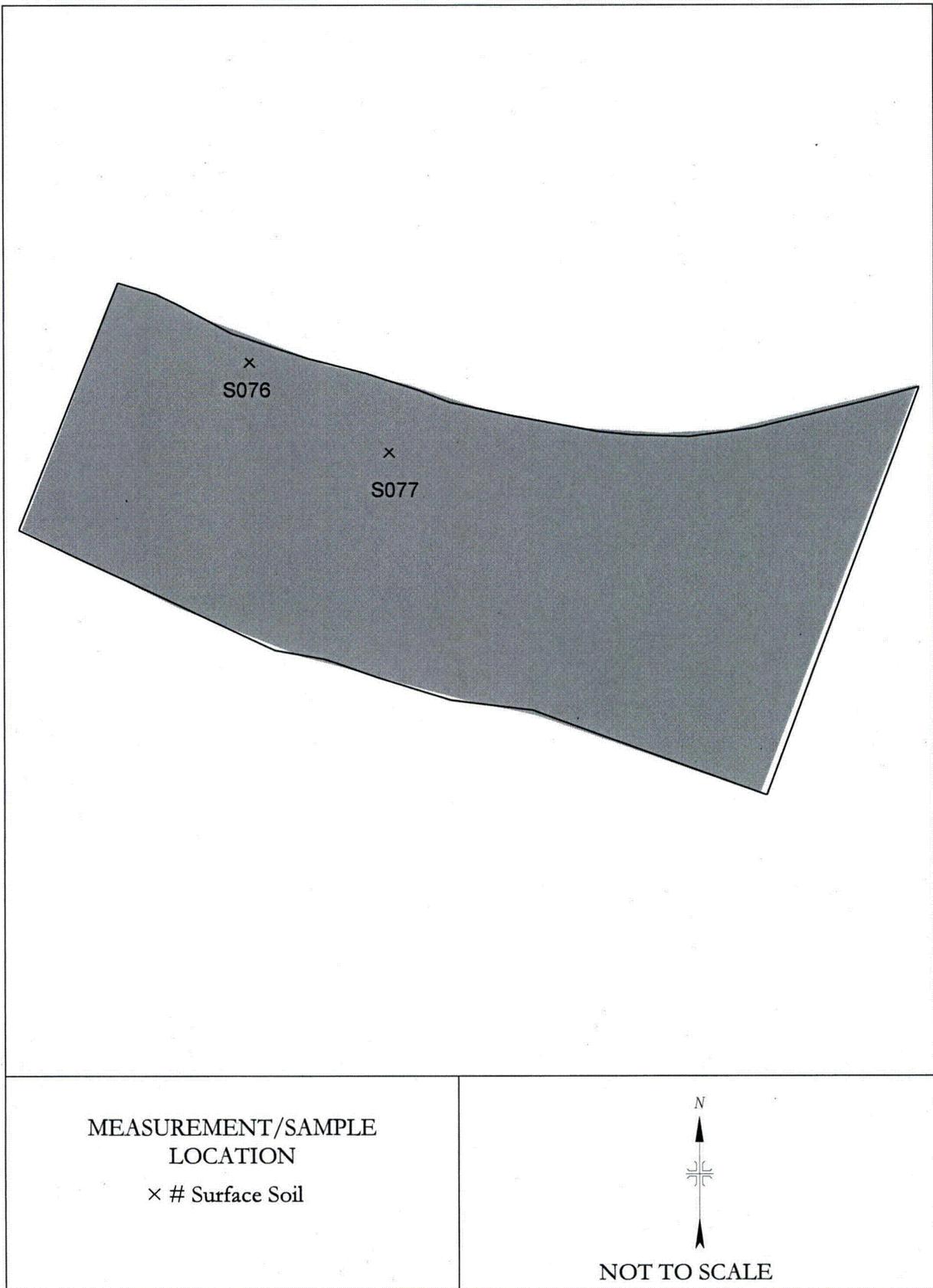
**Figure 2: Overview of Connecticut Yankee Land Area Phases**



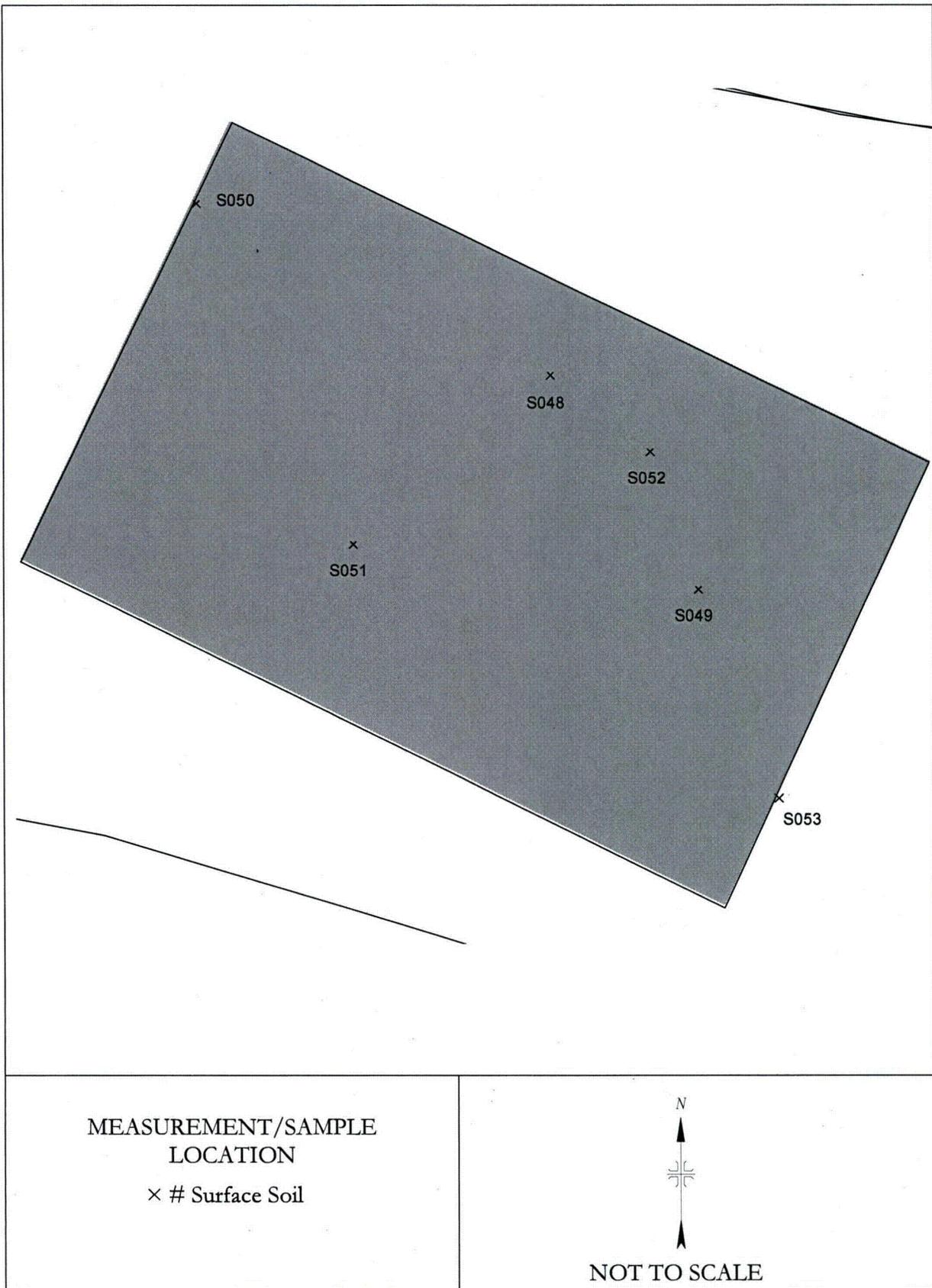
**Figure 3: Survey Unit 9520-0001 – Soil Sample Locations**



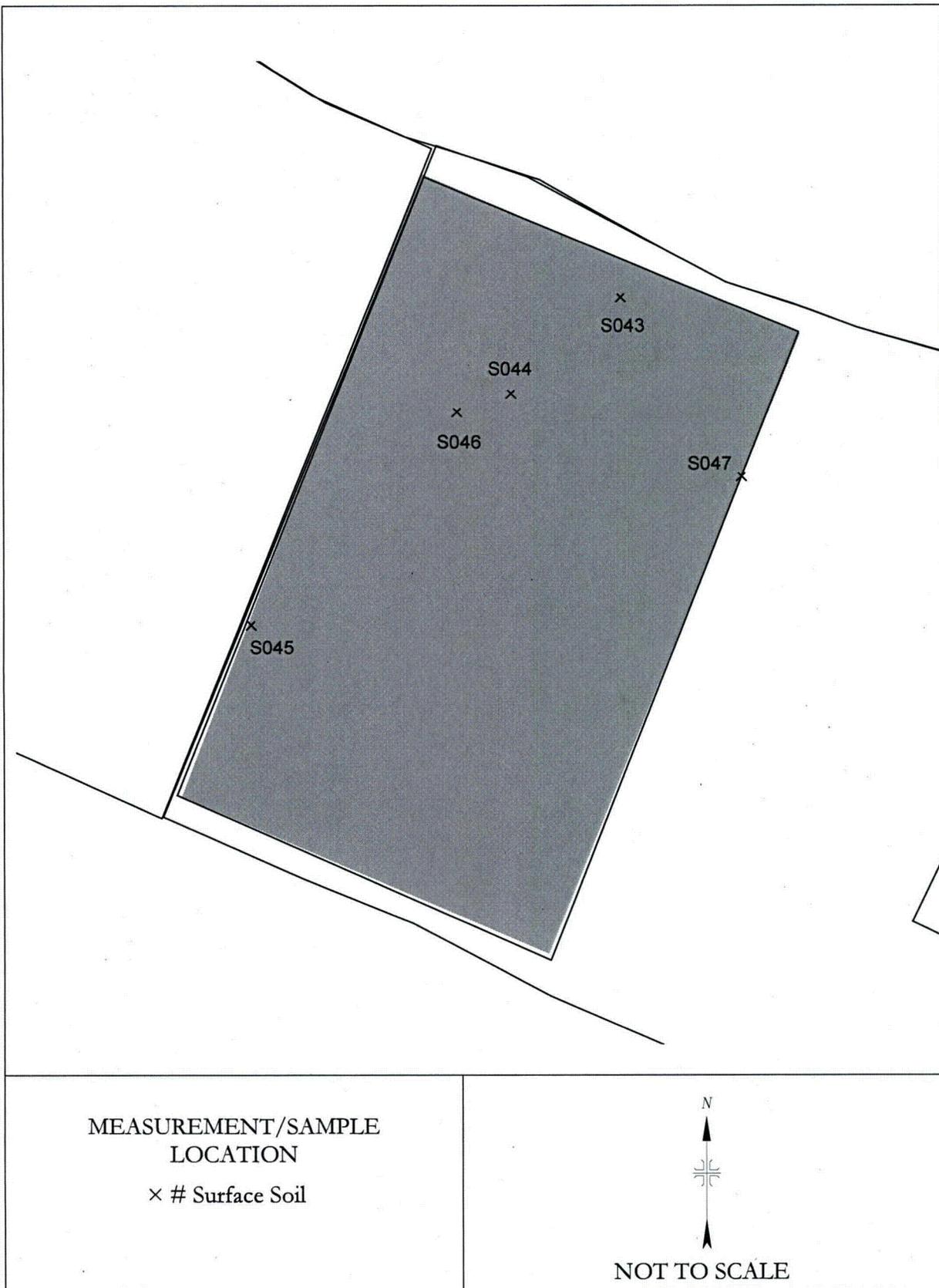
**Figure 4: Survey Unit 9520-0002 – Soil Sample Locations**



