Prime Farmland Evaluation
For
Seven Oaks Land and Minerals, LLC
Dekalb County, Alabama

Prepared by:

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Alabama Professional Soil Classifiers # 71

June 6, 2012

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Introduction

Seven Oaks Land and Minerals, LLC is planning to surface area mine several acres of land in Dekalb County, Alabama. The project site is identified as the Thunder Oaks Mine for company records and other inferences. The soils maps prepared by The Natural Resource Conservation Service indicate there are several acres of prime farmland within the planned project area. The soils maps are very helpful in planning and identifying areas of mapped prime farmland. However, for the successful reclamation of the prime farmland, additional site specific information is generally requested by mine operators. This is basically a “High Intensity Soil Survey” performed by a Registered Professional Soils Classifier.

This study/prime farmland site evaluation was requested by Seven Oaks Land and Minerals, LLC of Huntsville, Alabama. The property is located in Sections 2, 3, 4, 10, & 11, Township 6 South, Range 8 East, in Dekalb County, Alabama.

Prime farmland is a unique and valuable natural resource that is essential for the production of food, fiber and other substances necessary to sustain life. This distinctive group of soils have been identified and mapped in several counties in Alabama. Because of their special qualities and limited acres, these soils are being protected from conversion to other uses, when possible. By definition, prime farmland is “land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber and other oilseed crops and is available for these uses. It has the combination of soil properties, growing season, and moisture supply needed to produce sustainable high yields of crops in an economic manner if it is treated and managed according to acceptable farming methods". Also, for land areas designated as “Prime Farmland”, consideration must be given to land use, frequency of flooding, irrigation, water table and wind erodibility. Prime farmland areas have few or no rocks.

Rational

The soil borings/observations data were analyzed to determine the consistency in soil properties when considering prime farmland restoration. Some soil delineation boundaries were adjusted because of soil slope, drainage, total soil depth and other soil properties identified as prime farmland criteria. High consideration is given to soil depth to hard rock, the percent of exposed sandstone rock (rock outcrop), and the texture of the surface/subsoil horizons. The best and most consistent soil properties were delineated into a soil unit identified as an "Area". The revised soils maps, data for average surface thickness and dominant texture of the surface is presented in this document. The data for the average subsoil thickness, dominant texture of the subsoil, and detailed soil profile descriptions are contained in this document as well. The table below lists Prime Farmland map units identified and described during this study.

Current Trend

Several thousand acres of highly productive agricultural land is being converted to other land uses each year. This includes "Prime Farmland". If this trend continues, this nation's viable land base used for the production of food and fiber will be severely reduced beyond recovery. However, many conservation groups, individual landowners, and regulatory agencies are committed to the conservation and restoration of the nation's land base to the highest productivity level as possible. This includes the Alabama Surface Mining Commission and The Natural Resource Conservation Service.

Project Overview

Site Description

This project area is located in a rural area of the county north of Rainsville, Alabama. The number of households in the area is very low (low density population). The landscape is undulating to hilly with a few steep side slopes immediately adjacent to drainageways.

The major land use in the area, including the project site, is pasture land. Hay crops are harvested from some areas of the pasture land where low intensity grazing practices are applied. Additionally, some fields are site prepared/tilled and utilized for the production of corn. There are small areas of un-managed hardwood forest mainly on slopes and along drainageways.

Geology

The project site is located near the center of the county. The physiographic region is mainly the Appalachian Plateau province. The geologic unit is the Pottsville Formation of the Appalachian Plateau. The primary rock in the area is sandstone.

Soil

The soils in the area are formed in coarse material weathered from the sandstone parent material. The surface and subsurface layers of soil are dominated by coarse and fine sand. The textures are sandy loam and sandy clay loam on the uplands. Loam soil textures are also found along drainageways and in depressional areas. The prime farmland soils are shallow to moderately deep with rock outcrop in many areas identified as “Prime Farmland”. The depth to sandstone rock is highly variable in these “Prime Farmland” soil areas. They are well drained on the upland and moderately to somewhat poorly drained along the narrow drainageways and depressional areas. Also, there are several acres of previously mined soil areas within the project boundary. These areas have been graded, contoured to manageable slopes, and vegetated to grasses and/or trees. There are ponded areas within the reclaimed site.

The dominant soils in the area are identified as the Hartsells soils on the uplands and the Barbourville-Cotaco soils along the small drainageways and depressional areas.

Drainage

This proposed mining project site, located within the Tennessee River Basin, is near the center of the county. The landscape is undulating and hilly. Drainage flow is southeast into Wolf Branch and other un-named tributaries. These drainage courses flow into Bengis Creek which flows into Town Creek. .

There are several linear feet of intermittent and ephemeral drainage courses identified within the project boundary. These aquatic features are well defined and have typical characteristics associated with each stream type. The identifying characteristics include appropriate watershed acreage, bed & bank properties, flow regime, sinuosity, riffle/pool sequence, and etc.

Methods

Several soil observations were made throughout the subject property or study area primarily in the Prime Farmland (USDA-NRCS) areas. Observations were made in other major soil delineations to verify the other soil map units within the project boundary. The observation points were taken across the identified prime farmland map unit and were even spaced on a near grid pattern. Each point was located and recorded using a hand held Garmin GPS unit. This method is likely to capture variability and eliminate any bias in the study process. The upper part of the soil profile was excavated to a depth of approximately sixteen to twenty inches using a sharp shooter equivalent shovel. Soil properties (soil color, texture, structure, porosity and horizon thickness) and characteristics were observed and recorded. A soil auger was used to bore the lower part of the soil profile to a depth of 55 inches or to the parent rock. Also, Prime Farmland Soil boundaries were observed on-site. Where necessary, the boundaries were identified and relocated via visual observation. Soil map unit boundaries were identified and relocated based on the topography, land slope of the area, soil depth to hard rock in combination with the percent of exposed sandstone rock (rock outcrop), and the texture of the surface/ subsoil horizons. The new boundary locations were marked using a Garmin GPS unit and placed on aerial photos with ArcGis. The Prime Farmland observation areas are map

units An - Apison loam, Cl – Cotaco/Barbourville loam, Cn – Crossville loam, Hc – Hartsells fine sandy loam, He – Hartsells fine sandy loam, and Jc – Johnsburg loam, on the USDA-NRCS Soils map. Soil boring locations are numbered on the aerial photograph contained in this document.

Findings

The Prime Farmland soils areas mapped (USDA) in the project area were identified. Soil borings (data & observations) were taken within each map unit. The soils mapping is consistent with Order 2 soil survey criteria and there were inclusions within some mapped areas. The soils listed below are considered Prime Farmland under the USDA-NRCS Standards and Criteria.

Table 1. Soil Map Unit Legend.

An – Apison loam, eroded, undulating

Cl – Cotaco-Barbourville loams

Cn – Crossville loam, undulating

Hc – Hartsells fine sandy loam, eroded, undulating

He – Hartsells fine sandy loam eroded, undulating, shallow

Jc – Johnsburg loam

Results

The soil borings/observations data were analyzed to determine the consistency in soil properties when considering prime farmland restoration. Some soil delineation boundaries were adjusted and/or changed because of soil slope, drainage, total soil depth and other soil properties identified as prime farmland criteria. High consideration is given to soil depth to hard rock in combination with the percent of exposed sandstone rock (rock outcrop), and the texture of the surface/subsoil horizons. The best and most consistent soil properties were delineated into a soil unit identified as an “Area” The

revised soils maps, data for average surface thickness /dominant texture of the surface is presented, and data for the average subsoil thickness/dominant texture of the subsoil, and detailed soil profile descriptions are contained in this document. The table below lists Prime Farmland map units identified and described during this study.

Table 2. Soil Map Unit Legend.

An – Apison loam, eroded, undulating

Cl – Cotaco-Barbourville loams

Cn – Crossville loam, undulating

Hc – Hartsells fine sandy loam, eroded, undulating

HcS – Hartsells fine sandy loam, eroded, undulating, shallow

He – Hartsells fine sandy loam eroded, undulating, shallow

Jc – Johnsburg loam

Soil Descriptions

The following is a description of the Prime Farmland Soils within the proposed project area. The primary data was obtained from soil borings and recorded on-site. Additional information was obtained for the USDA/NRCS Soils Data Mart, USDA/NRCS Web Soil Survey and the USDA/NRCS Published Soil Survey for Dekalb County, Alabama.

(An) Apison loam, eroded undulating, eroded, undulating

This map unit consists of the Apison soil series. This soil is formed in parent material weathered from interlayered shale, siltstone and sandstone. The landscape, where these soils are mapped, is gently sloping and undulating. These soils are moderately deep, well drained and have moderate permeability. The available moisture for plant growth in the root zone is moderate. The organic matter content in the surface layer is about 1 percent. Unless limed, it is very strongly acidic throughout.

A representative profile of the Apison soil series

Ap – 0 to 6 inches: dark brown (10YR 4/3) loam; weak fine granular structure; very friable; many medium and fine roots; strongly acid; clear wavy boundary.

Bt1 – 6 to 20 inches; yellowish brown (10YR 5/6) clay loam; weak fine subangular blocky structure; friable; few medium roots; few coarse fragments; strongly acid; gradual wavy boundary.

Bt2 – 20 to 40 inches; yellowish brown (10YR 5/4) clay loam; weak medium subangular blocky structure; firm; few medium roots; few coarse fragments; strongly acidic; gradual wavy boundary.

BC – 40 to 46 inches; yellowish red (5YR 5/6) clay loam; weak medium subangular blocky structure; firm; few coarse fragments; strongly acid; gradual wavy boundary.

Cr – 46 inches; sandstone and siltstone mixed with shale; depth to this horizon is variable

Most of the area of this soil has been cleared and used for pasture, row crops or hay. This land use practice is likely to continue well into the future. However, these soils are suitable for the production of small grain and timber. The erosion hazard is slight to moderate. Conservation practices may be needed to help control erosion and reduce runoff. When tilled, these soils are easily cultivated and respond well to appropriate management. The rooting zone is moderately deep. Plants roots can penetrate the subsoil to obtain moisture and nutrients that are essential for good plant growth. These soils can be used for row crops each year if appropriate conservation practices are employed and sustained.

Potential yield for crops grown on the Apison soils

Grass clover grazed pasture	8 AUM
Soybean	30 bu.
Cotton	800 lbs. lint
Corn	74 bu.

Potential yield for trees grown on the Apison soils

	Site Index	Volume of wood fiber/Cu ft/ac
Shortleaf pine	71	114
Loblolly pine	80	114
Virginia pine	70	114
Trees to plant	Loblolly pine, Yellow Poplar	

(Cl) Cotaco loam

This map unit consists of the Cotaco and Barbourville soil series. These soils are formed in local alluvium from adjacent upland areas. The landscapes, where these soils are mapped are very narrow floodplain areas along ephemeral drainage courses. The Cotaco soil is deep, moderately well to somewhat poorly drained with moderate permeability. The available moisture for plant growth in the root zone is moderate. Organic matter content in the surface layer is about 1 percent. Unless limed, it is very strongly acidic throughout.

A representative profile of the Cotaco soil series

Ap – 0 to 6 inches: dark brown (10YR 4/3) loam; weak medium granular structure; very friable; many medium and fine roots; strongly acidic; clear wavy boundary.

Bt1 – 6 to 20 inches; brown (10YR 5/3) loam; weak medium subangular blocky structure; very friable; few medium roots; few coarse fragments; strongly acidic; gradual wavy boundary.

Bt2– 20 to 36 inches; light olive brown (10YR 5/2) loam; common distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; firm; few medium roots; few coarse fragments; strongly acidic; gradual wavy boundary.

Bt2– 36 to 50 inches; light olive brown (10YR 5/2) loam; many distinct yellowish brown (10YR 5/6) and few medium distinct yellowish brown (10YR 6/8) mottles; weak fine subangular blocky structure; firm; few medium roots; few coarse fragments; strongly acidic; gradual wavy boundary.

Cr –50 inches; interlayered shale, sandstone and siltstone

The majority of this soil area occurs along small ephemeral drainage courses and depressional areas adjacent to uplands. Most of these areas are used for crop production of pasture land. This land use practice is likely to continue well into the future. The erosion hazard is slight. The Cotaco soils are wet during winter and early spring. The wetness of these soils is a management concern which may be addressed by the installation of surface and/or subsurface drainage systems. When tilled, these soils are easily cultivated and respond well to appropriate management. The rooting zone is deep where drained. Plant roots can penetrate the subsoil to obtain moisture and nutrients for good plant growth. These soils can be used for row crops each year if appropriate conservation practices are employed and sustained.

Potential yield for crops grown on the Cotaco soils

Fescue grazed pasture	8 AUM
Soybean	40 bu.
Cotton	750 lbs. lint
Corn	110 bu.

Potential yield for trees grown on the Cotaco soils

	Site Index	Volume of wood fiber/Cu ft/ac
Eastern cottonwood	105	143
Loblolly pine	100	129
Sweetgum	100	143
Trees to plant	Eastern cottonwood, loblolly pine Yellow poplar	

(Cn) Crossville loam, undulating

This map unit consists of the Crossville soil series. This soil is formed in parent material weathered from acid sandstone. The landscape, where these soils are mapped are gently sloping and undulating. The soil is moderately deep, well drained and maintains moderate permeability. The available moisture for plant growth in the root zone is moderate. The organic matter content in the surface layer is, about 1 percent. Unless limed, it is very strongly acidic throughout.

A representative profile of the Crossville soil series

Ap – 0 to 6 inches: brown (10YR 5/3) loam; weak fine granular structure; very friable; many medium and fine roots; strongly acidic; clear wavy boundary.

Bw1 – 6 to 15 inches; yellowish red (5YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable; few medium roots; few coarse fragments; strongly acidic; gradual wavy boundary.

Bw2 – 15 to 24 inches; yellowish red (10YR 5/6) sandy loam; common medium distinct light yellowish brown (10YR 6/4) mottles; weak medium subangular blocky structure; very friable; few medium roots; few coarse fragments; strongly acidic; gradual wavy boundary.

R – 24 inches, sandstone parent rock, depth to this horizon is variable

Some of these soil areas are used for pasture land. Some small areas are used for hay crops. This land use practice is likely to continue well into the future. The rooting zone is shallow.

Potential yield for crops grown on the Crossville soils

Grass hay	4.0 tons/ac
Soybean	30 bu.
Cotton	800 lbs. lint
Corn	75 bu.

Potential yield for trees grown on the Crossville soils

	Site Index	Volume of wood fiber/Cu ft/ac
Shortleaf pine	80	129
Loblolly pine	89	129
Virginia pine	80	114
Sweetgum	90	100
Yellow poplar		
Trees to manage	Loblolly pine, Yellow Poplar, Sweetgum, Shortleaf pine, Virginia pine	

(Hc) Hartsells fine sandy loam, eroded, undulating

This map unit consists of the Hartsells soil series. These soils are formed in material weathered from acid sandstone. The landscape, where these soils are mapped are gently sloping and undulating. The soils are moderately deep, well drained and maintain moderate permeability. The available moisture for plant growth in the root zone is moderate. The organic matter content in the surface layer is about 1 percent. Unless limed, it is very strongly acidic throughout.

A representative profile of the Hartsells soil series

Ap – 0 to 7 inches: dark brown (10YR 4/3) sandy loam; weak fine granular structure; very friable; many medium and fine roots; strongly acidic; clear wavy boundary.

Bt1 – 7 to 20 inches; yellowish brown (10YR 5/4) sandy clay loam; weak fine subangular blocky structure; friable; few medium roots; few coarse fragments; strongly acidic; gradual wavy boundary.

Bt2 – 20 to 36 inches; yellowish brown (10YR 5/6) sandy clay loam; common medium distinct light yellowish brown (10YR 6/4) mottles; weak medium subangular blocky structure; friable; few medium roots; few coarse fragments; strongly acidic; gradual wavy boundary.

R – 36 inches; hard sandstone, depth to this layer is very variable

Most areas of this soil has been cleared and used for pasture, row crops or hay harvest. This land use practice is likely to continue well into the future. The erosion hazard is slight to moderate. Conservation practices may be needed to help control erosion and reduce runoff. When tilled, these soils are easily cultivated and respond well to appropriate management. The rooting zone is moderately deep. Plant roots can penetrate the subsoil to obtain moisture and nutrients for good plant growth. These soils can be used for row crops each year if appropriate conservation practices are employed and sustained.

Potential yield for crops grown on the Hartsells soils

Tall fescue	8.0 AUM
Soybean	35 bu.
Cotton	650 lbs. lint
Corn	75 bu.

Potential yield for trees grown on the Hartsells soils

	Site Index	Volume of wood fiber/Cu ft/ac
Shortleaf pine	76	114
Loblolly pine	81	114
Southern red oak	75	57
Trees to manage	Loblolly pine, Slash pine	

(HcS) Hartsells fine sandy loam, eroded, undulating, shallow

This map unit consists of the Hartsells soil series. These soils are formed in material weathered from acid sandstone. The landscape, where these soils are mapped are gently sloping and undulating. The soils are moderately shallow to sandstone rock; they are well drained and maintain moderate permeability. The available moisture for plant growth in the root zone is moderately low. The organic matter content in the surface layer is about 1 percent. Unless limed, it is very strongly acid throughout.

A representative profile of the Hartsells soil series

Ap – 0 to 6 inches: dark brown (10YR 4/3) sandy loam; weak fine granular structure; very friable; many medium and fine roots; strongly acidic; clear wavy boundary.

Bt1 – 6 to 22 inches; yellowish brown (10YR 5/4) sandy clay loam; weak fine subangular blocky structure; friable; few medium roots; few coarse fragments; strongly acidic; gradual wavy boundary.

R –22 inches; hard sandstone, depth to this layer is very variable

Most areas of this soil has been cleared and used for pasture, row crops or hay harvest. This land use practice is likely to continue well into the future. The erosion hazard is slight to moderate. Conservation practices may be needed to help control erosion and reduce runoff. When tilled, these soils are easily cultivated and respond well to appropriate management. The rooting zone is moderately deep. Plant roots can penetrate the subsoil to obtain moisture and nutrients for good plant growth. These soils can be used for row crops each year if appropriate conservation practices are employed and sustained.

Potential yield for crops grown on the Hartsells soils

Tall fescue	8.0 AUM
Soybean	35 bu.
Cotton	650 lbs. lint
Corn	75 bu.

Potential yield for trees grown on the Hartsells soils

	Site Index	Volume of wood fiber/Cu ft/ac
Shortleaf pine	76	114
Loblolly pine	81	114
Southern red oak	75	57
Trees to manage	Loblolly pine, Slash pine	

(Jc) Johnsburg loam

This map unit consists of the Johnsburg soil series. These soils are formed in local alluvium from adjacent upland areas. The landscapes, where these soils are mapped are undulating with and slopes are gentle. The Johnsburg soil is deep, somewhat poorly drained and maintains moderate permeability. The available moisture for plant growth in the root zone is moderate. Organic matter content in the surface layer is about 1 percent. Unless limed, it is very strongly acidic throughout.

A representative profile of the Johnsburg soil series

Ap – 0 to 8 inches: dark brown (10YR 4/3) loam; weak medium granular structure; very friable; many medium and fine roots; strongly acidic; clear wavy boundary.

Bt1 – 8 to 23 inches; yellowish brown (10YR 5/6) sandy clay loam; weak medium subangular blocky structure; friable; few medium roots; few coarse fragments; strongly acidic; gradual wavy boundary.

Bt2– 23 to 36 inches; yellowish brown (10YR 5/4) sandy clay loam; few medium distinct brownish yellow (10YR 6/8) and common medium distinct light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; firm; few medium roots; few coarse fragments; strongly acidic; gradual wavy boundary.

Bt3– 36 to 49 inches; yellowish brown (10YR 5/4) clay loam; few medium distinct brownish yellow (10YR 6/8) and common medium distinct light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; firm; few medium roots; few coarse fragments; strongly acidic; gradual wavy boundary.

Cr –49 inches; interlayered shale, sandstone and siltstone

This soil area occurs on undulating uplands. Slopes are gentle. They are used for hay production of pasture land. This land use practice is likely to continue well into the future. The erosion hazard is slight. The Johnsburg soils are wet during winter and early spring. The wetness of these soils is a management concern which may be addressed by the installation of surface and/or subsurface drainage systems. When tilled, these soils are easily cultivated and respond well to appropriate management. The rooting zone is deep. Plant roots can penetrate the subsoil to obtain moisture and nutrients for good plant growth.

Potential yield for crops grown on the Cotaco soils

Fescue grazed pasture	8 AUM
Soybean	40 bu.
Cotton	750 lbs. lint
Corn	110 bu.

Potential yield for trees grown on the Cotaco soils

	Site Index	Volume of wood fiber/Cu ft/ac
Eastern cottonwood	105	143
Loblolly pine	100	129
Sweetgum	100	143
Trees to plant	Eastern cottonwood, loblolly pine Yellow poplar	

Reference Documents

The following documents were used as “Guidance Documents” for this study:

Natural Resource Conservation Service, National Soil Survey Handbook Part 622.

Field Office Technical Guide, Dekalb County, Alabama (USDA-NRCS).

Geological Survey of Alabama.

Soil Survey of Dekalb County, Alabama - USDA-NRCS.

Keys to Soil Taxonomy, Agric. Handbook Number 436. Second edition, Soil Survey Staff, USDA-NRCS, 1999.

Official Soil Series Descriptions. http://soils.usda.gov.

Alabama. Surface Mine Commission Technical Document.

Summary of Field Analysis

Field Id	Area Id	Map Unit Id	Crop History	Surface Thickness to Replace (Inches)	Subsoil Thickness to Replace (Inches)	Total soil to replace (A & B)	Acres
1	1	Hc	Hayland	7	35	42	9.12
	2	HcS	Hay land	6	19	25	9.34
	3	He	Hay land	5	25	30	1.45**
	4 & 6	Cl	Hay land	6	42	48	1.94**
	5	Hc	Hay land	6	36	42	0.43**
2	1	Hc	Hay and	7	38	45	8.63
	2	Hc	Hay land	7	28	35	1.51
	3	Hc	Hay land	7	33	40	2.97
	4	Hc	Hay land	6	36	42	1.47
	6	Cl	Hay land	8	40	48	0.31
3	1 & 3	Hc	Hay land	6	27	33	3.74**
	2	Jc	Hay land	8	27	35	3.23
4	1	HcS	Hay land	6	19	25	2.00**
	2	Hc	Hay land	8	27	35	2.20**
	3 & 5	Cn	Hay land	7	16	23	5.19**
	4	He	Hay land	7	26	33	5.06**
	7	He	Hay land	7	35	42	2.36

Summary of Field Analysis

Field Id	Area Id	Map Unit Id	Crop History	Surface Thickness to Replace (Inches)	Subsoil Thickness to Replace (Inches)	Total soil to replace (A & B)	Acres
5	1	Hc	Pasture	8	40	48	3.5
	2	Hc	Pasture	6	33	39	4.4
6	1	HcS	Row crop	7	17	24	1.5
	2	Hc	Row crop	7	38	45	9.3
	3	He	Woodland				
	4	Hc	Pasture	7	38	45	1.00
	5	An	Row crop	7	25	32	2.98**
	6	An	Row crop	7	38	45	1.25
	7	An	Woodland				
	8	An	Pasture	6	23	29	2.55
	9 & 12	Cl	Row crop	7	25	32	0.6
	10	Cl	Woodland				
	11	Cl	Woodland				
							0.16
	13	Cl	Woodland				
	14	Cl	Pasture	7	25	32	0.21
	15	Cl	Woodland				
7	1	Hc	Hay land	6	26	32	3.9**
	2	Hc	Hay land	6	22	28	1.46**
	3	Hc	Hay land	6	25	31	3.73
	4	He	Hay land	6	21	27	1.92**
	5	Cl	Hay land	6	41	47	0.56
	6		Woodland				
	7	Cl	Pasture	6	41	47	1.28

Summary of Field Analysis

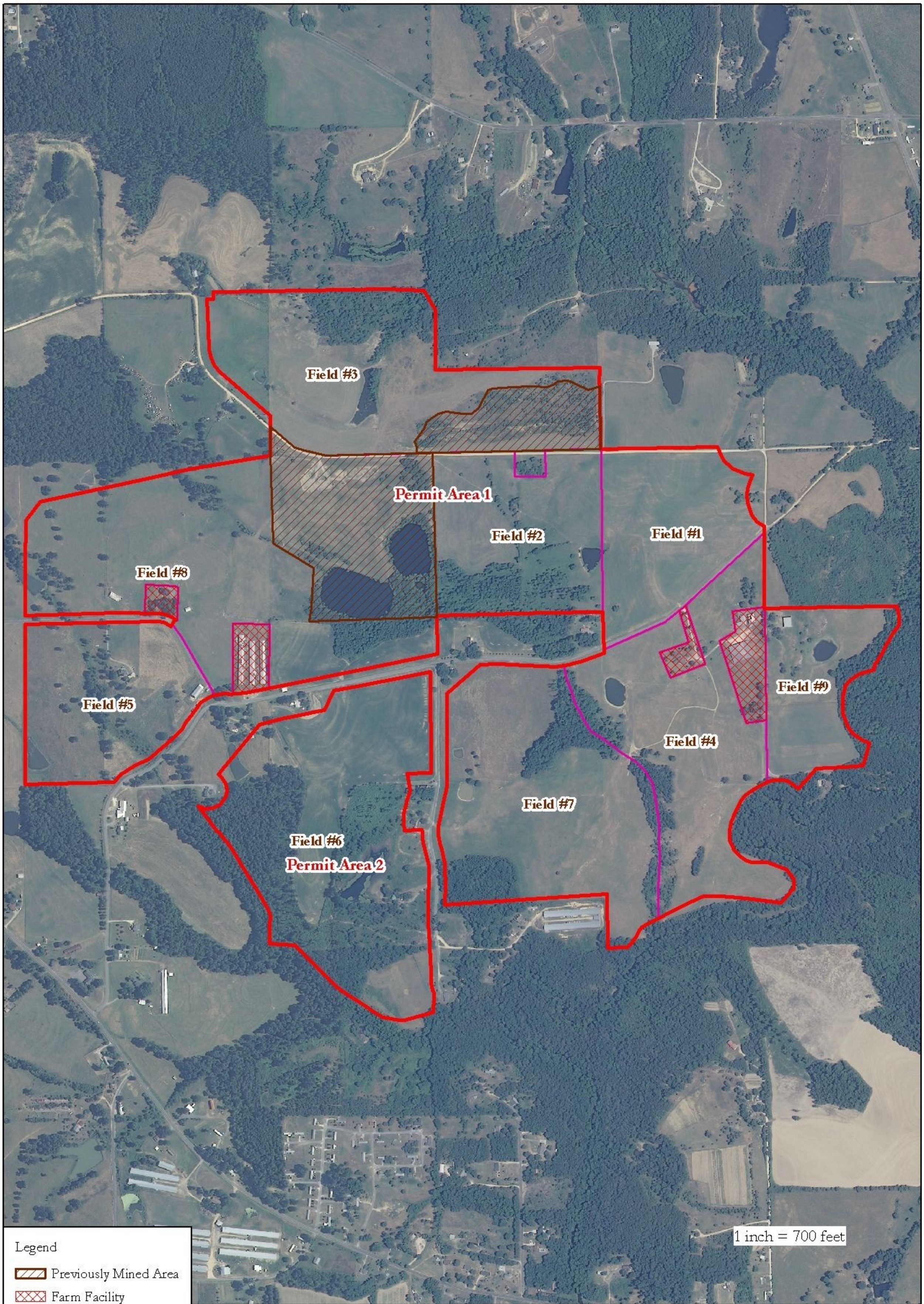
Field Id	Area Id	Map Unit Id	Crop History	Surface Thickness to Replace (Inches)	Subsoil Thickness to Replace (Inches)	Total soil to replace (A & B)	Acres
8	1	Hc	Cropland	7	36	43	4.29
	2	Hc	Cropland	6	29	35	0.77
	3	Cl	Cropland	8	39	47	0.5
	4	Hc	Pasture	8	40	48	5.04
	5	Hc	Pasture	8	38	46	13.67
	6	Hc	Pasture	8	14	22	2.49
	7	He	Pasture	7	33	40	1.03
9	1	Hc	Hay land	6	29	35	5.84
	2	Hc	Hay land	6	28	34	1.24
	3	Hc	Pasture	6	29	35	0.5
	4 & 5	Hc	Hay Land	6	29	35	0.69

** The field aces were adjusted lower to compensate for 15% inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

Alabama
Dekalb County
March 2012

Seven Oaks Land And Mineral LLC
Thunder Oaks Mine
Field Area Map

Sylvania DOQ
S2 - 4, 10, 11 T6S R8E



Legend
- Previously Mined Area
- Farm Facility
- Permit Area
- Field Area

0 330 660 1,320 1,980
Feet

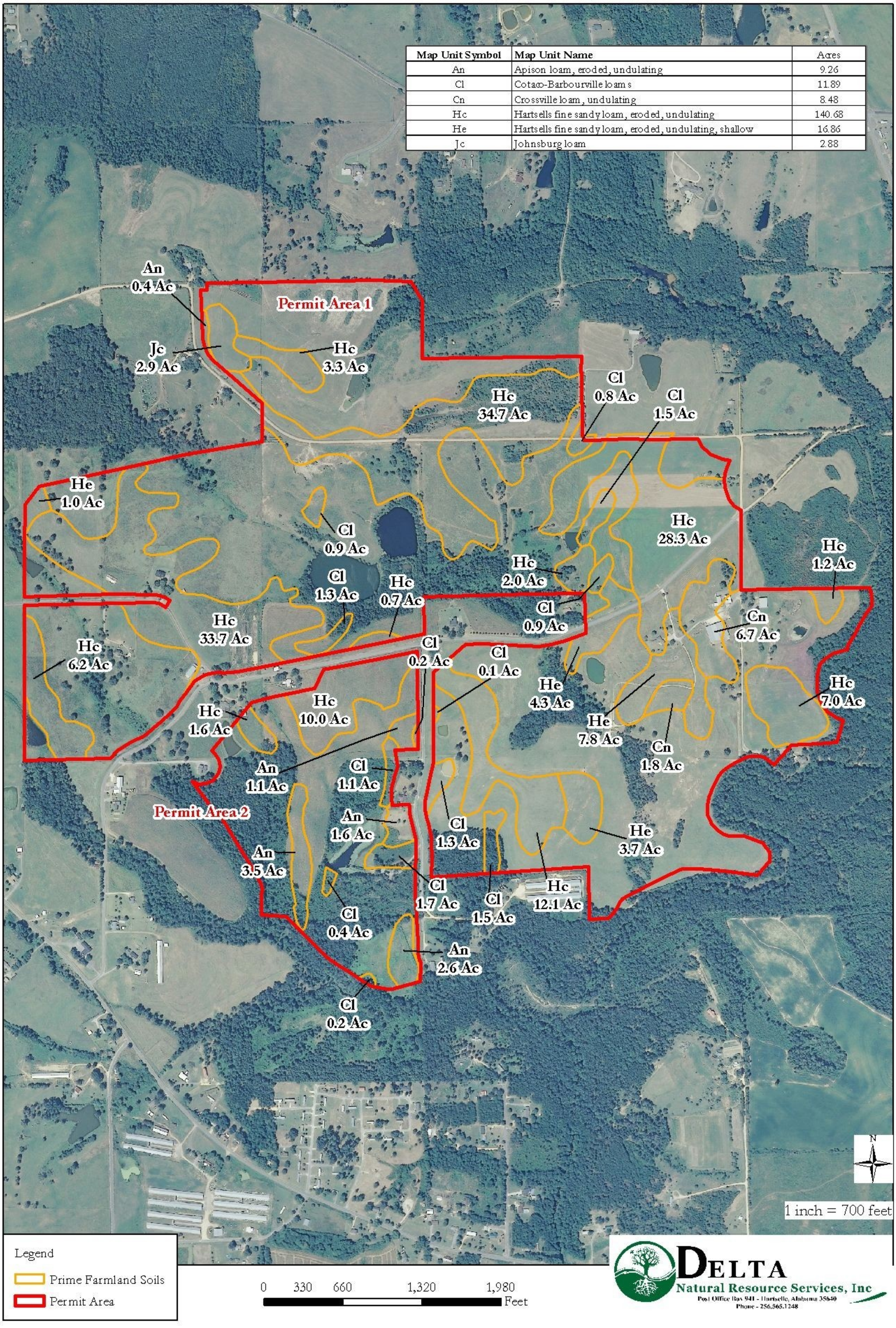
N

Alabama
Dekalb County
April 2012

Seven Oaks Land And Mineral LLC
Thunder Oaks Mine
Prime Farmland Soils Map

Sylvania DOQ
S2 - 4, 10, 11 T6S R8E

Map Unit Symbol	Map Unit Name	Acres
An	Apison loam, eroded, undulating	9.26
Cl	Cotaco-Barbourville loams	11.89
Cn	Crossville loam, undulating	8.48
Hc	Hartsells fine sandy loam, eroded, undulating	140.68
He	Hartsells fine sandy loam, eroded, undulating, shallow	16.86
Jc	Johnsburg loam	2.88



Legend

- Prime Farmland Soils
- Permit Area

0 330 660 1,320 1,980 Feet

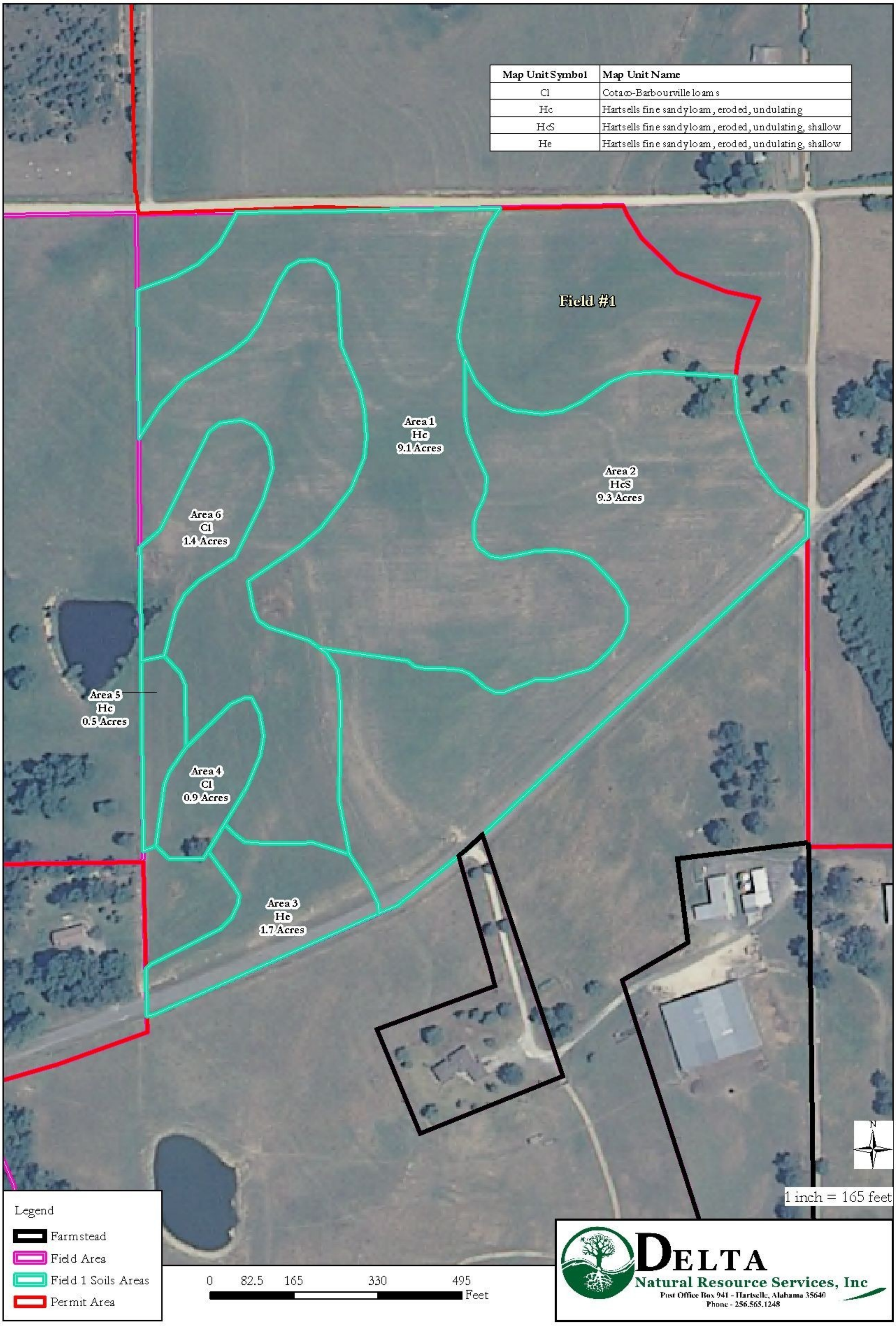
DELTA
Natural Resource Services, Inc
Post Office Box 941 - Hartselle, Alabama 35640
Phone - 256.565.1248

