HYDROLOGIC DETERMINATION
FOR
SEDBERRY ROAD DEVELOPMENT
FRANKLIN, WILLIAMSON COUNTY, TENNESSEE

Prepared For:

Encompass Land Group
121 First Avenue South
Suite 220
Franklin, Tennessee 37064

Prepared by:

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Lebanon, Tennessee 37087

May 7, 2018

GEOServices, LLC-Geotechnical and Materials Engineers

May 7, 2018

TDEC-Nashville Environmental Field Office (EFO)
711 R.S. Gass Boulevard
Nashville, Tennessee 37216

Subject: **Hydrologic Determination**
Sedberry Road Development
Franklin, Tennessee
GEOServices Project No. 34-181192

GEOServices, LLC has completed a Hydrologic Determination for the property located east of the intersection of Sedberry Road and Pioneer Lane in Franklin, Tennessee. Please see our findings in the attached report.

GEOServices appreciates the opportunity to continue providing services to you and looks forward to working with you in the future. If you have any questions, please do not hesitate to contact us at your convenience.

Sincerely,

GEOServices, LLC

C. Brandon Garrett, CPESC, TN-QHP #1130-15
Nashville Area Environmental Manager

Michael J. Kendall, P.G., E.P.
Executive Director

Cc: Encompass Land Group (Ryan Manners)

1.0 INTRODUCTION

GEOServices, LLC (GEOServices) performed a hydrologic determination on May 1, 2018, for the drainage features on the property of the proposed development, located north of SR-840 and east of the intersection of Sedberry Road and Pioneer Lane (See **Figure 2** - Site Location Map). During this field review, information was gathered regarding the drainage features present onsite and analyzed following the Tennessee Department of Environment and Conservation (TDEC) standard operating procedures for Hydrologic Determinations. Hydrologic Determination Field data sheets version 1.4 (HDFD's) completed during the course of the delineation are provided in **Appendix I**.

The proposed use of the property will include a residential development. Detailed civil plans have not been provided to us and we assume that the planning is in preliminary phase.

2.0 SITE DESCRIPTION

The subject property is located east of the intersection of Pioneer Lane and Sedberry Road and directly north of SR 840 at 1835 Sedberry Road (Parcel #13100701). Three drainage features were observed and scored on the HDFD sheet during the site reconnaissance.

The beginning of the WWC-1 determination is located at Latitude: North 35.823367^{o} and Longitude: West -86.900266^{o} and the termination is located at confluence with STR-2 at at Latitude: North 35.823470^{o} and Longitude: West -86.900305^{o}. STR-1 begins at the southern property boundary located at Latitude: North 35.823557° Longitude: West -86.909859° and the termination is located at the northern property boundary Latitude: North 35.829129° Longitude: West -86.908032°. STR-2 begins at the southern property boundary near the southeastern property corner at Latitude: North 35.823367° Longitude: West -86.908032° No potential wetland areas were identified during the field inspection. The property is bordered to the north and south by vacant partially wooded farmland and to the east and west by residential properties. Properties beyond consist of residential properties. Stormwater appears to drain multi-directionally across the property. The property consisted of vacant agricultural land which primarily is used for row crop farming. The wooded portions of the property included mostly

upland grass species and upland forest habitat.

The site is located on the Spring Hill, Tennessee US Geological Survey 7.5 Minute Topographic Quadrangle and has an approximate elevation range between approximately 745 and 825 feet above mean sea level (**Figure 1**).

3.0 SITE INFORMATION

Three (3) drainage features were observed on the property during the field investigation. The channels were scored using the HDFD's. STR-1 and STR-2 were identified on the Spring Hill, Tennessee US Geological Survey 7.5 Minute Topographic Quadrangle for the subject property. No other drainage features were identified on the US Geological Survey for the subject property, nor on the National Wetlands Inventory map (see section 4 below). For the purpose of this report, the drainage features on the property were scored as Stream 1, Stream 2 and Wet Weather Conveyance 1 (**Figure 2).**

4.0 NATIONAL WETLANDS INVENTORY (NWI) MAP

The NWI map was reviewed to identify any previously mapped wetlands within the boundaries of the site. The NWI map did identify riverine features on the property (STR-1, STR-2) **(Figure 3)**.

5.0 SOIL SURVEY

As shown in **Figure 4**, the site is predominantly underlain by soils listed in **Table 1**. None of the soils on the property were listed as hydric on the Hydric Soils List of Williamson County, Tennessee .