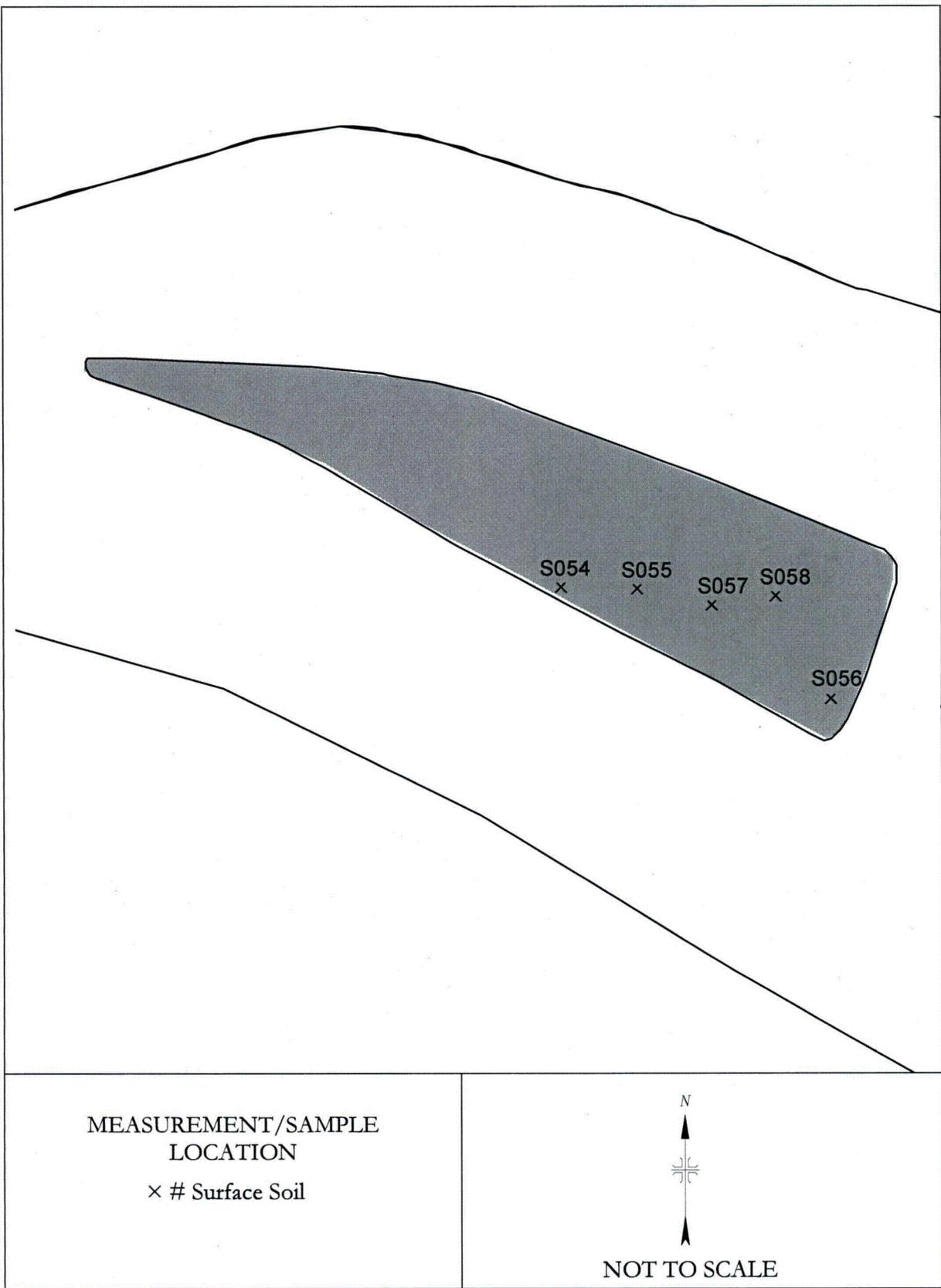
**Figure 5: Survey Unit 9520-0003 – Soil Sample Locations**



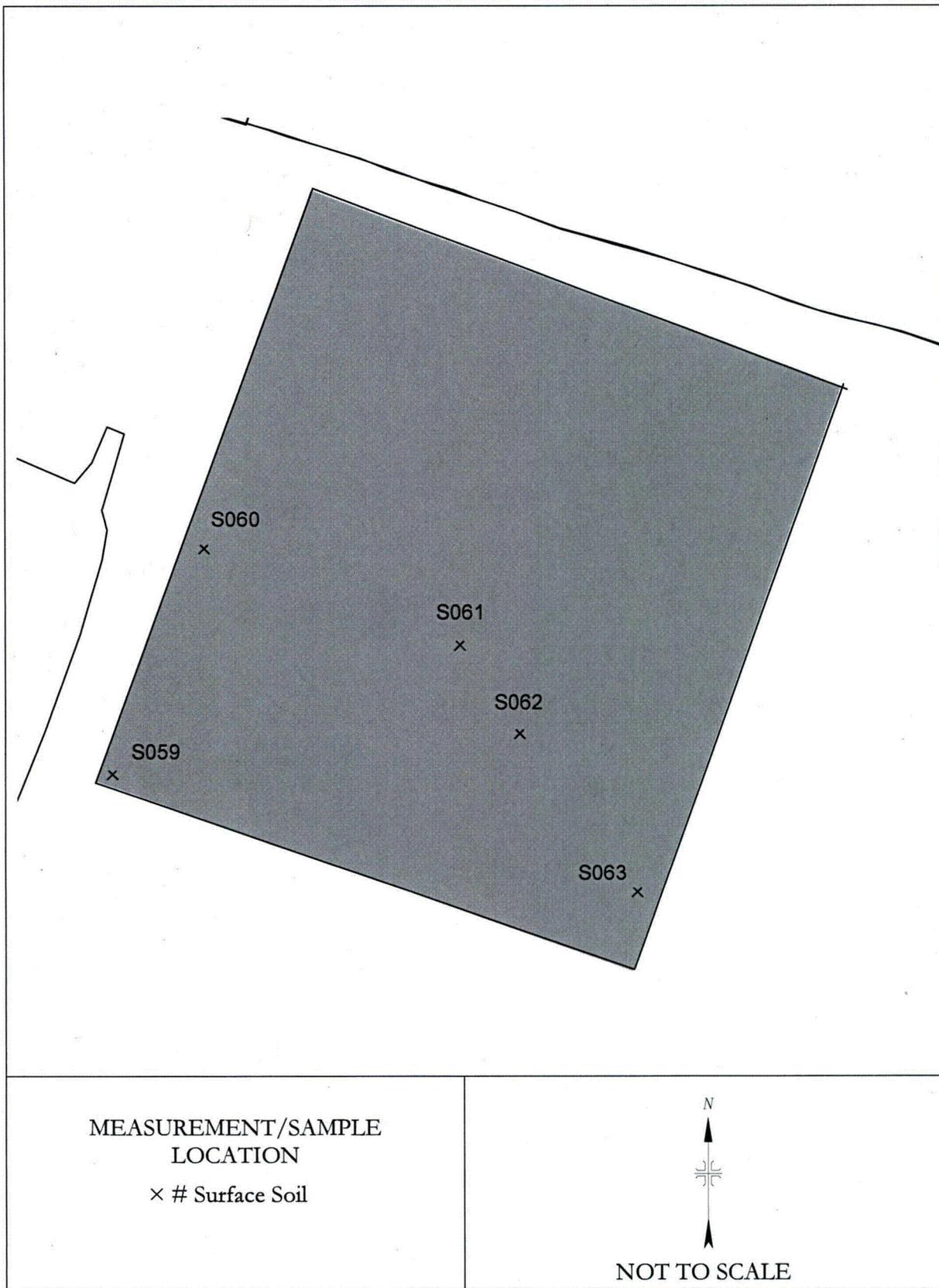
**Figure 6: Survey Unit 9520-0004 – Soil Sample Locations**