Alabama
Dekalb County
April 2012

Seven Oaks Land And Mineral LLC
Thunder Oaks Mine
Field 1 Soils Area Map

Sylvania DOQ
S2 - 4, 10, 11 T6S R8E

Map Unit Symbol	Map Unit Name
Cl	Cotaco-Barbourville loams
Hc	Hartsells fine sandy loam, eroded, undulating
HcS	Hartsells fine sandy loam, eroded, undulating, shallow
He	Hartsells fine sandy loam, eroded, undulating, shallow



Legend
- Farmstead
- Field Area
- Field 1 Soils Areas
- Permit Area

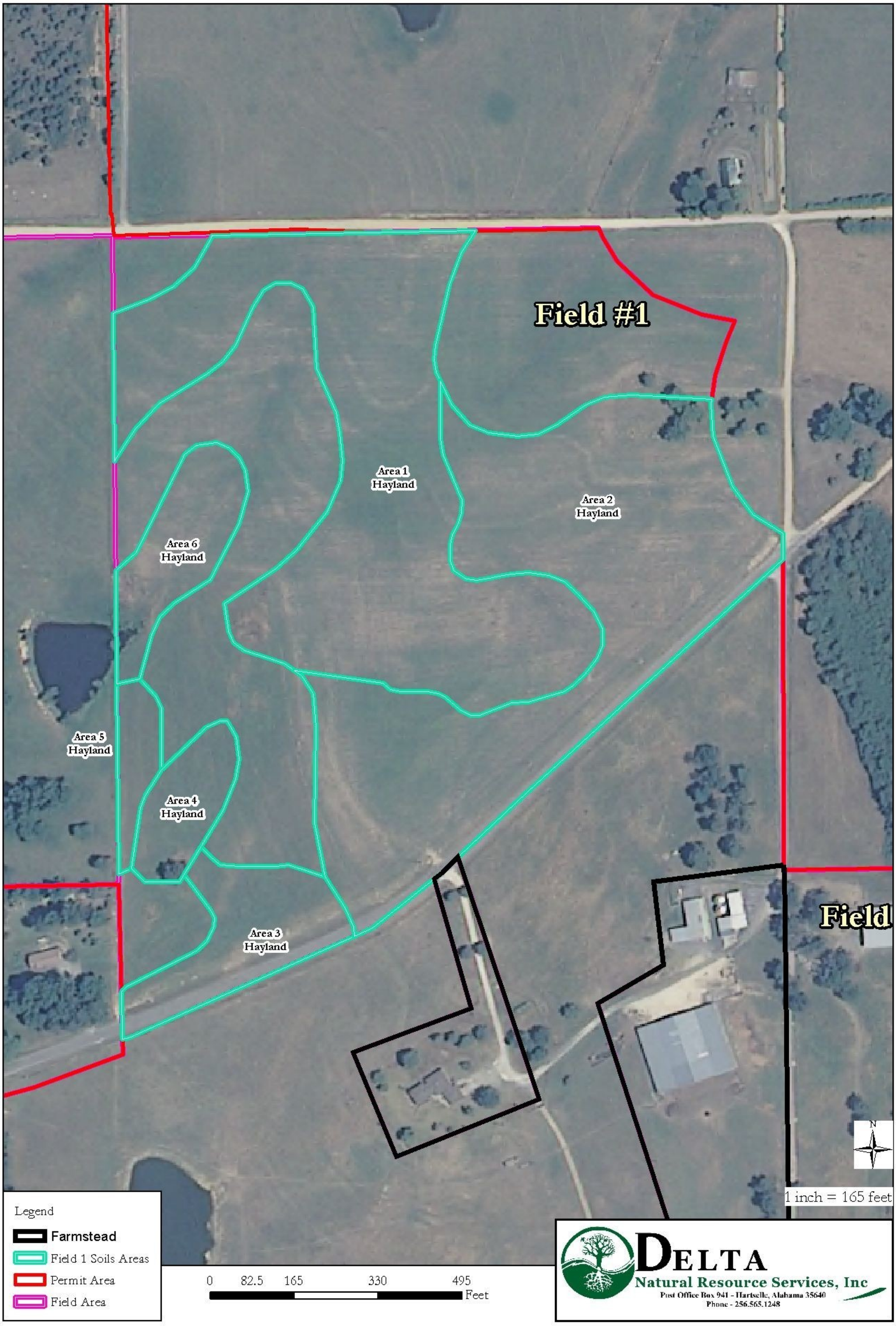
0 82.5 165 330 495 Feet

DELTA
Natural Resource Services, Inc
Post Office Box 941 - Hartselle, Alabama 35640
Phone - 256.565.1248

Alabama
Dekalb County
April 2012

Seven Oaks Land And Mineral LLC
Thunder Oaks Mine
Field 1 Land Use Map

Sylvania DOQ
S2 - 4, 10, 11 T6S R8E



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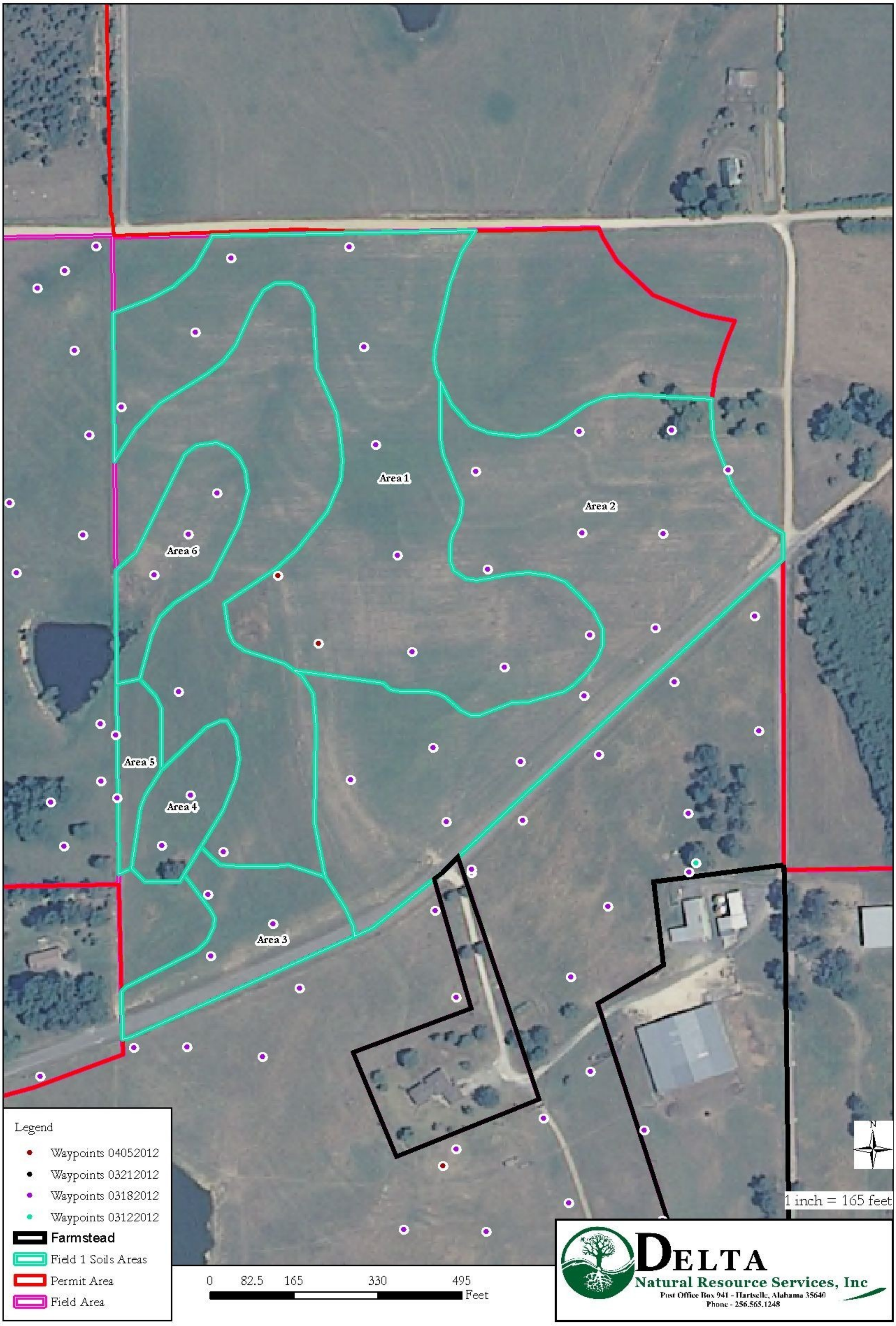
Alabama
Dekalb County
April 2012

Seven Oaks Land And Mineral LLC
Thunder Oaks Mine
Field 1 Waypoint Map

Sylvania DOQ
S2 - 4, 10, 11 T6S R8E



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Map Unit Hc (Field 1 Area 1) Prime Farmland to be Restored

(Hayland)

The dominant topsoil (A horizon) thickness for Map Unit Hc is between 6 and 7 inches. The dominant texture is sandy loam. The average thickness is 6.71 inches. Therefore, it seems practical to remove the top 7 inches of sandy loam soil from the Map Unit Hc area 1 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for Map Unit Hc area 1 is between 33 and 37 inches. The average thickness for the B plus its other underlying soil horizons is 35 inches. The textures of the subsoil horizons are loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 35 inches of this soil (B) from the Map Unit Hc area 1 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 42 inches for Map Unit Hc Area 1 (7 inches of top soil and 35 inches of B horizon).

Field # 1					
Horizon thickness and estimated soil volumes to remove and replace					
Area	**surface thickness to res.**	**subsoil thickness to res.**	**acres**	**cy surface**	**cy subsoil**
1	7 inches	35 inches	9.1	709	3,548

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored.

** The field aces were adjusted lower to compensate for 15% inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

Map Unit HcS (Field 1 Area 2) Prime Farmland to be Restored

(Hayland)

The dominant topsoil (A horizon) thickness for Map Unit Hc is between 5.5 and 6.5 inches. The dominant texture is sandy loam. The average thickness is 6 inches. Therefore, it seems practical to remove the top 6 inches of sandy loam soil from the Map Unit HcS area 2 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for Map Unit HcS area 2 is between 17 and 21 inches. The average thickness for the B plus its other underlying soil horizons is 19 inches. The textures of the subsoil horizons are loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 19 inches of this soil (B) from the Map Unit HcS area 2 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 25 inches for Map Unit HcS Area 2 (6 inches of top soil and 19 inches of B horizon).

Field # 1					
Horizon thickness and estimated soil volumes to remove and replace					
Area	**surface thickness to res.**	**subsoil thickness to res.**	**acres**	**cy surface**	**cy subsoil**
2	6 inches	19 inches	9.3	625	2,000

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored.

** The field aces were adjusted lower to compensate for 15% inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

Map Unit He (Field 1 Area 3) Prime Farmland to be Restored

(Hayland)

The dominant topsoil (A horizon) thickness for the Map Unit He is 5 inches. The dominant texture is sandy loam. The average thickness is 5 inches. Therefore, it seems practical to remove the top 5 inches of sandy loam soil from the Map Unit He area 3 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for the Map Unit He area 3 is between 20 and 30 inches. The average thickness for the B plus its other underlying soil horizons is 25 inches. The textures of the subsoil horizons are loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 25 inches of this soil (B) from Map Unit He area 3 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 30 inches for Map Unit He Area 3 (5 inches of top soil and 25 inches of B horizon).

Field # 1					
Horizon thickness and estimated soil volumes to remove and replace					
Area	**surface thickness to res.**	**subsoil thickness to res**	**acres**	**cy surface**	**cy subsoil**
3	5 inches	25 inches	1.45**	78	406

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored.

** The field aces were adjusted lower to compensate for 15% inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

Map Unit Cl (Field 1 Area 4 & 6) Prime Farmland to be Restored

(Hayland)

The dominant topsoil (A horizon) thickness for the Cl Map Unit is between 5 and 7 inches. The dominant texture is loam. The average thickness is 6 inches. Therefore, it seems practical to remove the top 6 inches of loam soil from Map Unit Cl areas 4 & 6 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for Map Unit Cl area is between 43 and 45 inches. The average thickness for the B plus its other underlying soil horizons is 44 inches. The textures of the subsoil horizons are loam, clay loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 42 inches of this soil (B) from Map Unit Cl area 4 & 6 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 48* inches for Map Unit Cl Area 4 & 6 (6 inches of top soil and 42 inches of B horizon).

Field # 1					
Horizon thickness and estimated soil volumes to remove and replace					
Area	**surface thickness to res.**	**subsoil thickness to res**	**acres**	**cy surface**	**cy subsoil**
4 & 6	6 inches	42 inches	1.94**	130	912

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored.

** The field aces were adjusted lower to compensate for 15% inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

Map Unit Hc (Field 1 Area 5) Prime Farmland to be Restored

(Hayland)

The dominant topsoil (A horizon) thickness for the Hc Map Units is between 5 and 7 inches. The dominant texture is sandy loam. The average thickness is 6 inches. Therefore, it seems practical to remove the top 6 inches of loam soil from Map Unit Hc area 5 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for Map Unit Hc area 5 is between 34 and 37 inches. The average thickness for the B plus its other underlying soil horizons is 36 inches. The textures of the subsoil horizons are loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 36 inches of this soil (B) from Map Unit Hc area 5 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 42 inches for Map Unit Hc Area 5 (6 inches of top soil and 36 inches of B horizon).

Field # 1					
Horizon thickness and estimated soil volumes to remove and replace					
Area	**surface thickness to res.**	**subsoil thickness to res**	**acres**	**cy surface**	**cy subsoil**
5	6 inches	36 inches	0.43**	29	173

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored.

** The field aces were adjusted lower to compensate for 15% inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

Alabama
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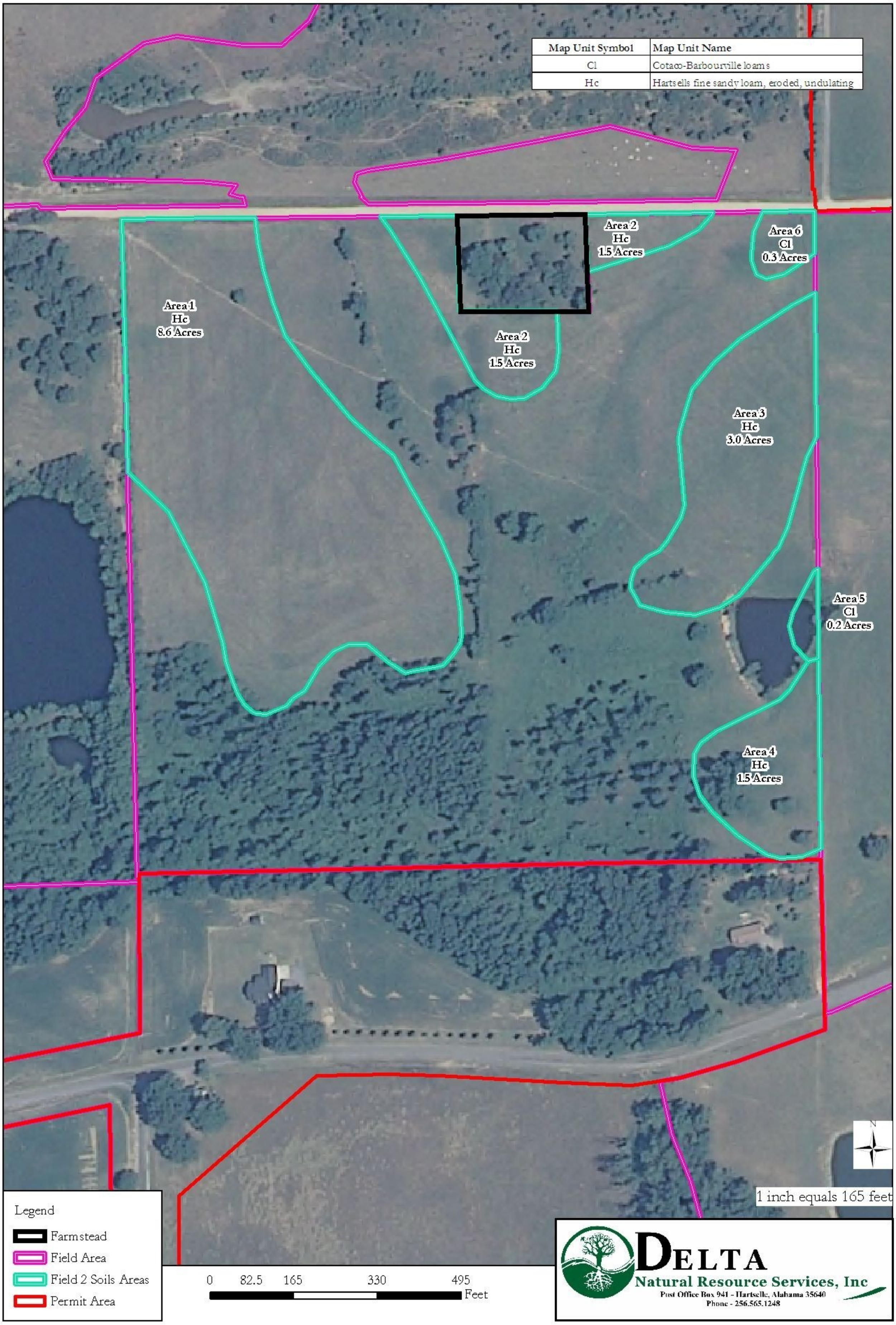
April 2012

Seven Oaks Land And Mineral LLC
Thunder Oaks Mine
Field 2 Soils Area Map

Sylvania DOQ
S2 - 4, 10, 11 T6S R8E

Map Unit Symbol	Map Unit Name
Cl	Cotaco-Barbourville loams
Hc	Hartsells fine sandy loam, eroded, undulating



Legend
- Farmstead
- Field Area
- Field 2 Soils Areas
- Permit Area

0 82.5 165 330 495 Feet

1 inch equals 165 feet

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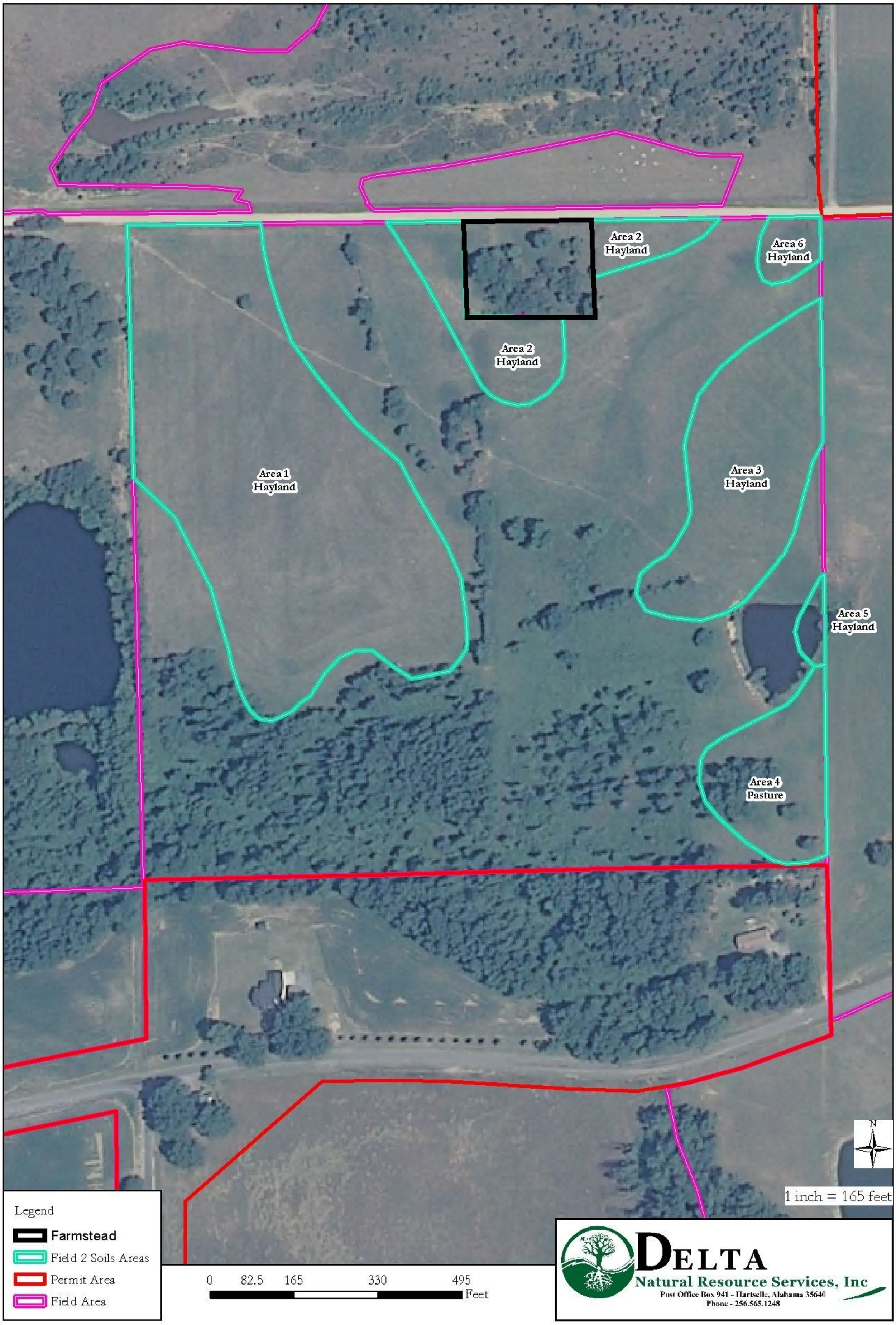
Alabama
Dekalb County
April 2012

Seven Oaks Land And Mineral LLC
Thunder Oaks Mine
Field 2 Land Use Map

Sylvania DOQ
S2 - 4, 10, 11 T6S R8E



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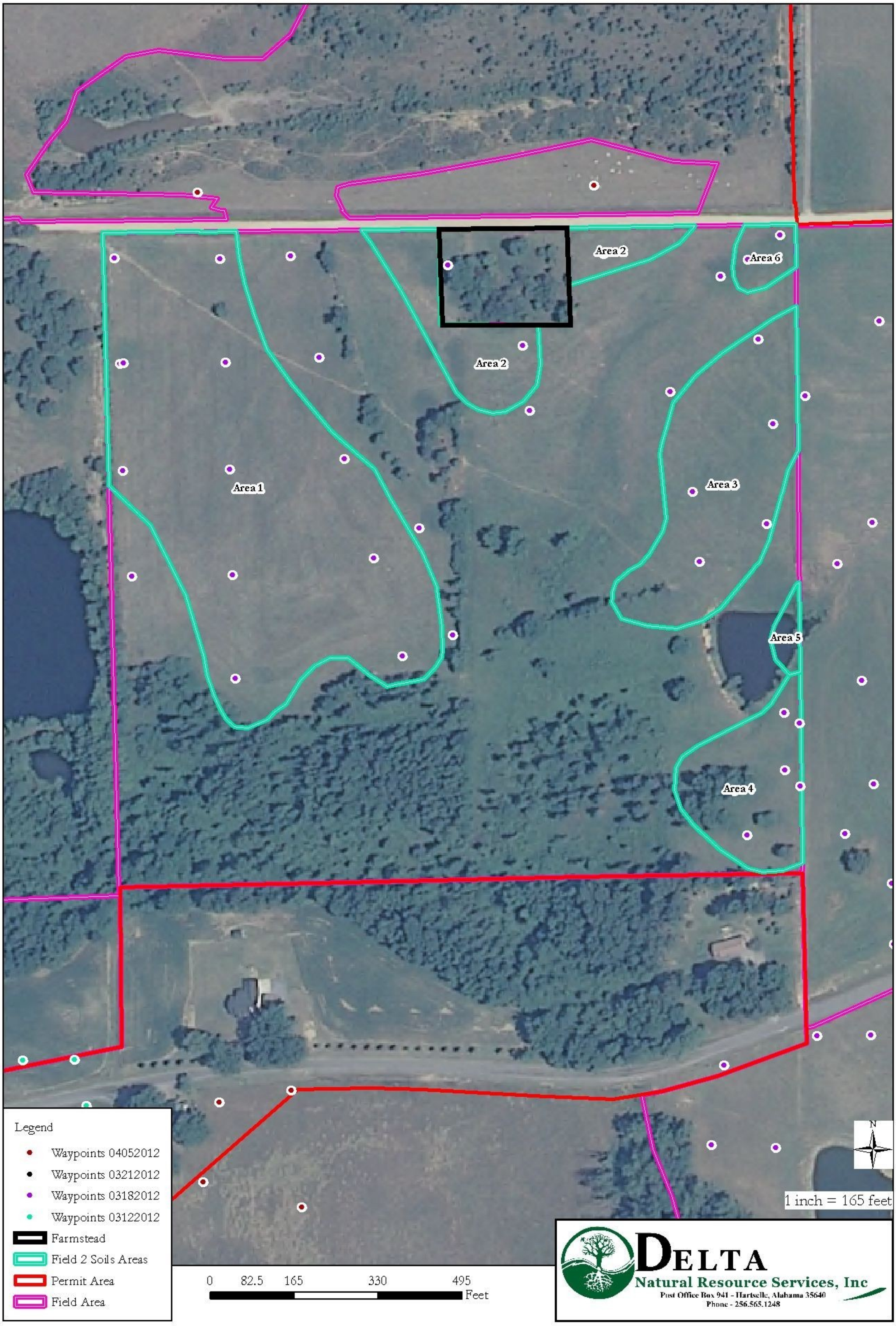
April 2012

Seven Oaks Land And Mineral LLC
Thunder Oaks Mine
Field 2 Waypoint Map

Sylvania DOQ
S2 - 4, 10, 11 T6S R8E



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Map Unit Hc (Field 2 Area 1) Prime Farmland to be Restored

(Hayland)

The dominant topsoil (A horizon) thickness for the Hc Map Unit is between 6 and 7 inches. The dominant texture is sandy loam. The average thickness is 7 inches. Therefore, it seems practical to remove the top 7 inches of loam soil from Map Unit Hc area 1 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for Map Unit Hc area 1 is between 35 and 42 inches. The average thickness for the B plus its other underlying soil horizons is 38 inches. The textures of the subsoil horizons are loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 38 inches of this soil (B) from Map Unit Hc area 1 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 45 inches for Map Unit Hc Area 1 (7 inches of top soil and 38 inches of B horizon).

Field # 2					
Horizon thickness and estimated soil volumes to remove and replace					
Area	**surface thickness to res.**	**subsoil thickness to res**	**acres**	**cy surface**	**cy subsoil**
1	7 inches	38 inches	8.6	694	3,699

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored.

** The field aces were adjusted lower to compensate for 15% inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

Map Unit Hc (Field 2 Area 2) Prime Farmland to be Restored

(Hayland)

The dominant topsoil (A horizon) thickness for the Hc Map Unit is 7 inches. The dominant texture is sandy loam. The average thickness is 7 inches. Therefore, it seems practical to remove the top 7 inches of loam soil from Map Unit Hc area 2 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for Map Unit Hc area 2 is between 21 and 35 inches. The average thickness for the B plus its other underlying soil horizons is 28 inches. The textures of the subsoil horizons are loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 28 inches of this soil (B) from Map Unit Hc area 2 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 35 inches for Map Unit Hc Area 2 (7 inches of top soil and 28 inches of B horizon).

Field # 2					
Horizon thickness and estimated soil volumes to remove and replace					
Area	**surface thickness to res.**	**subsoil thickness to res**	**acres**	**cy surface**	**cy subsoil**
2	7 inches	28 inches	1.5	121	464

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored.

** The field aces were adjusted lower to compensate for 15% inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

Map Unit Hc (Field 2 Area 3) Prime Farmland to be Restored

(Hayland)

The dominant topsoil (A horizon) thickness for the Hc Map Unit is between 7 and 8 inches. The dominant texture is sandy loam. The average thickness is 7 inches. Therefore, it seems practical to remove the top 7 inches of loam soil from Map Unit Hc area 3 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for Map Unit Hc area 3 is between 29 and 37 inches. The average thickness for the B plus its other underlying soil horizons is 33 inches. The textures of the subsoil horizons are loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 33 inches of this soil (B) from Map Unit Hc area 3 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 40 inches for Map Unit Hc Area 1 (6 inches of top soil and 38 inches of B horizon).

Field # 2					
Horizon thickness and estimated soil volumes to remove and replace					
Area	**surface thickness to res.**	**subsoil thickness to res**	**acres**	**cy surface**	**cy subsoil**
3	7 inches	33 inches	3.0	242	1,192

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored.

** The field aces were adjusted lower to compensate for 15% inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

Map Unit Hc (Field 2 Area 4) Prime Farmland to be Restored

(Hayland)

The dominant topsoil (A horizon) thickness for the Hc Map Units is between 5 and 7 inches. The dominant texture is sandy loam. The average thickness is 6 inches. Therefore, it seems practical to remove the top 6 inches of loam soil from Map Unit Hc area 4 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for Map Unit Hc area 4 is between 34 and 37 inches. The average thickness for the B plus its other underlying soil horizons is 36 inches. The textures of the subsoil horizons are loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 36 inches of this soil (B) from the Map Unit Hc area 4 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 42 inches for Map Unit Hc Area 4 (6 inches of top soil and 36 inches of B horizon).

Field # 2					
Horizon thickness and estimated soil volumes to remove and replace					
Area	**surface thickness to res.**	**subsoil thickness to res**	**acres**	**cy surface**	**cy subsoil**
4	6 inches	36 inches	1.5	101	605

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored.

** The field aces were adjusted lower to compensate for 15% inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

Map Unit Cl (Field 2 Area 6) Prime Farmland to be Restored

(Hayland)

The dominant topsoil (A horizon) thickness for the Cl Map Unit is between 7 and 9 inches. The dominant texture is loam. The average thickness is 8 inches. Therefore, it seems practical to remove the top 8 inches of loam soil from Map Unit Cl area 6 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for Map Unit Cl area 6 is between 40 and 49 inches. The average thickness for the B plus its other underlying soil horizons is 45 inches. The textures of the subsoil horizons are loam, clay loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 40 inches of this soil (B) from Map Unit Cl area 6 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 48* inches for Map Unit Cl Area 6 (8 inches of top soil and 40 inches of B horizon).

Field # 2					
Horizon thickness and estimated soil volumes to remove and replace					
Area	**surface thickness to res.**	**subsoil thickness to res**	**acres**	**cy surface**	**cy subsoil**
6	8 inches	40 inches	0.3	28	133

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored.

** The field aces were adjusted lower to compensate for 15% inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

Alabama
Dekalb County
April 2012

Seven Oaks Land And Mineral LLC
Thunder Oaks Mine
Field 3 Soils Area Map

Sylvania DOQ
S2 - 4, 10, 11 T6S R8E

Map Unit Symbol	Map Unit Name
Hc	Hartsells fine sandy loam, eroded, undulating
Jc	Johnsburg loam

Area 2
Jc
3.23 Acres

Area 1
Hc
3.12 Acres

Area 3
Hc
4.59 Acres

Field #3

Field #2

Field #1

Field #8

Field #6

Legend
- Farmstead
- Field 3 Soils Areas
- Permit Area
- Field Area

0 165 330 660 990 Feet

N

1 inch = 330 feet

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Dekalb County
April 2012

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Field 3 Land Use Map

Sylvania DOQ
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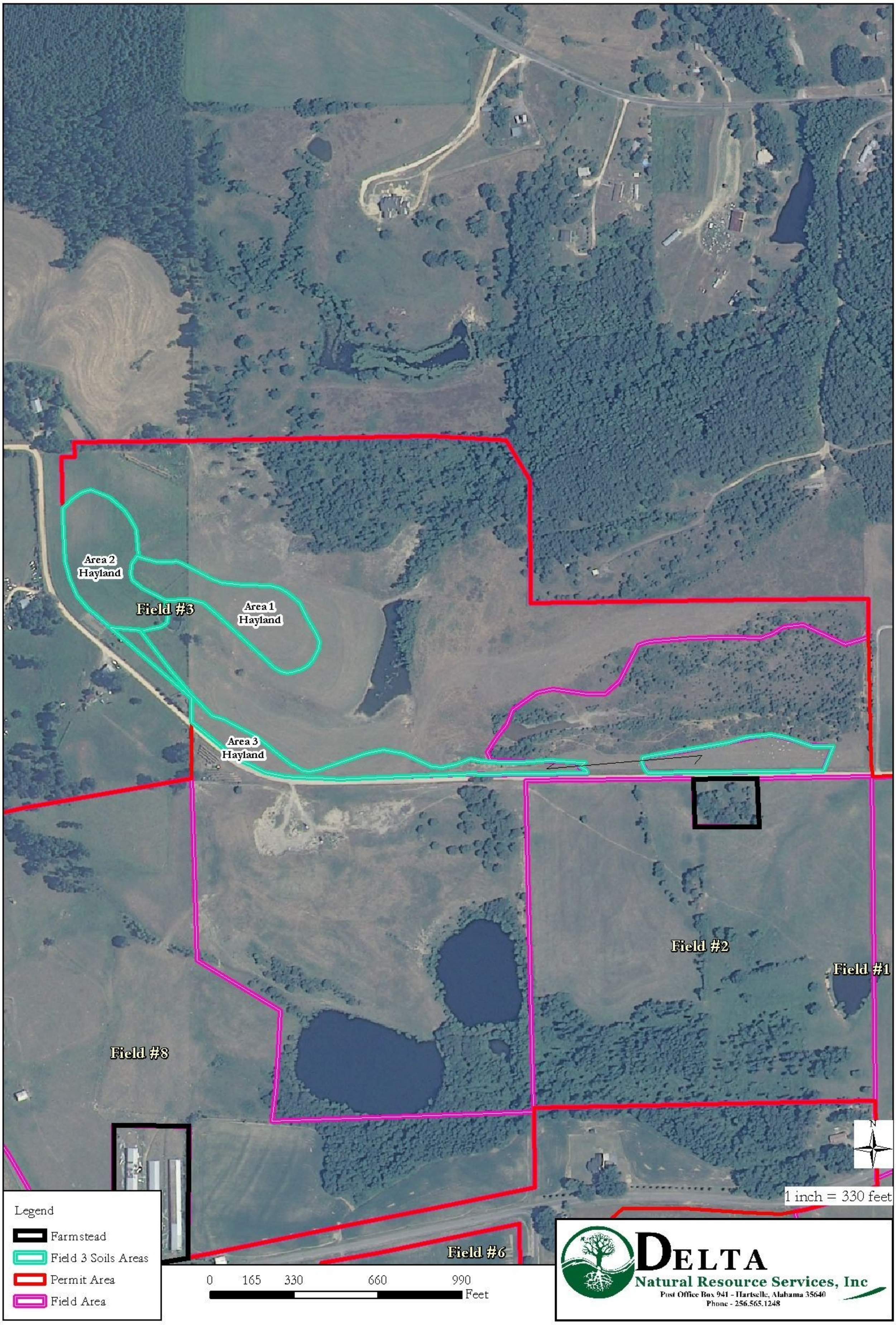

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Thunder Oaks Mine
Field 3 Waypoint Map

Sylvania DOQ
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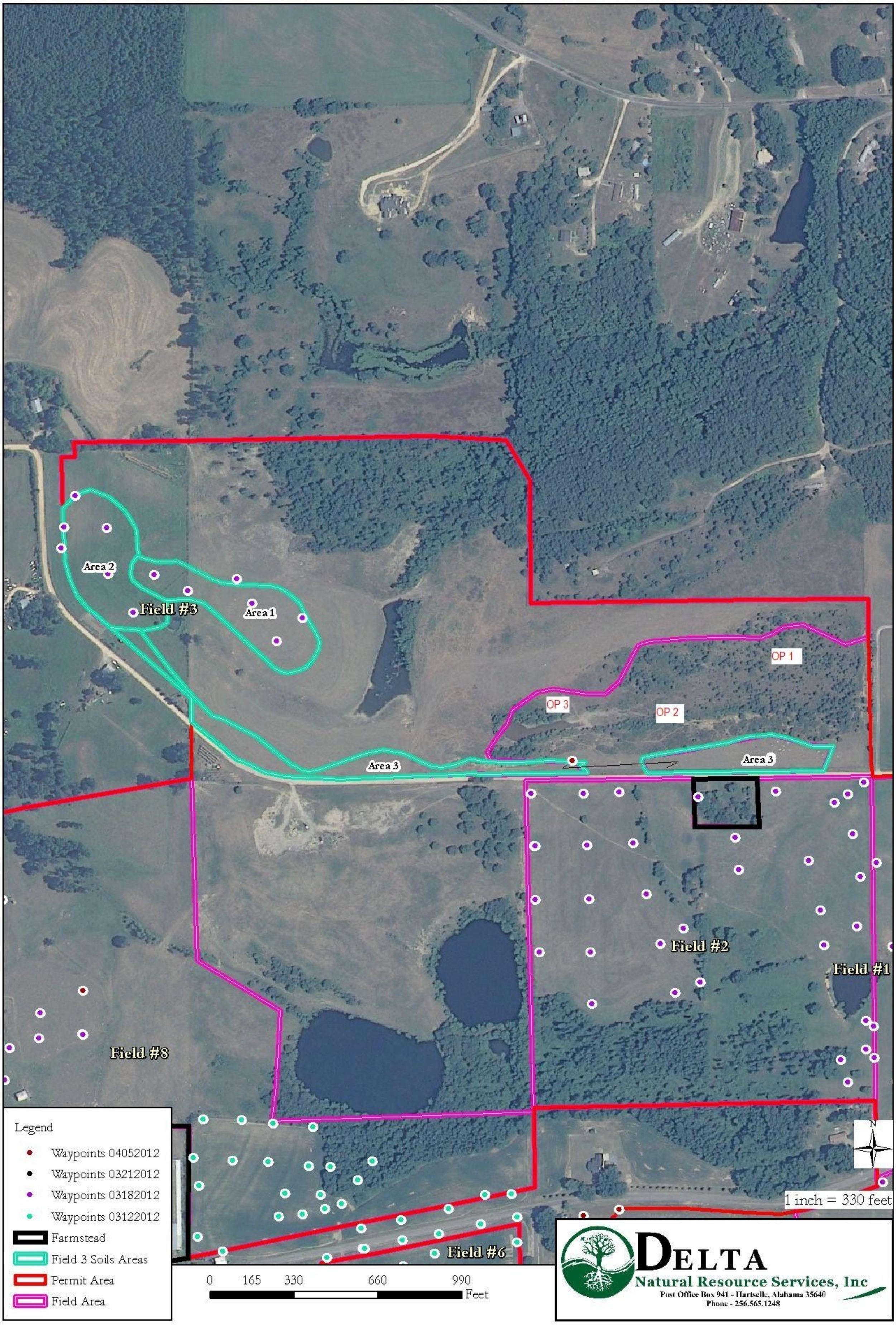

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Map Unit Hc (Field 3 Area 1 & 3) Prime Farmland to be Restored

(Hayland)

The dominant topsoil (A horizon) thickness for the Hc Map Unit areas 1 & 3 is between 5.5 and 6 inches. The dominant texture is sandy loam. The average thickness is 6 inches. Therefore, it seems practical to remove the top 6 inches of loam soil from Map Unit Hc areas 1 & 3 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for Map Unit Hc areas 1 & 3 is between 22 and 32 inches. The average thickness for the B plus its other underlying soil horizons is 27 inches. The textures of the subsoil horizons are loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 27 inches of this soil (B) from Map Unit Hc areas 1 & 3 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 33 inches for Map Unit Hc Area 1 & 3 (6 inches of top soil and 27 inches of B horizon).

Field # 3					
Horizon thickness and estimated soil volumes to remove and replace					
Area	**surface thickness to res.**	**subsoil thickness to res**	**acres**	**cy surface**	**cy subsoil**
1 & 3	6 inches	27 inches	3.74**	251	1,131

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored.

** The field aces were adjusted lower to compensate for 15% inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

Map Unit Jc (Field 3 Area 2) Prime Farmland to be Restored

(Hayland)

The dominant topsoil (A horizon) thickness for the Map Unit Jc area 2 is 8 inches. The dominant texture is sandy loam. The average thickness is 8 inches. Therefore, it seems practical to remove the top 8 inches of sandy loam soil from Map Unit Jc area 2 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for Map Unit Jc area 2 is between 23 and 30 inches. The average thickness for the B plus its other underlying soil horizons is 27 inches. The textures of the subsoil horizons are loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 27 inches of this soil (B) from Map Unit Jc area 2 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 35 inches for Map Unit Jc Area 2 (8 inches of top soil and 27 inches of B horizon).

Field # 3					
Horizon thickness and estimated soil volumes to remove and replace					
Area	**surface thickness to res.**	**subsoil thickness to res**	**acres**	**cy surface**	**cy subsoil**
2	8 inches	27 inches	3.23	260	977

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored.

** The field aces were adjusted lower to compensate for 15% inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

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April 2012

Seven Oaks Land And Mineral LLC
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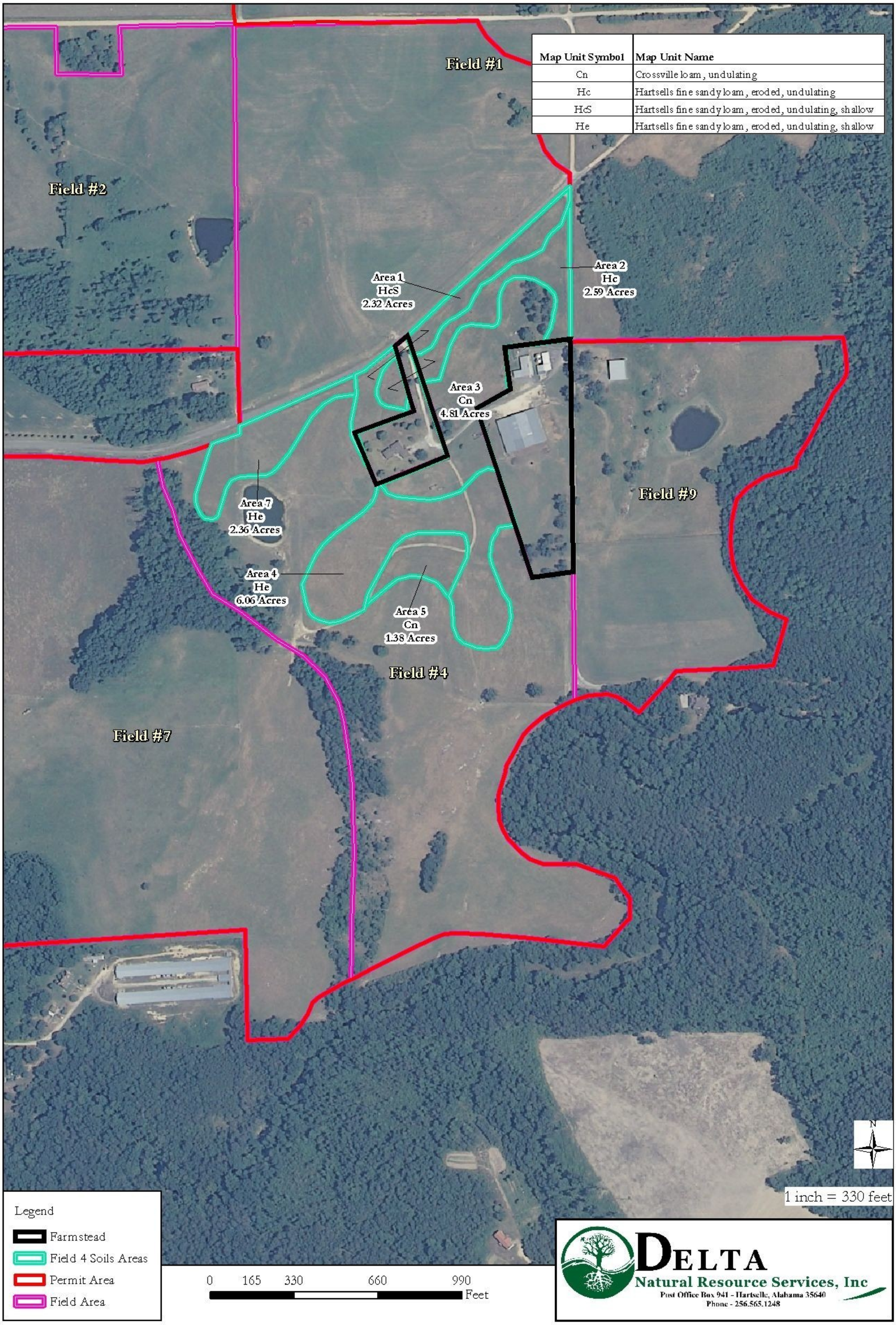
Field 4 Soils Area Map

Sylvania DOQ
S2 - 4, 10, 11 T6S R8E

Map Unit Symbol	Map Unit Name
Cn	Crossville loam, undulating
Hc	Hartsells fine sandy loam, eroded, undulating
HcS	Hartsells fine sandy loam, eroded, undulating, shallow
He	Hartsells fine sandy loam, eroded, undulating, shallow



Legend
- Farmstead
- Field 4 Soils Areas
- Permit Area
- Field Area

0 165 330 660 990 Feet

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Dekalb County
April 2012

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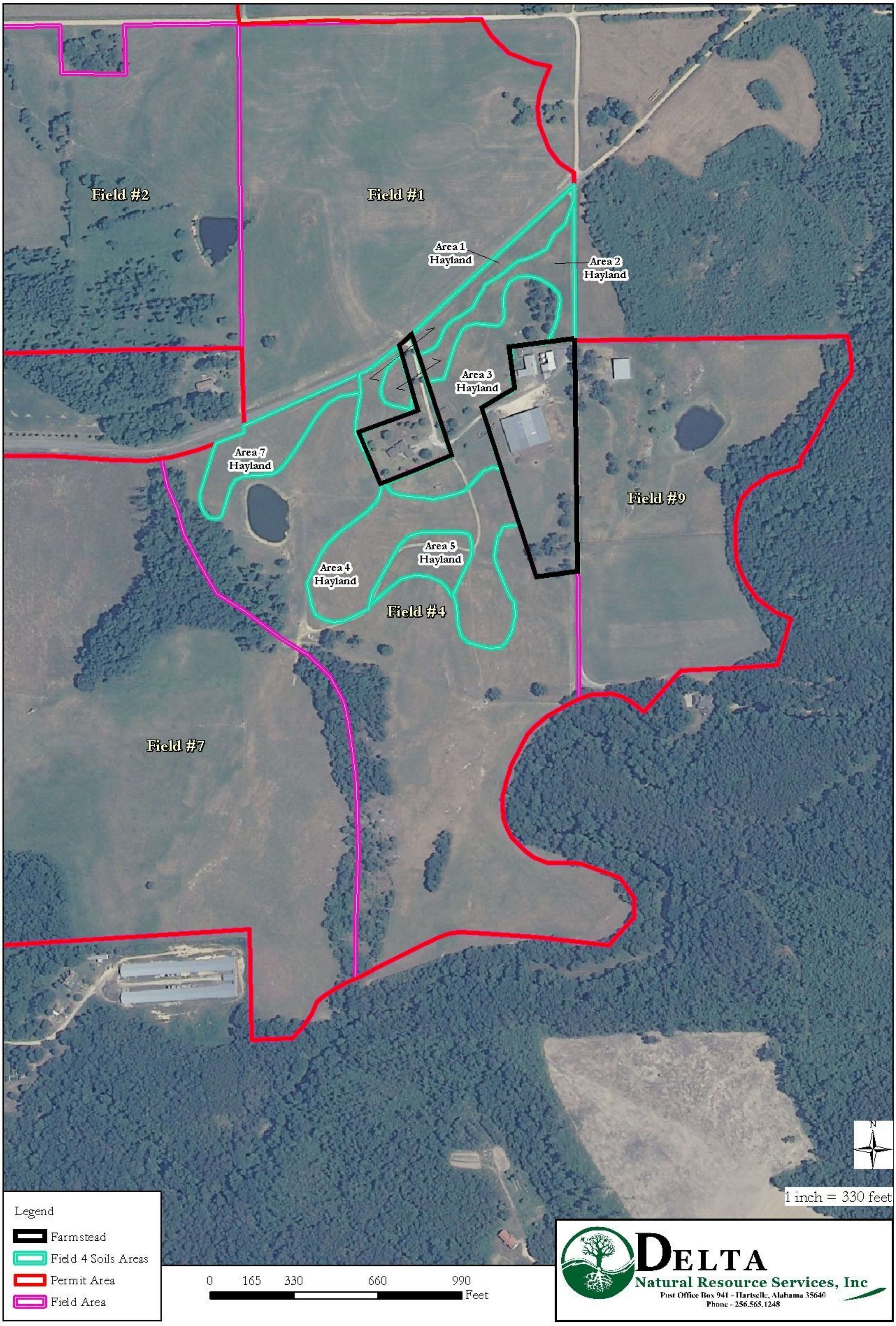
Thunder Oaks Mine
Field 4 Land Use Map

Sylvania DOQ
S2 - 4, 10, 11 T6S R8E



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Field 4 Waypoint Map

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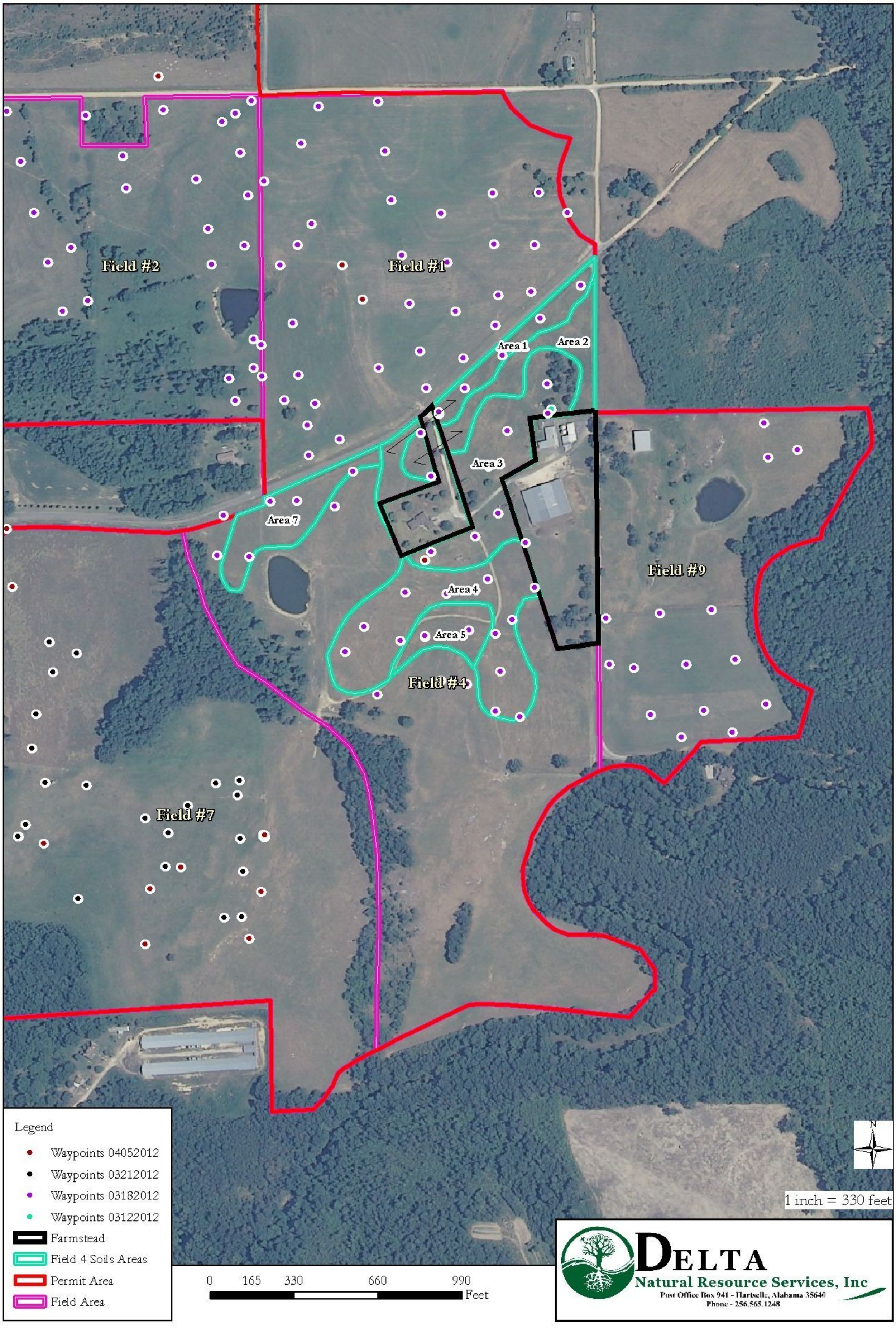

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Map Unit HcS (Field 4 Area 1) Prime Farmland to be Restored

(Hayland)

The dominant topsoil (A horizon) thickness for Map Unit Hc is between 5.5 and 6.5 inches. The dominant texture is sandy loam. The average thickness is 6 inches. Therefore, it seems practical to remove the top 6 inches of sandy loam soil from Map Unit HcS area 1 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for Map Unit HcS area 1 is between 17 and 21 inches. The average thickness for the B plus its other underlying soil horizons is 19 inches. The textures of the subsoil horizons are loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 19 inches of this soil (B) from Map Unit HcS area 1 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 25 inches for Map Unit HcS Area 1 (6 inches of top soil and 19 inches of B horizon).

Field # 4					
Horizon thickness and estimated soil volumes to remove and replace					
Area	**surface thickness to res.**	**subsoil thickness to res**	**acres**	**cy surface**	**cy subsoil**
1	6 inches	19 inches	2.0**	134	430

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored.

** The field aces were adjusted lower to compensate for 15% inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

Map Unit Hc (Field 4 Area 2) Prime Farmland to be Restored

(Hayland)

The dominant topsoil (A horizon) thickness for Map Unit Hc is between 7 and 8 inches. The dominant texture is sandy loam. The average thickness is 8 inches. Therefore, it seems practical to remove the top 8 inches of sandy loam soil from Map Unit Hc area 2 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for Map Unit Hc area 2 is between 25 and 29 inches. The average thickness for the B plus its other underlying soil horizons is 27 inches. The textures of the subsoil horizons are loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 27 inches of this soil (B) from Map Unit HcS area 2 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 35 inches for Map Unit Hc Area 2 (8 inches of top soil and 27 inches of B horizon).

Field # 4					
Horizon thickness and estimated soil volumes to remove and replace					
Area	**surface thickness to res.**	**subsoil thickness to res**	**acres**	**cy surface**	**cy subsoil**
2	8 inches	27 inches	2.2**	195	665

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored.

** The field aces were adjusted lower to compensate for 15% inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

Map Unit Cn (Field 4 Area 3 & 5) Prime Farmland to be Restored

(Hayland)

The dominant topsoil (A horizon) thickness for Map Unit Cn is between 6 and 7 inches. The dominant texture is sandy loam. The average thickness is 7 inches. Therefore, it seems practical to remove the top 7 inches of sandy loam soil from Map Unit Cn areas 3 & 5 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for the Map Unit Cn areas 3 & 5 is between 13 and 20 inches. The average thickness for the B plus its other underlying soil horizons is 16 inches. The textures of the subsoil horizons are loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 16 inches of this soil (B) from Map Unit Cn areas 3 & 5 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 23 inches for the Map Unit Cn Areas 3 & 5 (7 inches of top soil and 16 inches of B horizon).

Field # 4					
Horizon thickness and estimated soil volumes to remove and replace					
Area	**surface thickness to res.**	**subsoil thickness to res**	**acres**	**cy surface**	**cy subsoil**
3 & 5	7 inches	16 inches	5.19**	404	907

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored.

** The field aces were adjusted lower to compensate for 15% inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

Map Unit He (Field 4 Area 4) Prime Farmland to be Restored

(Hayland)

The dominant topsoil (A horizon) thickness for the Map Unit He is between 6 and 7 inches. The dominant texture is sandy loam. The average thickness is 7 inches. Therefore, it seems practical to remove the top 7 inches of sandy loam soil from Map Unit He area 4 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for Map Unit He area 4 is between 24 and 28 inches. The average thickness for the B plus its other underlying soil horizons is 26 inches. The textures of the subsoil horizons are loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 26 inches of this soil (B) from Map Unit He area 4 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 33 inches for Map Unit He Area 4 (7 inches of top soil and 26 inches of B horizon).

Field # 4					
Horizon thickness and estimated soil volumes to remove and replace					
Area	**surface thickness to res.**	**subsoil thickness to res**	**acres**	**cy surface**	**cy subsoil**
4	7 inches	26 inches	5.06**	395	1,469

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored.

** The field aces were adjusted lower to compensate for 15% inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

Map Unit He (Field 4 Area 7) Prime Farmland to be Restored

(Hayland)

The dominant topsoil (A horizon) thickness for Map Unit He is between 6 and 7 inches. The dominant texture is sandy loam. The average thickness is 7 inches. Therefore, it seems practical to remove the top 7 inches of sandy loam soil from Map Unit He area 7 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for Map Unit He area 7 is between 27 and 43 inches. The average thickness for the B plus its other underlying soil horizons is 35 inches. The textures of the subsoil horizons are loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 35 inches of this soil (B) from Map Unit He area 7 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 42 inches for Map Unit He Area 7 (7 inches of top soil and 35 inches of B horizon).

Field # 4					
Horizon thickness and estimated soil volumes to remove and replace					
Area	**surface thickness to res.**	**subsoil thickness to res**	**acres**	**cy surface**	**cy subsoil**
7	7 inches	35 inches	2.36	190	920

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored.

** The field aces were adjusted lower to compensate for 15% inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

Alabama
Dekalb County
April 2012

Seven Oaks Land And Mineral LLC
Thunder Oaks Mine
Field 5 Soils Area Map

Sylvania DOQ
S2 - 4, 10, 11 T6S R8E

Map Unit Symbol	Map Unit Name
Hc	Hartsells fine sandy loam, eroded, undulating

Area 1
Hc
3.5 Acres

Area 2
Hc
4.4 Acres

Legend
- Farmstead
- Field Area
- Field 5 Soils Areas
- Permit Area

0 82.5 165 330 495
Feet

N

1 inch = 165 feet

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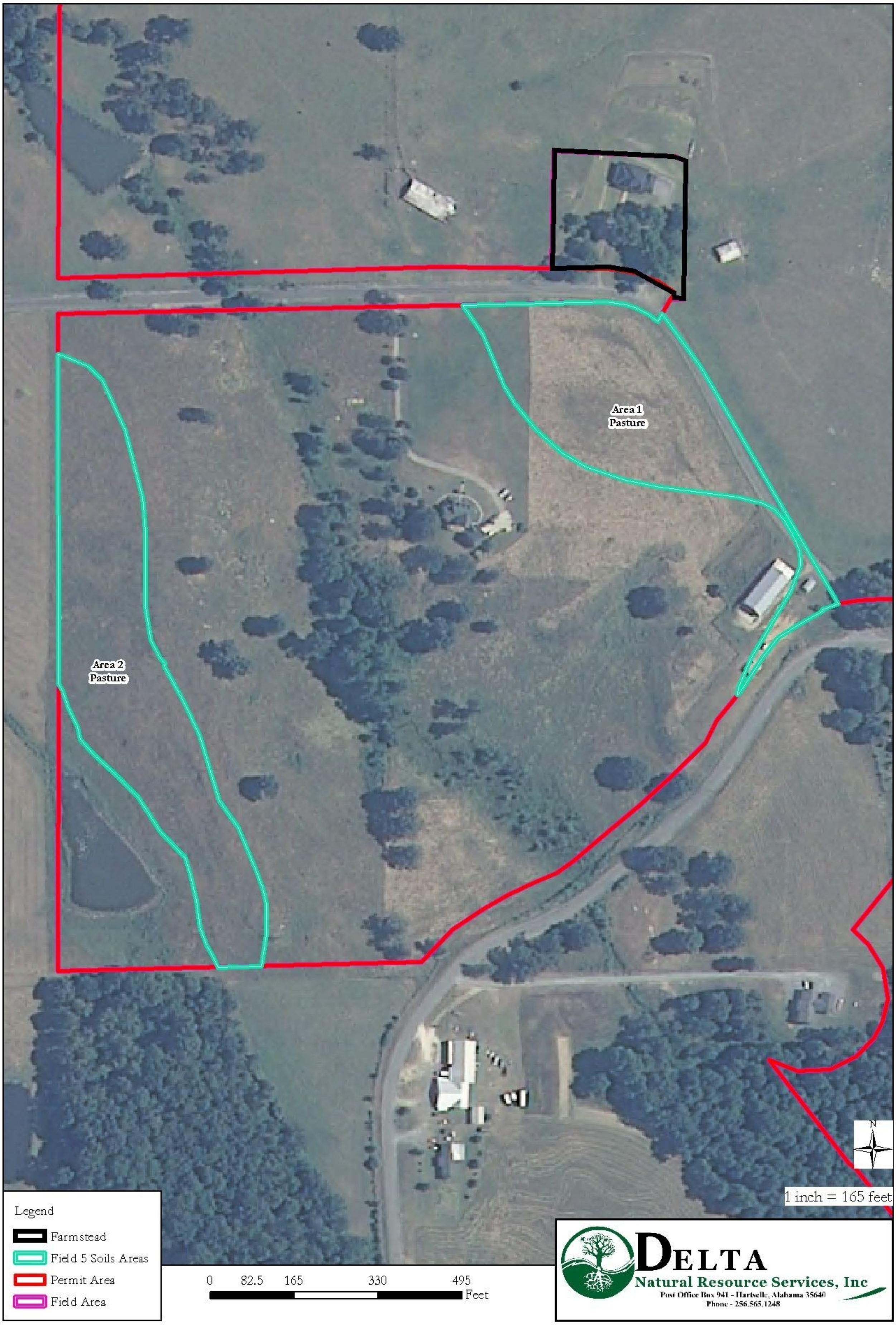
Alabama
Dekalb County
April 2012

Seven Oaks Land And Mineral LLC
Thunder Oaks Mine
Field 5 Land Use Map

Sylvania DOQ
S2 - 4, 10, 11 T6S R8E



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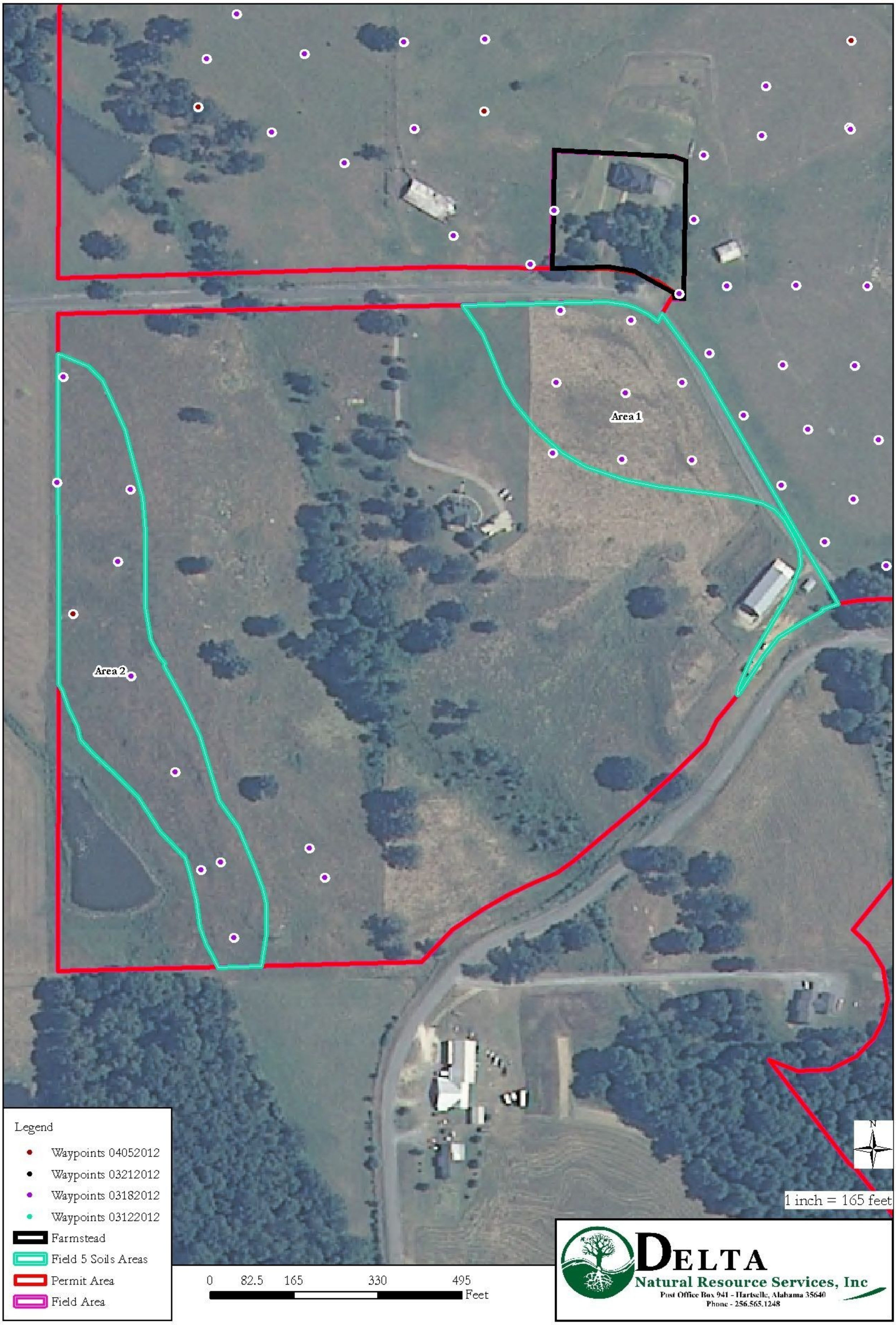
April 2012

Seven Oaks Land And Mineral LLC
Thunder Oaks Mine
Field 5 Waypoint Map

Sylvania DOQ
S2 - 4, 10, 11 T6S R8E



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Map Unit Hc (Field 5 Area 1) Prime Farmland to be Restored

(Pasture)

The dominant topsoil (A horizon) thickness for the Map Unit Hc is 8 inches. The dominant texture is sandy loam. The average thickness is 8 inches. Therefore, it seems practical to remove the top 8 inches of sandy loam soil from Map Unit Hc area 1 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for Map Unit Hc area 1 is between 41 and 46 inches. The average thickness for the B plus its other underlying soil horizons is 44 inches. The textures of the subsoil horizons are loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 40 inches of this soil (B) from Map Unit Hc area 1 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 48* inches for Map Unit Hc Area 1 (8 inches of top soil and 40 inches of B horizon).

Field # 5					
Horizon thickness and estimated soil volumes to remove and replace					
Area	**surface thickness to res.**	**subsoil thickness to res**	**acres**	**cy surface**	**cy subsoil**
1	8 inches	40 inches	3.5	329	1,553

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored.

** The field aces were adjusted lower to compensate for 15% inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

Map Unit Hc (Field 5 Area 2) Prime Farmland to be Restored

(Pasture)

The dominant topsoil (A horizon) thickness for Map Unit Hc is between 5 and 6 inches. The dominant texture is sandy loam. The average thickness is 6 inches. Therefore, it seems practical to remove the top 6 inches of sandy loam soil from Map Unit Hc area 2 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for Map Unit Hc area 2 is between 31 and 35 inches. The average thickness for the B plus its other underlying soil horizons is 33 inches. The textures of the subsoil horizons are loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 33 inches of this soil (B) from Map Unit Hc area 2 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 39 inches for Map Unit Hc Area 2 (6 inches of top soil and 33 inches of B horizon).

Field # 5					
Horizon thickness and estimated soil volumes to remove and replace					
Area	**surface thickness to res.**	**subsoil thickness to res**	**acres**	**cy surface**	**cy subsoil**
2	6 inches	33 inches	4.4	296	1,627

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored.