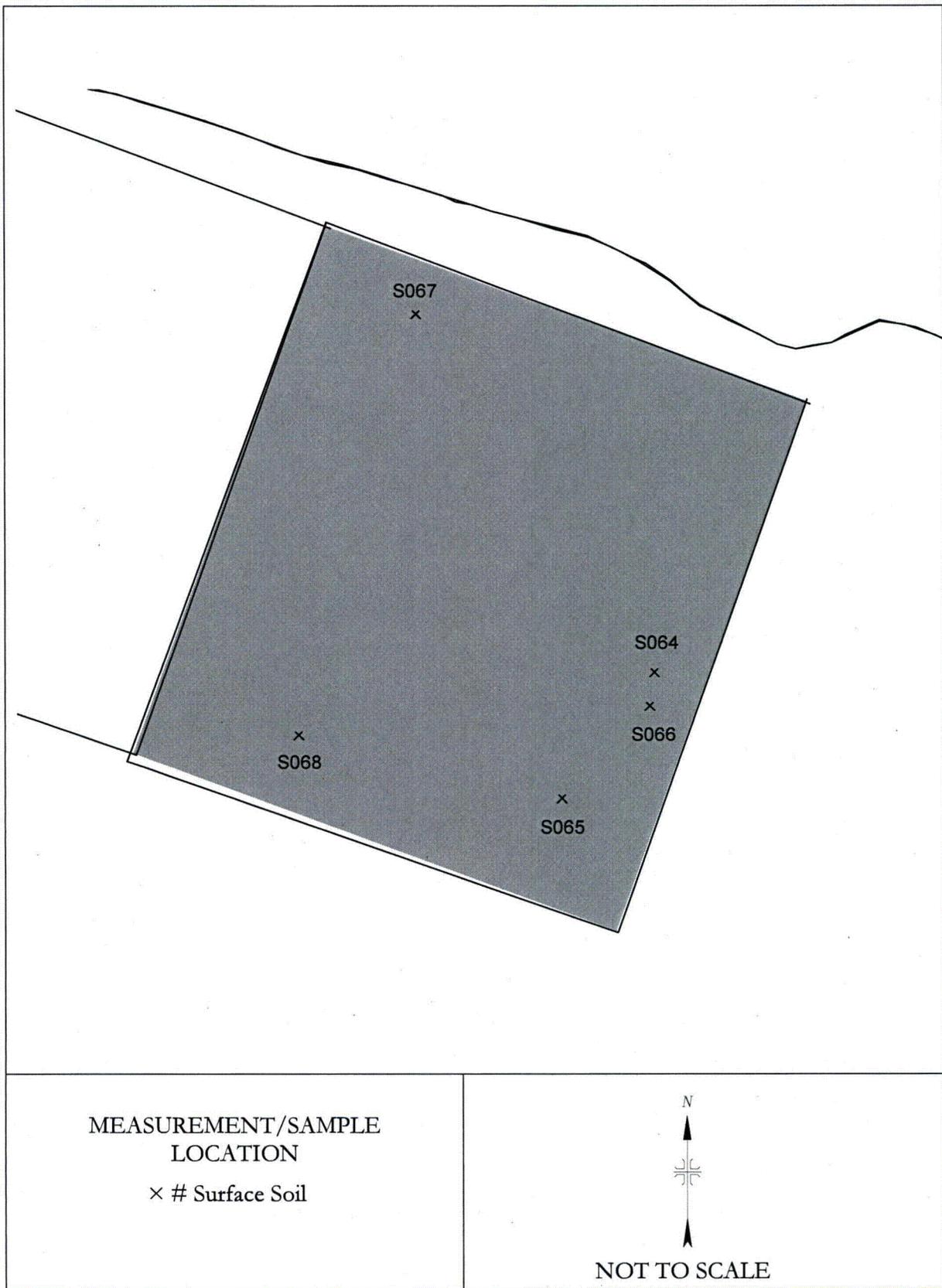
**Figure 7: Survey Unit 9520-0005 – Soil Sample Locations**



**Figure 8: Survey Unit 9530-0001 – Soil Sample Locations**



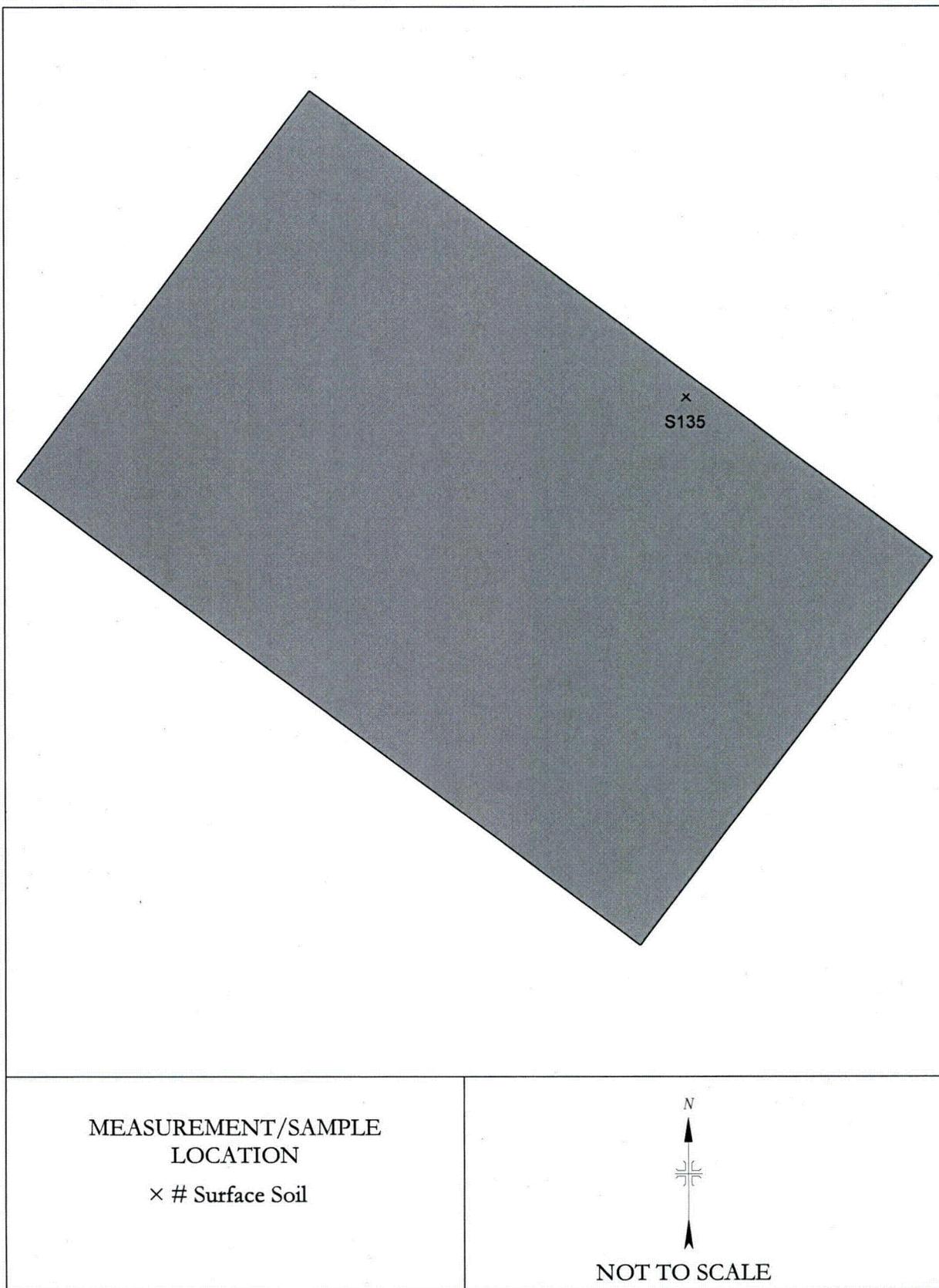
**Figure 9: Survey Unit 9530-0002 – Soil Sample Locations**



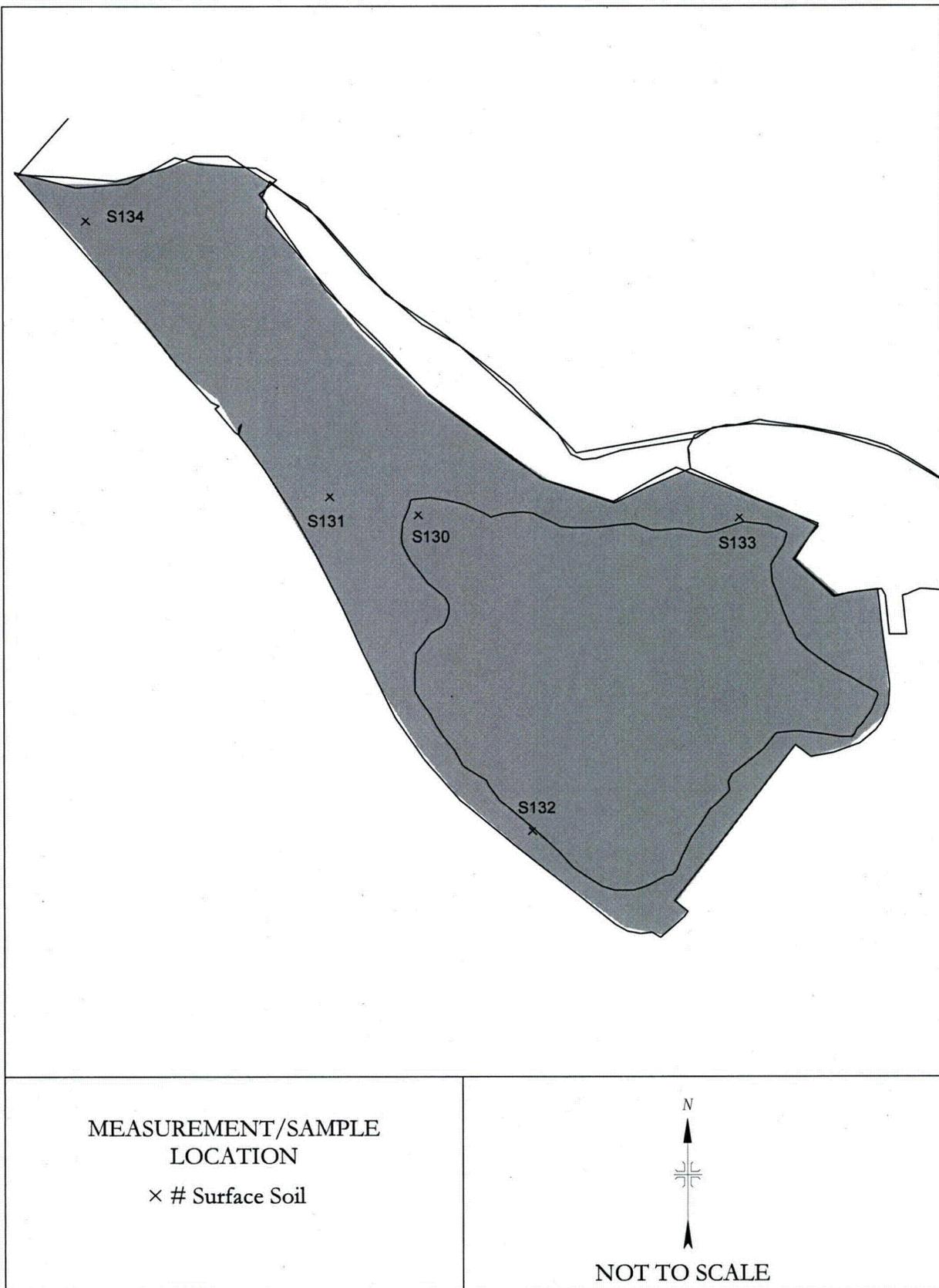
**Figure 10: Survey Unit 9530-0003 – Soil Sample Locations**