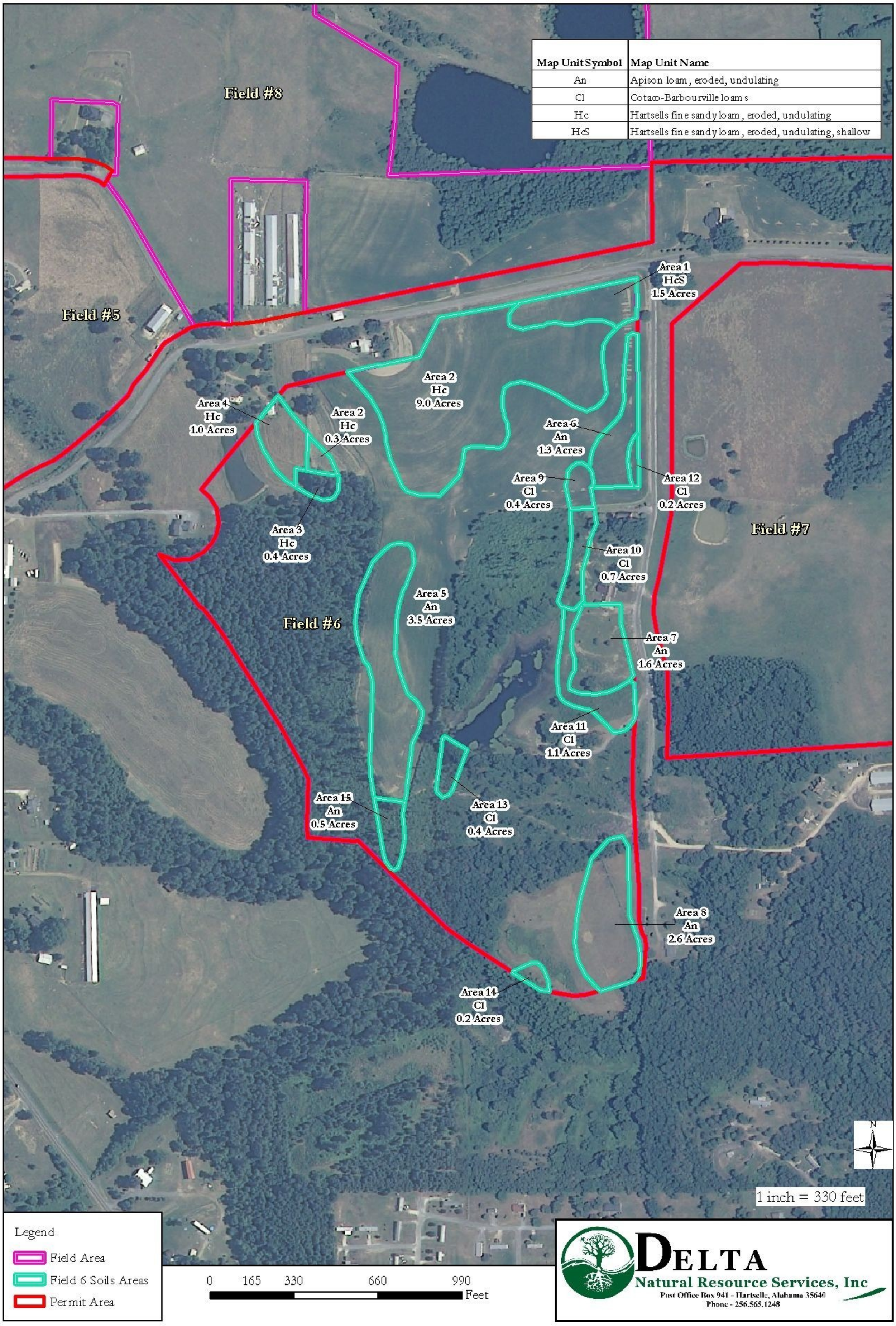
** The field aces were adjusted lower to compensate for 15% inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

Alabama
Dekalb County
April 2012

Seven Oaks Land And Mineral LLC
Thunder Oaks Mine
Field 6 Soils Area Map

Sylvania DOQ
S2 - 4, 10, 11 T6S R8E

Map Unit Symbol	Map Unit Name
An	Apison loam, eroded, undulating
Cl	Cotaco-Barbourville loams
Hc	Hartsells fine sandy loam, eroded, undulating
HcS	Hartsells fine sandy loam, eroded, undulating, shallow



Legend
- Field Area
- Field 6 Soils Areas
- Permit Area

0 165 330 660 990 Feet

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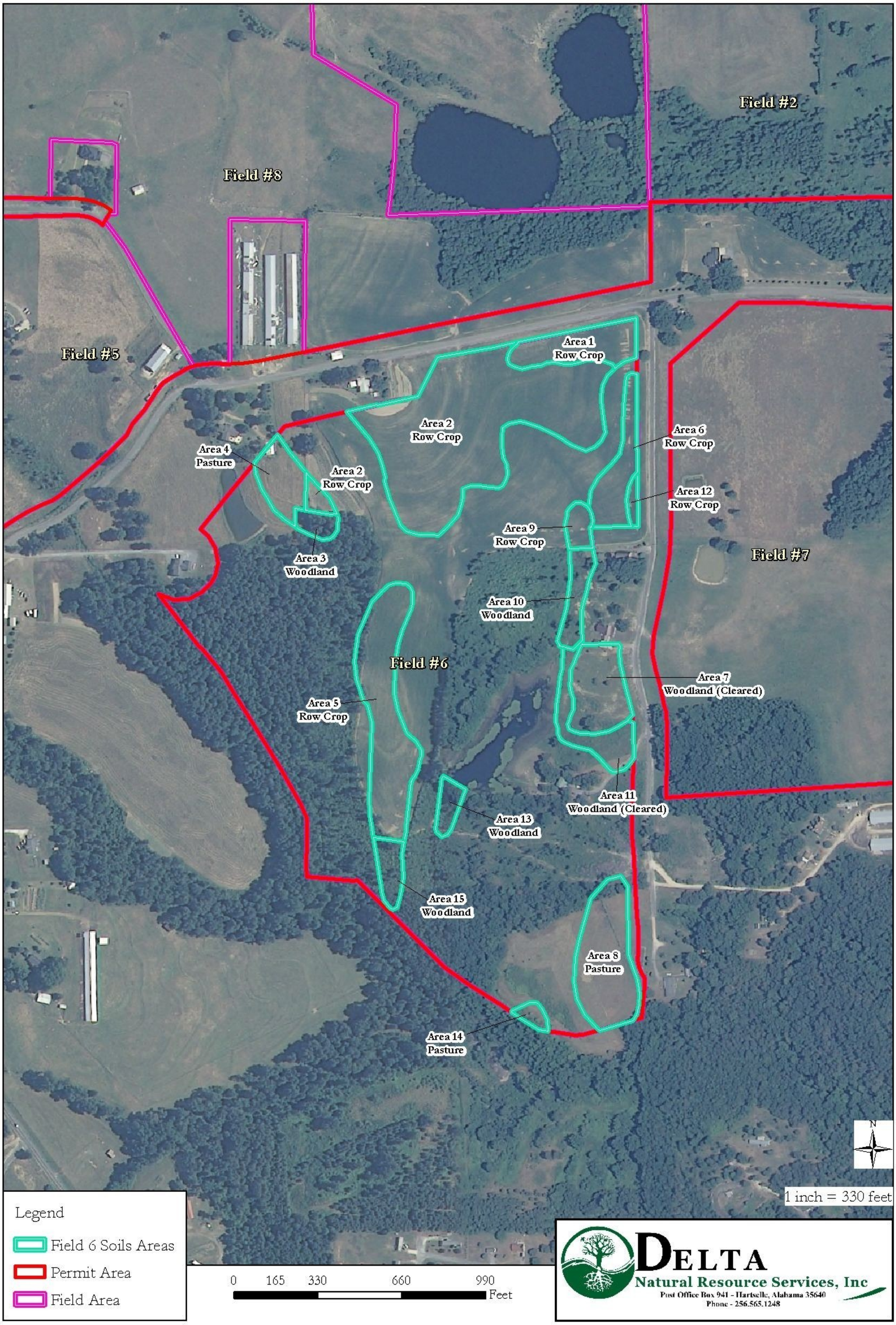
Alabama
Dekalb County
April 2012

Seven Oaks Land And Mineral LLC
Thunder Oaks Mine
Field 6 Land Use Map

Sylvania DOQ
S2 - 4, 10, 11 T6S R8E



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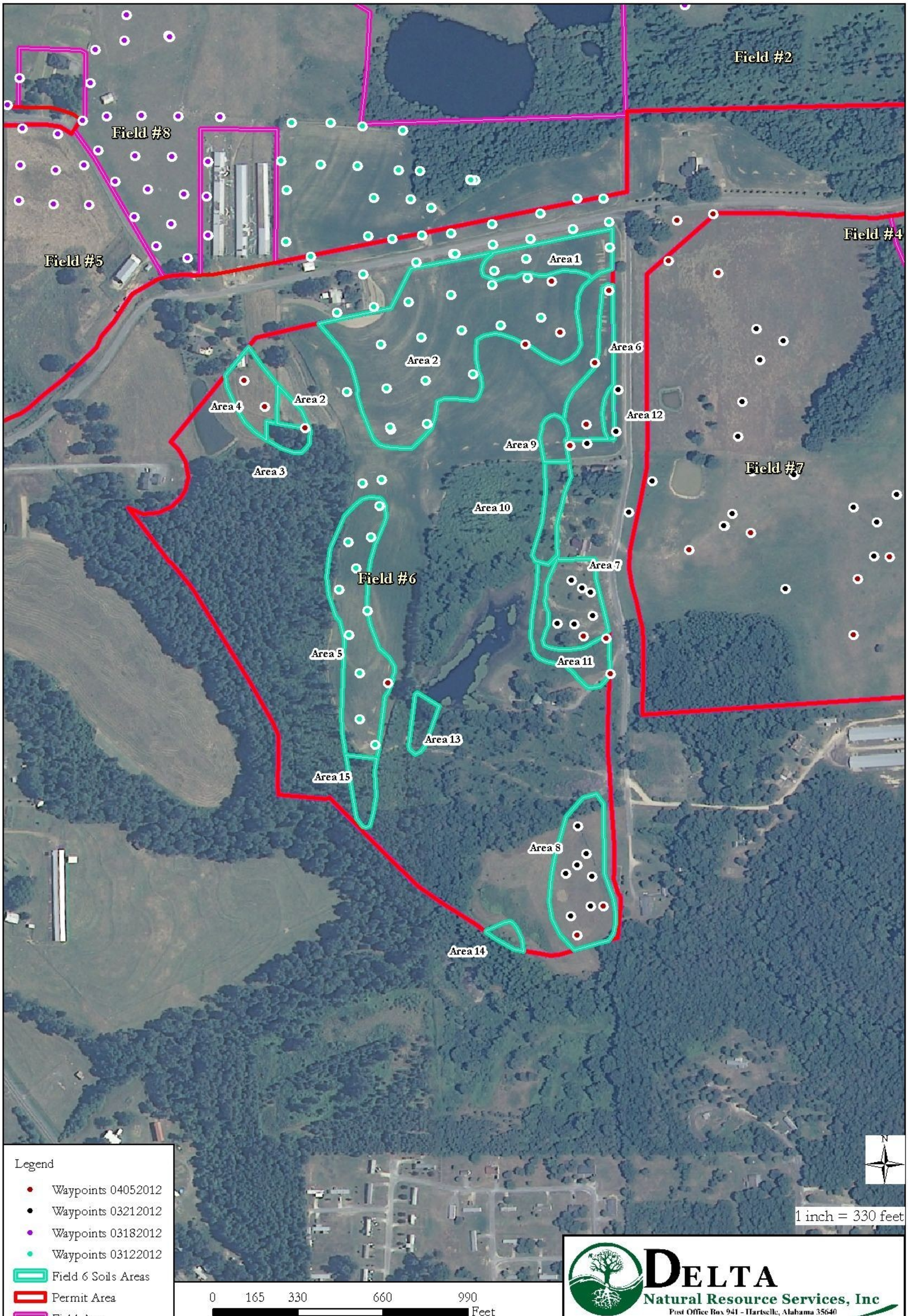
April 2012

Seven Oaks Land And Mineral LLC
Thunder Oaks Mine
Field 6 Waypoint Map

Sylvania DOQ
S2 - 4, 10, 11 T6S R8E



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Map Unit HcS (Field 6 Area 1) Prime Farmland to be Restored

(Cropland)

The dominant topsoil (A horizon) thickness for the Map Unit HcS is between 6.5 and 8 inches. The dominant texture is sandy loam. The average thickness is 7 inches. Therefore, it seems practical to remove the top 7 inches of sandy loam soil from Map Unit HcS area 1 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for Map Unit HcS area 1 is between 15 and 18 inches. The average thickness for the B plus its other underlying soil horizons is 17 inches. The textures of the subsoil horizons are loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 17 inches of this soil (B) from Map Unit HcS area 1 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 24 inches for Map Unit HcS Area 1 (7 inches of top soil and 17 inches of B horizon).

Field # 6					
Horizon thickness and estimated soil volumes to remove and replace					
Area	**surface thickness to res.**	**subsoil thickness to res**	**acres**	**cy surface**	**cy subsoil**
1	7 inches	17 inches	1.5	121	282

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored.

** The field aces were adjusted lower to compensate for 15% inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

Map Unit Hc (Field 6 Area 2) Prime Farmland to be Restored

(Cropland)

The dominant topsoil (A horizon) thickness for the Map Unit Hc is between 6.5 and 7 inches. The dominant texture is sandy loam. The average thickness is 7 inches. Therefore, it seems practical to remove the top 7 inches of sandy loam soil from Map Unit Hc area 2 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for Map Unit Hc area 2 is between 36 and 40 inches. The average thickness for the B plus its other underlying soil horizons is 38 inches. The textures of the subsoil horizons are loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 38 inches of this soil (B) from Map Unit Hc area 2 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 45 inches for Map Unit Hc Area 2 (7 inches of top soil and 38 inches of B horizon).

Field # 6					
Horizon thickness and estimated soil volumes to remove and replace					
Area	**surface thickness to res.**	**subsoil thickness to res**	**acres**	**cy surface**	**cy subsoil**
2	7 inches	38 inches	9.3	725	3,951

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored.

** The field aces were adjusted lower to compensate for 15% inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

Map Unit Hc (Field 6 Area 4) Prime Farmland to be Restored

(Pasture)

The dominant topsoil (A horizon) thickness for the Map Unit Hc is between 6.5 and 7 inches. The dominant texture is sandy loam. The average thickness is 7 inches. Therefore, it seems practical to remove the top 7 inches of sandy loam soil from Map Unit Hc area 4 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for Map Unit Hc area 4 is between 36 and 40 inches. The average thickness for the B plus its other underlying soil horizons is 38 inches. The textures of the subsoil horizons are loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 38 inches of this soil (B) from Map Unit Hc area 4 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 45 inches for Map Unit Hc Area 4 (7 inches of top soil and 38 inches of B horizon).

Field # 6					
Horizon thickness and estimated soil volumes to remove and replace					
Area	**surface thickness to res.**	**subsoil thickness to res**	**acres**	**cy surface**	**cy subsoil**
4	7 inches	38 inches	1	78	425

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored.

** The field aces were adjusted lower to compensate for 15% inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

Map Unit An (Field 6 Area 5) Prime Farmland to be Restored

(Cropland)

The dominant topsoil (A horizon) thickness for the Map Unit An is between 6 and 8 inches. The dominant texture is sandy loam. The average thickness is 7 inches. Therefore, it seems practical to remove the top 7 inches of sandy loam soil from Map Unit An area 5 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for Map Unit An area 5 is between 23 and 26 inches. The average thickness for the B plus its other underlying soil horizons is 25 inches. The textures of the subsoil horizons are loam, clay loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 25 inches of this soil (B) from Map Unit An area 5 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 32 inches for Map Unit An Area 5 (7 inches of top soil and 25 inches of B horizon).

Field # 6					
Horizon thickness and estimated soil volumes to remove and replace.					
Area	**surface thickness to res.**	**subsoil thickness to res**	**acres**	**cy surface**	**cy subsoil**
5	7 inches	25 inches	2.98**	232	833

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored.

** The field aces were adjusted lower to compensate for 15% inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

Map Unit An (Field 6 Area 6) Prime Farmland to be Restored

(Cropland)

The dominant topsoil (A horizon) thickness for the Map Unit An is between 6 and 8 inches. The dominant texture is loam. The average thickness is 7 inches. Therefore, it seems practical to remove the top 7 inches of loam soil from Map Unit An area 6 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for Map Unit An area 6 is between 31 and 44 inches. The average thickness for the B plus its other underlying soil horizons is 38 inches. The textures of the subsoil horizons are loam, clay loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 38 inches of this soil (B) from Map Unit An area 6 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 45 inches for Map Unit An Area 6 (7 inches of top soil and 38 inches of B horizon).

Field # 6					
Horizon thickness and estimated soil volumes to remove and replace					
Area	**surface thickness to res.**	**subsoil thickness to res**	**acres**	**cy surface**	**cy subsoil**
6	7 inches	38 inches	1.3	105	559

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored.

** The field aces were adjusted lower to compensate for 15% inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

Map Unit An (Field 6 Area 7) Prime Farmland to be Restored

The dominant topsoil (A horizon) thickness for Map Unit An is between 5 and 7 inches. The dominant texture is loam. The average thickness is 6 inches. Therefore, it seems practical to remove the top 6 inches of sandy loam soil from the Map Unit An area 7 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for Map Unit An area 7 is between 20 and 31 inches. The average thickness for the B plus its other underlying soil horizons is 26 inches. The textures of the subsoil horizons are loam, clay loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 26 inches of this soil (B) from the Map Unit An area 7 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 32 inches for Map Unit An Area 7 (6 inches of top soil and 26 inches of B horizon).

Field # 6					
Soil volumes before shrink/swell compensation					
Area	**surface thickness to res.**	**subsoil thickness to res**	**acres**	**cy surface**	**cy subsoil**
7	6 inches	26 inches	1.6	108	473
Soil volumes applying shrink/swell compensation					
Area	**surface thickness to res.**	**subsoil thickness to res**	**acres**	**cy surface**	**cy subsoil**
7	5.8 inches	23 inches	1.6	108	409

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored

Map Unit An (Field 6 Area 8) Prime Farmland to be Restored

(Pasture)

The dominant topsoil (A horizon) thickness for the Map Unit An is between 5 and 6 inches. The dominant texture is sandy loam. The average thickness is 6 inches. Therefore, it seems practical to remove the top 6 inches of sandy loam soil from the Map Unit An area 8 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for Map Unit An area 8 is between 21 and 25 inches. The average thickness for the B plus its other underlying soil horizons is 23 inches. The textures of the subsoil horizons are loam, clay loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 23 inches of this soil (B) from Map Unit An area 8 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 29 inches for Map Unit An Area 8 (6 inches of top soil and 23 inches of B horizon).

Field # 6					
Horizon thickness and estimated soil volumes to remove and replace					
Area	**surface thickness to res.**	**subsoil thickness to res**	**acres**	**cy surface**	**cy subsoil**
8	6 inches	23 inches	2.6	174	664

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored.

** The field aces were adjusted lower to compensate for 15% inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

Map Unit Cl (Field 6 Areas 9 & 12) Prime Farmland to be Restored

(Cropland)

The dominant topsoil (A horizon) thickness for the Map Unit Cl is between 7 and 8 inches. The dominant texture is sandy loam. The average thickness is 7 inches. Therefore, it seems practical to remove the top 7 inches of sandy loam soil from Map Unit Cl areas 9 & 12 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for Map Unit Cl areas 9 & 12 is between 23 and 27 inches. The average thickness for the B plus its other underlying soil horizons is 25 inches. The textures of the subsoil horizons are loam, clay loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 25 inches of this soil (B) from Map Unit Cl areas 9 & 12 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 32 inches for Map Unit Cl Areas 9 & 12 (7 inches of top soil and 25 inches of B horizon).

Field # 6					
Horizon thickness and estimated soil volumes to remove and replace					
Area	**surface thickness to res.**	**subsoil thickness to res**	**acres**	**cy surface**	**cy subsoil**
9 & 12	7 inches	25 inches	0.6	47	168

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored.

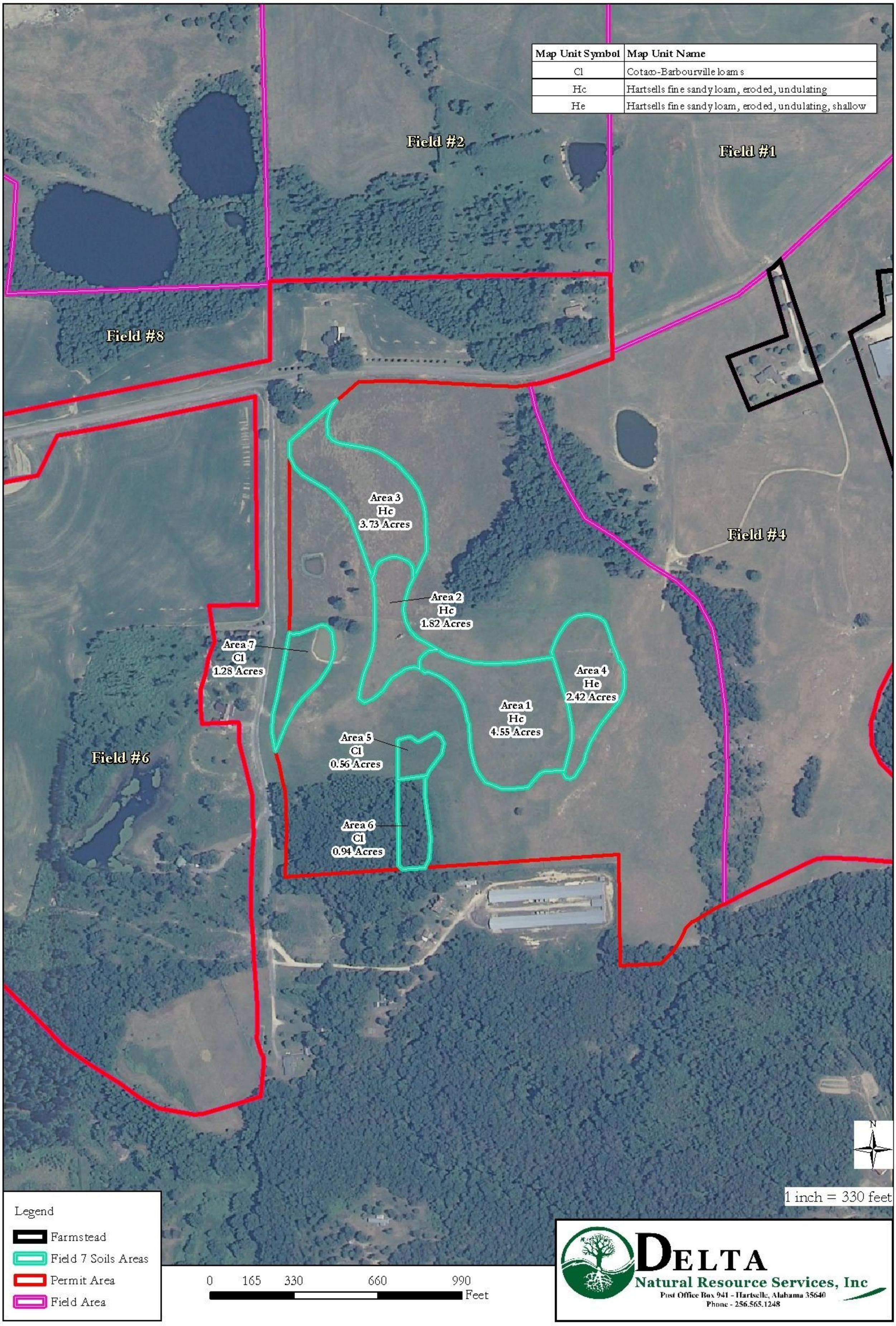
** The field aces were adjusted lower to compensate for 15% inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

Alabama
Dekalb County
April 2012

Seven Oaks Land And Mineral LLC
Thunder Oaks Mine
Field 7 Soils Area Map

Sylvania DOQ
S2 - 4, 10, 11 T6S R8E

Map Unit Symbol	Map Unit Name
Cl	Cotaco-Barbourville loams
Hc	Hartsells fine sandy loam, eroded, undulating
He	Hartsells fine sandy loam, eroded, undulating, shallow



Legend
- Farmstead
- Field 7 Soils Areas
- Permit Area
- Field Area

0 165 330 660 990 Feet

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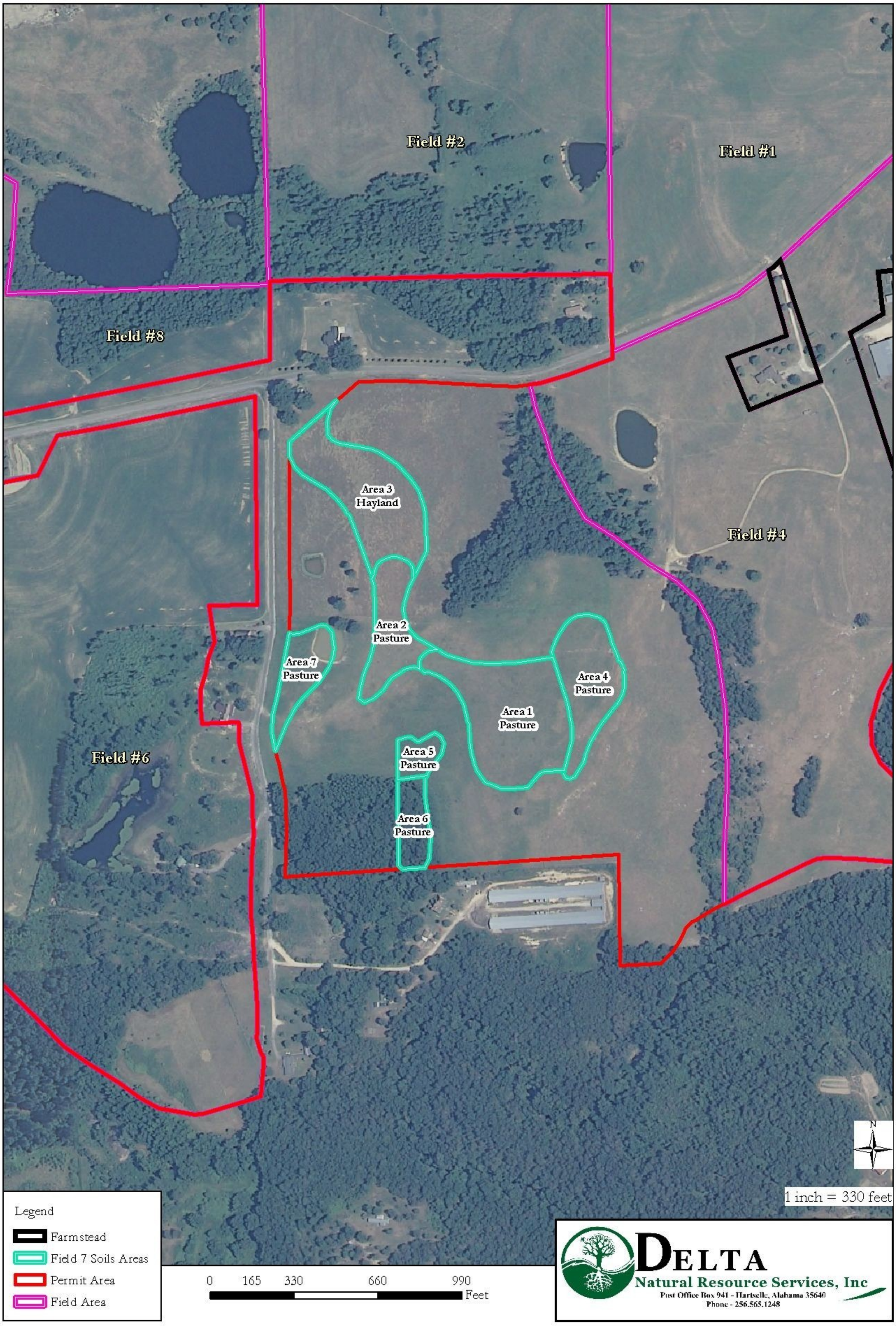
Alabama
Dekalb County
April 2012

Seven Oaks Land And Mineral LLC
Thunder Oaks Mine
Field 7 Land Use Map

Sylvania DOQ
S2 - 4, 10, 11 T6S R8E



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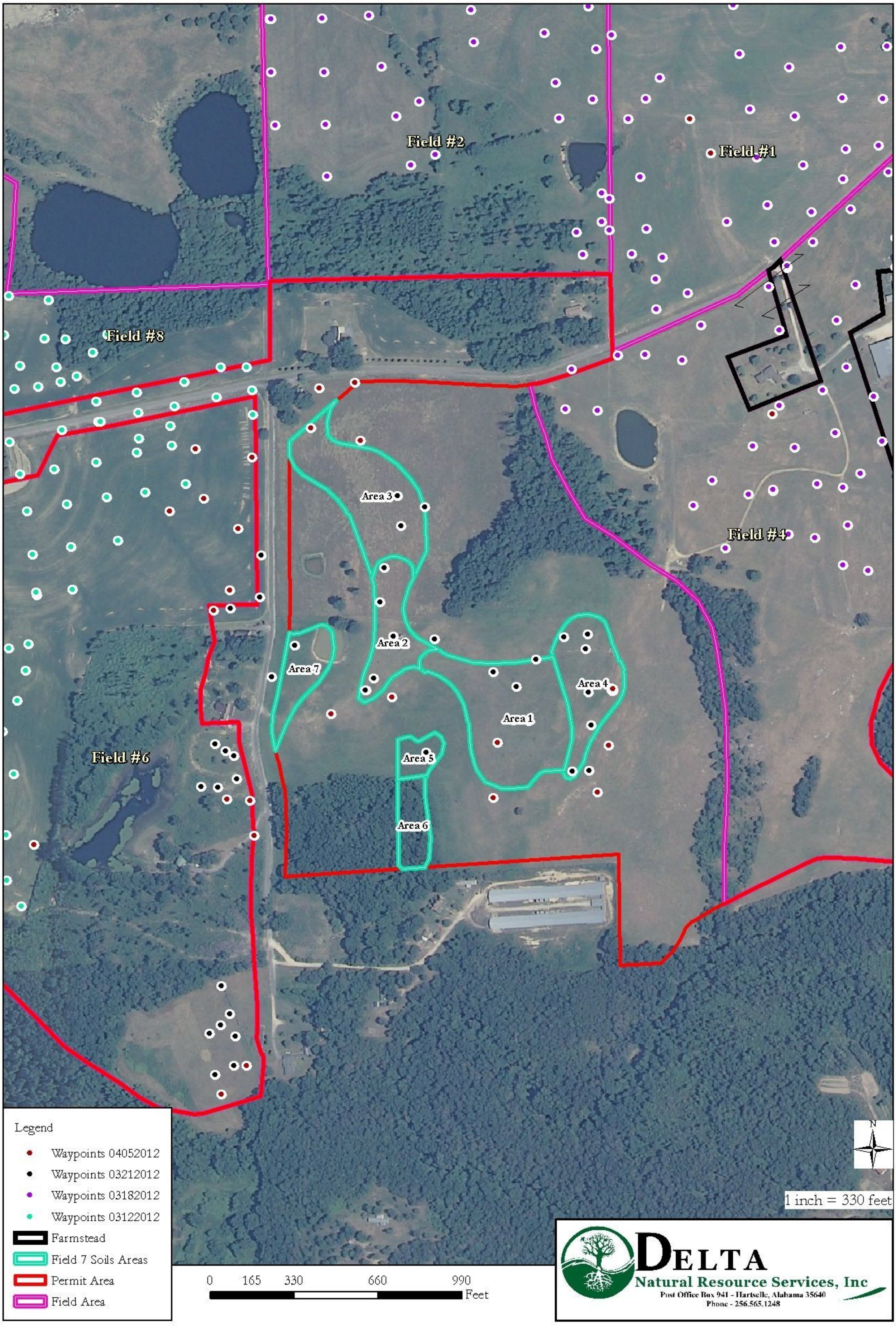
April 2012

Seven Oaks Land And Mineral LLC
Thunder Oaks Mine
Field 7 Waypoint Map

Sylvania DOQ
S2 - 4, 10, 11 T6S R8E



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Map Unit Hc (Field 7 Area 1) Prime Farmland to be Restored

(Hayland)

The dominant topsoil (A horizon) thickness for the Map Unit Hc is 6 inches. The dominant texture is sandy loam. The average thickness is 6 inches. Therefore, it seems practical to remove the top 6 inches of sandy loam soil from Map Unit Hc area 1 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for Map Unit Hc area 1 is between 24 and 29 inches. The average thickness for the B plus its other underlying soil horizons is 26 inches. The textures of the subsoil horizons are loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 26 inches of this soil (B) from Map Unit Hc area 1 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 32 inches for Map Unit Hc Area 1 (6 inches of top soil and 26 inches of B horizon).

Field # 7					
Horizon thickness and estimated soil volumes to remove and replace					
Area	**surface thickness to res.**	**subsoil thickness to res**	**acres**	**cy surface**	**cy subsoil**
1	6 inches	26 inches	3.9**	262	1,132

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored.

** The field aces were adjusted lower to compensate for 15% inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

Map Unit Hc (Field 7 Area 2) Prime Farmland to be Restored

(Hayland)

The dominant topsoil (A horizon) thickness for the Map Unit Hc is between 5 and 6 inches. The dominant texture is sandy loam. The average thickness is 6 inches. Therefore, it seems practical to remove the top 6 inches of sandy loam soil from Map Unit Hc area 2 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for Map Unit Hc area 2 is between 19 and 24 inches. The average thickness for the B plus its other underlying soil horizons is 22 inches. The textures of the subsoil horizons are loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 22 inches of this soil (B) from Map Unit Hc area 2 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 28 inches for Map Unit Hc Area 2 (6 inches of top soil and 22 inches of B horizon).

Field # 7					
Soil volumes before shrink/swell compensation					
Area	**surface thickness to res.**	**subsoil thickness to res**	**acres**	**cy surface**	**cy subsoil**
2	6 inches	22 inches	1.46**	98	359

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored.

** The field aces were adjusted lower to compensate for 20 % inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

Map Unit Hc (Field 7 Area 3) Prime Farmland to be Restored

(Hayland)

The dominant topsoil (A horizon) thickness for the Map Unit Hc is between 6 and 7 inches. The dominant texture is sandy loam. The average thickness is 6 inches. Therefore, it seems practical to remove the top 6 inches of sandy loam soil from Map Unit Hc area 3 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for Map Unit Hc area 3 is between 23 and 28 inches. The average thickness for the B plus its other underlying soil horizons is 25 inches. The textures of the subsoil horizons are loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 25 inches of this soil (B) from Map Unit Hc area 3 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 31 inches for Map Unit Hc Area 3 (6 inches of top soil and 25 inches of B horizon).

Field # 7					
Horizon thickness and estimated soil volumes to remove and replace					
Area	**surface thickness to res.**	**subsoil thickness to res**	**acres**	**cy surface**	**cy subsoil**
3	6 inches	25 inches	3.73	250	1,053

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored.

** The field aces were adjusted lower to compensate for 15% inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

Map Unit He (Field 7 Area 4) Prime Farmland to be Restored

(Hayland)

The dominant topsoil (A horizon) thickness for the Map Unit He is between 4 and 8 inches. The dominant texture is sandy loam. The average thickness is 6 inches. Therefore, it seems practical to remove the top 6 inches of sandy loam soil from Map Unit He area 4 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for Map Unit He area 4 is between 16 and 25 inches. The average thickness for the B plus its other underlying soil horizons is 21 inches. The textures of the subsoil horizons are loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 21 inches of this soil (B) from Map Unit He area 4 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 27 inches for Map Unit He Area 4 (6 inches of top soil and 21 inches of B horizon).

Field # 7					
Horizon thickness and estimated soil volumes to remove and replace					
Area	**surface thickness to res.**	**subsoil thickness to res**	**acres**	**cy surface**	**cy subsoil**
4	6 inches	21 inches	1.92**	129	452

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored.

** The field aces were adjusted lower to compensate for 20 % inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

Map Unit Cl (Field 7 Area 5) Prime Farmland to be Restored

(Hayland)

The dominant topsoil (A horizon) thickness for Map Unit Cl area 5 is between 5 and 7 inches. The dominant texture is loam. The average thickness is 6 inches. Therefore, it seems practical to remove the top 6 inches of loam soil from Map Unit Cl area 5 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for Map Unit Cl area 5 is between 32 and 50 inches. The average thickness for the B plus its other underlying soil horizons is 41 inches. The textures of the subsoil horizons are loam, clay loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 41 inches of this soil (B) from Map Unit Cl area 5 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 47 inches for Map Unit Cl Area 5 (6 inches of top soil and 41 inches of B horizon).

Field # 7					
Horizon thickness and estimated soil volumes to remove and replace					
Area	**surface thickness to res.**	**subsoil thickness to res**	**acres**	**cy surface**	**cy subsoil**
5	6 inches	41 inches	0.56	37	256

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored.

** The field aces were adjusted lower to compensate for 15% inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

Map Unit Cl (Field 7 Area 7) Prime Farmland to be Restored

(Pasture)

The dominant topsoil (A horizon) thickness for the Map Unit Cl area 7 is between 5 and 7 inches. The dominant texture is loam. The average thickness is 6 inches. Therefore, it seems practical to remove the top 6 inches of loam soil from Map Unit Cl area 7 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for Map Unit Cl area 7 is between 32 and 50 inches. The average thickness for the B plus its other underlying soil horizons is 41 inches. The textures of the subsoil horizons are loam, clay loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 41 inches of this soil (B) from Map Unit Cl area 7 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 47 inches for Map Unit Cl Area 7 (6 inches of top soil and 41 inches of B horizon).

Field # 7					
Horizon thickness and estimated soil volumes to remove and replace					
Area	**surface thickness to res.**	**subsoil thickness to res**	**acres**	**cy surface**	**cy subsoil**
7	6 inches	41 inches	1.28	86	585

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored.