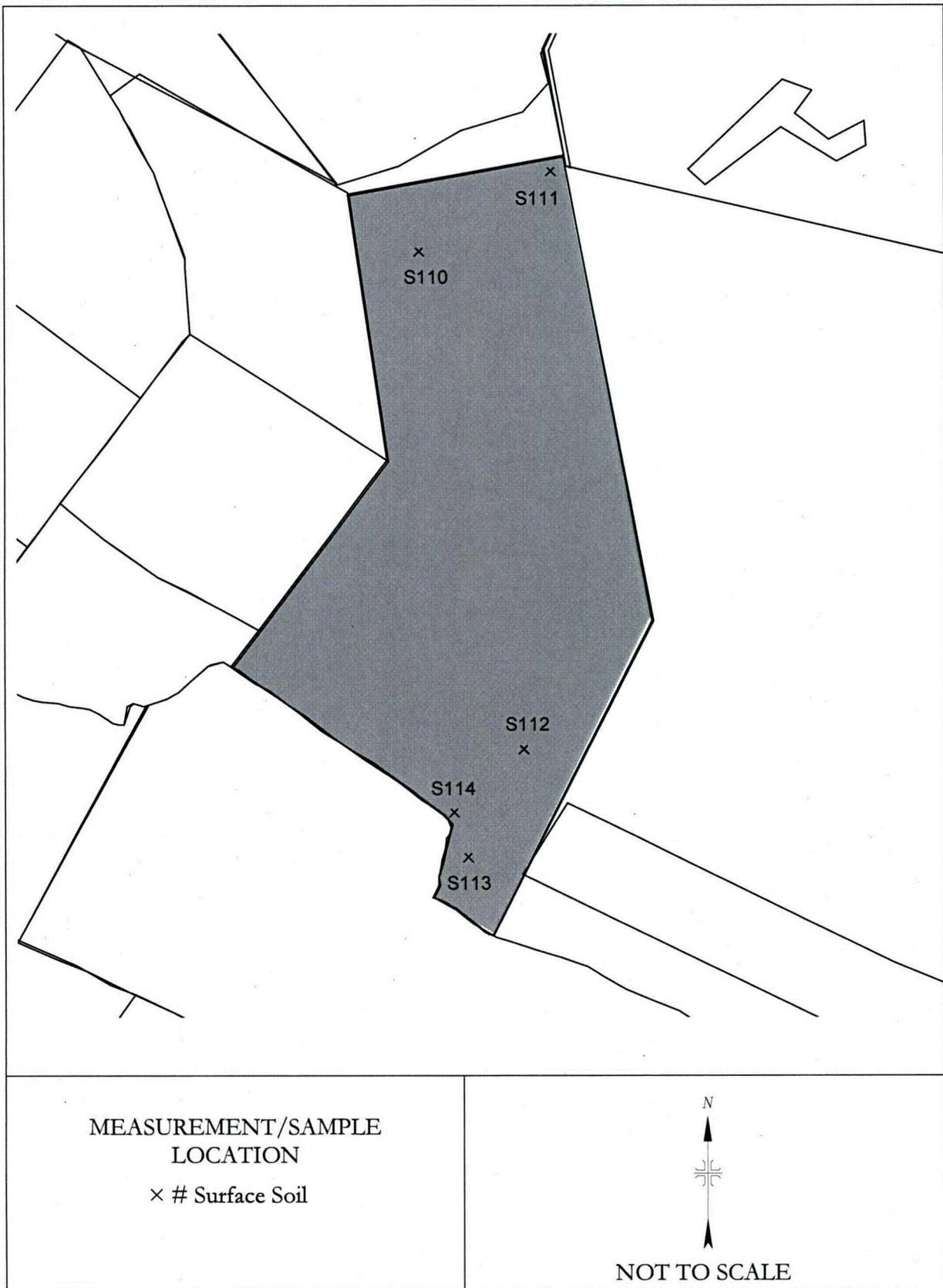
**Figure 11: Survey Unit 9530-0004 – Soil Sample Locations**



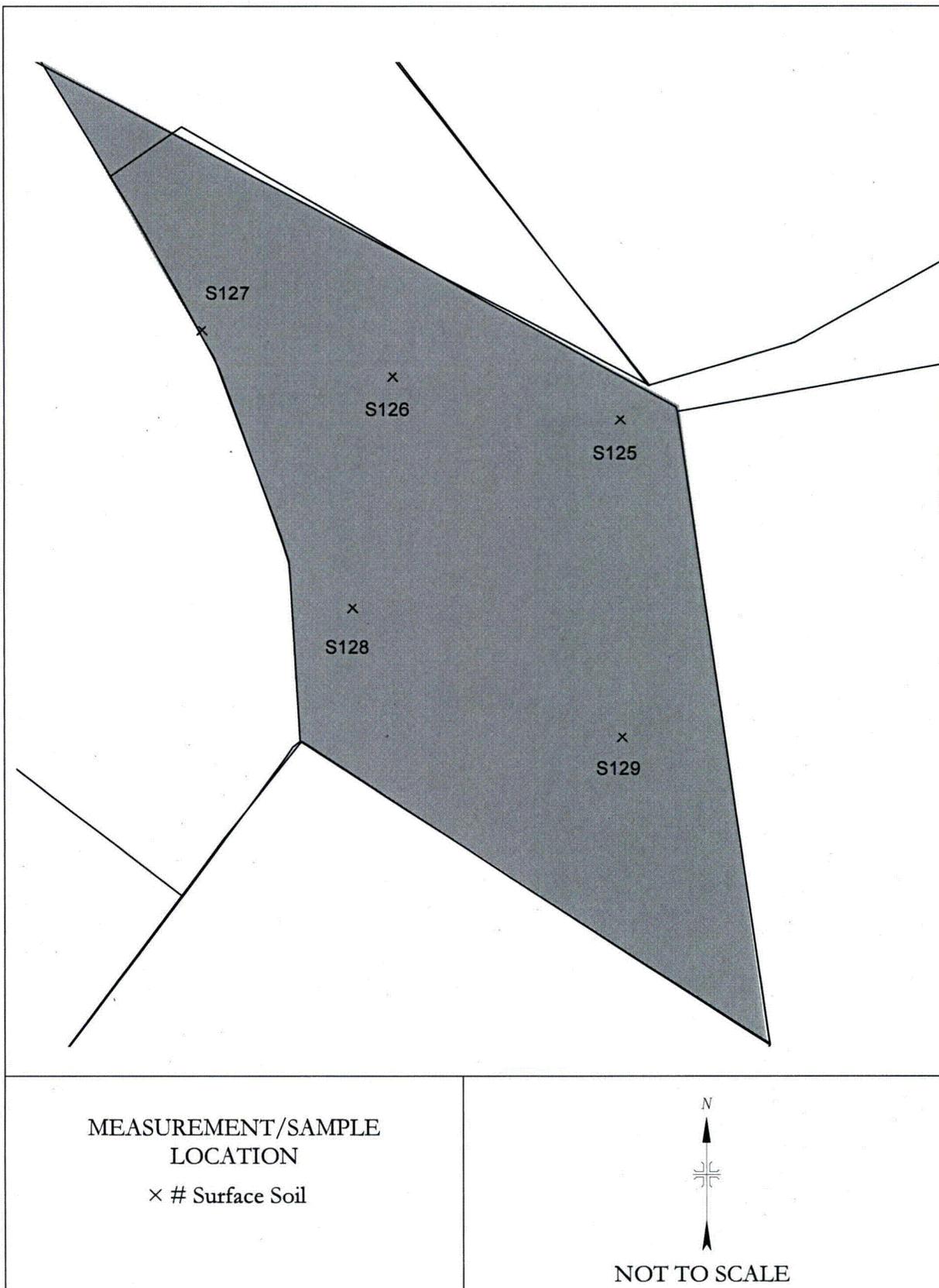
**Figure 12: Survey Unit 9304-0002 – Soil Sample Locations**



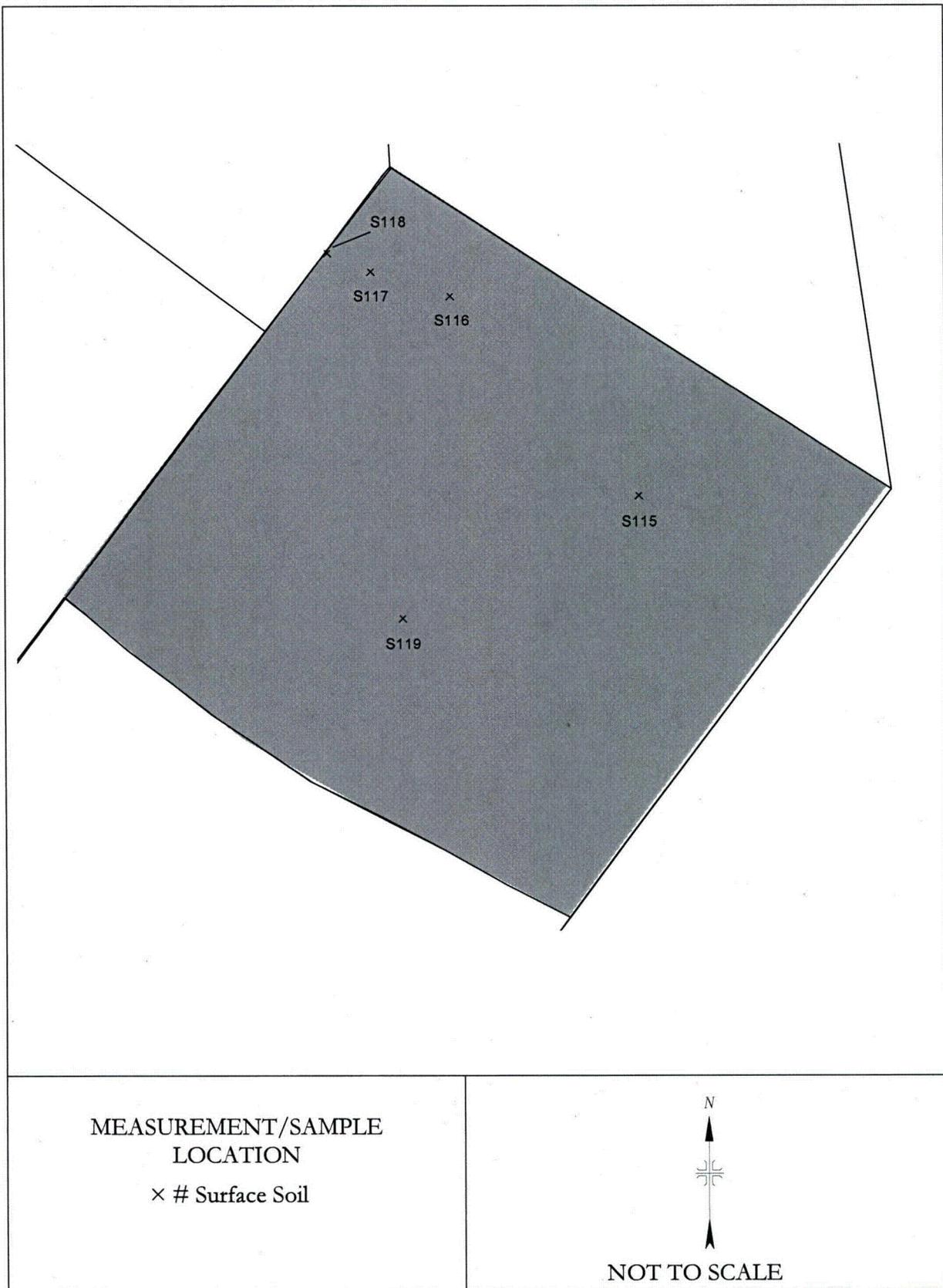
**Figure 13: Survey Unit 9506-0000 – Soil Sample Locations**



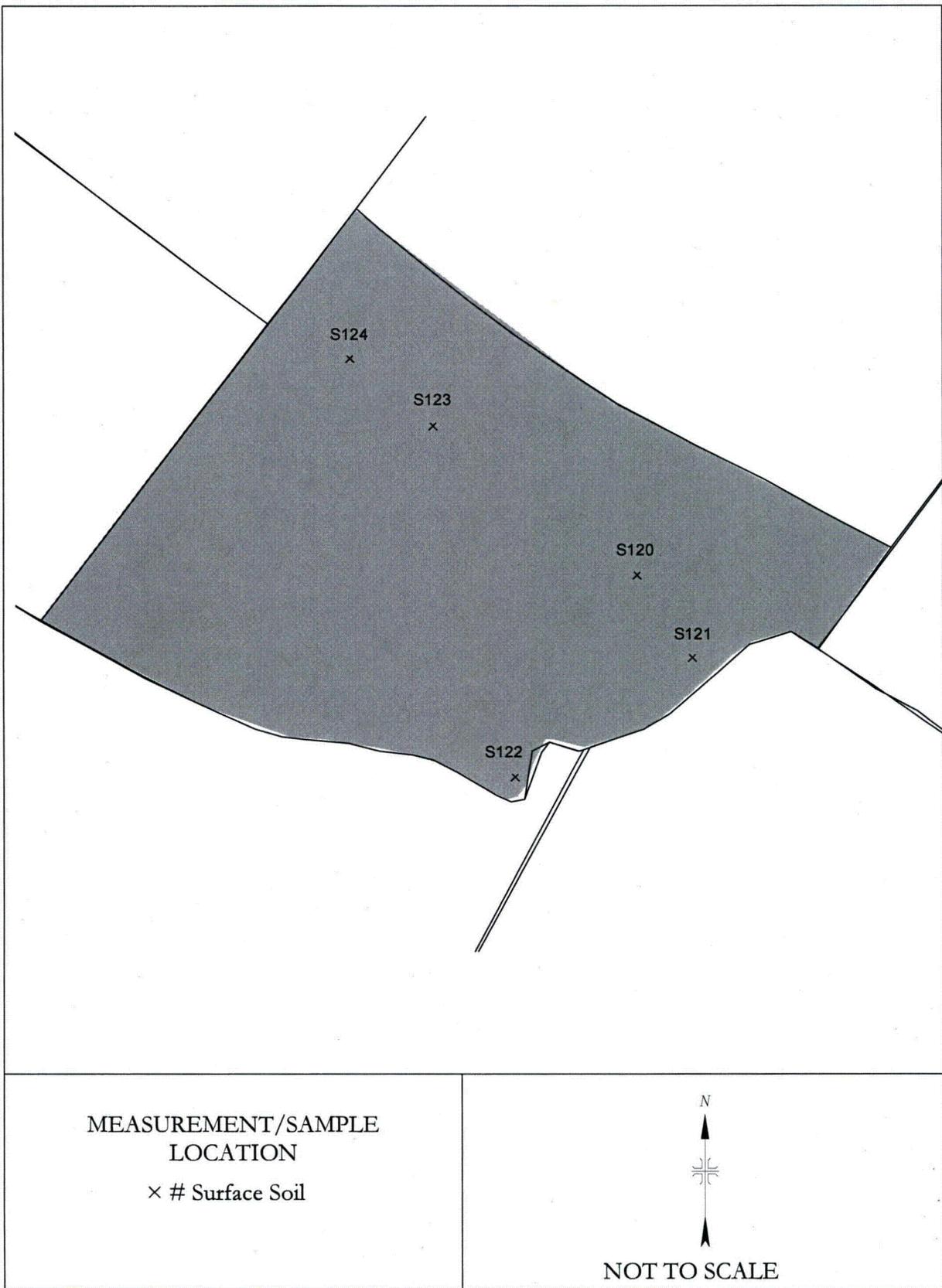
**Figure 14: Survey Unit 9522-0001 – Soil Sample Locations**



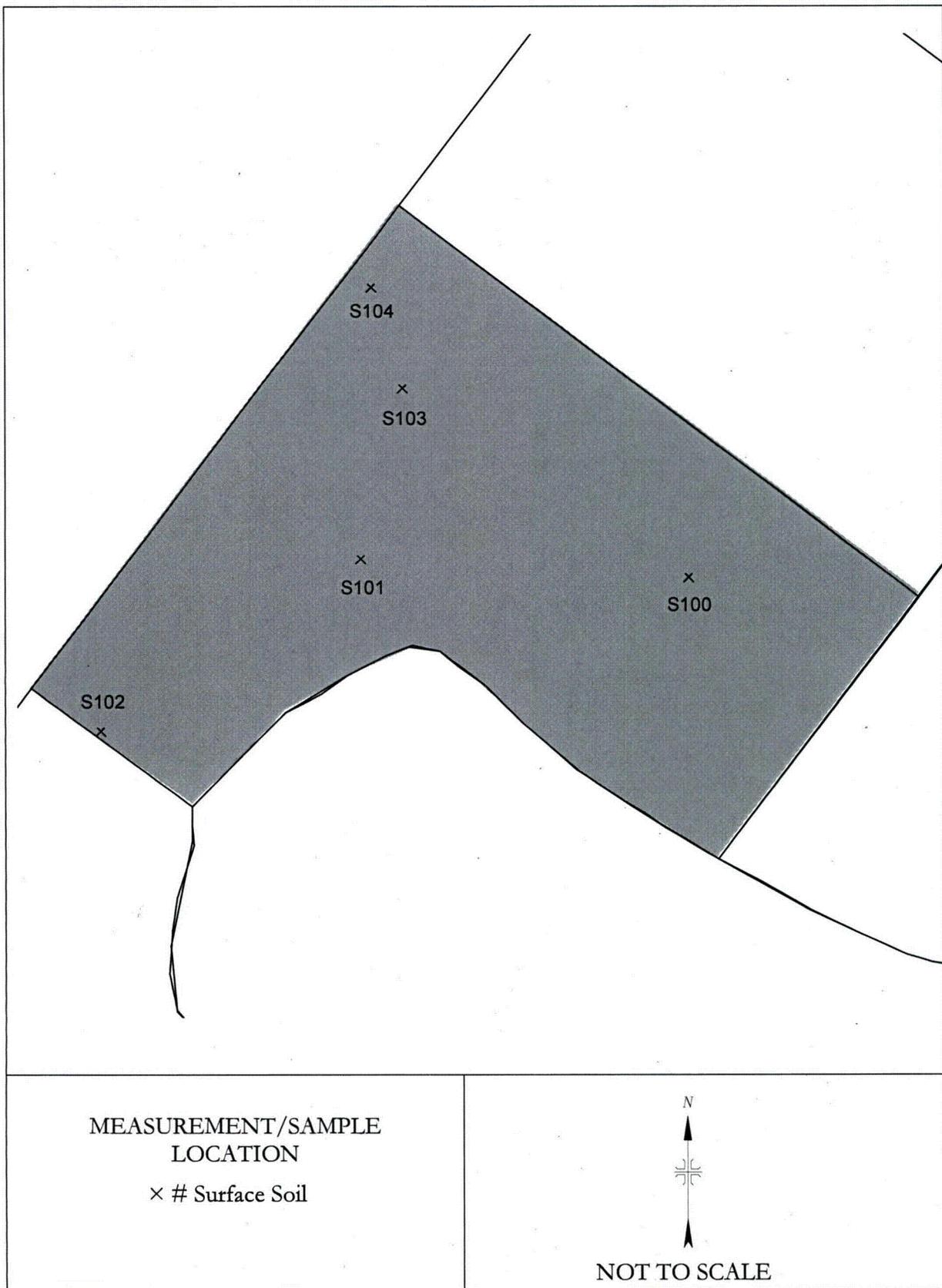
**Figure 15: Survey Unit 9522-0002 – Soil Sample Locations**