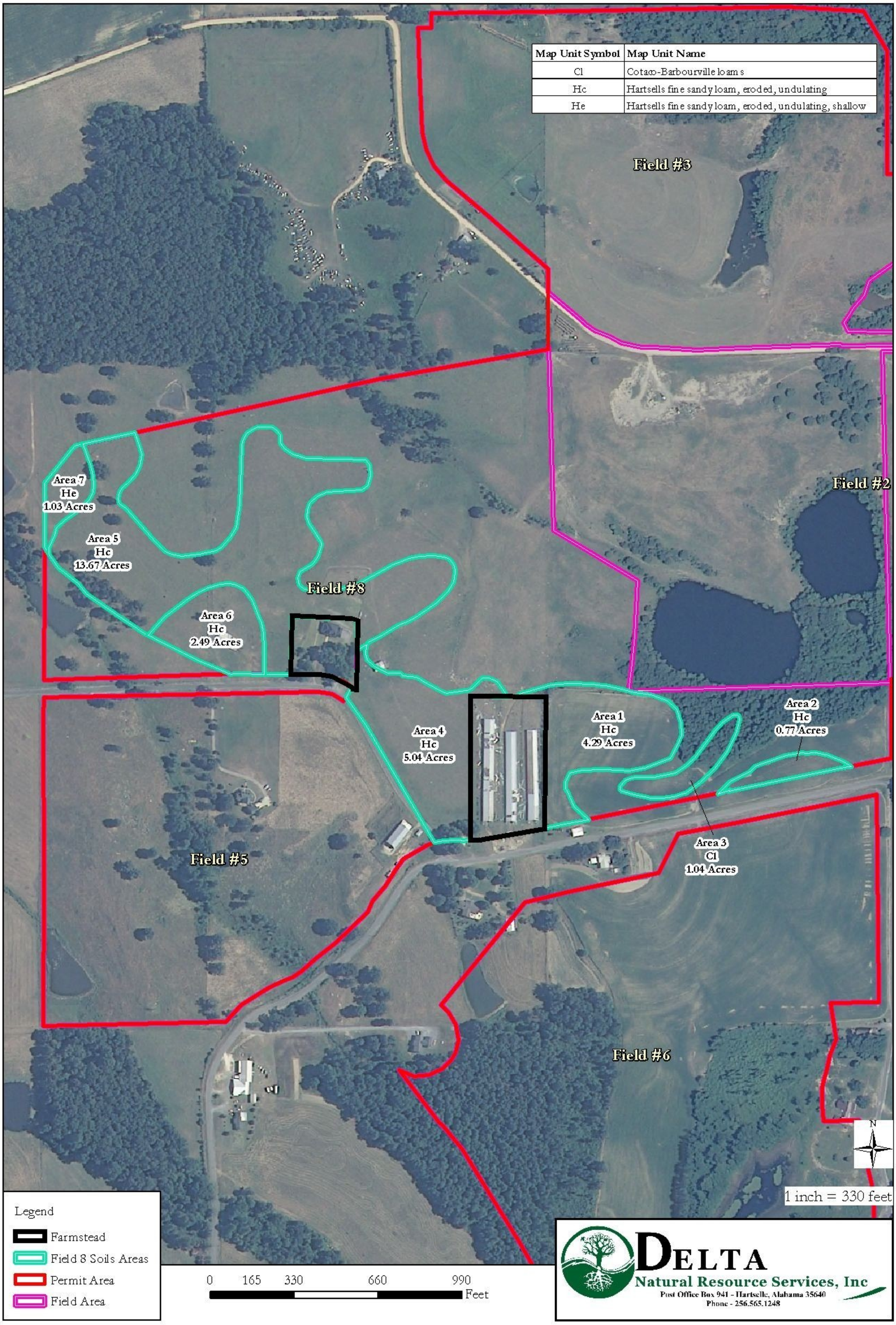
** The field aces were adjusted lower to compensate for 15% inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

Alabama
Dekalb County
April 2012

Seven Oaks Land And Mineral LLC
Thunder Oaks Mine
Field 8 Soils Area Map

Sylvania DOQ
S2 - 4, 10, 11 T6S R8E

Map Unit Symbol	Map Unit Name
Cl	Cotaco-Barbourville loams
Hc	Hartsells fine sandy loam, eroded, undulating
He	Hartsells fine sandy loam, eroded, undulating, shallow



Legend
- Farmstead
- Field 8 Soils Areas
- Permit Area
- Field Area

0 165 330 660 990 Feet

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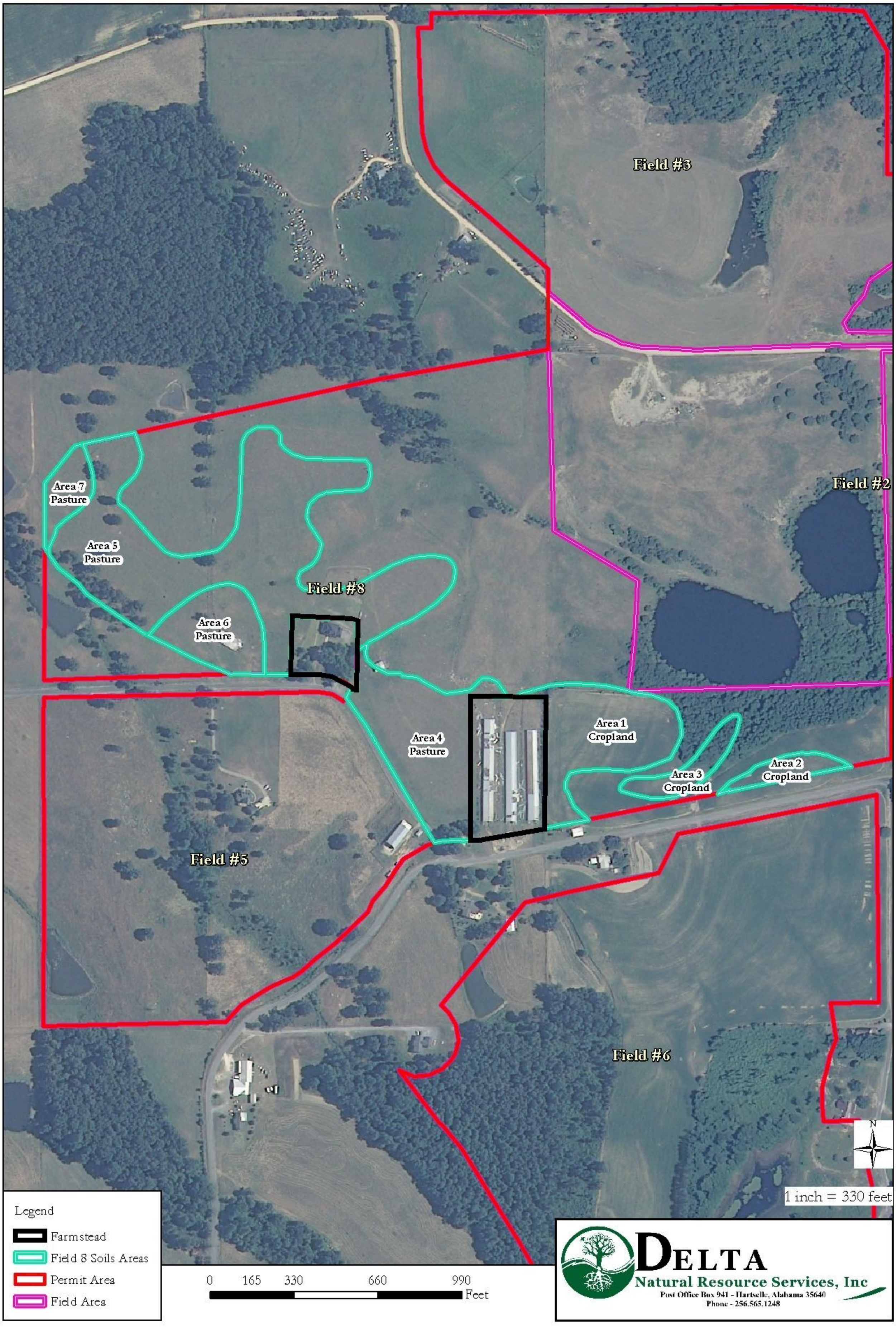
Alabama
Dekalb County
April 2012

Seven Oaks Land And Mineral LLC
Thunder Oaks Mine
Field 8 Land Use Map

Sylvania DOQ
S2 - 4, 10, 11 T6S R8E



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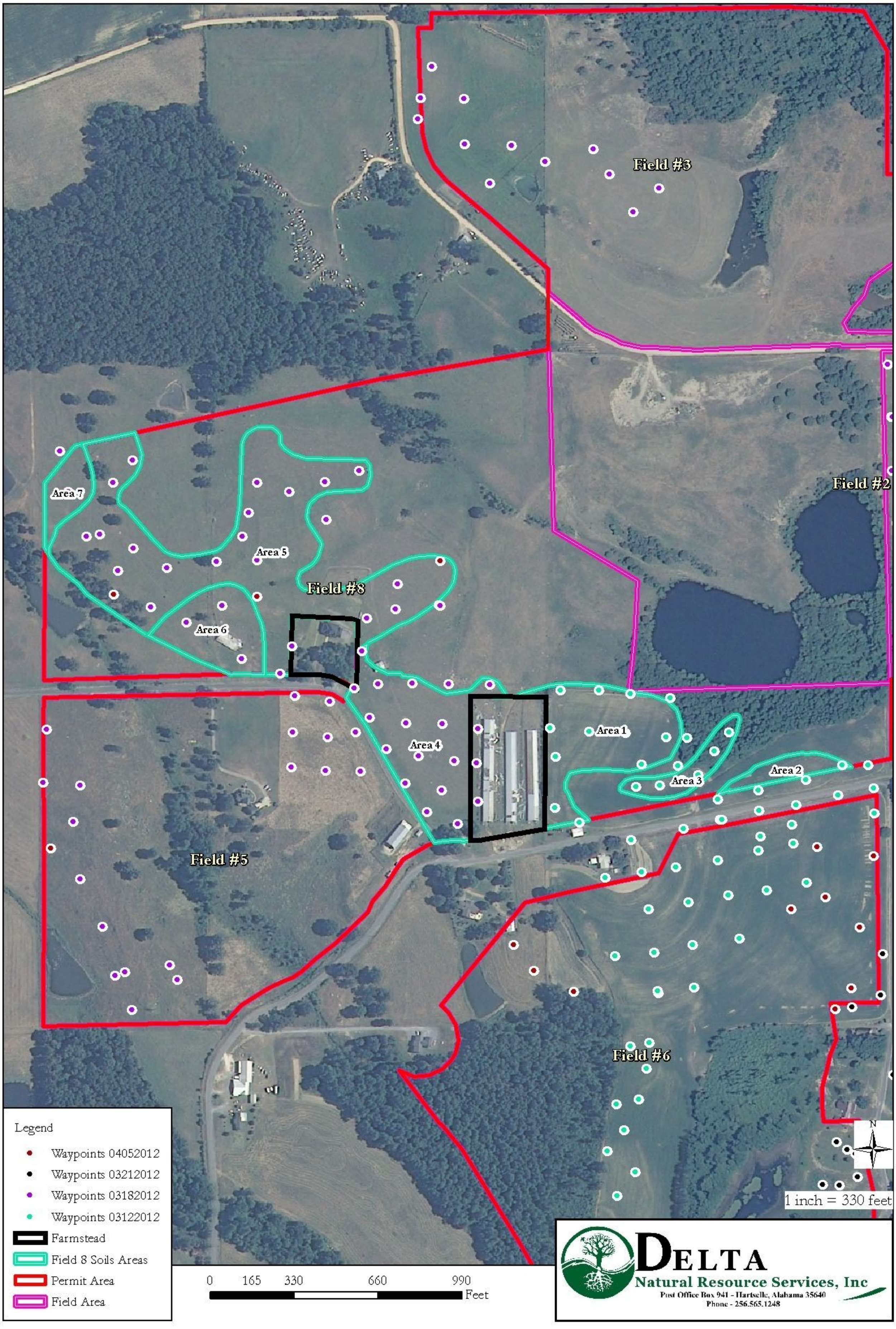
Dekalb County
April 2012

Seven Oaks Land And Mineral LLC
Thunder Oaks Mine
Field 8 Waypoint Map

Sylvania DOQ
S2 - 4, 10, 11 T6S R8E



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Map Unit Hc (Field 8 Area 1) Prime Farmland to be Restored

(Cropland)

The dominant topsoil (A horizon) thickness for the Map Unit Hc is between 6.5 and 7 inches. The dominant texture is sandy loam. The average thickness is 7 inches. Therefore, it seems practical to remove the top 7 inches of sandy loam soil from Map Unit Hc area 1 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for Map Unit Hc area 1 is between 34 and 38 inches. The average thickness for the B plus its other underlying soil horizons is 36 inches. The textures of the subsoil horizons are loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 36 inches of this soil (B) from Map Unit Hc area 1 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 43 inches for Map Unit Hc Area 1 (7 inches of top soil and 36 inches of B horizon).

Field # 8					
Horizon thickness and estimated soil volumes to remove and replace					
Area	**surface thickness to res.**	**subsoil thickness to res**	**acres**	**cy surface**	**cy subsoil**
1	7 inches	36 inches	4.29	346	1,730

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored

** The field aces were adjusted lower to compensate for 15% inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

Map Unit Hc (Field 8 Area 2) Prime Farmland to be Restored

(Cropland)

The dominant topsoil (A horizon) thickness for the Map Unit Hc is between 5 and 7 inches. The dominant texture is sandy loam. The average thickness is 6 inches. Therefore, it seems practical to remove the top 6 inches of sandy loam soil from Map Unit Hc area 2 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for Map Unit Hc area 2 is between 23 and 35 inches. The average thickness for the B plus its other underlying soil horizons is 29 inches. The textures of the subsoil horizons are loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 29 inches of this soil (B) from Map Unit Hc area 2 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 35 inches for Map Unit Hc Area 2 (6 inches of top soil and 29 inches of B horizon).

Field # 8					
Horizon thickness and estimated soil volumes to remove and replace					
Area	**surface thickness to res.**	**subsoil thickness to res**	**acres**	**cy surface**	**cy subsoil**
2	6 inches	29 inches	0.77	52	249

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored.

** The field aces were adjusted lower to compensate for 15% inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

Map Unit Cl (Field 8 Area 3A) Prime Farmland to be Restored

(Cropland)

The dominant topsoil (A horizon) thickness for the Map Unit Cl is between 8 and 9 inches. The dominant texture is loam. The average thickness is 8 inches. Therefore, it seems practical to remove the top 8 inches of loam soil from Map Unit Cl area 3 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for Map Unit Cl area 3 is between 31 and 46 inches. The average thickness for the B plus its other underlying soil horizons is 39 inches. The textures of the subsoil horizons are loam, clay loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 39 inches of this soil (B) from the Map Unit Cl area 3 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 47 inches for Map Unit Cl Area 3 (8 inches of top soil and 39 inches of B horizon).

Field # 8					
Horizon thickness and estimated soil volumes to remove and replace					
Area	**surface thickness to res.**	**subsoil thickness to res**	**acres**	**cy surface**	**cy subsoil**
3A	8 inches	39 inches	0.5	47	221

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored.

** The field aces were adjusted lower to compensate for 15% inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

Map Unit Hc (Field 8 Area 4) Prime Farmland to be Restored

(Pasture)

The dominant topsoil (A horizon) thickness for the Map Unit Hc is between 7 and 8 inches. The dominant texture is sandy loam. The average thickness is 8 inches. Therefore, it seems practical to remove the top 8 inches of sandy loam soil from Map Unit Hc area 4 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for Map Unit Hc area 4 is between 43 and 44 inches. The average thickness for the B plus its other underlying soil horizons is 41 inches. The textures of the subsoil horizons are loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 41 inches of this soil (B) from Map Unit Hc area 4 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 48* inches for Map Unit Hc Area 4 (7 inches of top soil and 41 inches of B horizon).

Field # 8					
Horizon thickness and estimated soil volumes to remove and replace					
Area	**surface thickness to res.**	**subsoil thickness to res**	**acres**	**cy surface**	**cy subsoil**
4	8 inches	40 inches	5.0	471	2,218

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored.

** The field aces were adjusted lower to compensate for 15% inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

Map Unit Hc (Field 8 Area 5) Prime Farmland to be Restored

(Pasture)

The dominant topsoil (A horizon) thickness for the Map Unit Hc is between 7 and 8 inches. The dominant texture is sandy loam. The average thickness is 8 inches. Therefore, it seems practical to remove the top 8 inches of sandy loam soil from Map Unit Hc area 5 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for Map Unit Hc area 5 is between 36 and 40 inches. The average thickness for the B plus its other underlying soil horizons is 38 inches. The textures of the subsoil horizons are loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 38 inches of this soil (B) from Map Unit Hc area 5 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 46 inches for Map Unit Hc Area 5 (8 inches of top soil and 38 inches of B horizon).

Field # 8					
Horizon thickness and estimated soil volumes to remove and replace					
Area	**surface thickness to res.**	**subsoil thickness to res**	**acres**	**cy surface**	**cy subsoil**
5	8 inches	38 inches	13.7	1,289	5,894

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored.

** The field aces were adjusted lower to compensate for 15% inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

Map Unit Hc (Field 8 Area 6) Prime Farmland to be Restored

(Pasture)

The dominant topsoil (A horizon) thickness for the Map Unit Hc is between 7 and 9 inches. The dominant texture is sandy loam. The average thickness is 8 inches. Therefore, it seems practical to remove the top 8 inches of sandy loam soil from Map Unit Hc area 6 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for Map Unit Hc area 6 is between 12 and 17 inches. The average thickness for the B plus its other underlying soil horizons is 14 inches. The textures of the subsoil horizons are loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 14 inches of this soil (B) from Map Unit Hc area 6 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 22 inches for Map Unit Hc Area 6 (8 inches of top soil and 14 inches of B horizon).

Field # 8					
Horizon thickness and estimated soil volumes to remove and replace					
Area	**surface thickness to res.**	**subsoil thickness to res**	**acres**	**cy surface**	**cy subsoil**
6	8 inches	14 inches	2.49	234	401

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored.

** The field aces were adjusted lower to compensate for 15% inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

Map Unit He (Field 8 Area 7) Prime Farmland to be Restored

(Pasture)

The dominant topsoil (A horizon) thickness for the Map Unit He is between 6 and 8 inches. The dominant texture is sandy loam. The average thickness is 7 inches. Therefore, it seems practical to remove the top 7 inches of sandy loam soil from Map Unit He area 7 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for Map Unit He area 7 is between 20 and 46 inches. The average thickness for the B plus its other underlying soil horizons is 33 inches. The textures of the subsoil horizons are loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 33 inches of this soil (B) from Map Unit He area 7 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 40 inches for Map Unit He Area 7 (7 inches of top soil and 33 inches of B horizon).

Field # 8					
Horizon thickness and estimated soil volumes to remove and replace					
Area	**surface thickness to res.**	**subsoil thickness to res**	**acres**	**cy surface**	**cy subsoil**
7	7 inches	33 inches	1.03	83	388

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored.

** The field aces were adjusted lower to compensate for 15% inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

Alabama
Dekalb County
April 2012

Seven Oaks Land And Mineral LLC
Thunder Oaks Mine
Field 9 Soils Area Map

Sylvania DOQ
S2 - 4, 10, 11 T6S R8E

Map Unit Symbol	Map Unit Name
Hc	Hartsells fine sandy loam, eroded, undulating

Field #9

Area 2
Hc
1.24 Acres

Area 3
Hc
1.2 Acres

Area 1
Hc
5.83 Acres

Legend
- Farmstead
- Field 9 Soils Areas
- Permit Area
- Field Area

0 82.5 165 330 495 Feet

N

1 inch = 165 feet

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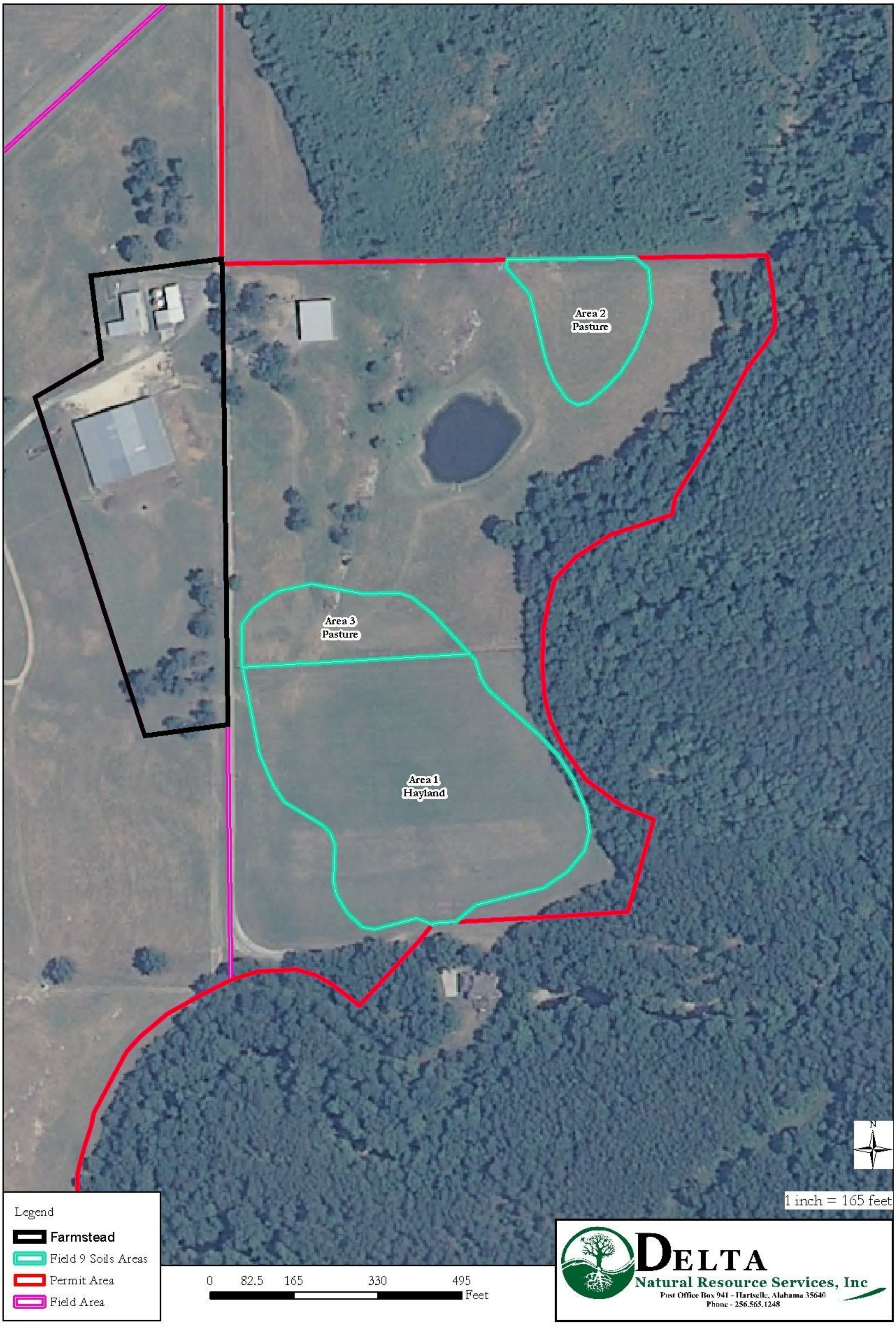
Alabama
Dekalb County
April 2012

Seven Oaks Land And Mineral LLC
Thunder Oaks Mine
Field 9 Land Use Map

Sylvania DOQ
S2 - 4, 10, 11 T6S R8E



Legend
- Farmstead
- Field 9 Soils Areas
- Permit Area
- Field Area

0 82.5 165 330 495 Feet

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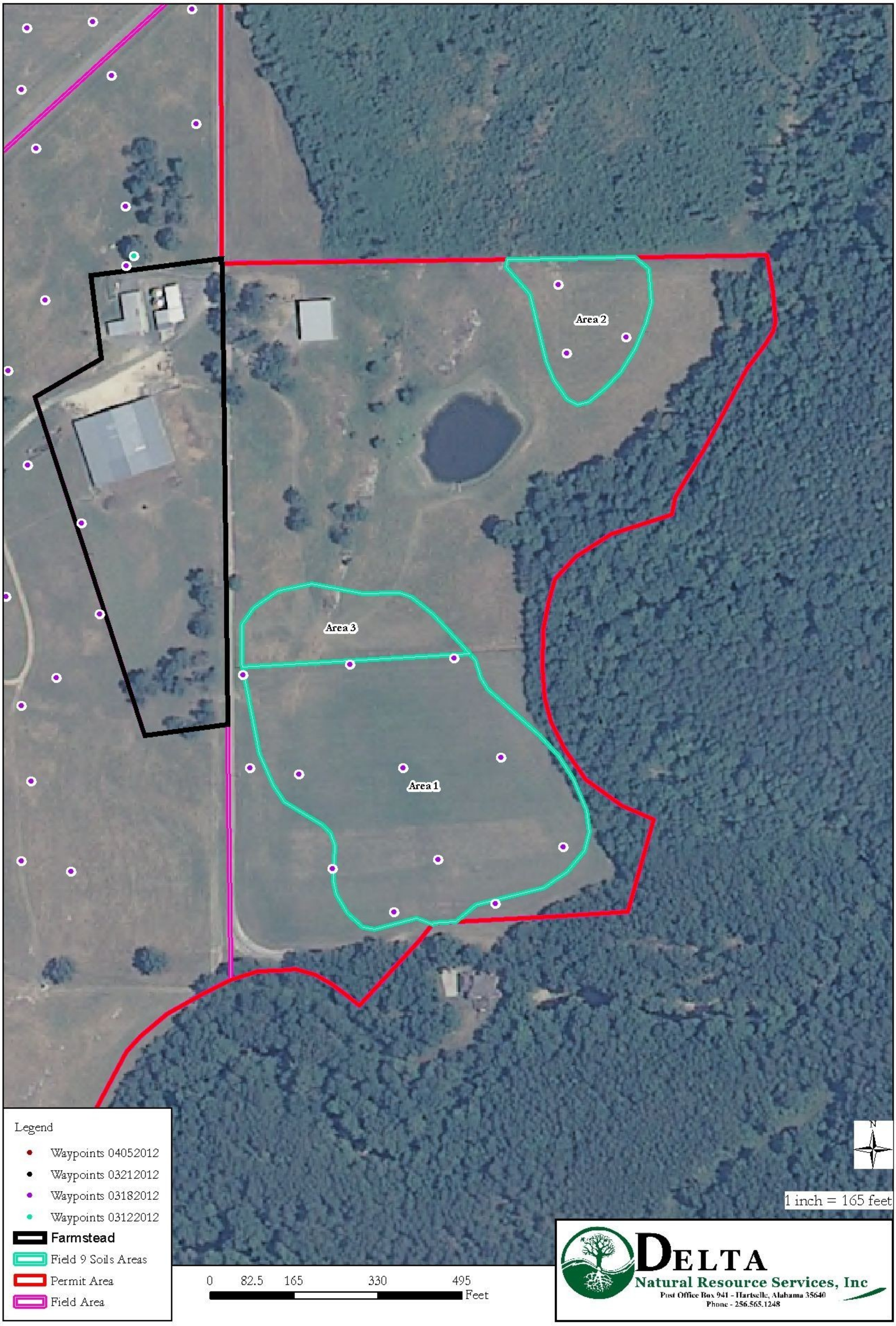
Alabama
Dekalb County
April 2012

Seven Oaks Land And Mineral LLC
Thunder Oaks Mine
Field 9 Waypoint Map

Sylvania DOQ
S2 - 4, 10, 11 T6S R8E



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Map Unit Hc (Field 9 Area 1) Prime Farmland to be Restored

(Hayland)

The dominant topsoil (A horizon) thickness for the Map Unit Hc is between 6 and 7 inches. The dominant texture is sandy loam. The average thickness is 6 inches. Therefore, it seems practical to remove the top 6 inches of sandy loam soil from Map Unit Hc area 1 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for Map Unit Hc area 1 is between 27 and 31 inches. The average thickness for the B plus its other underlying soil horizons is 29 inches. The textures of the subsoil horizons are loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 29 inches of this soil (B) from Map Unit Hc area 1 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 35 inches for Map Unit Hc Area 1 (6 inches of top soil and 29 inches of B horizon).

Field # 9					
Horizon thickness and estimated soil volumes to remove and replace					
Area	**surface thickness to res.**	**subsoil thickness to res**	**acres**	**cy surface**	**cy subsoil**
1	6 inches	29 inches	5.84	393	1,884

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored.

** The field aces were adjusted lower to compensate for 15% inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

Map Unit Hc (Field 9 Area 2) Prime Farmland to be Restored

(Hayland)

The dominant topsoil (A horizon) thickness for the Map Unit Hc is between 5 and 7 inches. The dominant texture is sandy loam. The average thickness is 6 inches. Therefore, it seems practical to remove the top 6 inches of sandy loam soil from Map Unit Hc area 2 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for Map Unit Hc area 2 is between 20 and 36 inches. The average thickness for the B plus its other underlying soil horizons is 28 inches. The textures of the subsoil horizons are loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 28 inches of this soil (B) from Map Unit Hc area 2 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 34 inches for Map Unit Hc Area 2 (6 inches of top soil and 28 inches of B horizon).

Field # 9					
Horizon thickness and estimated soil volumes to remove and replace					
Area	**surface thickness to res.**	**subsoil thickness to res**	**acres**	**cy surface**	**cy subsoil**
2	6 inches	28 inches	1.24	83	383

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored.

** The field aces were adjusted lower to compensate for 15% inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

Map Unit Hc (Field 9 Area 3) Prime Farmland to be Restored

(Pasture)

The dominant topsoil (A horizon) thickness for the Map Unit Hc is between 6 and 7 inches. The dominant texture is sandy loam. The average thickness is 6 inches. Therefore, it seems practical to remove the top 6 inches of sandy loam soil from Map Unit Hc area 3 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for Map Unit Hc area 3 is between 27 and 31 inches. The average thickness for the B plus its other underlying soil horizons is 29 inches. The textures of the subsoil horizons are loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 29 inches of this soil (B) from Map Unit Hc area 3 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 35 inches for Map Unit Hc Area 3 (6 inches of top soil and 29 inches of B horizon).

Field # 9					
Horizon thickness and estimated soil volumes to remove and replace					
Area	**surface thickness to res.**	**subsoil thickness to res**	**acres**	**cy surface**	**cy subsoil**
3	6 inches	29 inches	0.5	34	161

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored.

** The field aces were adjusted lower to compensate for 15% inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

Map Unit Hc (Field 9 Areas 4 & 5) Prime Farmland to be Restored

(Hayland)

The dominant topsoil (A horizon) thickness for the Map Unit Hc is between 6 and 7 inches. The dominant texture is sandy loam. The average thickness is 6 inches. Therefore, it seems practical to remove the top 6 inches of sandy loam soil from Map Unit Hc areas 4 & 5 and stockpile it for future redistribution and Prime Farmland restoration.

The dominant thickness of the B and other underlying soil horizons for Map Unit Hc areas 4 & 5 is between 27 and 31 inches. The average thickness for the B plus its other underlying soil horizons is 29 inches. The textures of the subsoil horizons are loam and sandy clay loam. These horizons vary in occurrence and thickness. Due to the fact that the B horizon and its underlying soil horizons are similar with respect to agricultural production, it seems practical to remove 29 inches of this soil (B) from Map Unit Hc areas 4 & 5 and stockpile them together for future redistribution and Prime Farmland restoration.

Total amount of soil to be removed, stored and then replaced is 35 inches for Map Unit Hc Areas 4 & 5 (6 inches of top soil and 29 inches of B horizon).

Field # 9					
Horizon thickness and estimated soil volumes to remove and replace					
Area	**surface thickness to res.**	**subsoil thickness to res**	**acres**	**cy surface**	**cy subsoil**
4 & 5	6 inches	29 inches	0.69	46	223

*ASMC Regulations require no more than 48 inches total of Prime Farmland soils to be restored.

** The field aces were adjusted lower to compensate for 15% inclusion of rock outcrop areas and very shallow soil areas that are not prime farmland.

Soil Profile Notes **(CL)**

Field #1	**Waypoint 084**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 8	10YR 4/3	FISL			
	8 – 18	10YR 4/3	L	10YR 5/4		
	18 – 30	10YR 4/4	L			
	30 – 51	10YR 4/4	SL			

Field #1	**Waypoint 085**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 6	10YR 4/3	SL			
	6 – 33	10YR 5/4	SCL-			
	33 – 38	10YR 5/4	SL			
	38 – 52	10YR 5/4	SCL			

Field #1	**Waypoint # 086**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 4/3	L			
	7 – 24	10YR 5/4	SCL			
	24 - 51	10YR 5/4	SCL+			

Field #1	**Waypoint # 090**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 5	10YR 4/3	SL			
	5 – 30	10YR 5/4	SCL-			
	30 – 48	10YR 5/6	SCL	7.5YR 5/6		
R	48					

Soil Profile Notes **(CL)**

Field #1	**Waypoint 091**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 5	10YR 4/3	L			
	5 – 18	10YR 5/4	SL			
	18 – 35	0YR 5/6	SCL			
	35 – 50	10YR 5/6	SCL+	10YR 6/4		

Soil Profile Notes **(HC)**

Field # 1	**Waypoint # 060**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 4/3	SL		4%	hay crop
Bt1	7 - 18	10YR 4/4	SL			
Bt2	18 – 24	10YR 5/6	SL			
R	24					

Field # 1	**Waypoint # 061**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 5	10YR 4/3	SL		4%	hay crop
Bt	5 – 23	10YR 5/4	SL			
R	23					

Field # 1	**Waypoint # 062**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 5	10YR 4/3	SL		4%	hay crop
Bt1	5 - 10	10YR 5/4	SL			
Bt2	10 - 24	10YR 5/4	SL			
Cr	24					

Area # 1	Waypoint # **063**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
AP	0 - 6	10YR 4/3	SL		4%	hay crop
Bt	6 - 25	10YR 5/4	SL			
Cr	25					

Soil Profile Notes **(HC)**

Field # 1	**Waypoint # 064**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 6	10YR 4/3	SL		4%	hay crop
Bt	6 – 24	10YR 5/4	SL			
Cr	24					

Field # 1	**Waypoint # 065**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 6	10YR 4/3	SL		4%	hay crop
Bt1	6 – 14	10YR 5/4	SL			
Bt2	14 – 48	10YR 5/4	SCL+	10YR 6/8		
Cr	48					

Field # 1	**Waypoint # 066**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 6	10YR 4/3	SL		4%	hay crop
Bt	6 – 24	10YR 5/6	SL			
Cr	24					

Field # 1	**Waypoint # 067**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 4/3	SL		4%	hay crop
Bt1	7 - 20	10YR 5/4	SCL			
Bt2	20 - 36	10YR 5/6	SCL	10YR 6/4		
R	36					

Soil Profile Notes **(HC)**

Field # 1	**Waypoint # 068**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 4/3	SL		4%	hay crop
Bt1	7 – 18	10YR 5/4	SCL			
Bt2	18 – 26	10YR 6/4	SL			
Bt3	26 – 45	10YR 6/8	CL+	5YR 5/6		
Cr	45					

Field # 1	**Waypoint # 069**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 7	10YR 4/3	SL		4%	hay crop
Bt1	7 – 12	10YR 5/4	SL			
Bt2	12 – 33	10YR 5/6	SCL-	10YR 5/6		
Cr	33					

Field # 1	**Waypoint # 070**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 7	10YR 4/3	SL		4%	hay crop
Bt1	7 – 18	10YR 6/8	SIC			
Bt2	18 – 26	10YR 6/8	SIC	5YR 4/6		
Cr	26					

Field # 1	**Waypoint # 071**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 4/3	SL		4%	hay crop
Bt1	7 - 30	10YR 5/4	SCL			
Bt2	30 - 42	7.5YR 5/6	SCL	5YR4/6		
Cr	42					

Soil Profile Notes **(HC)**

Field # 1	**Waypoint # 072**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 7	10YR 4/3	L		4%	hay crop
Bt1	7 – 18	10YR 5/4	SCL-			
Bt2	18 – 33	10YR 5/4	SL			
Bt3	33 – 36	10YR 5/4	SL-	10YR 7/4		
Cr	36					

Field # 1	**Waypoint # 073**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR 4/3	SL		4%	hay crop
Bt1	8 - 26	10YR 5/4	SCL			
Bt2	26 – 48	10YR 6/8	CLAY	5YR 5/6 10YR 6/2		
Cr	48					

Field # 1	**Waypoint # 074**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 5	10YR 4/3	SL		4%	hay crop
Bt1	5 – 26	10YR 5/4	SCL			
Bt2	26 – 48	10YR 6/8	CLAY	10YR 6/2		
Cr	48					

Field # 1	**Waypoint # 075**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 6	10YR 4/3	SL		4%	hay crop
Bt1	6 – 36	10YR 5/6	SCL	7.5YR 5/6		
Bt2	36 - 40	10YR 6/8	CL			
Cr	40					

Soil Profile Notes **(HC)**

Field # 1	**Waypoint # 076**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 7	10YR 4/3	SL		4%	hay crop
Bt	7 – 24	10YR 5/4	SCL			
R	24					

Field # 1	**Waypoint # 077**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR 4/3	SL		4%	hay crop
Bt1	6 – 15	10YR 5/6	SCL-			
Bt2	15 – 33	10YR 5/6	SL			
Cr	33					

Field # 1	**Waypoint # 078**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR 4/3	L		4%	hay crop
Bt	6 – 23	10YR 5/4	SCL-			
R	23					

Field # 1	**Waypoint # 079**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 5	10YR 4/3	SL		4%	hay crop
Bt1	5 – 24	10YR 5/6	SCL			
Bt2	24 – 40	10YR 5/6	SL-	10YR 7/4		
Cr	40					

Soil Profile Notes **(HC)**

Field # 1	**Waypoint # 080**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR 4/3	L		4%	hay crop
Bt1	8 - 30	10YR 5/6	SCL			
Bt2	30 – 36	10YR 6/4	SL	7.5YR 5/6		
Cr	36					

Field # 1	**Waypoint # 081**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 4/3	SL		4%	hay crop
Bt1	7 - 24	10YR 5/4	SCL			
Bt2	24 – 45	10YR 5/6	SL	7.5YR 5/8		
Cr	45					

Field # 1	**Waypoint # 083**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 5	10YR 4/3	SL		4%	hay crop
Bt	5 - 18	10YR 5/4	SL			
R	18					

Soil Profile Notes **(HE)**

Field #1	**Waypoint 092**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 5	10YR 4/3	SL-			hay crop
Bt	5 - 15	10YR 5/6	SCL			
Cr	15					

Field #1	**Waypoint 093**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 5	10YR 4/3	SL-			
Bt1	5 - 15	10YR 5/4	SCL-			
Bt2	15 - 27	10YR 5/4	SCL			
R	27					

Field #1	**Waypoint # 094**					
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 5	10YR 4/3	SL			
Bt1	5 - 15	10YR 5/4	SL			
Bt2	15 – 33	10YR 5/4	SL+			
R	33					

Field #1	**Waypoint # 095**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 5	10YR 4/3	SL			
Bt1	5 – 20	10YR 5/6	SL			
Bt2	20 – 30	10YR 6/8	SCL	7.5YR 5/6		
Cr	30					

Field 1 Area 1 HC Soil Boring Statistics

n = number of soil borings per area
n = 7

$$\bar{x} = \frac{\sum x}{n}$$

Average surface depth = 6.71 inches
Average subsoil depth = 35.14 inches

$$s_{N-1} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \bar{x})^2},$$

Surface Standard Deviation = 0.95
Subsoil Standard Deviation = 2.41

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

Surface standard error = 0.36
Subsoil standard error = 0.91

$t_{\alpha, df} = 1.943$

$CI = x \pm [t_{\alpha, df} \times s_x]$

Surface confidence interval range 6 to 7.4 inches
Subsoil confidence interval range 33.37 to 36.91 inches

Results: There is a 90% confidence that the surface thickness of soil in Field 1 HE ranges from 6 to 7 inches.

Results: There is a 90% confidence that the subsoil thickness of soil in Field 1 HE ranges from 33 to 37 inches.

Field 1 Area 2 HCS Soil Boring Statistics

n = number of soil borings per area
n = 10

$$\bar{x} = \frac{\sum x}{n}$$

Average surface depth = 6.1 inches
Average subsoil depth = 19 inches

$$s_{N-1} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \bar{x})^2},$$

Surface Standard Deviation = 0.74
Subsoil Standard Deviation = 2.94

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

Surface standard error = 0.23
Subsoil standard error = 0.93

$t_{\alpha, df} = 1.83$

$CI = x \pm [t_{\alpha, df} \times s_x]$

Surface confidence interval range 5.67 to 6.5 inches
Subsoil confidence interval range 17.29 to 20.7 inches

Results: There is a 90% confidence that the surface thickness of soil in Field 1 Area 2 HC ranges from 5.5 to 6.5 inches.

Results: There is a 90% confidence that the subsoil thickness of soil in Field 1 Area 2 HC ranges from 17 to 21 inches.

Field 1 Area 3 HE Soil Boring Statistics

n = number of soil borings per area
n = 3

$$\bar{x} = \frac{\sum x}{n}$$

Average surface depth = 5 inches
Average subsoil depth = 25 inches

$$s_{N-1} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \bar{x})^2}.$$

Surface Standard Deviation = 0
Subsoil Standard Deviation = 3

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

Surface standard error = 0
Subsoil standard error = 1.73

$t_{\alpha, df} = 2.92$

$CI = x \pm [t_{\alpha, df} \times s_x]$

Surface confidence interval range 5 to 5 inches
Subsoil confidence interval range 19.94 to 30.06 inches

Results: There is a 90% confidence that the surface thickness of soil in Field 1 HE ranges from 5 to 5 inches.

Results: There is a 90% confidence that the subsoil thickness of soil in Field 1 HE ranges from 20 to 30 inches.

Field 1 Area 4 CL Soil Boring Statistics

n = number of soil borings per area
n = 5

$$\bar{x} = \frac{\sum x}{n}$$

Average surface depth = 6.2 inches
Average subsoil depth = 44.2 inches

$$s_{N-1} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \bar{x})^2},$$

Surface Standard Deviation =1.30
Subsoil Standard Deviation = 1.30

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

Surface standard error = 0.58
Subsoil standard error = 0.58

$t_{\alpha, df} = 2.132$

$CI = x \pm [t_{\alpha, df} \times s_x]$

Surface confidence interval range 4.96 to 7.44 inches
Subsoil confidence interval range 42.95 to 45.44 inches

Results: There is a 90% confidence that the surface thickness of soil in Field 1 CL ranges from 5 to 7 inches.

Results: There is a 90% confidence that the subsoil thickness of soil in Field 1 CL ranges from 43 to 45 inches.

Soil Profile Notes **(CL)**

Field # 2	**Waypoint 127**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10 YR 4/3	L		2%	hay crop
	8 - 24	10YR 4/4	L	10YR 5/6, 5/4 10YR 6/4		
	24 - 49	10YR 5/6	CL	10YR 5/6, 5/4 10YR 6/4		
Bc	49 - 51	10YR 6/8	SL	7.5YR 5/6		

Field # 2	**Waypoint 128**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10 YR 4/4	SL	10YR 6/2	2%	hay crop
	7 - 23	10YR 5/6	SCL	10YR 5/6,6/8 7.5YR 5/6		
	23 - 55	10YR 5/6	L	10YR 5/6,6/8 7.5YR 5/6		

Field # 2	**Waypoint 129**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10 YR 4/3	L		2%	hay crop
	7 - 26	10YR 7/4	SCL			
	26 - 51	7.5YR 5/6	SCL-			

Soil Profile Notes **(HC)**

Field # 2	**Waypoint 110**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 5	10 YR 4/3	SL		3%	hay crop
Bt1	5 - 26	10YR 5/4	SL			
Bt2	26 - 41	10YR 5/6	SCL-			
Btx	41 - 54	10YR 6/4	SL-	7.5YR5/6		

Field # 2	**Waypoint 111**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 4/3	SL		3 %	hay crop
Bt1	7 – 20	10YR 5/4	SCL-			
Bt2	20 - 28	10YR 5/4	SL			
Btx	28 - 54	10YR 5/6	SCL-	10YR 5/6 7.5YR 5/6		

Field # 2	**Waypoint # 112**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 8	10YR 5/4	SL		3%	hay crop
Bt1	8 – 19	10YR 5/6	SL+			
Bt2	19 - 34	10YR5/6	SL			
Btx	34 – 51	7.5YR 5/6	SL+	10YR 6/4, 7.5YR 5/6		

Field # 2	**Waypoint # 113**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 7	10YR 4/4	SL		3%	hay crop
Bt1	7 – 19	10YR 5/4	SCL-			
Bt2	19 – 37	10YR 5/6	SL	7.5YR 5/6		
Bc	37 – 54	7.5YR 5/6	SL	10YR 6/4, 10YR 5/6		

Soil Profile Notes **(HC)**

Field # 2	**Waypoint 114**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 6	10YR 5/4	SL		3%	hay crop
Bt	6 – 23	10YR 5-6	SL	10YR 7/4		

Field # 2	**Waypoint 115**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 4/3	SL-		3 %	hay crop
Bt1	7 - 19	10YR 5/6	SL-			
Bt2	19 - 34	7.5YR 5/6	SL	10YR 6/4, 6/8		
Cr	34					

Field # 2	**Waypoint # 116**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 5/4	SL		3%	hay crop
Bt1	7 - 14	10YR 5/6	SCL-			
Bt2	14 - 26	10YR 5/4	SL	5 % coarse fragments 7.5YR 5/6,		
Btx	26 - 51	10YR 5/6	SL	10YR 6/4, 6/8 7.5YR 5/6		

Field # 2	**Waypoint # 117**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 5/4	LS		3%	hay crop
Bt1	7 - 12	10YR 5/4	SCL			
Bt2	12 - 36	10YR 5/6	SL-	10YR 6/8		
Bc	36 - 42	10YR 6/4	SL-	10YR 6/4, 6/8 7.5YR 5/6		

Soil Profile Notes **(HC)**

Field # 2	**Waypoint 118**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR 4/3	SL		3%	hay crop
Bt1	6 - 16	10YR 5/6	SCL	10YR 6/2, 6/4		
Bt2	16 - 33	10YR 5/4	SCL	10YR 6/8		
Bc	33 - 42	10YR 5/4	SCL	10YR 6/4, 6/8		

Field # 2	**Waypoint 119**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR 4/3	SL		3 %	hay crop
Bt1	8- 19	10YR 5/4	SCL	10YR 6/6		
Bt2	19 - 24	10YR 6/4	SCL	10YR 6/8,7/4		
Bt3	24 - 51	10YR 5/6	SL_+	10YR 6/8,7/4		

Field # 2	**Waypoint # 120**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR 5/4	SL		3%	hay crop
Bt	6 - 26	10YR 5/6	SL+	7.5YR 5/6 10YR 6/4,		
R	26					

Field # 2	**Waypoint # 121**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR 5/4	L		3%	hay crop
Bt1	8 - 19	10YR 5/6	SCL-			
Bt2	19 - 30	7.5YR 5/6	SL+	10YR 5/6 10YR 6/8		
Cr	30					

Soil Profile Notes **(HC)**

Field # 2	**Waypoint 122**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR 5/4	SL		3%	hay crop
Bt	6 - 19	10YR 5/4	SL+			
Btx	19 - 31	10YR 6/4	SL-	7.5YR 5/6 10YR 5/6		
Bc	31 - 44	10YR 6/4	SL	10YR 6/8		

Field # 2	**Waypoint 123**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 3/3	L		3 %	hay crop
Bt	7 - 19	10YR 5/4	SCL-			
Btx	19 - 38	10YR 5/4	SL	10YR 6/4		
Bc	38 - 46	7.5YR 5/6	SL	10YR 5/6 7.5 YR 5/6		

Field # 2	**Waypoint # 124**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR 5/4	SL		3%	hay crop
Bt1	6 - 14	10YR 5/4	SL+			
Bt2	14 - 30	10YR 5/6	SCL			
Bt3	30 - 48	10YR 6/4	SL-	10YR 5/6		
Bc	48-51	10YR 6/4	LS	10YR 5/6, 6/8		

Field # 2	**Waypoint 125**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR 5/3	L		3 %	hay crop
Bt1	8 - 24	10YR 5/4	SCL-			
Bt2	24 - 38	10YR 5/6	SL	10YR 6/4		
Bc	38 - 42	10YR 6/4	SL	10YR 5/6 7.5 YR 5/6		

Soil Profile Notes **(HC)**

Field # 2	**Waypoint 126**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10 YR 5/4	SL		3%	hay crop
Bt1	7 - 19	10YR 5/4	SL			
Bt2	19 - 30	10YR 5/6	SL			
Cr	30					

Field # 2	**Waypoint 087**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 5	10 YR 4/3	SL		3%	hay crop
Bt1	5 - 20	10YR 5/6	SCL			
Bt2	20 - 30	10YR 6/8	SL			
Cr	30					

Field # 2	**Waypoint 088**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10 YR 4/3	L		3%	hay crop
Bt1	6 - 24	10YR 5/6	SL+			
Bt2	24 - 36	10YR 5/6	SCL			
Bc	36 - 42	10YR 5/6	SL			

Field # 2	**Waypoint 089**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 5	10 YR 4/3	SL		3%	hay crop
Bt1	5 - 26	10YR 5/6	SCL			
Bt2	26 - 42	10YR 5/4	SL	10YR 6/4 7.5YR 5/6		
Cr	42					

Soil Profile Notes **(HC)**

Field # 2	**Waypoint 096**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10 YR 4/3	SL		3%	hay crop
Bt	6 - 18	10YR 5/6	SL_			
Bc	18 - 30	10YR 6/8	SL			
Cr	30					

Field # 2	**Waypoint 097**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 5	10 YR 4/3	SL		3%	hay crop
Bt1	5 - 24	10YR 5/6	SCL-			
Bt2	24 - 30	7.5YR 5/6	SL	10YR 6/8		
Bc	30 -38	7.5YR 5/6	SL			

Field # 2	**Waypoint 098**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10 YR 4/3	SL		3%	hay crop
Bt1	7 - 15	10YR 5/6	SL+			
Bt2	15 - 30	10YR 5/6	SCL-			
Bc	30- 42	10YR 5/6	SL-			

Field # 2	**Waypoint 099**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10 YR 4/3	SL		3%	hay crop
Bt1	7 - 30	10YR 5/4	SL			
Bt2	30 - 42	10YR 5/4	SCL	10YR 6/4 7.5YR 5/6		
Bt3	42 - 44	10YR 6/8	SCL			

Soil Profile Notes **(HC)**

Field # 2	**Waypoint 100**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10 YR 4/3	SL		3%	hay crop
Bt1	6 - 18	10YR 5/4	SL			
Bt2	18 - 30	10YR 5/6	SL			
Cr	30					

Field # 2	**Waypoint 101**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10 YR 4/3	SL		3%	hay crop
Bt	7 - 30	10YR 5/4	SCL-			
Btx1	30 - 37	10YR 5/4	SL-			
Bx2	37 - 44	10YR 5/6	SCL	10YR 6/8		

Field # 2	**Waypoint 102**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10 YR 4/3	L		3%	hay crop
Bt1	7 - 12	10YR 5/4	SL+			
Bt2	12 - 20	10YR 5/4	SCL			
Bt3	20 - 42	10YR 5/6	SL	10% fragments		

Field # 2	**Waypoint 103**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10 YR 4/3	L		3%	hay crop
Bt1	8 - 14	10YR 5/6	SCL			
Bt2	14 - 23	10YR 5/4	SL	10YR 6/4 7.5YR 5/6		
Bc	23 - 36	10YR 6/8	SL-			

Soil Profile Notes **(HC)**

Field # 2	**Waypoint 104**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10 YR 5/4	SL		3%	hay crop
Bt1	7 - 15	10YR 5/4	SL			
Bt2	15 - 24	10YR 5/6	SCL	10% fragments		
Bc	24 - 42	10YR 6/8	SL	7.5YR 5/6		

Field # 2	**Waypoint 105**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10 YR 4/3	SL		3%	hay crop
Bt1	7 - 19	10YR 5/4	SCL			
Bt2	19 - 26	10YR 5/4	SL			
C	26 - 36	10YR 6/8	LS			

Field # 2	**Waypoint 106**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10 YR 4/3	L		3%	hay crop
Bt1	7 - 15	10YR 5/4	SCL			
Bt2	15 - 24	10YR 5/6	SL			
C	24 - 30	10YR 6/4	LS			

Field # 2	**Waypoint 107**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10 YR 4/3	SL		3%	hay crop
Bt1	7 - 26	10YR 5/4	SCL			
Bt2	26 - 33	10YR 5/4	SL	10YR 6/4 7.5YR 5/6		
Bt3	33 - 38	10YR 5/6	SL-	7.5YR 5/6 10YR 6/4		

Soil Profile Notes **(HC)**

Field # 2	**Waypoint 108**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10 YR 4/3	SL		3%	hay crop
Bt1	7 - 18	10YR 5/6	SCL			
Bt2	18 - 30	10YR 5/4	SL-	10% fragments		
C	30 - 36	10YR 5/4				

Field # 2	**Waypoint 109**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10 YR 4/3	SL		3%	hay crop
Bt1	7 - 26	10YR 5/4	SCL			
Bt2	26 - 30	10YR 5/6	SL			
C	30 - 42	7.5YR 5/6	SL			

Field 2 Area 1 HC Soil Boring Statistics

n = number of soil borings per area
n = 7

$$\bar{x} = \frac{\sum x}{n}$$

Average surface depth = 6.6 inches
Average subsoil depth = 38.4 inches

$$s_{N-1} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \bar{x})^2},$$

Surface Standard Deviation = 0.55
Subsoil Standard Deviation = 3.51

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

Surface standard error = 0.24
Subsoil standard error = 1.57

$t_{\alpha, df} = 2.132$

$CI = x \pm [t_{\alpha, df} \times s_x]$

Surface confidence interval range 6.1 to 7.1 inches
Subsoil confidence interval range 35.1 to 41.7 inches

Results: There is a 90% confidence that the surface thickness of soil in Field 2 Area 1 HC ranges from 6 to 7 inches.

Results: There is a 90% confidence that the subsoil thickness of soil in Field 2 Area 1 HC ranges from 35 to 42 inches.

Field 2 Area 2 HC Soil Boring Statistics

n = number of soil borings per area
n = 3

$$\bar{x} = \frac{\sum x}{n}$$

Average surface depth = 7 inches
Average subsoil depth = 27.7 inches

$$s_{N-1} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \bar{x})^2}.$$

Surface Standard Deviation = 0
Subsoil Standard Deviation = 4.16

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

Surface standard error = 0
Subsoil standard error = 2.4

$t_{\alpha, df} = 2.92$

$CI = x \pm [t_{\alpha, df} \times s_x]$

Surface confidence interval range 7 to 7 inches
Subsoil confidence interval range 20.6 to 34.7 inches

Results: There is a 90% confidence that the surface thickness of soil in Field 2 Area 2 HC ranges from 7 to 7 inches.

Results: There is a 90% confidence that the subsoil thickness of soil in Field 2 Area 2 HC ranges from 21 to 35 inches.

Field 2 Area 3 HC Soil Boring Statistics

n = number of soil borings per area
n = 5

$$\bar{x} = \frac{\sum x}{n}$$

Average surface depth = 7.2 inches
Average subsoil depth = 32.8 inches

$$s_{N-1} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \overline{x})^2}.$$

Surface Standard Deviation = 0.45
Subsoil Standard Deviation = 4.02

$$\sigma_{\overline{x}} = \frac{\sigma}{\sqrt{n}}$$

Surface standard error = 0.2
Subsoil standard error = 1.8

$t_{\alpha, df} = 2.132$

$CI = x \pm [t_{\alpha, df} \times s_x]$

Surface confidence interval range 6.8 to 7.6 inches
Subsoil confidence interval range 28.9 to 36.6 inches

Results: There is a 90% confidence that the surface thickness of soil in Field 2 Area 3 HC ranges from 7 to 8 inches.

Results: There is a 90% confidence that the subsoil thickness of soil in Field 2 Area 3 HC ranges from 29 to 37 inches.

Field 2 Area 4 HC Soil Boring Statistics

n = number of soil borings per area
n = 5

$$\bar{x} = \frac{\sum x}{n}$$

Average surface depth = 6 inches
Average subsoil depth = 35.6 inches

$$s_{N-1} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \bar{x})^2}.$$

Surface Standard Deviation = 1
Subsoil Standard Deviation = 1.67

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

Surface standard error = 0.45
Subsoil standard error = 0.75

$t_{\alpha, df} = 2.132$

$CI = x \pm [t_{\alpha, df} \times s_x]$

Surface confidence interval range 5 to 6.95 inches
Subsoil confidence interval range 34 to 37.2 inches

Results: There is a 90% confidence that the surface thickness of soil in Field 2 Area 4 HC ranges from 5 to 7 inches.

Results: There is a 90% confidence that the subsoil thickness of soil in Field 2 Area 4 HC ranges from 34 to 37 inches.

Field 2 Area 6 CL Soil Boring Statistics

n = number of soil borings per area
n = 3

$$\bar{x} = \frac{\sum x}{n}$$

Average surface depth = 7.67 inches
Average subsoil depth = 44.67 inches

$$s_{N-1} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \bar{x})^2},$$

Surface Standard Deviation =0.58
Subsoil Standard Deviation = 2.89

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

Surface standard error = 0.33
Subsoil standard error = 1.67

$t_{\alpha, df} = 2.92$

$CI = x \pm [t_{\alpha, df} \times s_x]$

Surface confidence interval range 6.7 to 8.6 inches
Subsoil confidence interval range 39.8 to 49.5 inches

Results: There is a 90% confidence that the surface thickness of soil in Field 2 CL ranges from 7 to 9 inches.

Results: There is a 90% confidence that the subsoil thickness of soil in Field 2 CL ranges from 40 to 49 inches.

Soil Profile Notes (**HC**)

Field # 3	**Waypoint 130**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR4/3	SL			
Bt1	6 - 21	10YR4/6	SL+			
Btx	21 – 42	10YR5/4	SL-	10YR6/4 7.5YR5/6		
Cr	42					

Field # 3	**Waypoint 131**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR4/3	L			
Bt1	7 - 24	10YR5/4	SCL			
Bt2	24 – 30	10YR5/6	SL	10YR6/4		10% fragments
Cr	30					

Field # 3	**Waypoint 132**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 5	10YR5/3	SL			
Bt	5 - 24	10YR5/4	SL+			
Cr	24					

Field # 3	**Waypoint 133**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR4/3	SL			
Bt1	6 - 12	10YR4/4	SL			
Bt2	12 – 32	10YR5/4	SL+			
Cr	32					

Soil Profile Notes (**HC**)

Field # 3	**Waypoint 134**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR5/3	L			
Bt1	6 - 21	10YR5/6	SL+			
Bt2	21 – 29	10YR5/6	SL	10YR6/8, 6/4		
Cr	29					

Field # 3	**Waypoint 135**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR5/3	SL			
Bt1	6 - 12	10YR5/6	SCL-			
Bt2	12 – 32	10YR5/6	SL	10YR7/4		
Cr	32					

Soil Profile Notes (**JC**)

Field # 3	**Waypoint 136**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR4/3	SL			
	7 - 26	10YR5/4	SCL-			
	26 – 49	10YR3/6	LS			
Cr	49					

Field # 3	**Waypoint 137**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR4/3	L			
	8 - 23	10YR5/6	SCL			
	23 – 36	10YR5/6	SL			
	36 – 48	10YR6/8	CL	10YR6/4 7.5YR5/6		mg
Cr	48					

Field # 3	**Waypoint 138**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR4/3	L			
	8 - 19	10YR5/6	SCL			
	19 - 36	10YR6/8	CL	2.5YR4/6 10YR6/8, 6/4		
Cr	36					

Field # 3	**Waypoint 139**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR4/3	L			
	8 - 24	10YR5/6	CL			
	24 – 32	10YR6/8	SCL	10YR5/6, 6/4 7.5YR5/6		
Cr	32					

Soil Profile Notes (**JC**)

Field # 3	**Waypoint 140**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR4/3	L			
	8 - 21	10YR5/6	CL			
	21 – 30	10YR6/8	SCL	10YR5/6, 6/4 7.5YR5/6		15% coarse fragments
	30 – 36	10YR6/8	CL	10YR5/6, 6/4 7.5YR5/6		
Cr	36					

Field # 3	**Waypoint 141**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR5/3	SL			
	8 - 23	10YR5/4	CL			
	23 – 34	10YR5/6	SCL	2.5YR4/6 10YR6/8		
	34 – 41	10YR6/8	CL	2.5YR4/6 10YR6/8		
Cr	41					

Field 3 Area 1 & 3 HC Soil Boring Statistics

n = number of soil borings per area
n = 5

$$\bar{x} = \frac{\sum x}{n}$$

Average surface depth = 6.2 inches
Average subsoil depth = 26.8 inches

$$s_{N-1} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \bar{x})^2},$$

Surface Standard Deviation = 0.45
Subsoil Standard Deviation = 5.36

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

Surface standard error = 0.2
Subsoil standard error = 12.39

$t_{\alpha, df} = 2.132$

$CI = x \pm [t_{\alpha, df} \times s_x]$

Surface confidence interval range 5.8 to 6.6 inches
Subsoil confidence interval range 21.7 to 31.9 inches

Results: There is a 90% confidence that the surface thickness of soil in Field 3 HC ranges from 5.5 to 6.5 inches.

Results: There is a 90% confidence that the subsoil thickness of soil in Field 3 HC ranges from 22 to 32 inches.

Field 3 Area 2 JC Soil Boring Statistics

n = number of soil borings per area
n = 3

$$\bar{x} = \frac{\sum x}{n}$$

Average surface depth = 8 inches
Average subsoil depth = 27 inches

$$s_{N-1} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \bar{x})^2}$$

Surface Standard Deviation = 0
Subsoil Standard Deviation = 2.31

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

Surface standard error = 0
Subsoil standard error = 1.33

$t_{\alpha, df} = 2.92$

$CI = x \pm [t_{\alpha, df} \times s_x]$

Surface confidence interval range 8 inches
Subsoil confidence interval range 22.8 to 30.6 inches

Results: There is a 90% confidence that the surface thickness of soil in Field 3 JC ranges from 8 to 8 inches.

Results: There is a 90% confidence that the subsoil thickness of soil in Field 3 JC ranges from 23 to 30 inches.

Soil Profile Notes **(CN)**

Field # 4	**Waypoint 171**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 3/2	L		3%	grazed
Bt	7 - 20	10YR 5/6	SL+	10% fragments		
R	20					

Field # 4	**Waypoint 172**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR 3/2	L		3 %	grazed
Bt	6 - 15	10YR 5/6	SL+	10% fragments		
R	15					

Field # 4	**Waypoint # 173**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 5/3	L		3%	
Bt1	7 - 19	10YR 5/6	SL			
Bt2	19 - 26	10YR 5/6	SCL	10YR 6/8,6/4 7.5YR 5/6		
R	26					

Field # 4	**Waypoint # 174**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR 4/3	SL		3%	
Bt	6 - 19	10YR 5/4	SL			
R	19					

Soil Profile Notes **(CN)**

Field # 4	**Waypoint 175**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 5/3	L		3%	grazed
Bt1	7 - 18	10YR 5/4	SCL			
Bt2	18 - 29	10YR 5/6	SL+			
R	29					

Field # 4	**Waypoint 176**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 4/3	SL		3 %	grazed
Bt	7 - 21	10YR 5/4	SCL			
R	21					

Field # 4	**Waypoint #177**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 3/2	L			
Bt1	7 - 24	10YR 5/6	SCL+			
Bt2	24 - 32	10YR 5/6	SL+			
R	32					

Field # 4	**Waypoint # 178**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR 3/2	L		3 %	grazed
Bt1	8 - 20	10YR 5/6	SCL-			
Bt2	20 - 26	10YR 5/4	SL-	10YR 6/8		
R	26					

Soil Profile Notes **(CN)**

Field # 4	**Waypoint 179**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR 3/2	L		3%	grazed
Bt	8 - 18	10YR 5/4	SCL_			
R						

Field # 4	**Waypoint 180**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 4/3	L		3%	grazed
Bt	7 - 24	10YR 5/6	SCL_			
R	24					

Field # 4	**Waypoint 181**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR 5/3	L		3%	grazed
Bt1	6 - 15	10YR 5/6	SCL_			
Bt2	15- 24	10YR 5/6	SL+			
R	24					

Field # 4	**Waypoint 182**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR 4/3	L		3%	grazed
Bt	6 - 18	10YR 5/4	SCL_			
R	18					

Soil Profile Notes **(CN)**

Field # 4	**Waypoint 082**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 5	10YR 3/2	L		3%	grazed
Bt	5 - 18	10YR 5/4	SCL_			
R	18					

Soil Profile Notes **(HC)**

Field # 4	**Waypoint 142**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 3/3	L		3%	grazed
Bt1	7 - 19	10YR 5/4	SL+			
Bt2	19 - 31	10YR 5/6	SL-	10YR 6/8,6/4 7.5YR 5/6		
R						

Field # 4	**Waypoint 143**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 4/3	L		3 %	grazed
Bt1	7 - 21	10YR 5/4	SL			
Bt2	21 - 31	10YR 5/6	SL	10YR 6/8,6/4 7.5YR 5/6		
R	31					

Field # 4	**Waypoint # 144**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR 4/3	L		3%	
Bt1	8 - 23	10YR 5/4	SCL-			
Bt2	23 - 34	10YR 5/6	SL-	10YR 6/8,6/4 7.5YR 5/6		
R	34					

Field # 4	**Waypoint # 145**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR 4/3	L		3%	
Bt1	8 - 26	10YR 5/4	SCL-			
Bt2	26 - 42	10YR 5/6	SL-	10YR 6/8,6/4 7.5YR 5/6		
Cr	42					

Soil Profile Notes **(HC)**

Field # 4	**Waypoint 146**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 3/3	L		3%	grazed
Bt1	7 - 22	10YR 5/4	SCL			
Bt2	22 - 34	10YR 5/6	SCL-	10YR 6/8,6/4 7.5YR 5/6		
R	34					

Field # 4	**Waypoint 147**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR 4/3	SL		3 %	grazed
Bt1	8 - 21	10YR 5/4	SCL-			
Bt2	21 - 35	10YR 5/6	SL	10YR 6/8		
Cr	35					

Field # 4	**Waypoint # 149**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR 4/3	SL		3 %	grazed
Bt1	8 - 21	10YR 5/4	SCL-			
Bt2	21 - 35	10YR 5/6	SL	10YR 6/8		
Cr	35					

Field # 4	**Waypoint 150**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 3/3	L		3%	grazed
Bt1	7 - 22	10YR 5/4	SCL			
Bt2	22 - 34	10YR 5/6	SCL-	10YR 6/8,6/4 7.5YR 5/6		
R	34					

Soil Profile Notes **(HE)**

Field # 4	**Waypoint 151**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR 4/3	SL		3%	grazed
Bt1	6 - 24	10YR 5/4	SCL-			
Bt2	24 - 36	10YR 5/6	SL+	10YR 6/8,6/4 7.5YR 5/6		
Bt3	36 - 49	10YR 6/8	SCL			

Field # 4	**Waypoint 152**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 4/3	SL		3 %	grazed
Bt1	7 - 24	10YR 5/4	SCL			
Bt2	24 - 38	10YR 5/6	SCL-			
Bt3	38 - 48	10YR 6/8	SL+	10YR 6/8,6/4 7.5YR 5/6		

Field # 4	**Waypoint # 153**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 4/3	SL		3%	
Bt1	7 - 23	10YR 5/6	SCL-			
Bt2	23 - 36	10YR 5/6	SCL-	10YR 6/8,6/4 7.5YR 5/6		
Bt3	36 - 52	10YR 6/8	SCL			

Field # 4	**Waypoint # 154**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 4/3	L		3%	
Bt1	7 - 23	10YR 5/4	SCL-			
Bt2	23- 42	10YR 5/6	SCL	10YR 6/8,6/4 7.5YR 5/6		
Cr	42					

Soil Profile Notes **(HE)**

Field # 4	**Waypoint 155**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 3/3	SL		3%	grazed
Bt1	7 - 18	10YR 5/4	SCL			
Bt2	18 - 30	10YR 5/6	SL			
Cr	30					

Field # 4	**Waypoint 156**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 4/3	SL		3 %	grazed
Bt	7 - 24	10YR 5/4	SL			
R	24					

Field # 4	**Waypoint # 157**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 4/3	SL			
Bt1	7 - 20	10YR 5/4	SL			
Bt2	20 - 30	10YR 5/6	SL-			
Cr	30					

Field # 4	**Waypoint # 158**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 4/3	SL		3 %	grazed
Bt1	7 - 24	10YR 5/4	SL			
Bt2	24 - 43	10YR 5/4	SL-	10YR 6/8		
R	43					

Soil Profile Notes **(HC)**

Field # 4	**Waypoint 159**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 4/3	SL		3%	grazed
Bt	7 - 19	10YR 5/4	SL			
R	19					

Field # 4	**Waypoint 160**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 4/3	SL		3%	grazed
Bt1	7 - 24	10YR 5/4	SL+			
Bt2	24 - 34	10YR 5/4	SL-			
Bt3	34 - 38	10YR 5/4	SL-	7.5YR 5/6		

Field # 4	**Waypoint 161**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 4/3	SL		3%	grazed
Bt1	7 - 12	10YR 5/4	SL			
Bt2	12 - 24	10YR 5/4	SCL			
Bt3	24 - 34	10YR 5/4	SL-	10YR 5/6, 6/4		

Field # 4	**Waypoint 162**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 4/3	SL		3%	grazed
Bt1	7 - 15	10YR 5/4	SL			
Bt2	15 - 27	10YR 5/6	SCL			
Bt3	27 - 33	10YR 5/4	SL	7.5 YR 5/6		

Soil Profile Notes **(HE)**

Field # 4	**Waypoint 163**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 3/3	SL		3%	grazed
Bt1	7 - 15	10YR 5/4	SL			
R				R.O.C. in the area		

Field # 4	**Waypoint 164**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 5	10YR 4/3	SL		3 %	grazed
Bt	7 - 10	10YR 5/6	SL			
R	10			R..O.C. in the area		

Field # 4	**Waypoint # 165**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR 4/3	SL			
Bt	6 - 27	10YR 5/4	SL-			
R	27					

Field # 4	**Waypoint # 166**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 4/3	L		3 %	grazed
Bt1	7 - 24	10YR 5/4	SCL			
Bt2	24 - 30	10YR 5/4	SL-	10YR 6/8		
R	30					

Soil Profile Notes **(HE)**

Field # 4	**Waypoint 167**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 3/3	SL		3%	grazed
Bt1	7 - 25	10YR 5/4	SL+			
Bt2	25 - 31	10YR 5/6	SCL			

Field # 4	**Waypoint 168**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 5	10YR 4/3	SL		3 %	grazed
Bt	7 - 24	10YR 5/4	SL			
R	24					

Field # 4	**Waypoint # 169**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 4/3	SL			
Bt1	7 - 20	10YR 5/4	SL-			
Bt2	20 - 36	10YR 5/6	SL-	7.5YR 5/6 2.5YR 5/6		
Cr	36					

Field # 4	**Waypoint # 170**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR 4/3	SL		3 %	grazed
Bt	6 - 28	10YR 5/4	SL			
R	28					

Field 4 Area 1 HC Soil Boring Statistics

n = number of soil borings per area
n = 10

$$\bar{x} = \frac{\sum x}{n}$$

Average surface depth = 6.1 inches
Average subsoil depth = 19 inches

$$s_{N-1} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \bar{x})^2},$$

Surface Standard Deviation = 0.74
Subsoil Standard Deviation = 2.94

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

Surface standard error = 0.23
Subsoil standard error = 0.93

$t_{\alpha, df} = 1.83$

$CI = x \pm [t_{\alpha, df} \times s_x]$

Surface confidence interval range 5.67 to 6.5 inches
Subsoil confidence interval range 17.29 to 20.7 inches

Results: There is a 90% confidence that the surface thickness of soil in Field 4 Area 1 HC ranges from 5.5 to 6.5 inches.

Results: There is a 90% confidence that the subsoil thickness of soil in Field 4 Area 1 HC ranges from 17 to 21 inches.

Field 4 Area 2 HC Soil Boring Statistics

n = number of soil borings per area
n = 8

$$\bar{x} = \frac{\sum x}{n}$$

Average surface depth = 7.5 inches
Average subsoil depth = 27 inches

$$s_{N-1} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \bar{x})^2}$$

Surface Standard Deviation = 0.53
Subsoil Standard Deviation = 3.12

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

Surface standard error = 0.19
Subsoil standard error = 1.11

$t_{\alpha, df} = 1.89$

$CI = x \pm [t_{\alpha, df} \times s_x]$

Surface confidence interval range 7.1 to 7.8 inches
Subsoil confidence interval range 24.9 to 29.1 inches

Results: There is a 90% confidence that the surface thickness of soil in Field 4 Area 2 HC ranges from 7 to 8 inches.

Results: There is a 90% confidence that the subsoil thickness of soil in Field 4 Area 2 HC ranges from 25 to 29 inches.

Field 4 Area 3 & 5 CN Soil Boring Statistics

n = number of soil borings per area
n = 6

$$\bar{x} = \frac{\sum x}{n}$$

Average surface depth = 6.8 inches
Average subsoil depth = 16.3 inches

$$s_{N-1} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \bar{x})^2}.$$

Surface Standard Deviation = 0.75
Subsoil Standard Deviation = 4.5

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

Surface standard error = 0.31
Subsoil standard error = 1.83

$t_{\alpha, df} = 2.015$

$CI = x \pm [t_{\alpha, df} \times s_x]$

Surface confidence interval range 6.2 to 7.5 inches
Subsoil confidence interval range 12.6 to 20 inches

Results: There is a 90% confidence that the surface thickness of soil in Field 4 Area 3 and 5 CN ranges from 6 to 7 inches.

Results: There is a 90% confidence that the subsoil thickness of soil in Field 4 Area 3 and 5 CN ranges from 13 to 20 inches.

Field 4 Area 4 HE Soil Boring Statistics

n = number of soil borings per area
n = 7

$$\bar{x} = \frac{\sum x}{n}$$

Average surface depth = 6.9 inches
Average subsoil depth = 26 inches

$$s_{N-1} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \bar{x})^2},$$

Surface Standard Deviation = 0.38
Subsoil Standard Deviation = 3.27

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

Surface standard error = 0.14
Subsoil standard error = 1.23

$t_{\alpha, df} = 1.943$

$CI = x \pm [t_{\alpha, df} \times s_x]$

Surface confidence interval range 6.6 to 7.1 inches
Subsoil confidence interval range 23.6 to 28.4 inches

Results: There is a 90% confidence that the surface thickness of soil in Field 4 Area 4 HE ranges from 6 to 7 inches.