**Figure 16: Survey Unit 9522-0003 – Soil Sample Locations**



**Figure 17: Survey Unit 9522-0004 – Soil Sample Locations**



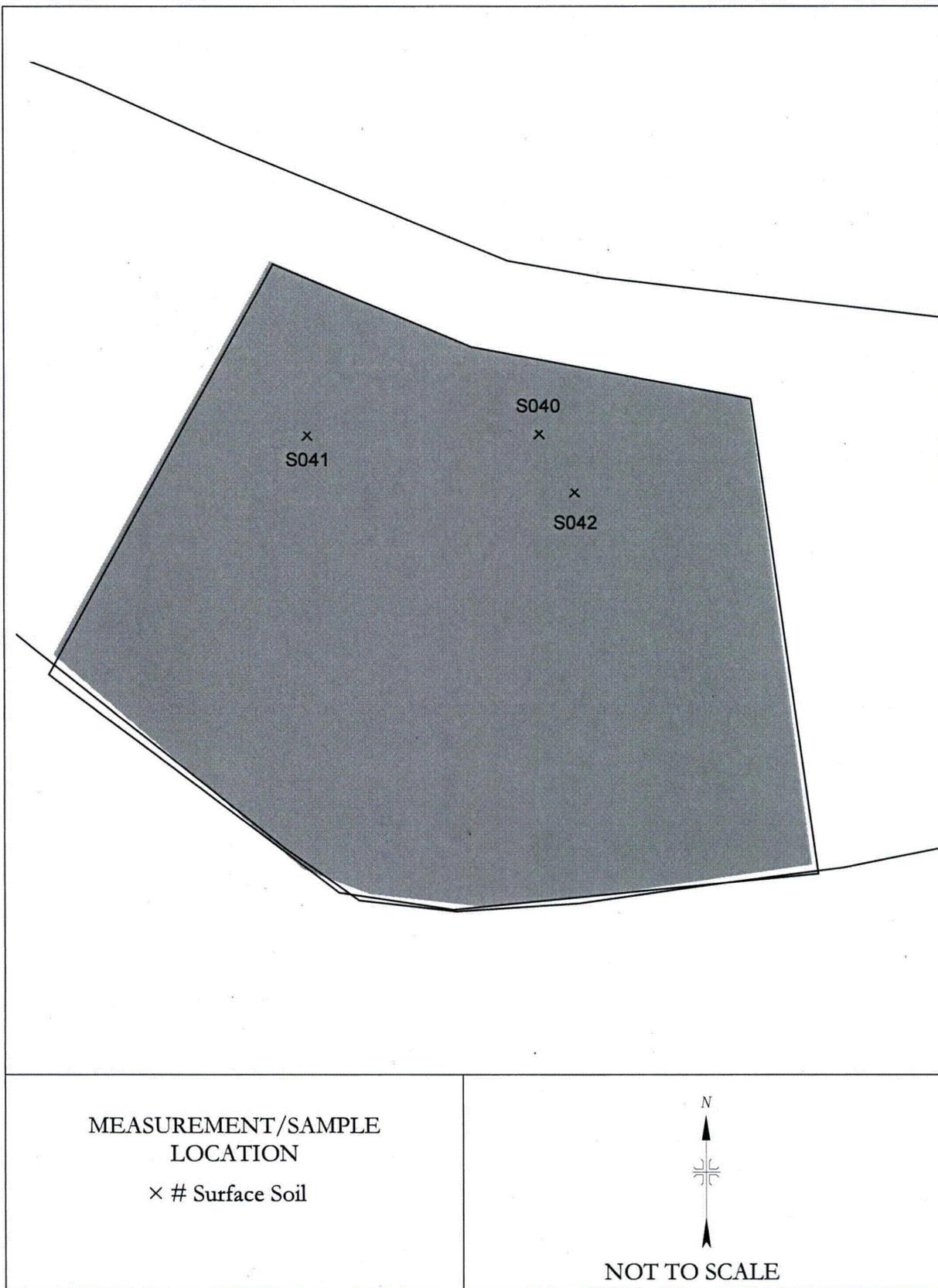
**Figure 18: Survey Unit 9522-0005 – Soil Sample Locations**



**Figure 19: Survey Unit 9522-0006 – Soil Sample Locations**



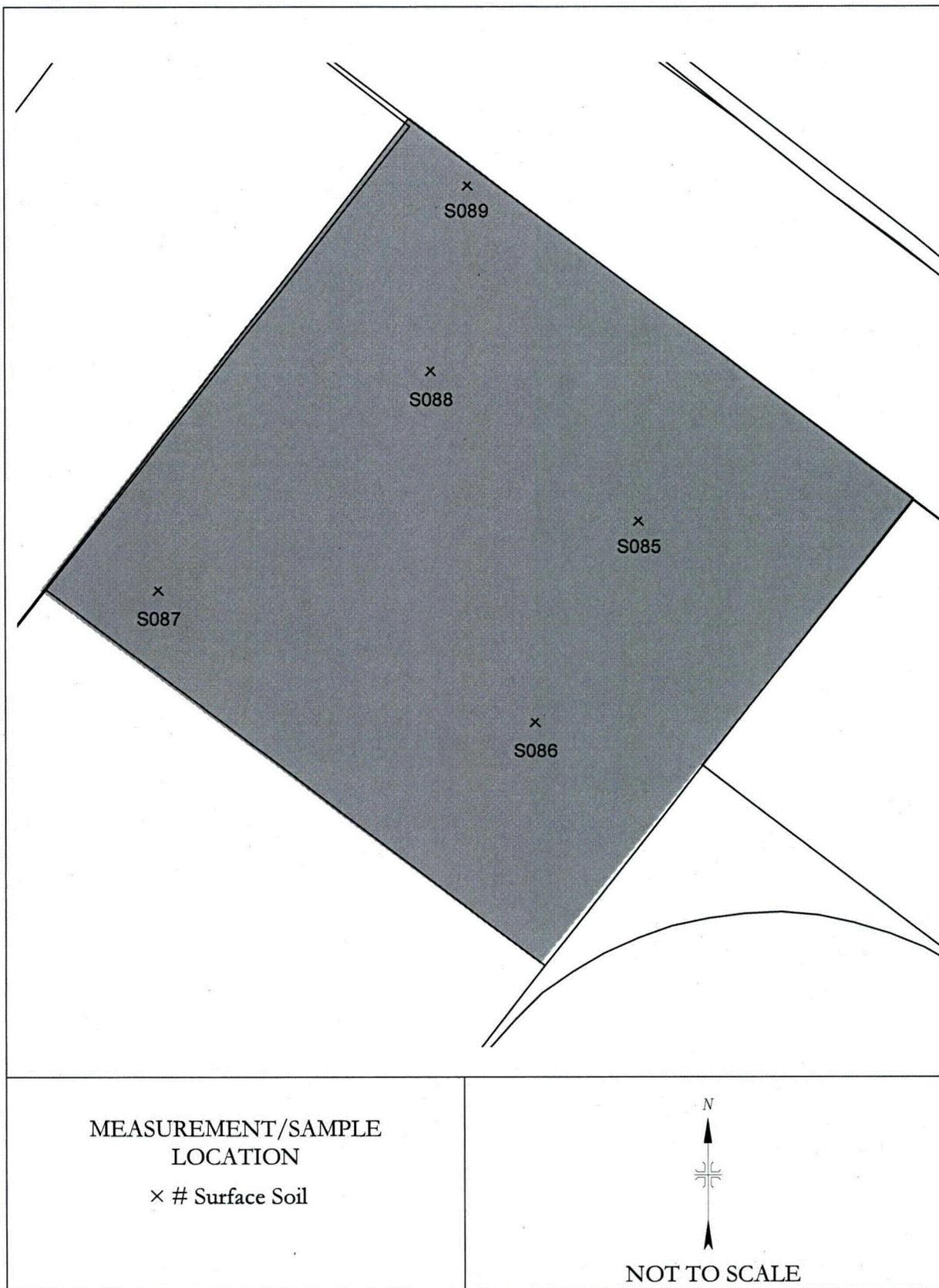
**Figure 20: Survey Unit 9527-0005 – Soil Sample Locations**



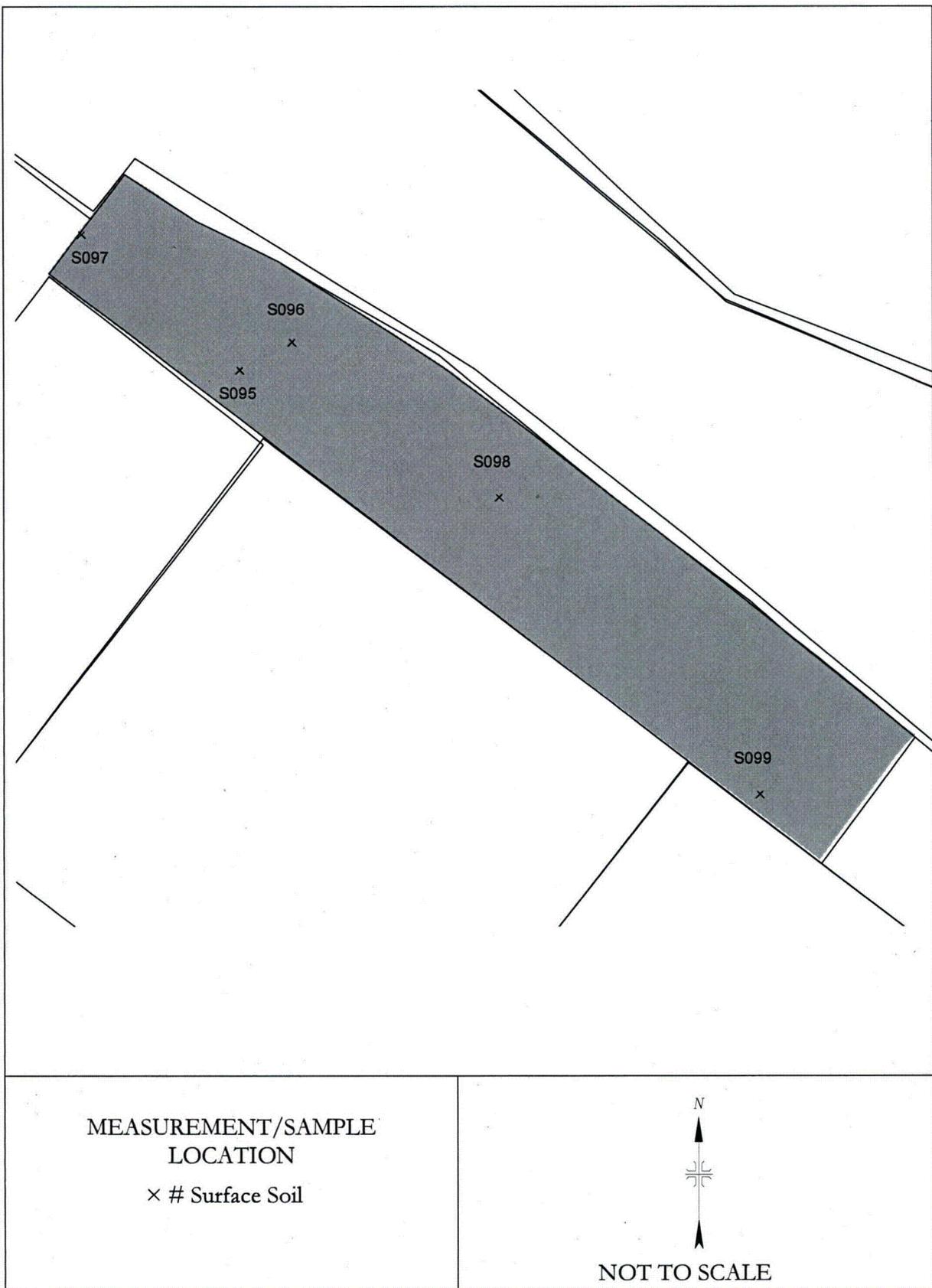
**Figure 21: Survey Unit 9527-0006 – Soil Sample Locations**



**Figure 22: Survey Unit 9312-0004 – Soil Sample Locations**



**Figure 23: Survey Unit 9312-0005 – Soil Sample Locations**



**Figure 24: Survey Unit 9312-0009 – Soil Sample Locations**



**Figure 25: Survey Unit 9514-0001 – Soil Sample Locations**

TABLE 1

CONFIRMATORY SURVEY SCAN PERCENTAGES  
CONNECTICUT YANKEE HADDAM NECK PLANT  
HADDAM, CONNECTICUT

Survey Unit	Class	Scan Density %	Survey Unit	Class	Scan Density %
<b>Phase V</b>			<b>Phase VI continued</b>		
9520-0001	2	30	9527-0006	1	50
9520-0002	2	30	9504-0000	3	30
9520-0003	2	30	9512-0000	3	30
9520-0004	1	75	<b>Phase VII</b>		
9520-0005	1	50	9312-0004	1	50
9530-0001	2	25	9312-0005	1	50
9530-0002	2	75	9312-0009	1	50
9530-0003	2	80	9514-0001	2	50
9530-0004	3	25	9514-0000	3	30
<b>Phase VI</b>			9312-0001	1	30
9304-0002	1	100	9312-0002	1	30
9506-0000	3	30	9312-0003	1	30
9522-0001	2	40	9312-0006	1	30
9522-0002	1	50	9312-0007	1	30
9522-0003	1	50	9312-0008	1	30
9522-0004	1	50	9312-0010	1	30
9522-0005	1	50	9313-0000	2	30
9522-0006	1	50	9302-0000	3	30
9527-0005	2	20	9306-0000	2	30
---	---	---	New Haul Road	2 <sup>a</sup>	80

<sup>a</sup>Asphalt used for new haul road was from pile in Survey Unit 9520-0001.