Results: There is a 90% confidence that the subsoil thickness of soil in Field 4 Area 4 HE ranges from 24 to 28 inches.

Field 4 Area 7 HE Soil Boring Statistics

n = number of soil borings per area
n = 6

$$\bar{x} = \frac{\sum x}{n}$$

Average surface depth = 6.8 inches
Average subsoil depth = 35 inches

$$s_{N-1} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \bar{x})^2},$$

Surface Standard Deviation = 0.41
Subsoil Standard Deviation = 9.88

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

Surface standard error = 0.17
Subsoil standard error = 4.03

$t_{\alpha, df} = 2.015$

$CI = x \pm [t_{\alpha, df} \times s_x]$

Surface confidence interval range 6.5 to 7.2 inches
Subsoil confidence interval range 26.8 to 43.1 inches

Results: There is a 90% confidence that the surface thickness of soil in Field 4 Area 7 HE ranges from 6 to 7 inches.

Results: There is a 90% confidence that the subsoil thickness of soil in Field 4 Area 7 HE ranges from 27 to 43 inches.

Soil Profile Notes (**HC**)

Field # 5	**Waypoint 050**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR4/3	SL			
Bt1	7 - 35	10YR5/4	SCL-			
Bt2	35 – 38	10YR5/4	SL			
Cr	38					

Field # 5	**Waypoint 051**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR4/3	SL			
Bt1	8 - 30	10YR5/6	SCL			
Btx1	30 – 40	10YR5/6	SL	10YR6/4 7.5YR5/6		5% fragments
Btx2	40 – 45	7.5YR5/6	SCL	10YR6/4, 5/6		
Cr	45					

Field # 5	**Waypoint 052**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR4/3	L			
Bt1	8 - 25	10YR5/4	SCL-			
Btx1	25 – 35	10YR5/6	SCL	5YR5/6 10YR6/4		
Btx2	35 – 42	7.5YR5/6	SCL-	10YR5/6, 6/4		
Cr	42					

Field # 5	**Waypoint 053**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR4/3	L			
Bt1	8 - 25	10YR5/4	SCL			
Btx1	25 – 30	10YR5/4	SL			
Btx2	30 – 54	7.5YR5/6	SCL	10YR6/4, 6/2		
Cr	54					

Soil Profile Notes (**HC**)

Field # 5	**Waypoint 054**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR4/3	SL			
Bt1	8 - 19	10YR5/4	SCL			
Btx1	19 – 40	10YR5/4	SL	5YR5/6 10YR6/4		
Btx2	40 – 54	7.5YR5/6	SL			
Cr	54					

Field # 5	**Waypoint 055**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR4/3	SL			
Bt	8 - 24	10YR5/4	SCL-			
Btx1	24 – 36	10YR5/4	SL			
Btx2	36 – 54	5YR5/6	SCL			
Cr	54					

Field # 5	**Waypoint 056**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR4/3	SL			
Bt1	8 - 19	10YR5/4	SCL			
Bt2	19 – 40	7.5YR5/6	SCL	10YR6/4		
Bt3	40 – 51	5YR5/6	SCL	10YR6/2, 6/4		
Cr	51					

Field # 5	**Waypoint 057**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR4/3	L			
Bt1	8 - 35	10YR5/4	SCL			
Btx	35 – 51	10YR5/4	SL	10YR6/4, 6/2		
Cr	51					

Soil Profile Notes (**HC**)

Field # 5	**Waypoint 198**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 5	10YR4/3	SL			
Bt1	5 - 15	10YR5/4	SL+			
Bt2	15 – 30	10YR5/6	SCL			
Bc	30 – 38	10YR5/6	SL	10YR6/8		
Cr	38					

Field # 5	**Waypoint 199**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 6	10YR4/3	SL			
Bt	6 – 30	10YR5/4	SCL			
Bc	30 – 42	10YR5/4	SL-	10YR7/4		
Cr	42					

Field # 5	**Waypoint 200**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR4/3	SL			
Bt1	6 - 26	10YR5/4	SCL			
Bt2	26 - 36	10YR5/6	SL	10YR6/4		
Bc	36 - 48		SL-			
Cr	48					

Field # 5	**Waypoint 201**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR4/3	SL			
Bt	6 - 30	10YR5/4	SCL			
Bc	30 - 49	10YR5/6	SL	10YR6/4		
Cr	49					

Soil Profile Notes (**HC**)

Field # 5	**Waypoint 202**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 5	10YR4/3	SL			
Bt	5 - 30	10YR5/4	SL			
C	30 – 38	10YR5/6	SL-			
Cr	38					

Field # 5	**Waypoint 203**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 6	10YR4/3	SL			
Bt1	6 – 12	10YR5/6	SL			25 ft away shallow rock
Bt2	12 – 30	10YR5/6	SCL-			outcrop
Bc	30 – 36	10YR6/8	SL-			5% fragments
R	36					

Field # 5	**Waypoint 204**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR4/3	SL			
Bt	7 - 18	10YR5/4	SL			
R	18					

Field # 5	**Waypoint 205**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR4/3	SL			
Bt1	6 - 24	10YR5/4	SL			
Bt2	24 - 40	10YR5/6	SL-			
R	40					

Soil Profile Notes (**HC**)

Field # 5	**Waypoint 206**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR4/3	SL			
Bt1	6 - 15	10YR5/6	SCL-			
Bt2	15 – 28	10YR5/6	SL			
R	28					

Field # 5	**Waypoint 207**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 6	10YR4/3	SL			
Bt	6 – 13	10YR5/4	SCL			
R	13					

Field # 5	**Waypoint 208**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR3/3	L			
Bt	7 - 12	10YR5/4	SCL			20% shallow soils rock outcrop
Bc	12 - 24	10YR5/6	SL	10YR6/8		15% fragments
R	24					

Field 5 Area 1 HC Soil Boring Statistics

n = number of soil borings per area
n = 6

$$\bar{x} = \frac{\sum x}{n}$$

Average surface depth = 8 inches
Average subsoil depth = 43.5 inches

$$s_{N-1} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \bar{x})^2},$$

Surface Standard Deviation = 0
Subsoil Standard Deviation = 3.51

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

Surface standard error = 0
Subsoil standard error = 1.43

$t_{\alpha, df} = 2.015$

$CI = x \pm [t_{\alpha, df} \times s_x]$

Surface confidence interval range 8 to 8 inches
Subsoil confidence interval range 41 to 46 inches

Results: There is a 90% confidence that the surface thickness of soil in Field 5 Area 1 HC ranges from 8 to 8 inches.

Results: There is a 90% confidence that the subsoil thickness of soil in Field 5 Area 1 HC ranges from 41 to 46 inches.

Field 5 Area 2 HC Soil Boring Statistics

n = number of soil borings per area
n = 5

$$\bar{x} = \frac{\sum x}{n}$$

Average surface depth = 5.6 inches
Average subsoil depth = 33.2 inches

$$s_{N-1} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \bar{x})^2},$$

Surface Standard Deviation = 0.55
Subsoil Standard Deviation = 2.17

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

Surface standard error = 0.24
Subsoil standard error = 0.97

$t_{\alpha, df} = 2.132$

$CI = x \pm [t_{\alpha, df} \times s_x]$

Surface confidence interval range 5.1 to 6.1 inches
Subsoil confidence interval range 31.1 to 25.3 inches

Results: There is a 90% confidence that the surface thickness of soil in Field 5 Area 2 HC ranges from 5 to 6 inches.

Results: There is a 90% confidence that the subsoil thickness of soil in Field 5 Area 2 HC ranges from 31 to 35 inches.

Soil Profile Notes (**AN**)

Field # 6	**Waypoint 212**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR4/3	L			
Bt1	7 - 26	10YR5/6	CL			
Bt2	26 – 36	10YR5/4	CL-	10YR6/8		
Bt3	36 – 51	10YR5/6	SCL	7.5YR5/6 10YR6/4		

Field # 6	**Waypoint 213**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 8	10YR4/3	L			
Bt1	8 – 30	10YR5/4	L			
Bt2	30 – 52	10YR5/6	SCL	10YR6/8, 6/2, 6/4		
Cr	52					

Field # 6	**Waypoint 214**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR4/3	SL			
Bt	6 - 24	10YR5/6	SL			
Btx	24 - 42	10YR5/6	L	10YR6/8 7.5YR5/6		
Cr	42					

Field # 6	**Waypoint 215**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR4/3	SL			
Bt1	6 - 12	10YR5/4	SCL			
Bt2	12 - 30	10YR6/8	CL+	7.5YR5/6		
Bt3	30 – 41	10YR6/8	CL+	10YR5/6, 6/2, 7/4		
Cr	41					

Soil Profile Notes (**AN**)

Field # 6	**Waypoint 216**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 5	10YR4/3	SL			
Bt	5 - 16	10YR6/8	CL			
Cr	16					

Field # 6	**Waypoint 217**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 6	10YR4/3	SL			
Bt	6 – 15	10YR5/4	CL			
Cr	15					

Field # 6	**Waypoint 218**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR4/3	SL			
Bt1	6 - 12	10YR5/4	SL			
Bt2	12 - 31	10YR6/8	L	10YR6/4 5YR5/6		
Cr	31					

Field # 6	**Waypoint 219**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR4/3	SL			
Bt1	6 - 12	10YR5/4	L			
Bt2	12 - 29	10YR6/8	CL			
Cr	29					

Soil Profile Notes (**AN**)

Field # 6	**Waypoint 220**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR4/3	SL			
Bt	7 - 22	10YR6/8	CL			
Cr	22					

Field # 6	**Waypoint 222**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 6	10YR5/3	FSL			
Bt1	6 – 12	10YR5/6	CL			Extremely gravelly
Bt2	12 - 25	10YR5/6	GCL			freestanding water
Cr	25					

Field # 6	**Waypoint 223**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR4/3	L			
Bt1	6 - 22	10YR5/6	CL			
Bt2	22 - 28	10YR6/2	CL	7.5YR5/6		
Cr	28					

Field # 6	**Waypoint 224**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR4/3	L			
Bt1	6 - 16	10YR5/6	CL			
Bt2	16 - 22	10YR5/6	CL	5YR5/6		
Cr	22					shaly

Soil Profile Notes (**AN**)

Field # 6	**Waypoint 225**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 5	10YR4/3	L			
Bt1	5 - 34	10YR5/6	CL			
Bt2	34 - 40	10YR5/6	CL+	7.5YR5/6		
C	40 - 46	5YR5/6	CL	5YR5/6		
Cr	46					

Field # 6	**Waypoint 226**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 5	10YR4/3	FSL			
Bt1	5 - 15	10YR5/6	L			
Bt2	15 - 28	10YR6/6	CL			
Bt3	28 - 32	10YR5/6	CL	10YR6/4, 6/2		
Cr	32					

Field # 6	**Waypoint 227**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR4/3	L			
Bt1	6 - 18	10YR5/4	CL+			
Bt2	18 - 34	10YR5/6	CL+	7.5YR5/6 10YR6/4		
Cr	34					

Field # 6	**Waypoint 287**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR4/3	SL			
Bt	8 - 19	10YR4/4	SCL			
Btx1	19 - 28	10YR5/6	SL	7.5YR5/6 10YR6/8, 6/4		
Btx2	28 - 41	10YR6/8	SCL	10YR5/6, 6/4 7.5YR5/6		
R	41					

Soil Profile Notes (**AN**)

Field # 6	**Waypoint 288**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 7	10YR4/4	SL			
Bt1	7 – 20	10YR5/6	CL			
Bt2	20 – 24	10YR6/8	CL	2.5YR5/6		
Cr	24					

Field # 6	**Waypoint 289**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR4/4	L			
Bt1	7 - 18	10YR5/6	CL			
Bt2	18 - 23	10YR5/6	CL	2.5YR5/4		
Bt3	18 - 32	10YR6/8	SCL	10YR6/4		
R	32					

Field # 6	**Waypoint 290**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR4/3	L			
Bt1	8 - 19	10YR4/4	SCL			
Btx	19 - 24	10YR5/6	SCL	10YR6/6		
Cr	24					

Field # 6	**Waypoint 291**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 5	10YR4/3	SL			
Bt	5 - 19	10YR5/6	SCL	10YR6/8		
Cr	19					

Soil Profile Notes (**AN**)

Field # 6	**Waypoint 292**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 7	10YR4/3	SL			
Bt1	7 – 19	10YR5/6	SCL			
Bt2	19 – 31	10YR5/6	SCL	10YR6/8		
Cr	31					

Field # 6	**Waypoint 293**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 5	10YR4/4	L			
Bt1	5 - 14	10YR5/6	CL			
Bt2	14 - 21	10YR6/8	L	7.5YR5/6		
Cr	21					

Field # 6	**Waypoint 294**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR4/3	L			
Bt1	6 - 17	10YR5/6	CL			
Bt2	17 - 29	10YR6/8	CL	7.5YR5/6		
Cr	29					

Field # 6	**Waypoint 295**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR4/3	SL			
Bt1	6 - 15	10YR5/4	SL			
Bc	15 - 23	10YR5/6	SCL	7.5YR5/6		
Cr	23					

Soil Profile Notes (**AN**)

Field # 6	**Waypoint 296**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 7	10YR4/3	SL			
Bt1	7 – 19	10YR5/6	SCL			
Bt2	19 – 34	10YR5/6	SCL	5YR5/6		
Cr	34					

Field # 6	**Waypoint 297**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR4/4	SL			
Bt1	8 - 24	10YR5/6	SCL			
Bt2	24 – 33	10YR5/6	SCL	7.5YR5/6		
Cr	33					

Field # 6	**Waypoint 298**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR4/3	SL			
Bt1	6 - 19	10YR5/6	SCL			
Bt2	19 - 24	10YR5/6	SL			
Cr	24					

Field # 6	**Waypoint 299**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 7	10YR4/3	SL			
Bt1	7 – 18	10YR5/6	SCL			
Bt2	18 – 24	10YR5/8	SCL	5YR4/6		
Bc	24 – 29	7.5YR5/6	SCL	5YR5/6		10% fragments
Cr	29					

Soil Profile Notes (**AN**)

Field # 6	**Waypoint 300**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR4/3	SL			
Bt1	8 - 19	10YR5/6	SCL			
Bt2	19 – 26	10YR5/6	SCL	7.5YR4/6		10% fragments
Cr	26					

Field # 6	**Waypoint 301**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR4/3	SL			
Bt1	8 - 14	10YR5/6	SCL-			
Bt2	14 - 23	10YR5/6	SL	5YR4/6		10% fragments

Soil Profile Notes (**HC**)

Field # 6	**Waypoint 261**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR4/4	SL			
Bt1	6 - 17	10YR5/6	SL+			
Bt2	17 – 21	10YR5/6	SCL			
R	21	sand stone				

Field # 6	**Waypoint 262**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 7	10YR4/4	SL			
Bt	7 – 11	10YR5/6	SL			
R	11	sand stone				Due South rock outcrop

Field # 6	**Waypoint 263**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR4/4	SL			
Bt	7 - 21	10YR5/6	SCL			
R	21	sand stone				

Field # 6	**Waypoint 264**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR4/4	SL			
Bt1	6 - 14	10YR5/4	SL			
Bt2	14 - 20	10YR5/6, 5/4	SCL	7.5YR5/6		
Bt3	20 – 27	7.5YR5/6	SCL	10YR4/4		
R	27	sand stone				

Soil Profile Notes (**HC**)

Field # 6	**Waypoint 265**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR4/3	SL			
Ap2	6 - 10	10YR4/4	L			concave LF
Bt1	10 – 23	10YR4/3	SCL			
Bt2	23 – 40	10YR5/4	L	7.5YR5/6		
R	40	sand stone				

Field # 6	**Waypoint 266**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 7	10YR4/3	SL			
Ap2	7 – 12	10YR4/4	SL			
Bt	12 – 32	10YR4/4	SCL			
Btx	32 – 55+	10YR5/6	LSCL	7.5YR5/6		

Field # 6	**Waypoint 267**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR4/3	SL			
Bt1	7 - 14	10YR4/4	SL			
Bt2	14 - 27	10YR5/6	SL			
R	27					

Field # 6	**Waypoint 268**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR4/3	SL			
Bt	7 - 30	10YR4/4	SL	7.5YR5/6		
R	30					

Soil Profile Notes (**HC**)

Field # 6	**Waypoint 269**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR4/3	SL			
Bt1	7 - 21	10YR5/6	SCL			% fragments
Btx	21 – 27	10YR5/4	SL	7.5YR5/6		
2Bt1	27 - 36	5YR5/6	CL	10YR4/4		
2Bt2	36 – 48+	5YR5/6	C	10YR4/4		

Field # 6	**Waypoint 270**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 8	10YR4/3	SL			
Bt1	8 – 20	10YR4/3	SCL			
Bt2	20 – 36	7.5YR5/6	SCL	5YR5/6		
R	36					

Field # 6	**Waypoint 271**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR4/3	L			
Bt1	8 - 20	10YR4/4	SCL			
Btx	20 - 36	10YR4/4	SL	7.5YR5/6		5% fragments
2Bt	36 - 53	10YR6/8	SCL	10YR5/6		
Cr	53					

Field # 6	**Waypoint 272**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR4/3	L			
Bt1	6 - 33	10YR5/6	LSCL			
Btx	33 - 48	7.5YR5/6	SCL	10YR4/6		
Cr	48					

Soil Profile Notes (**HC**)

Field # 6	**Waypoint 273**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR4/3	L			
Bt	7 - 26	10YR4/4	SCL			
Btx	26 - 48	10YR5/4	SL	7.5YR5/6		
2Btx	48 - 54	10YR5/4	SCL			

Field # 6	**Waypoint 274**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 8	10YR4/3	L			
Bt1	8 – 24	10YR4/4	SL			
Btx	24 – 36	10YR4/4	SL	10YR5/6, 6/4		
2Bt	36 - 40	10YR5/6	SCL			
Cr	40					

Field # 6	**Waypoint 275**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR4/3	L			
Bt1	7 - 18	10YR4/4	HL			
Bt2	18 - 24	10YR4/4	SCL			
Btx	24 - 30	10YR5/6	SCL	10YR6/4		
2Bt	30 - 42	10YR5/6	CL	7.5YR5/6		
R	42					

Field # 6	**Waypoint 276**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR4/3	L			
Bt1	6 - 21	10YR4/4	SL			
Btx	21 - 40	10YR5/4	SL+	7.5YR5/6		
Bc	40 - 52	5YR5/6	SCL	10YR6/2, 7.5YR5/6		
	52+					

Soil Profile Notes (**HC**)

Field # 6	**Waypoint 277**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR4/3	SL			
Bt	7 - 23	10YR4/4	SCL			
Btx	23 - 32	10YR5/4	SL	7.5YR5/6		
Bt	32 - 52	5YR5/6	SCL			

Field # 6	**Waypoint 278**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 7	10YR4/3	L			
Bt1	7 – 24	10YR4/4	SCL			
Btx	24 – 36	10YR5/4	SL	10YR6/4, 7.5YR5/6		
2Bt1	36 - 43	7.5YR5/6	SCL	10YR6/4		
2Bt2	43 - 52	5YR5/6	SCL+	10YR6/4		

Field # 6	**Waypoint 279**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR4/3	L			
Bt1	6 - 18	10YR5/4	L			
Bt2	18 - 23	10YR5/4	SL			
Btx	23 - 28	10YR5/6	SCL	7.5YR5/6, 10YR6/2		
2Bt	28 -52+	5YR5/6	SCL	10YR5/6		

Field # 6	**Waypoint 280**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR4/3	SL			
Bt	7 - 27	10YR5/4	SL			
R	27					

Soil Profile Notes (**HC**)

Field # 6	**Waypoint 281**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR4/3	SL			
Bt1	7 - 18	10YR5/6	SCL			
Bt2	18 - 24	10YR6/8	CL	7.5YR5/6		
Bt3	24 - 33	10YR6/8	C			
Bt4	33 - 48	10YR6/8	SCL	10YR6/2 2.5YR4/6		
Cr	48					

Field # 6	**Waypoint 282**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 6	10YR4/3	SL			
Bt	6 – 17	10YR4/3	SL			
Btx	17 – 39	10YR5/4	SL	10YR6/4, 6/2		
2Bt	39 – 51+	5YR5/6	SCL			15% fragments

Field # 6	**Waypoint 283**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR4/3	SL			
Bt	7 - 24	10YR5/4	SCL			
Btx	24 – 52+	10YR5/4	SCL	7.5YR5/6		

Field # 6	**Waypoint 284**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR4/3	SL			
Bt1	6 - 24	10YR4/4	SL			
Bt2	24 - 30	10YR5/6	SCL			
Bt3	30 – 42	10YR6/8	CL			
Bt4	42 – 54	10YR6/8	C	10YR6/2		
CR	54					

Soil Profile Notes (**HC**)

Field # 6	**Waypoint 286**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR4/3	SL			
Bt1	8 - 24	10YR4/4	SL			
Bt2	24 - 28	10YR5/6	SL			
Cr	28					

Field # 6	**Waypoint 299**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 7	10YR4/3	SL			
Bt1	7 – 18	10YR5/6	SCL			
Bt2	18 – 24	10YR5/8	SCL	5YR4/6		
Bc	24 – 29	7.5YR5/6	SCL	5YR5/6		10% fragments
Cr	29					

Field # 6	**Waypoint 300**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR4/3	SL			
Bt1	8 - 19	10YR5/6	SCL			
Bt2	19 – 26	10YR5/6	SCL	7.5YR4/6		10% fragments
Cr	26					

Field # 6	**Waypoint 301**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR4/3	SL			
Bt1	8 - 14	10YR5/6	SCL-			
Bt2	14 - 23	10YR5/6	SL	5YR4/6		10% fragments
Cr	23					

Field 6 Area 1 HCS Soil Boring Statistics

n = number of soil borings per area
n = 7

$$\bar{x} = \frac{\sum x}{n}$$

Average surface depth = 7.3 inches
Average subsoil depth = 16.6 inches

$$s_{N-1} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \bar{x})^2},$$

Surface Standard Deviation = 0.95
Subsoil Standard Deviation = 2.51

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

Surface standard error = 0.36
Subsoil standard error = 0.95

$t_{\alpha, df} = 1.943$

$CI = x \pm [t_{\alpha, df} \times s_x]$

Surface confidence interval range 6.6 to 7.98 inches
Subsoil confidence interval range 14.7 to 18.4 inches

Results: There is a 90% confidence that the surface thickness of soil in Field 6 Area 1 HC ranges from 6.5 to 8 inches.

Results: There is a 90% confidence that the subsoil thickness of soil in Field 6 Area 1 HC ranges from 15 to 18 inches.

Field 6 Area 2 & 4 HC Soil Boring Statistics

n = number of soil borings per area
n = 13

$$\bar{x} = \frac{\sum x}{n}$$

Average surface depth = 6.8 inches
Average subsoil depth = 38.1 inches

$$s_{N-1} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \bar{x})^2},$$

Surface Standard Deviation = 0.60
Subsoil Standard Deviation = 4.91

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

Surface standard error = 0.17
Subsoil standard error = 1.36

$t_{\alpha, df} = 1.782$

$CI = x \pm [t_{\alpha, df} \times s_x]$

Surface confidence interval range 6.47 to 7.07 inches
Subsoil confidence interval range 35.65 to 40.50 inches

Results: There is a 90% confidence that the surface thickness of soil in Field 6 Area 2-4 HC ranges from 6.5 to 7 inches.

Results: There is a 90% confidence that the subsoil thickness of soil in Field 6 Area 2-4 HC ranges from 36 to 40 inches.

Field 6 Area 5 AN Soil Boring Statistics

n = number of soil borings per area
n = 5

$$\bar{x} = \frac{\sum x}{n}$$

Average surface depth = 7 inches
Average subsoil depth = 24.8 inches

$$s_{N-1} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \bar{x})^2}.$$

Surface Standard Deviation = 0.71
Subsoil Standard Deviation = 1.48

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

Surface standard error = 0.36
Subsoil standard error = 0.66

$t_{\alpha, df} = 2.132$

$CI = x \pm [t_{\alpha, df} \times s_x]$

Surface confidence interval range 6.3 to 7.7 inches
Subsoil confidence interval range 23.4 to 26.2 inches

Results: There is a 90% confidence that the surface thickness of soil in Field 6 Area 5 AN ranges from 6 to 8 inches.

Results: There is a 90% confidence that the subsoil thickness of soil in Field 6 Area 5 AN ranges ranges from 23 to 26 inches.

Field 6 Area 6 AN Soil Boring Statistics

n = number of soil borings per area
n = 3

$$\bar{x} = \frac{\sum x}{n}$$

Average surface depth = 6.7 inches
Average subsoil depth = 37.7 inches

$$s_{N-1} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \bar{x})^2}.$$

Surface Standard Deviation = 0.58
Subsoil Standard Deviation = 3.79

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

Surface standard error = 0.33
Subsoil standard error = 2.18

$t_{\alpha, df} = 2.92$

$CI = x \pm [t_{\alpha, df} \times s_x]$

Surface confidence interval range 4.7 to 6.6 inches
Subsoil confidence interval range 20.2 to 31.1 inches

Results: There is a 90% confidence that the surface thickness of soil in Field 6 Area 6 AN ranges from 5.5 to 7.5 inches.

Results: There is a 90% confidence that the subsoil thickness of soil in Field 6 Area 6 AN ranges from 31 to 44 inches.

Field 6 Area 7 AN Soil Boring Statistics

n = number of soil borings per area
n = 3

$$\bar{x} = \frac{\sum x}{n}$$

Average surface depth = 5.7 inches
Average subsoil depth = 25.7 inches

$$s_{N-1} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \overline{x})^2}.$$

Surface Standard Deviation = 0.58
Subsoil Standard Deviation = 3.21

$$\sigma_{\overline{x}} = \frac{\sigma}{\sqrt{n}}$$

Surface standard error = 0.33
Subsoil standard error = 1.86

$t_{\alpha, df} = 2.92$

$CI = x \pm [t_{\alpha, df} \times s_x]$

Surface confidence interval range 5.37 to 6.22 inches
Subsoil confidence interval range 21.36 to 25.03 inches

Results: There is a 90% confidence that the surface thickness of soil in Field 6 Area 7 AN ranges from 4.5 to 6.5 inches.

Results: There is a 90% confidence that the subsoil thickness of soil in Field 6 Area 7 AN ranges from 20 to 31 inches.

Field 6 Area 8 CN Soil Boring Statistics

n = number of soil borings per area
n = 5

$$\bar{x} = \frac{\sum x}{n}$$

Average surface depth = 5.8 inches
Average subsoil depth = 23.2 inches

$$s_{N-1} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \overline{x})^2}.$$

Surface Standard Deviation = 0.44
Subsoil Standard Deviation = 1.92

$$\sigma_{\overline{x}} = \frac{\sigma}{\sqrt{n}}$$

Surface standard error = 0.2
Subsoil standard error = 0.86

$t_{\alpha, df} = 2.132$

$CI = x \pm [t_{\alpha, df} \times s_x]$

Surface confidence interval range 5.37 to 6.22 inches
Subsoil confidence interval range 21.36 to 25.03 inches

Results: There is a 90% confidence that the surface thickness of soil in Field 6 Area 8 CN ranges from 5 to 6 inches.

Results: There is a 90% confidence that the subsoil thickness of soil in Field 6 Area 8 CN ranges from 21 to 25 inches.

Field 6 Area 9-12 & 14 CN Soil Boring Statistics

n = number of soil borings per area
n = 4

$$\bar{x} = \frac{\sum x}{n}$$

Average surface depth = 7.25 inches
Average subsoil depth = 24.75 inches

$$s_{N-1} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \overline{x})^2}.$$

Surface Standard Deviation = 0.5
Subsoil Standard Deviation = 1.5

$$\sigma_{\overline{x}} = \frac{\sigma}{\sqrt{n}}$$

Surface standard error = 0.25
Subsoil standard error = 0.75

$t_{\alpha, df} = 2.353$

$CI = x \pm [t_{\alpha, df} \times s_x]$

Surface confidence interval range 6.7 to 7.8 inches
Subsoil confidence interval range 22.98 to 26.51 inches

Results: There is a 90% confidence that the surface thickness of soil in Field 6 Area 9-11 CL ranges from 7 to 8 inches.

Results: There is a 90% confidence that the subsoil thickness of soil in Field 6 Area 9-11 CL ranges from 23 to 26.5 inches.

Soil Profile Notes (**CL**)

Field # 7	**Waypoint 246**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR 3/2	L		3%	
	6 - 24	10YR 5/2	CL			
	24 - 41	10YR 5/2	CL	10YR 6/8		
Cr	41					

Field # 7	**Waypoint 247**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR 4/3	L		3 %	
	6 - 20	10YR 5/3	L			
	20 - 36	10YR 5/2	L			
	36 - 50	10YR 5/2	CL	10YR 6/8		
Cr	50					

Field # 7	**Waypoint 248**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 4/3	SL		3%	
	7 - 30	10YR 5/4	SCL			
	30 - 51	10YR 5/4	SCL-			MN concretous
Cr	51					

Soil Profile Notes (**HC**)

Field # 7	**Waypoint 228**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 5	10YR5/3	SL			
Bt1	5 - 23	10YR4/4	SCL			
Bt2	23 – 28	10YR5/4	SL			
Cr						

Field # 7	**Waypoint 229**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 6	10YR5/3	SL			
Bt	6 – 28	10YR4/4	SCL			
Cr	28					Due South rock outcrop

Field # 7	**Waypoint 230**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 5	10YR4/3	SL			
Bt1	5 - 20	10YR5/4	SCL-			
Bt2	20 - 36	10YR5/6	SL			
Cr	36					

Field # 7	**Waypoint 231**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR4/3	SL			
Bt1	6 - 23	10YR5/4	SCL			
Btx	23 - 35	10YR5/6	SCL	10YR7/4 7.5YR5/6		
B’t	35 – 40	10YR5/6	SCL	10YR5/6		
Bc	40					

Soil Profile Notes (**HC**)

Field # 7	**Waypoint 232**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR4/3	SL			
Bw	6 - 15	10YR5/6	SCL			
Btx	15 – 30	10YR5/6	SCL	10YR6/3		
Bt	30 – 42	10YR5/6	SCL			
Cr	42					

Field # 7	**Waypoint 233**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 6	10YR4/3	SL			
Bw	6 – 19	10YR5/4	SL			
Btx	19 – 30	10YR5/4	SL	10YR5/6, 7/4		
Cr	30					

Field # 7	**Waypoint 234**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR4/3	SL			
Bt	6 - 26	10YR5/6	GSCL			15% coarse fragments
Bc	26 - 32	10YR5/6	GSL			
Cr	32					

Field # 7	**Waypoint 235**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR4/3	SL			
Bw	6 - 16	10YR5/4	SL			
Bt	16 - 28	10YR5/6	SL	10YR6/4		
Bc	28 – 37	10YR5/6	SL			% fragments
Cr	37					

Soil Profile Notes (**HC**)

Field # 7	**Waypoint 236**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR4/3	SL			
Bt1	6 - 17	10YR5/6	SCL-			% fragments
Bt2	17 – 30	10YR5/6	CL	2.5YR4/6		
Cr	30					

Field # 7	**Waypoint 237**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 5	10YR4/3	SL			
Bw	5 – 14	10YR4/4	SL			
Btx	14 – 20	10YR5/4	SL	10YR7/4		
C	20 – 24	10YR5/4	LS			
CR	24					

Field # 7	**Waypoint 238**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR4/3	SL			
Bt	6 - 14	10YR5/6	SCL			15’ from hole
Bc	14 - 30	10YR5/6	SL			observed linear rock outcrop
Cr	30					alone slope

Field # 7	**Waypoint 239/240**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR4/3	SL			
Bt	6 - 27	10YR5/4	SCL			
Cr	27					

Soil Profile Notes (**HC**)

Field # 7	**Waypoint 241**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR4/3	SL			
Bt	6 - 14	10YR5/6	SL			
R	14					

Field # 7	**Waypoint 242**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 6	10YR4/3	SL			
Bt1	6 – 18	10YR5/4	SL			
Bc	18 – 28	10YR5/4	LS	7.5YR5/6		15% fragments
Cr	28					

Field # 7	**Waypoint 243**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR4/3	SL			
Bt	6 - 20	10YR5/4	SL			15’ from hole
Btx	20 - 30	10YR5/6	SCL			observed linear rock outcrop
Bc	30 - 38	10YR5/6	SL			alone slope
Cr	38					

Field # 7	**Waypoint 244**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR5/4	SL			
Bt1	6 - 16	10YR5/6	SCL			
Bt2	16 - 24	10YR6/4	SCL			
Bc	24 - 30	10YR6/4	SCL			
Cr	30					

Soil Profile Notes (**HC**)

Field # 7	**Waypoint 245**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR4/3	SL			
Bt	6 - 15	10YR5/4	SCL			
Btx	15 - 30	10YR5/4	SCL	10YR7/4		
Cr	30					

Soil Profile Notes (**HE**)

Area # 7	**Waypoint 228**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 5	10YR5/3	SL			
Bt1	5 - 23	10YR4/4	SCL			
Bt2	23 – 28	10YR5/4	SL			
Cr	28					

Area # 7	**Waypoint 229**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 6	10YR5/3	SL			
Bt	6 – 28	10YR4/4	SCL			
Cr	28					Due South rock outcrop

Area # 7	**Waypoint 249**			Soil Series		
	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
		10 soil depth and there is				
		approximately 80% exposed rock in the area				

Area # 7	**Waypoint 250**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR5/3	SL			
Bt1	7 - 15	10YR5/4	SL			
Bt2	15 - 25	10YR5/4	LS			
Cr	25					

Soil Profile Notes (**HE**)

Area # 7	**Waypoint 251**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
		rock outcrop				

Field 7 Area 1 HC Soil Boring Statistics

n = number of soil borings per area
n = 5

$$\bar{x} = \frac{\sum x}{n}$$

Average surface depth = 6 inches
Average subsoil depth = 26.4 inches

$$s_{N-1} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \bar{x})^2},$$

Surface Standard Deviation = 0
Subsoil Standard Deviation = 2.88

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

Surface standard error = 0
Subsoil standard error = 1.29

$t_{\alpha, df} = 2.132$

$CI = x \pm [t_{\alpha, df} \times s_x]$

Surface confidence interval range 6 to 6 inches
Subsoil confidence interval range 23.6 to 29.1 inches

Results: There is a 90% confidence that the surface thickness of soil in Field 7 Area 1 HC ranges from 6 to 6 inches.

Results: There is a 90% confidence that the subsoil thickness of soil in Field 7 Area 1 HC ranges from 23.5 to 29 inches.

Field 7 Area 2 HC Soil Boring Statistics

n = number of soil borings per area
n = 4

$$\bar{x} = \frac{\sum x}{n}$$

Average surface depth = 5.75 inches
Average subsoil depth = 21.5 inches

$$s_{N-1} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \bar{x})^2},$$

Surface Standard Deviation = 0.50
Subsoil Standard Deviation = 2.08

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

Surface standard error = 0.25
Subsoil standard error = 1.04

$t_{\alpha, df} = 2.353$

$CI = x \pm [t_{\alpha, df} \times s_x]$

Surface confidence interval range 5.16 to 6.33 inches
Subsoil confidence interval range 19.05 to 23.95 inches

Results: There is a 90% confidence that the surface thickness of soil in Field 7 Area 2 HC ranges from 5 to 6 inches.

Results: There is a 90% confidence that the subsoil thickness of soil in Field 7 Area 2 HC ranges from 19 to 24 inches.

Field 7 Area 3 HC Soil Boring Statistics

n = number of soil borings per area
n = 6

$$\bar{x} = \frac{\sum x}{n}$$

Average surface depth = 6.2 inches
Average subsoil depth = 25.4 inches

$$s_{N-1} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \bar{x})^2},$$

Surface Standard Deviation = 0.45
Subsoil Standard Deviation = 2.61

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

Surface standard error = 0.20
Subsoil standard error = 1.17

$t_{\alpha, df} = 2.132$

$CI = x \pm [t_{\alpha, df} \times s_x]$

Surface confidence interval range 5.8 to 6.6 inches
Subsoil confidence interval range 22.9 to 27.9 inches

Results: There is a 90% confidence that the surface thickness of soil in Field 7 Area 3 HC ranges from 6 to 6.5 inches.

Results: There is a 90% confidence that the subsoil thickness of soil in Field 6 Area 6 AN ranges from 23 to 28 inches.

Field 7 Area 4 HE Soil Boring Statistics

n = number of soil borings per area
n = 3

$$\bar{x} = \frac{\sum x}{n}$$

Average surface depth = 6 inches
Average subsoil depth = 21 inches

$$s_{N-1} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \bar{x})^2},$$

Surface Standard Deviation = 1
Subsoil Standard Deviation = 2.64

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

Surface standard error = 0.58
Subsoil standard error = 1.53

$t_{\alpha, df} = 2.92$

$CI = x \pm [t_{\alpha, df} \times s_x]$

Surface confidence interval range 4.3 to 7.68 inches
Subsoil confidence interval range 16.5 to 25.46 inches

Results: There is a 90% confidence that the surface thickness of soil in Field 7 Area 4 HE ranges from 4 to 7.5 inches.

Results: There is a 90% confidence that the subsoil thickness of soil in Field 7 Area 4 HE ranges from 16 to 25 inches.

Field 7 Area 5 & 7 CL Soil Boring Statistics

n = number of soil borings per area
n = 3

$$\bar{x} = \frac{\sum x}{n}$$

Average surface depth = 6.3 inches
Average subsoil depth = 41 inches

$$s_{N-1} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \bar{x})^2},$$

Surface Standard Deviation = 0.58
Subsoil Standard Deviation = 5.20

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

Surface standard error = 0.33
Subsoil standard error = 3

$t_{\alpha, df} = 2.92$

$CI = x \pm [t_{\alpha, df} \times s_x]$

Surface confidence interval range 5.36 to 7.3 inches
Subsoil confidence interval range 32.24 to 49.76 inches

Results: There is a 90% confidence that the surface thickness of soil in Field 6 Area 8 CL ranges from 5 to 7 inches.

Results: There is a 90% confidence that the subsoil thickness of soil in Field 6 Area 8 CL ranges from 32 to 50 inches.

Soil Profile Notes **(CL)**

Field # 2	**Waypoint 307**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10 YR 4/3	L		2%	hay crop
Bt1	8 - 17	10YR 5/4	SL+			
Bt2	17 - 33	10YR 5/8	SCL	10YR 5/6, 5/4 10YR 6/4		
Cr	33					

Field # 2	**Waypoint 308**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10 YR 4/3	SL		2%	hay crop
Bt1	8 - 31	10YR 5/4	SCL			
Bt2	31 - 52	10YR 5/8	SCL	10YR 5/6,6/8 7.5YR 5/6		
Cr	52					

Field # 2	**Waypoint 309**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10 YR 4/3	SL		2%	hay crop
E	8 - 23	10YR 7/4	LS			
Bt	23 - 51	7.5YR 5/6	SCL	10YR 6/2, 6/4		
Cr	51					

Field # 2	**Waypoint 310**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 9	10 YR 4/3	SL		2%	hay crop
Bt1	9 - 31	10YR 4/4	SCL	10YR 6/4		
Bt2	23 - 51	10YR 5/8	SL	10YR 6/2, 6/4, 6/6		
Cr	51					

Soil Profile Notes **(CL)**

Field # 2	**Waypoint 311**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 9	10 YR 4/3	SL		2%	hay crop
Bt1	9 - 26	10YR 4/4	SCL	10YR 6/4		
Bt2	26 - 48	10YR 5/8	SL	10YR 6/2, 6/4, 6/6		
Cr	48					

Soil Profile Notes **(HC)**

Field # 8	**Waypoint # 1**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR 4/3	SL		3%	hay crop
Bt1	7 - 18	10YR 4/4	SL			
Bt2	18 – 48	10YR 5/6	SL			
Cr	48					

Field # 8	**Waypoint # 2**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 7	10YR 4/3	SL		3%	hay crop
Bt	7 – 24	10YR 5/4	SCL			
R	24					

Field # 8	**Waypoint # 3**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 4/3	SL		4%	hay crop
Bt1	7 - 27	10YR 4/4	SCL			
Bt2	27 - 48	10YR 5/6	SL-	10YR 7/4		
Bt3	48 - 52	10YR 5/6	SCL-			
Cr	52					

Field # 8	Waypoint # **4**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
AP	0 - 7	10YR 4/3	SL		4%	hay crop
Bt	7 - 33	10YR 5/4	SCL			
Btx1	33 - 48	10YR 5/4	SL	10YR 7/4 7.5YR 5/6		
Btx2	48 - 52	10YR 5/6	SL+	7.5YR 5/6		
Cr	52					

Soil Profile Notes **(HC)**

Field # 8	**Waypoint # 5**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 7	10YR 4/4	SL		4%	hay crop
Bt	7 – 35	10YR 4/4	SCL			
Btx	35 - 52	10YR 5/6	SL	7.5YR 5/6 10YR 7/4		
Cr	52					

Field # 8	**Waypoint # 6**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 8	10YR 4/3	SL		4%	hay crop
Bt	8 – 30	10YR 5/6	SCL			
Btx	30 - 51	10YR 5/6	SCL	7.5YR 5/6 10YR 6/8, 7/4		
Cr	51					

Field # 8	**Waypoint # 7**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 8	10YR 4/3	SL		4%	hay crop
Bt1	8 – 41	10YR 5/6	SCL			
Bt2	41 - 51	10YR 5/6	SCL	10YR 6/4 7.5YR 5/6		
Cr	51					

Field # 8	**Waypoint # 8**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 4/3	SL		4%	hay crop
Bt1	7 - 19	10YR 5/4	SCL	10YR 6/4, 7/4		
Bt2	19 - 36	10YR 5/6	SCL	10YR 6/4, 7/4		
Bt3	36 - 42	10YR 5/6	SL			
Cr	42					

Soil Profile Notes **(HC)**

Field # 8	**Waypoint # 9**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR 4/3	SL		4%	hay crop
Bt1	8 – 18	10YR 4/4	SCL			
Bt2	18 – 36	10YR 5/6	SCL			
Bt3	36 - 51	10YR 5/6	SL+	10YR 6/4, 7/4 2.5YR 5/6		
Cr	51					

Field # 8	**Waypoint # 10**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 8	10YR 4/3	SL		4%	hay crop
Bt1	8 – 18	10YR 5/4	SCL			
Bt3	18 – 30	10YR 5/6	SCL-	10YR 5/6		
Bt3	30 - 49	10YR 5/6	SL	10YR 6/4, 7/4		

Field # 8	**Waypoint # 11**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 8	10YR 4/3	SL		4%	hay crop
Bt1	8 – 20	10YR 5/6	SCL			
Bt2	20 – 24	10YR 5/6	SL			
R	24					

Field # 8	**Waypoint # 12**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR 4/3	SL		4%	hay crop
Bt	8 - 24	10YR 5/6	SCL			
Btx1	24 - 36	10YR 5/6	SL	7.5YR 5/6 10YR 6/2		
Btx2	36 -54	5YR 5/6	SCL	7.5YR 5/6 10YR 6/2		

Soil Profile Notes **(HC)**

Field # 8	**Waypoint # 13**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 8	10YR 4/3	SL		4%	hay crop
Bt	8 – 25	10YR 5/6	SCL			
Btx	25 – 48	10YR 5/4	SL	10YR 5/4, 6/4 7.5YR 5/6		
Bc	48 -52	5YR 5/6	CL	10YR 5/4, 6/4 7.5YR 5/6		
Cr	52					

Field # 8	**Waypoint # 14**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR 4/3	SL		4%	hay crop
Bt	8 - 32	10YR 5/4	SCL			
Btx	32 – 44	7.5YR 5/6	CLAY	2.5YR 5/6 10YR 5/6, 5/4, 6/4		
R	48					

Field # 8	**Waypoint # 15**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 8	10YR 4/3	SL		4%	hay crop
Bt1	8 – 26	10YR 5/6	SCL			
Bt2	26 – 44	7.5YR 5/6	SL	10YR 6/4, 5/6 2.5YR 5/6		
Bc	44 - 52	5YR 5/6	SCL	10YR 6/4, 5/6 2.5YR 5/6		

Field # 8	**Waypoint # 16**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 8	10YR 4/3	L		4%	hay crop
Bt1	8 – 24	10YR 5/6	SCL	7.5YR 5/6		
Bt2	24 - 48	10YR 5/6	SL			
Bt3	48 -51	5YR 5/6	SCL			
Cr	51					

Soil Profile Notes **(HC)**

Field # 8	**Waypoint # 17**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 8	10YR 4/3	SL		4%	hay crop
Bt1	8 – 26	10YR 5/4	SCL			
Bt2	26 - 44	10YR 5/6	SL	10YR 7/4		
Bt3	44 - 52	5YR 5/6	SCL	10YR 7/4, 6/8		

Field # 8	**Waypoint # 18**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR 4/3	SL		4%	hay crop
Bt1	8 - 24	10YR 5/6	SCL	10YR 7/4		
Bt2	24 - 42	10YR 5/6	SL	10YR 7/4 7.5YR 5/6		
Bt3	42 - 54	7.5YR 5/6	SCL	10YR 7/4 7.5YR 5/6		

Field # 8	**Waypoint # 19**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 4/3	SL		4%	hay crop
Bt	7 – 35	10YR 5/4	SL			
R	35					

Field # 8	**Waypoint # 20**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 8	10YR 4/3	SL		4%	hay crop
Bt1	8 – 18	10YR 5/4	SCL			
Bt2	18 – 51	10YR 5/6	SL-	10YR 7/4 7.5YR 5/6		
Cr	51					

Soil Profile Notes **(HC)**

Field # 8	**Waypoint # 21**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR 4/3	SL		4%	hay crop
Bt1	8 - 30	10YR 5/6	SCL			
Bt2	30 – 52	10YR 5/4	SL	10YR 7/4		
Cr	52					

Field # 8	**Waypoint # 22**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 4/3	SL		4%	hay crop
Bt1	7 - 30	10YR 5/6	SCL			
Bt2	30– 48	10YR 5/6	SL	710YR 7/4		
Cr	48					

Field # 8	**Waypoint # 23**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR 4/3	SL		4%	hay crop
Bt1	8 - 20	10YR 4/4	SCL	10YR 7/4		
Bt2	20 - 36	10YR 5/6	SL+			
Cr	36					

Field # 8	**Waypoint # 24**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR 4/3	SL		4%	hay crop
Bt1	8 - 30	10YR 4/4	SCL	10YR 7/4		
Bt2	30 - 47	10YR 5/6	SL+	10YR 7/4 7.5YR 5/6		
Cr	47					

Soil Profile Notes **(HC)**

Field # 8	**Waypoint # 25**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 8	10YR 4/3	SL		4%	hay crop
Bt1	8 – 27	10YR 5/4	SCL			
Bt2	27 - 36	10YR 5/6	SL	10YR 7/4		
Bt3	36					

Field # 8	**Waypoint # 26**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 9	10YR 4/3	SL		4%	hay crop
Bt1	9 - 25	10YR 5/4	SCL	10YR 7/4		
Bt2	25 - 36	10YR 5/6	SL	10YR 7/4 7.5YR 5/6		
Cr	36					

Field # 8	**Waypoint # 27**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 4/3	SL		4%	hay crop
Bt	7 – 20	10YR 5/4	SL			
R	20					

Field # 8	**Waypoint # 28**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 8	10YR 4/3	SL		4%	hay crop
Bt1	8 – 15	10YR 5/4	SL			
Bt2	15 – 22	10YR 5/4	SL-	10YR 7/4 7.5YR 5/6		
Cr	22					

Soil Profile Notes **(HC)**

Field # 8	**Waypoint # 29**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 8	10YR 4/3	SL		4%	hay crop
Bt1	8 – 30	10YR 5/4	SCL			
Bt2	30 - 48	10YR 5/6	SL	7.5YR 5/6		
Cr	48					

Field # 8	**Waypoint # 30**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR 4/3	SL		4%	hay crop
Bt1	8 - 30	10YR 5/4	SL	10YR 7/4		
Bt2	30 - 48	10YR 5/6	SCL	10YR 7/4 7.5YR 5/6		
Cr	48					

Field # 8	**Waypoint # 31**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 4/3	SL		4%	hay crop
Bt	7 – 24	10YR 5/4	SL			
Btx	24 - 38	10YR 5/6	SCL	10YR 7/4, 7/2 7.5 YR 5/6		
Cr	38					

Field # 8	**Waypoint # 32**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 7	10YR 4/3	SL		4%	hay crop
Bt1	7 – 30	10YR 5/4	SCL			
Bt2	30 – 36	7.5YR 5/6	SCL	10YR 7/4 7.5YR 5/6		
Cr	36					

Soil Profile Notes **(HC)**

Field # 8	**Waypoint # 33**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 8	10YR 4/3	SL		4%	hay crop
Bt1	8 – 30	10YR 5/4	SL			
Bt2	30 - 42	10YR 6/4	SL	7.5YR 5/6		
Cr	42					

Field # 8	**Waypoint # 34**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 4/3	SL		4%	hay crop
Bt1	7 - 36	10YR 5/4	SL	10YR 7/4		
Bt2	36 - 48	7.5YR 5/6	SCL	10YR 7/4 7.5YR 5/6		
Cr	48					

Field # 8	**Waypoint # 35**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR 4/3	SL		4%	hay crop
Bt	8 – 19	10YR 5/4	SCL			
Btx	19 - 36	10YR 5/4	SL			
Cr	38					

Field # 8	**Waypoint # 36**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 8	10YR 4/3	SL		4%	hay crop
Bt	8 – 24	10YR 5/4	SL			
Cr	24					

Soil Profile Notes **(HC)**

Field # 8	**Waypoint # 37**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 7	10YR 4/3	SL		4%	hay crop
Bt1	7 – 30	10YR 5/4	SCL			
Bt2	30 - 35	7.5YR 5/6	SL	10YR 5/6, 7/4 7.5YR 5/6		
Cr	35					

Field # 8	**Waypoint # 38**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR 4/3	SL		4%	hay crop
Bt1	8 - 24	10YR 5/4	SCL	10YR 7/4		
Bt2	24 - 36	7.5YR 5/6	SCL	10YR 7/4 7.5YR 5/6		
Cr	36					

Field # 8	**Waypoint # 39**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR 4/3	SL		4%	hay crop
Bt	8 – 24	7.5YR 5/4	SCL-	5% fragments		
Cr						

Field # 8	**Waypoint # 40**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 7	10YR 4/3	L		4%	hay crop
Bt1	7 – 30	10YR 5/6	SL			
Bt2	30 -38	10YR 6/6	SCL			
R	38					

Soil Profile Notes **(HC)**

Field # 8	**Waypoint # 37**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 7	10YR 4/3	SL		4%	hay crop
Bt1	7 – 30	10YR 5/4	SCL			
Bt2	30 - 35	7.5YR 5/6	SL	10YR 5/6, 7/4 7.5YR 5/6		
Cr	35					

Field # 8	**Waypoint # 38**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR 4/3	SL		4%	hay crop
Bt1	8 - 24	10YR 5/4	SCL	10YR 7/4		
Bt2	24 - 36	7.5YR 5/6	SCL	10YR 7/4 7.5YR 5/6		
Cr	36					

Field # 8	**Waypoint # 39**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR 4/3	SL		4%	hay crop
Bt	8 – 24	7.5YR 5/4	SCL-	5% fragments		
Cr						

Field # 8	**Waypoint # 40**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 7	10YR 4/3	L		4%	hay crop
Bt1	7 – 30	10YR 5/6	SL			
Bt2	30 -38	10YR 6/6	SCL			
R	38					

Soil Profile Notes **(HC)**

Field # 8	**Waypoint # 41**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 8	10YR 3/2	SL		4%	hay crop
Bt1	8 – 33	10YR 5/6	SCL			
Bt2	33 - 42	10YR 6/4	SL	10YR 5/6, 7/4 7.5YR 5/6		
Cr	42					

Field # 8	**Waypoint # 42**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 4/3	SL		4%	hay crop
Bt1	7 - 28	10YR 5/4	SCL-	10YR 7/4		
Bt2	28 - 33	7.5YR 5/6	SL	7.5YR 5/6		
Cr	33					

Field # 8	**Waypoint # 43**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR 3/2	SL		4%	hay crop
Bt1	8 – 30	10YR 5/6	SCL-	10YR 7/4		
Bt2	30 - 54	7.5YR 5/6	SCL	5YR 5/6		
Cr	54					

Field # 8	**Waypoint # 44**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 6	10YR 4/3	L		4%	hay crop
Bt1	6 – 26	10YR 5/6	SCL			
Bt2	26 -38	7.5YR 6/6	SCL	5YR 5/6		
R	38					

Soil Profile Notes **(HC)**

Field # 8	**Waypoint # 45**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 7	10YR 4/3	SL		4%	hay crop
Bt1	7 – 19	10YR 5/6	SCL+			
Bt2	19 - 43	10YR 5/6	SCL-	10YR 5/6, 7/4 7.5YR 5/6		
Cr	43					

Field # 8	**Waypoint # 46**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR 4/3	SL		4%	hay crop
Bt1	8 - 30	10YR 5/4	SCL-	10YR 7/4		
Bt2	30 - 47	7.5YR 5/6	SL	10YR 5/6		
R	33					

Field # 8	**Waypoint # 47**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR 3/2	SL		4%	hay crop
Bt1	8 – 30	10YR 5/6	SCL-	10YR 7/4		
Bt2	30 - 42	7.5YR 5/6	SCL	5YR 5/6		
R	42					

Field # 8	**Waypoint # 302**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR 4/3	SL		4%	hay crop
Bt	8 – 19	10YR 5/6	SCL-	10YR 7/4		
Cr						

Soil Profile Notes **(HC)**

Field # 8	**Waypoint # 303**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 6	10YR 4/3	SL		4%	hay crop
Bt1	6 – 26	10YR 5/4	SCL			
Bt2	26 - 39	10YR 5/8	SCL	10YR 5/6, 7/4 7.5YR 5/6		
Cr	39					

Field # 8	**Waypoint # 304**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 4/3	SL		4%	hay crop
Bt1	7 - 16	10YR 5/4	SL			
Bt2	16 - 34	7.5YR 5/6	SCL	10% fragments 7.5YR 5/6		
Cr	34					

Field # 8	**Waypoint # 305**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 5	10YR 5/4	SL		4%	hay crop
Bt	5 – 19	10YR 5/6	SL	10YR 7/4		
Cr						

Field # 8	**Waypoint # 306**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 6	10YR 5/4	L		4%	hay crop
Bt1	6 – 17	10YR 5/6	SL			
Bt2	17 -33	10YR 5/8	SCL	7.5YR 5/6		
R	33					

Soil Profile Notes **(HC)**

Field # 8	**Waypoint # 315**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 6	10YR 4/3	SL		4%	hay crop
Bt1	7 – 19	10YR 4/4	SCL+			
Bt2	19 - 41	10YR 5/6	SCL-	10YR 5/6, 7/4 7.5YR 5/6		
Cr	41					

Field # 8	**Waypoint # 316**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 4/3	SL		4%	hay crop
Bt1	7 - 12	10YR 5/4	SL			
Bt2	12 - 24	10YR 5/6	SCL	7.5YR 5/6 5YR 5/6		
R	24					

Field # 8	**Waypoint # 317**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 4/4	SL		4%	hay crop
Bt1	7 – 19	10YR 4/4	SCL-			
Bt2	19 - 42	7.5YR 5/6	SCL	10YR 5/6, 6/4, 7/4		
R	42					

Field # 8	**Waypoint # 318**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 4/3	SL		4%	hay crop
Bt	7 – 17	10YR 5/6	SCL-	10YR 7/4		
Btx	17 - 41	10YR 5/6	SL+	7.5YR 5/6 10YR 6/4, 5/4, 6/2		
Cr	41					

Soil Profile Notes **(HC)**

Field # 8	**Waypoint # 319**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 8	10YR 4/3	SL		4%	hay crop
Bt	8 – 23	10YR 4/4	SCL+			
Btx	23 - 39	10YR 5/6	SCL-	10YR 5/6, 7/4, 6/8 7.5YR 5/6		
Cr	39					

Field # 8	**Waypoint # 320**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR 4/3	SL		4%	hay crop
Bt	8- 27	10YR 5/4	SL			
Btx	27 - 41	10YR 5/6	SCL	7.5YR 5/6 5YR 5/6, 10YR 5/6, 6/2		
R	41					

Field # 8	**Waypoint # 321**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 4/3	SL		4%	hay crop
Bt	7 – 24	10YR 4/4	SCL-			
Btx1	24 - 37	10YR 5/6	SCL	7.5YR 5/6 10YR 5/6, 6/4, 7/4		
Btx2	37 - 52					

Field # 8	**Waypoint # 322**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 5/4	SL		4%	hay crop
Bt1	7 – 26	10YR 5/4	SCL-			
Bt2	26 - 46	10YR 6/4	SL+	7.5YR 5/6 10YR 6/4, 5/4, 6/2		
Cr	46					

Soil Profile Notes **(HC)**

Field # 8	**Waypoint # 323**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 7	10YR 4/3	SL		4%	hay crop
Bt	7 – 23	10YR 4/4	SCL+			
Btx	23 - 51	10YR 5/6	SL+	10YR 5/6, 7/4, 6/8 7.5YR 5/6		
Cr	51					

Field # 8	**Waypoint # 324**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 4/3	SL		4%	hay crop
Bt	7- 19	10YR 4/4	SCL			
Btx	19 - 48	10YR 5/4	SL	7.5YR 5/6 5YR 5/6, 10YR 5/6, 6/2		
R	48					

Field # 8	**Waypoint # 325**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR 4/3	SL		4%	hay crop
Bt	8 – 23	10YR 5/4	SCL			
Btx1	23 - 40	10YR 5/4	SL	7.5YR 5/6 10YR 5/6, 6/4, 7/4		
Btx2	40 - 51	10YR 5/8	SCL	7.5YR 5/6 10YR 5/6, 6/4, 7/4		

Field # 8	**Waypoint # 326**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 4/3	SL		4%	hay crop
Bt	7 – 23	10YR 5/4	SCL-			
Btx1	23 - 40	10YR 5/6	SL+	7.5YR 5/6 10YR 6/4, 5/4, 6/2		
Btx2	40 - 51	10YR 5/8	SCL	7.5YR 5/6 10YR 6/4, 5/4, 6/2		

Soil Profile Notes **(HC)**

Field # 8	**Waypoint # 327**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 7	10YR 4/3	SL		4%	hay crop
Bt	7 – 22	10YR 4/4	SCL+			
Btx1	22 - 38	10YR 5/6	SL+	10YR 5/6, 7/4, 6/8 7.5YR 5/6		
Btx2	38 - 42	7.5YR 5/6	SCL	10YR 5/6, 7/4, 6/8 7.5YR 5/6		

Field # 8	**Waypoint # 328**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 4/3	SL		4%	hay crop
Bt1	7- 23	10YR 5/4	SCL			
Bt2	23 - 49	10YR 5/8	C	7.5YR 5/6 5YR 5/6, 10YR 5/6, 6/2		
Cr	49					

Soil Profile Notes **(HE)**

Field # 8	**Waypoint # 48**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 8	10YR 4/3	L		3%	hay crop
Bt1	8 - 25	10YR 4/4	SCL			
Bt2	25 – 34	10YR 5/6	SL	5YR 5/6 10YR 6/2		
Cr	34					

Field # 8	**Waypoint # 49**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 – 7	10YR 4/3	SL		3%	hay crop
Bt1	7 – 25	10YR 5/6	SCL			
Bt2	25 - 45	10YR 5/6	SL	10YR 6/4 7.5YR 5/6		
Bc	45 - 48	10YR 6/4	SL -	7.5YR 5/6		
Cr						

Field # 8	**Waypoint #50**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 4/3	SL		4%	hay crop
Bt1	7 - 27	10YR 4/4	SCL			
Bt2	27 - 39	10YR 5/6	SL-	10YR 7/4		
Cr	39					

Field 8 Area 1 HC Soil Boring Statistics

n = number of soil borings per area
n = 7

$$\bar{x} = \frac{\sum x}{n}$$

Average surface depth = 7 inches
Average subsoil depth = 36 inches

$$s_{N-1} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \bar{x})^2},$$

Surface Standard Deviation = 0.58
Subsoil Standard Deviation = 2.89

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

Surface standard error = 0.22
Subsoil standard error = 1.09

$t_{\alpha, df} = 1.943$

$CI = x \pm [t_{\alpha, df} \times s_x]$

Surface confidence interval range 6.6 to 7.4 inches
Subsoil confidence interval range 33.9 to 38.1 inches

Results: There is a 90% confidence that the surface thickness of soil in Field 8 Area 1 HC ranges from 6.5 to 7 inches.

Results: There is a 90% confidence that the subsoil thickness of soil in Field 8 Area 1 HC ranges from 34 to 38 inches.

Field 8 Area 2 HC Soil Boring Statistics

n = number of soil borings per area
n = 3

$$\bar{x} = \frac{\sum x}{n}$$

Average surface depth = 6.33 inches
Average subsoil depth = 29 inches

$$s_{N-1} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \bar{x})^2},$$

Surface Standard Deviation = 0.57
Subsoil Standard Deviation = 3.46

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

Surface standard error = 0.33
Subsoil standard error = 2

$t_{\alpha, df} = 2.92$

$CI = x \pm [t_{\alpha, df} \times s_x]$

Surface confidence interval range 5.36 to 7.3 inches
Subsoil confidence interval range 23.2 to 34.8 inches

Results: There is a 90% confidence that the surface thickness of soil in Field 8 Area 2 HC ranges from 5 to 7 inches.

Results: There is a 90% confidence that the subsoil thickness of soil in Field 8 Area 2 HC ranges from 23 to 35 inches.

Field 8 Area 3 CL Soil Boring Statistics

n = number of soil borings per area
n = 5

$$\bar{x} = \frac{\sum x}{n}$$

Average surface depth = 8.4 inches
Average subsoil depth = 38.6 inches

$$s_{N-1} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \bar{x})^2},$$

Surface Standard Deviation = 0.55
Subsoil Standard Deviation = 7.83

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

Surface standard error = 0.24
Subsoil standard error = 3.50

$t_{\alpha, df} = 2.132$

$CI = x \pm [t_{\alpha, df} \times s_x]$

Surface confidence interval range 7.9 to 8.9 inches
Subsoil confidence interval range 31.13 to 46.06 inches

Results: There is a 90% confidence that the surface thickness of soil in Field 8 Area 3 CL ranges from 8 to 9 inches.

Results: There is a 90% confidence that the subsoil thickness of soil in Field 6 Area 6 AN ranges from 31 to 46 inches.

Field 8 Area 3 CL Soil Boring Statistics

n = number of soil borings per area
n = 5

$$\bar{x} = \frac{\sum x}{n}$$

Average surface depth = 8.4 inches
Average subsoil depth = 38.6 inches

$$s_{N-1} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \bar{x})^2},$$

Surface Standard Deviation = 0.55
Subsoil Standard Deviation = 7.83

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

Surface standard error = 0.24
Subsoil standard error = 3.50

$t_{\alpha, df} = 2.132$

$CI = x \pm [t_{\alpha, df} \times s_x]$

Surface confidence interval range 7.9 to 8.9 inches
Subsoil confidence interval range 31.13 to 46.06 inches

Results: There is a 90% confidence that the surface thickness of soil in Field 8 Area 3 CL ranges from 8 to 9 inches.

Results: There is a 90% confidence that the subsoil thickness of soil in Field 6 Area 6 AN ranges from 31 to 46 inches.

Field 8 Area 4 HC Soil Boring Statistics

n = number of soil borings per area
n = 15

$$\bar{x} = \frac{\sum x}{n}$$

Average surface depth = 7.67 inches
Average subsoil depth = 43.73 inches

$$s_{N-1} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \bar{x})^2},$$

Surface Standard Deviation = 0.62
Subsoil Standard Deviation = 1.83

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

Surface standard error = 0.16
Subsoil standard error = 0.47

$t_{\alpha, df} = 1.761$

$CI = x \pm [t_{\alpha, df} \times s_x]$

Surface confidence interval range 7.4 to 7.9 inches
Subsoil confidence interval range 42.9 to 44.6 inches

Results: There is a 90% confidence that the surface thickness of soil in Field 8 Area 4 HC ranges from 7 to 8 inches.

Results: There is a 90% confidence that the subsoil thickness of soil in Field 8 Area 4 HC ranges from 43 to 44 inches.

Field 8 Area 5 HC Soil Boring Statistics

n = number of soil borings per area
n = 9

$$\bar{x} = \frac{\sum x}{n}$$

Average surface depth = 7.67 inches
Average subsoil depth = 37.67 inches

$$s_{N-1} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \bar{x})^2},$$

Surface Standard Deviation = 0.5
Subsoil Standard Deviation 3.12

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

Surface standard error = 0.17
Subsoil standard error = 1.04

$t_{\alpha, df} = 1.86$

$CI = x \pm [t_{\alpha, df} \times s_x]$

Surface confidence interval range 7.4 to 8 inches
Subsoil confidence interval range 42.9 to 44.5 inches

Results: There is a 90% confidence that the surface thickness of soil in Field 8 Area 5 HC ranges from 7 to 8 inches.

Results: There is a 90% confidence that the subsoil thickness of soil in Field 8 Area 5 HC ranges from 36 to 40 inches.

Field 8 Area 6 HC Soil Boring Statistics

n = number of soil borings per area
n = 3

$$\bar{x} = \frac{\sum x}{n}$$

Average surface depth = 7.67 inches
Average subsoil depth = 14.33 inches

$$s_{N-1} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \bar{x})^2},$$

Surface Standard Deviation = 0.57
Subsoil Standard Deviation = 1.53

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

Surface standard error = 0.33
Subsoil standard error = 0.88

$t_{\alpha, df} = 2.92$

$CI = x \pm [t_{\alpha, df} \times s_x]$

Surface confidence interval range 6.7 to 8.6 inches
Subsoil confidence interval range 11.8 to 16.9 inches

Results: There is a 90% confidence that the surface thickness of soil in Field 8 Area 6 HC ranges from 7 to 8.5 inches.

Results: There is a 90% confidence that the subsoil thickness of soil in Field 8 Area 6 HC ranges from 12 to 17 inches.

Field 8 Area 7 HE Soil Boring Statistics

n = number of soil borings per area
n = 3

$$\bar{x} = \frac{\sum x}{n}$$

Average surface depth = 7.33 inches
Average subsoil depth = 33 inches

$$s_{N-1} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \bar{x})^2},$$

Surface Standard Deviation = 0.58
Subsoil Standard Deviation = 7.55

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

Surface standard error = 0.33
Subsoil standard error = 4.36

$t_{\alpha, df} = 2.92$

$CI = x \pm [t_{\alpha, df} \times s_x]$

Surface confidence interval range 6.4 to 8.3 inches
Subsoil confidence interval range 20.3 to 45.7 inches

Results: There is a 90% confidence that the surface thickness of soil in Field 8 Area 7 HE ranges from 6 to 8 inches.

Results: There is a 90% confidence that the subsoil thickness of soil in Field 8 Area 7 HE ranges from 20 to 46 inches.

Soil Profile Notes **(HC)**

Field # 9	**Waypoint 183**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 5	10YR 3/3	L		3%	hay crop
Bt1	5 - 18	10YR 5/4	SL			
Bt2	18 - 26	10YR 5/4	SL-			
R						

Field # 9	**Waypoint 184**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR 3/3	L		3 %	
Bt1	6 - 20	10YR 5/6	SCL			
Bt2	20 - 36	10YR 5/6	SL-			
R	36					

Field # 9	**Waypoint # 185**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 5	10YR 4/3	SL		3%	
Bt1	5 - 14	10YR 5/4	SCL-			
Bt2	14 - 25	10YR 5/6	SL-			
R	25					

Field # 9	**Waypoint # 186**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR 4/3	LS		3%	
Bt1	6 - 19	10YR 5/4	SCL			
Bt2	19 - 37	10YR 5/4	SL-			
Cr	37					

Soil Profile Notes **(HC)**

Field # 9	**Waypoint 187**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR 3/3	L		3%	hay crop
Bt1	6 - 24	10YR 5/4	SL			
Bt2	24 - 32	10YR 5/4	SL-			
R	32					

Field # 9	**Waypoint 188**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR 4/3	L		3 %	
Bt1	6 - 18	10YR 5/4	SCL			
Bt2	18 - 30	10YR 5/6	SL-			
C	30 – 42	10YR 5/6	LS+			

Field # 9	**Waypoint # 189**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR 4/3	SL		3%	
Bt1	6 - 30	10YR 5/4	SCL-			
Bt2	30 - 37	10YR 5/4	SCL-	5 % coarse fragments 7.5YR 5/6,		
R	37					

Field # 9	**Waypoint # 190**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 4/3	LS		3%	
Bt1	7 - 20	10YR 5/4	SCL			
Bt2	20 - 32	10YR 5/4	SL-	10YR 6/8		
Cr	32					

Soil Profile Notes **(HC)**

Field # 9	**Waypoint 191**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 7	10YR 3/3	SL		3%	hay crop
Bt1	7 - 25	10YR 5/4	SCL			
Bt2	25 - 36	10YR 5/6	SL-	10YR 6/8		
Cr	36					

Field # 9	**Waypoint 192**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR 4/3	SL		3 %	
Bt1	6 - 18	10YR 5/4	SL	10YR 6/6		
Bt2	18 - 42	10YR 5/6	SCL	10YR 6/8,7/4		
C	42	10YR 5/6	SL_+	10YR 6/8,7/4		

Field # 9	**Waypoint # 193**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 5	10YR 4/3	SL		3%	
Bt	5 - 19	10YR 5/4	SL	20% fragments		
R	19					

Field # 9	**Waypoint # 194**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 5	10YR 4/3	L		3%	
Bt1	5 - 24	10YR 5/6	SCL			
Bt2	24 - 42	10YR 5/6	SL+	15% fragments		
Cr	42					

Soil Profile Notes **(HC)**

Field # 9	**Waypoint 195**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR 3/3	L		3%	grazed
Bt1	6 - 30	10YR 5/4	SL			
Bt2	30 - 38	10YR 6/6	SL	10YR 6/8		
Cr	38					

Field # 9	**Waypoint 196**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 6	10YR 3/3	L		3 %	grazed
Bt1	6 - 30	10YR 5/4	SCL-			
Bt2	30- 36	10YR 5/4	SL	10YR 6/4		
R	36					

Field # 9	**Waypoint # 197**			Soil Series		
Horizon	Depth/ inches	Color	Texture	Mottles	Slope	Crop History
Ap	0 - 5	10YR 4/3	SL		3%	grazed
Bt1	5 - 14	10YR 5/4	SCL-			
Bt2	14 - 24	10YR 5/6	SL			
Bt3	24 - 28	10YR 5/6	SL-			
Cr	28					

Field 9 Area 1 HC Soil Boring Statistics

n = number of soil borings per area
n = 5

$$\bar{x} = \frac{\sum x}{n}$$

Average surface depth = 6.2 inches
Average subsoil depth = 29.4 inches

$$s_{N-1} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \bar{x})^2},$$

Surface Standard Deviation = 0.45
Subsoil Standard Deviation = 2.07

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

Surface standard error = 0.20
Subsoil standard error = 0.92

$t_{\alpha, df} = 2.132$

$CI = x \pm [t_{\alpha, df} \times s_x]$

Surface confidence interval range 5.8 to 6.6 inches
Subsoil confidence interval range 27.4 to 31.4 inches

Results: There is a 90% confidence that the surface thickness of soil in Field 9 Area 1 HC ranges from 6 to 6.5 inches.

Results: There is a 90% confidence that the subsoil thickness of soil in Field 9 Area 1 HC ranges from 27 to 31 inches.

Field 9 Area 2 HC Soil Boring Statistics

n = number of soil borings per area
n = 3

$$\bar{x} = \frac{\sum x}{n}$$

Average surface depth = 5.67 inches
Average subsoil depth = 28.3 inches

$$s_{N-1} = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \bar{x})^2},$$

Surface Standard Deviation = 0.58
Subsoil Standard Deviation = 4.72

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

Surface standard error = 0.33
Subsoil standard error = 2.72

$t_{\alpha, df} = 2.92$

$CI = x \pm [t_{\alpha, df} \times s_x]$

Surface confidence interval range 4.7 to 6.6 inches
Subsoil confidence interval range 20.4 to 36.3 inches

Results: There is a 90% confidence that the surface thickness of soil in Field 9 Area 2 HC ranges from 5 to 6.5 inches.

Results: There is a 90% confidence that the subsoil thickness of soil in Field 9 Area 2 HC ranges from 20 to 36 inches.