TABLE 2

**RANGE OF RADIONUCLIDE CONCENTRATIONS IN SOIL SAMPLES  
CONNECTICUT YANKEE HADDAM NECK PLANT  
HADDAM, CONNECTICUT**

Survey Units <sup>a</sup>	Range of Radionuclide Concentrations in Soil Samples (pCi/g)				
	Co-60	Cs-137	Sr-90	Tc-99	C-14
<b>Phase V</b>					
9520-0001	-0.01 to 0.02	0.00 <sup>b</sup> to 0.03	--- <sup>c</sup>	---	---
9520-0002	0.00 to 0.02	0.05 to 0.05	---	---	---
9520-0003	0.01 to 0.02	0.05 to 0.06	0.04 to 0.07	---	---
9520-0004	-0.01 to 0.02	0.01 to 0.09	---	---	---
9520-0005	0.02 to 0.04	0.01 to 0.32	---	---	---
9530-0001	-0.01 to 0.02	0.07 to 0.23	---	---	---
9530-0002	-0.01 to 0.02	0.03 to 0.10	---	---	---
9530-0003	0.00 to 0.03	0.12 to 0.21	---	---	---
9530-0004	-0.01 to 0.01	0.06 to 0.16	---	---	---
<b>Phase VI</b>					
9304-0002	0.00	0.02	---	---	---
9506-0000	-0.01 to 0.04	0.03 to 0.19	---	---	---
9522-0001	0.00 to 0.05	0.16 to 1.68	-0.01 to 0.25	---	---
9522-0002	-0.01 to 0.12	0.12 to 2.43	0.05 to 0.39	---	0.19 to 0.85
9522-0003	-0.01 to 0.05	0.09 to 0.61	-0.14 to 0.15	---	---
9522-0004	0.00 to 0.03	0.00 to 0.09	-0.19 to 0.33	---	---
9522-0005	-0.02 to 0.00	-0.01 to 0.09	---	---	---
9522-0006	-0.01 to 0.26	0.01 to 0.17	-0.11 to 0.33	---	---
9527-0005	-0.01 to 0.10	0.30 to 0.85	-0.14 to 0.03	---	---
9527-0006	0.00 to 0.10	0.16 to 2.66	0.00 to 0.34	---	---

TABLE 2 (continued)

RANGE OF RADIONUCLIDE CONCENTRATIONS IN SOIL SAMPLES  
CONNECTICUT YANKEE HADDAM NECK PLANT  
HADDAM, CONNECTICUT

Survey Units <sup>a</sup>	Range of Radionuclide Concentrations in Soil Samples (pCi/g)				
	Co-60	Cs-137	Sr-90	Tc-99	C-14
<b>Phase VII</b>					
9312-0004	0.00 to 0.06	0.02 to 0.16	---	---	---
9312-0005	0.00 to 0.01	0.01 to 0.07	---	-0.06 to 0.14	---
9312-0009	0.01 to 0.04	0.06 to 0.95	-0.20 to 0.01	---	---
9514-0001	0.00 to 0.04	0.01 to 0.14	-0.10 to -0.03	---	---

<sup>a</sup>Refer to Figures 3 through 25.

<sup>b</sup>Zero values due to rounding.

<sup>c</sup>Analysis not performed.

TABLE 3

**RADIONUCLIDE CONCENTRATIONS IN SOIL  
CONNECTICUT YANKEE HADDAM NECK PLANT  
HADDAM, CONNECTICUT**

Sample ID <sup>a</sup>	Class	Radionuclide Concentrations (pCi/g) <sup>b</sup>				
		Co-60	Cs-137	Sr-90	Tc-99	C-14
<b>Phase V</b>						
<b>Survey Unit 9520-0001</b>						
1698S078	2	0.02 ± 0.03 <sup>c</sup>	0.02 ± 0.02	--- <sup>d</sup>	---	---
1698S079	2	0.00 <sup>c</sup> ± 0.03	0.00 ± 0.02	---	---	---
1698S136	2	-0.01 ± 0.02	0.03 ± 0.02	---	---	---
1698S137	2	0.00 ± 0.01	0.00 ± 0.01	---	---	---
1698S138	2	-0.01 ± 0.02	0.02 ± 0.02	---	---	---
<b>Survey Unit 9520-0002</b>						
1698S074	2	0.02 ± 0.03	0.05 ± 0.02	---	---	---
1698S075	2	0.00 ± 0.02	0.05 ± 0.02	---	---	---
<b>Survey Unit 9520-0003</b>						
1698S076	2	0.02 ± 0.02	0.06 ± 0.03	0.04 ± 0.21	---	---
1698S077	2	0.01 ± 0.03	0.05 ± 0.02	0.07 ± 0.23	---	---
<b>Survey Unit 9520-0004</b>						
1698S048	1	0.02 ± 0.03	0.06 ± 0.03	---	---	---
1698S049	1	0.00 ± 0.01	0.01 ± 0.01	---	---	---
1698S050	1	-0.01 ± 0.02	0.04 ± 0.02	---	---	---
1698S051	1	0.01 ± 0.02	0.03 ± 0.02	---	---	---
1698S052	1	0.00 ± 0.02	0.07 ± 0.02	---	---	---
1698S053 <sup>f</sup>	1	0.01 ± 0.03	0.09 ± 0.04	---	---	---
<b>Survey Unit 9520-0005</b>						
1698S043	1	0.04 ± 0.03	0.32 ± 0.04	---	---	---
1698S044	1	0.04 ± 0.02	0.06 ± 0.02	---	---	---
1698S045	1	0.03 ± 0.02	0.12 ± 0.03	---	---	---
1698S046	1	0.04 ± 0.03	0.05 ± 0.03	---	---	---
1698S047	1	0.02 ± 0.02	0.01 ± 0.02	---	---	---

TABLE 3 (continued)

**RADIONUCLIDE CONCENTRATIONS IN SOIL  
CONNECTICUT YANKEE HADDAM NECK PLANT  
HADDAM, CONNECTICUT**

Sample ID <sup>a</sup>	Class	Radionuclide Concentrations (pCi/g) <sup>b</sup>				
		Co-60	Cs-137	Sr-90	Tc-99	C-14
<b>Survey Unit 9530-0001</b>						
1698S054	2	0.01 ± 0.03	0.07 ± 0.04	---	---	---
1698S055	2	-0.01 ± 0.02	0.12 ± 0.03	---	---	---
1698S056	2	0.02 ± 0.03	0.09 ± 0.04	---	---	---
1698S057	2	0.00 ± 0.03	0.23 ± 0.04	---	---	---
1698S058	2	-0.01 ± 0.02	0.10 ± 0.02	---	---	---
<b>Survey Unit 9530-0002</b>						
1698S059	2	-0.01 ± 0.03	0.03 ± 0.02	---	---	---
1698S060	2	0.00 ± 0.02	0.07 ± 0.03	---	---	---
1698S061	2	0.00 ± 0.02	0.10 ± 0.02	---	---	---
1698S062	2	0.02 ± 0.02	0.10 ± 0.03	---	---	---
1698S063	2	0.00 ± 0.02	0.08 ± 0.02	---	---	---
<b>Survey Unit 9530-0003</b>						
1698S064	2	0.01 ± 0.02	0.14 ± 0.03	---	---	---
1698S065	2	0.03 ± 0.03	0.21 ± 0.03	---	---	---
1698S066	2	0.00 ± 0.03	0.12 ± 0.03	---	---	---
1698S067	2	0.00 ± 0.03	0.19 ± 0.06	---	---	---
1698S068	2	0.01 ± 0.03	0.20 ± 0.06	---	---	---
<b>Survey Unit 9530-0004</b>						
1698S069	3	0.00 ± 0.03	0.14 ± 0.03	---	---	---
1698S070	3	0.01 ± 0.02	0.06 ± 0.03	---	---	---
1698S071	3	-0.01 ± 0.02	0.15 ± 0.03	---	---	---
1698S072	3	0.01 ± 0.03	0.16 ± 0.04	---	---	---
1698S073	3	-0.01 ± 0.03	0.10 ± 0.03	---	---	---

TABLE 3 (continued)

**RADIONUCLIDE CONCENTRATIONS IN SOIL  
CONNECTICUT YANKEE HADDAM NECK PLANT  
HADDAM, CONNECTICUT**

Sample ID <sup>a</sup>	Class	Radionuclide Concentrations (pCi/g) <sup>b</sup>				
		Co-60	Cs-137	Sr-90	Tc-99	C-14
<b>Phase VI</b>						
<b>Survey Unit 9304-0002</b>						
1698S135 <sup>f</sup>	1	0.00 ± 0.02	0.02 ± 0.02	---	---	---
<b>Survey Unit 9506-0000</b>						
1698S130	3	0.03 ± 0.03	0.11 ± 0.04	---	---	---
1698S131	3	-0.01 ± 0.02	0.03 ± 0.02	---	---	---
1698S132	3	0.04 ± 0.03	0.08 ± 0.04	---	---	---
1698S133	3	-0.01 ± 0.03	0.19 ± 0.04	---	---	---
1698S134	3	-0.01 ± 0.02	0.04 ± 0.02	---	---	---
<b>Survey Unit 9522-0001</b>						
1698S110	2	0.05 ± 0.04	1.68 ± 0.12	0.25 ± 0.25	---	---
1698S111	2	0.03 ± 0.03	0.85 ± 0.06	0.19 ± 0.23	---	---
1698S112	2	0.00 ± 0.02	0.17 ± 0.04	0.00 ± 0.22	---	---
1698S113	2	0.02 ± 0.02	0.23 ± 0.03	-0.01 ± 0.23	---	---
1698S114	2	0.00 ± 0.03	0.16 ± 0.05	0.06 ± 0.23	---	---
<b>Survey Unit 9522-0002</b>						
1698S125	1	0.07 ± 0.03	1.09 ± 0.09	0.25 ± 0.26	---	0.51 ± 0.38
1698S126	1	0.01 ± 0.03	0.69 ± 0.05	0.16 ± 0.24	---	0.41 ± 0.37
1698S127	1	-0.01 ± 0.03	0.15 ± 0.04	0.11 ± 0.26	---	0.19 ± 0.37
1698S128	1	0.00 ± 0.02	0.12 ± 0.03	0.05 ± 0.23	---	0.19 ± 0.37
1698S129	1	0.12 ± 0.06	2.43 ± 0.17	0.39 ± 0.24	---	0.85 ± 0.39
<b>Survey Unit 9522-0003</b>						
1698S115	1	0.05 ± 0.03	0.61 ± 0.05	-0.07 ± 0.23	---	---
1698S116	1	0.02 ± 0.03	0.24 ± 0.04	0.15 ± 0.25	---	---
1698S117	1	0.01 ± 0.03	0.31 ± 0.04	-0.02 ± 0.22	---	---
1698S118	1	-0.01 ± 0.02	0.09 ± 0.03	-0.14 ± 0.23	---	---
1698S119	1	0.04 ± 0.04	0.25 ± 0.05	-0.03 ± 0.20	---	---

TABLE 3 (continued)

**RADIONUCLIDE CONCENTRATIONS IN SOIL  
CONNECTICUT YANKEE HADDAM NECK PLANT  
HADDAM, CONNECTICUT**

Sample ID <sup>a</sup>	Class	Radionuclide Concentrations (pCi/g) <sup>b</sup>				
		Co-60	Cs-137	Sr-90	Tc-99	C-14
<b>Survey Unit 9522-0004</b>						
1698S120	1	0.00 ± 0.03	0.02 ± 0.03	-0.14 ± 0.21	---	---
1698S121	1	0.01 ± 0.03	0.00 ± 0.03	0.33 ± 0.24	---	---
1698S122	1	0.02 ± 0.02	0.04 ± 0.02	-0.16 ± 0.22	---	---
1698S123	1	0.01 ± 0.02	0.05 ± 0.03	-0.19 ± 0.22	---	---
1698S124	1	0.03 ± 0.02	0.09 ± 0.02	-0.03 ± 0.24	---	---
<b>Survey Unit 9522-0005</b>						
1698S100	1	-0.02 ± 0.02	0.02 ± 0.02	---	---	---
1698S101	1	0.00 ± 0.03	0.01 ± 0.02	---	---	---
1698S102	1	-0.01 ± 0.02	0.03 ± 0.04	---	---	---
1698S103	1	-0.01 ± 0.03	-0.01 ± 0.02	---	---	---
1698S104	1	0.00 ± 0.02	0.09 ± 0.02	---	---	---
<b>Survey Unit 9522-0006</b>						
698S105	1	-0.01 ± 0.02	0.02 ± 0.02	-0.02 ± 0.23	---	---
1698S106	1	0.00 ± 0.02	0.01 ± 0.02	0.24 ± 0.26	---	---
1698S107	1	0.01 ± 0.03	0.09 ± 0.03	-0.11 ± 0.23	---	---
1698S108	1	0.26 ± 0.05	0.09 ± 0.03	0.15 ± 0.24	---	---
1698S109	1	0.11 ± 0.05	0.17 ± 0.04	0.33 ± 0.23	---	---
<b>Survey Unit 9527-0005</b>						
1698S035	2	0.04 ± 0.03	0.45 ± 0.05	-0.07 ± 0.21	---	---
1698S036	2	0.10 ± 0.04	0.83 ± 0.06	-0.14 ± 0.21	---	---
1698S037	2	-0.01 ± 0.02	0.30 ± 0.03	0.00 ± 0.23	---	---
1698S038	2	0.05 ± 0.03	0.85 ± 0.06	-0.03 ± 0.23	---	---
1698S039	2	0.05 ± 0.03	0.32 ± 0.04	0.03 ± 0.23	---	---

TABLE 3 (continued)

**RADIONUCLIDE CONCENTRATIONS IN SOIL  
CONNECTICUT YANKEE HADDAM NECK PLANT  
HADDAM, CONNECTICUT**

Sample ID <sup>a</sup>	Class	Radionuclide Concentrations (pCi/g) <sup>b</sup>				
		Co-60	Cs-137	Sr-90	Tc-99	C-14
<b>Survey Unit 9527-0006</b>						
1698S040	1	0.03 ± 0.03	1.44 ± 0.09	0.02 ± 0.23	---	---
1698S041	1	0.00 ± 0.02	0.16 ± 0.03	0.00 ± 0.25	---	---
1698S042 <sup>f</sup>	1	0.10 ± 0.04	2.66 ± 0.15	0.34 ± 0.25	---	---
<b>Phase VII</b>						
<b>Survey Unit 9312-0004</b>						
1698S090	1	0.01 ± 0.02	0.07 ± 0.03	---	---	---
1698S091	1	0.00 ± 0.02	0.02 ± 0.02	---	---	---
1698S092	1	0.03 ± 0.03	0.08 ± 0.04	---	---	---
1698S093	1	0.00 ± 0.02	0.03 ± 0.03	---	---	---
1698S094	1	0.06 ± 0.03	0.16 ± 0.05	---	---	---
<b>Survey Unit 9312-0005</b>						
1698S085	1	0.01 ± 0.02	0.01 ± 0.02	---	-0.06 ± 0.15	---
1698S086	1	0.00 ± 0.02	0.01 ± 0.01	---	0.03 ± 0.15	---
1698S087	1	0.01 ± 0.02	0.02 ± 0.02	---	0.09 ± 0.15	---
1698S088	1	0.00 ± 0.02	0.01 ± 0.02	---	0.09 ± 0.15	---
1698S089	1	0.01 ± 0.03	0.07 ± 0.03	---	0.14 ± 0.15	---
<b>Survey Unit 9312-0009</b>						
1698S095	1	0.01 ± 0.02	0.21 ± 0.03	0.00 ± 0.26	---	---
1698S096	1	0.02 ± 0.02	0.95 ± 0.06	0.01 ± 0.25	---	---
1698S097	1	0.04 ± 0.02	0.07 ± 0.02	-0.20 ± 0.21	---	---
1698S098	1	0.04 ± 0.02	0.42 ± 0.04	-0.06 ± 0.21	---	---
1698S099	1	0.02 ± 0.03	0.06 ± 0.03	-0.09 ± 0.21	---	---
<b>Survey Unit 9514-0001</b>						
1698S080	2	0.00 ± 0.03	0.14 ± 0.03	-0.05 ± 0.23	---	---
1698S081	2	0.00 ± 0.01	0.01 ± 0.01	-0.06 ± 0.23	---	---

TABLE 3 (continued)

RADIONUCLIDE CONCENTRATIONS IN SOIL  
CONNECTICUT YANKEE HADDAM NECK PLANT  
HADDAM, CONNECTICUT

Sample ID <sup>a</sup>	Class	Radionuclide Concentrations (pCi/g) <sup>b</sup>				
		Co-60	Cs-137	Sr-90	Tc-99	C-14
<b>Survey Unit 9514-0001 continued</b>						
1698S082	2	0.01 ± 0.02	0.05 ± 0.02	-0.03 ± 0.23	---	---
1698S083	2	0.00 ± 0.02	0.03 ± 0.02	-0.03 ± 0.24	---	---
1698S084	2	0.04 ± 0.03	0.06 ± 0.02	-0.10 ± 0.22	---	---

<sup>a</sup>Refer to Figures 3 through 25.

<sup>b</sup>The LTP Base Case DCGL values are 3.81 pCi/g for Co-60, 7.91 pCi/g for Cs-137, 1.55 pCi/g for Sr-90, 12.6 pCi/g for Tc-99 and 5.66 pCi/g for C-14. The FSS Operational DCGL values are 2.59 pCi/g for Co-60, 5.38 pCi/g for Cs-137, 1.05 pCi/g for Sr-90, 8.57 pCi/g for Tc-99 and 3.85 pCi/g for C-14.

<sup>c</sup>Uncertainties represent the 95% confidence level, based on total propagated uncertainties.

<sup>d</sup>Analysis not performed.

<sup>e</sup>Zero values due to rounding.

<sup>f</sup>Biased sample location.

## REFERENCES

Connecticut Yankee Atomic Power Company (CYAPCO). License Termination Plan, Connecticut Yankee Decommissioning Project, Haddam Neck Plant, Revision 3. Haddam, Connecticut; August 2005.

Connecticut Yankee Atomic Power Company. Final Status Survey Final Report—Phase V. Connecticut Yankee Decommissioning Project, Haddam Neck Plant. Haddam, Connecticut; December 2006.

Connecticut Yankee Atomic Power Company. Final Status Survey Final Report—Phase VI. Connecticut Yankee Decommissioning Project, Haddam Neck Plant. Haddam, Connecticut; February 2007a.

Connecticut Yankee Atomic Power Company. Final Status Survey Final Report—Phase VII. Connecticut Yankee Decommissioning Project, Haddam Neck Plant. Haddam, Connecticut; May 2007b.

Oak Ridge Institute for Science and Education (ORISE). Survey Procedures Manual for the Independent Environmental Assessment and Verification Program. Oak Ridge, Tennessee; August 7, 2006a.

Oak Ridge Institute for Science and Education. Confirmatory Survey Results for Survey Units 9304, 9527, and 9530 at the Connecticut Yankee Haddam Neck Plant, Haddam, Connecticut [Docket No. 50-0213; RFTA No. 06-006]. Oak Ridge, Tennessee; September 25, 2006b.

Oak Ridge Institute for Science and Education. Electronic Mail from W. Adams (ORISE) to T. Smith, et. al. (NRC), Subject: 2007-04-20 ORISE Review of Surrogate Ratios Used by CY for Phase VI Survey Units. Oak Ridge, Tennessee; April 20, 2007a.

Oak Ridge Institute for Science and Education. Proposed Final Confirmatory Survey Plan for the Remaining Open Land Area Survey Units, Connecticut Yankee Decommissioning Project, Haddam, Connecticut [Docket No. 50-0213; RFTA No. 06-006]. Oak Ridge, Tennessee; April 17, 2007b.

Oak Ridge Institute for Science and Education. Quality Program Manual for the Independent Environmental Assessment and Verification Program. Oak Ridge, Tennessee; March 1, 2007c.

Oak Ridge Institute for Science and Education. Laboratory Procedures Manual for the Environmental Survey and Site Assessment Program. Oak Ridge, Tennessee; June 15, 2007d.