Table 1: Potential Soils Located on the Subject Property

Symbol	Soil Name	Description	Hydric
ArA	Armour silt loam, 0 to 2 percent slopes	Silty alluvium over clayey residuum weathered from phosphatic limestone	No
ArB	Armour silt loam, 2 to 5 percent slopes	Silty alluvium over clayey residuum weathered from phosphatic limestone	No
ArB2	Armour silt loam, 2 to 5 percent slopes, eroded	Loamy alluvium derived from interbedded sedimentary rock	No
ArC2	Armour silt loam, 5 to 12 percent slopes	Loamy alluvium derived from interbedded sedimentary rock	No
CaB	Captina silt loam, phosphatic, 2 to 5 percent slopes	Silty or loamy colluvium over clayey residuum weathered from limestone	No
DnB2	Donerall silt loam, 2 to 5 percent slopes, eroded	Clayey alluvium derived from limestone	No
DoB2	Donerall silt loam, concretionary, 2 to 5 percent slopes, eroded	Clayey alluvium derived from limestone	No
DoC2	Donerall silt loam, concretionary, 5 to 12 percent slopes, eroded	Clayey alluvium derived from limestone	No
Eg	Egam silt loam, phospatic	Clayey alluvium	No
Gu	Gullied land	Gullied land	No
HbB2	Hampshire silt loam, 2 to 5 percent slopes, eroded	Clayey residuum weathered from limestone and shale over gravelly residuum weathered from limestone sandstone and shale	No
HbC2	Hampshire silt loam, 5 to 12 percent slopes, eroded	Clayey residuum weathered from limestone and shale over gravelly residuum weathered from limestone sandstone and shale	No
Hu	Huntington silt loam, phosphatic	Loamy alluvium derived from limestone, sandstone and shale	No
Lp	Lindell silt loam, 0 to 2 percent slopes, occasionally flooded	Fine-loamy alluvium derived from limestone and siltstone	No
MbA	Maury silt loam, 0 to 2 percent slopes	Loess over clayey residuum and/or alluvium derived from limestone	No
MbB2	Maury silt loam, 2 to 5 percent slopes, eroded	Loess over clayey residuum and/or alluvium derived from limestone	No
MbC2	Maury silt loam, 5 to 12 percent slopes	Loess over clayey residuum and/or alluvium derived from limestone	No
MoD	Ashwood-Mimosa-Rock outcrop complex, 5 to 15 percent slopes	Clayey residuum weathered from limestone	No
Mp	Mine pits and Dumps	Mine pits and dumps	No
SrC3	Stiversville clay loam, 5 to 12 percent slopes, severely eroded	Loamy residuum weathered from limestone, sandstone and shale	No
StB2	Stiversville silt loam, 2 to 5 percent slopes	Loamy residuum weathered from limestone, sandstone and shale	No
StC2	Stiversville silt loam, 5 to 12 percent slopes, eroded	Loamy residuum weathered from limestone, sandstone and shale	No

Source: NRCS Web Soil Survey

6.0 ON-SITE FINDINGS

The channels observed on site were scored using the HDFD. The primary indicators for stream (presence of multiple populations of obligate lotic organisms with >two months aquatic phase) was observed for STR-1. Primary indicators for stream (presence of multiple populations of obligate lotic organisms with > two month aquatic phase and presence of fish excluding *gambusia*) were observed for STR-2.

Feature 1 (STR-1) displayed an abundance of geomorphic features including moderate indicators for continuous bed and bank, in-channel structure, sorting of soil structure, active/relic floodplain, recent alluvial deposits, grade controls, natural valley/drainageway. Weaker geomorphic indicators including sinuous channel and depositional bars/benches were observed. Strong hydrology indicator; water in channel and greater than 48 hours since last rainfall was observed, as well as moderate indicator for organic debris lines and weak indicator for subsurface flow in channel and sediment on plants or debris. The feature displayed an abundance of biological indicators including crayfish, bivalves, amphibians, and filamentous algae. An abundance of macro-benthos species was observed and included stonefly larvae (*Plecoptera),* mayfly larvae (*Emphemoroptera),* caddisfly cases (*Tricoptera),* and Scudfly larva (*Amphipoda*).

Feature 2 (STR-2) displayed an abundance of geomorphic features including moderate indicators for continuous bed and bank, in-channel structure, sorting of soil structure, active/relic floodplain, recent alluvial deposits, grade controls, natural valley/drainageway and depositional bars/benches. Weaker geomorphic indicators including sinuous channel and natural valley/drainageway were observed. Moderate hydrology indicators; water in channel and greater than 48 hours since last rainfall, weak indicators for organic debris lines, weak indicators for subsurface flow in channel, and sediment on plants or debris were noted. The feature displayed an abundance of biological indicators including crayfish, bivalves, amphibians, and filamentous algae. An abundance of macro-benthos species was observed and included stonefly larvae (*Plecoptera),* mayfly larvae (*Emphemoroptera),* caddisfly cases (*Tricoptera),* and Scudfly larva (*Amphipoda*). Multiple species of fish were also observed in-stream.

Feature 3 (WWC-1) displayed weak geomorphic indicators which included continuous bed and bank, sinuous channel, in-channel structure, recent alluvial deposits, and natural valley/drainageway. The feature displayed an absence of all other geomorphic indicators. Hydrology indicators displayed were weak and included water in channel and 48 hours since significant rainfall and sediment on plants or debris but the feature did display strong indicators for leaf litter in channel as the channel was lined with leaves. The feature displayed an absence of biological indicators with the exception of weak indicators for filamentous algae. Macro-benthic invertebrates encountered in Feature 3 included scudfly larvae (*Amphipoda*), isopods (*Isopoda*), and water striders (*Gerridae*).

Hydrologic Determination Field Data Sheet scores for each feature were as follows:

- Feature 1 (STR-1) – 32.5
- Feature 2 (STR-2) – 32.0
- Feature 3 (WWC-1) – 12.0

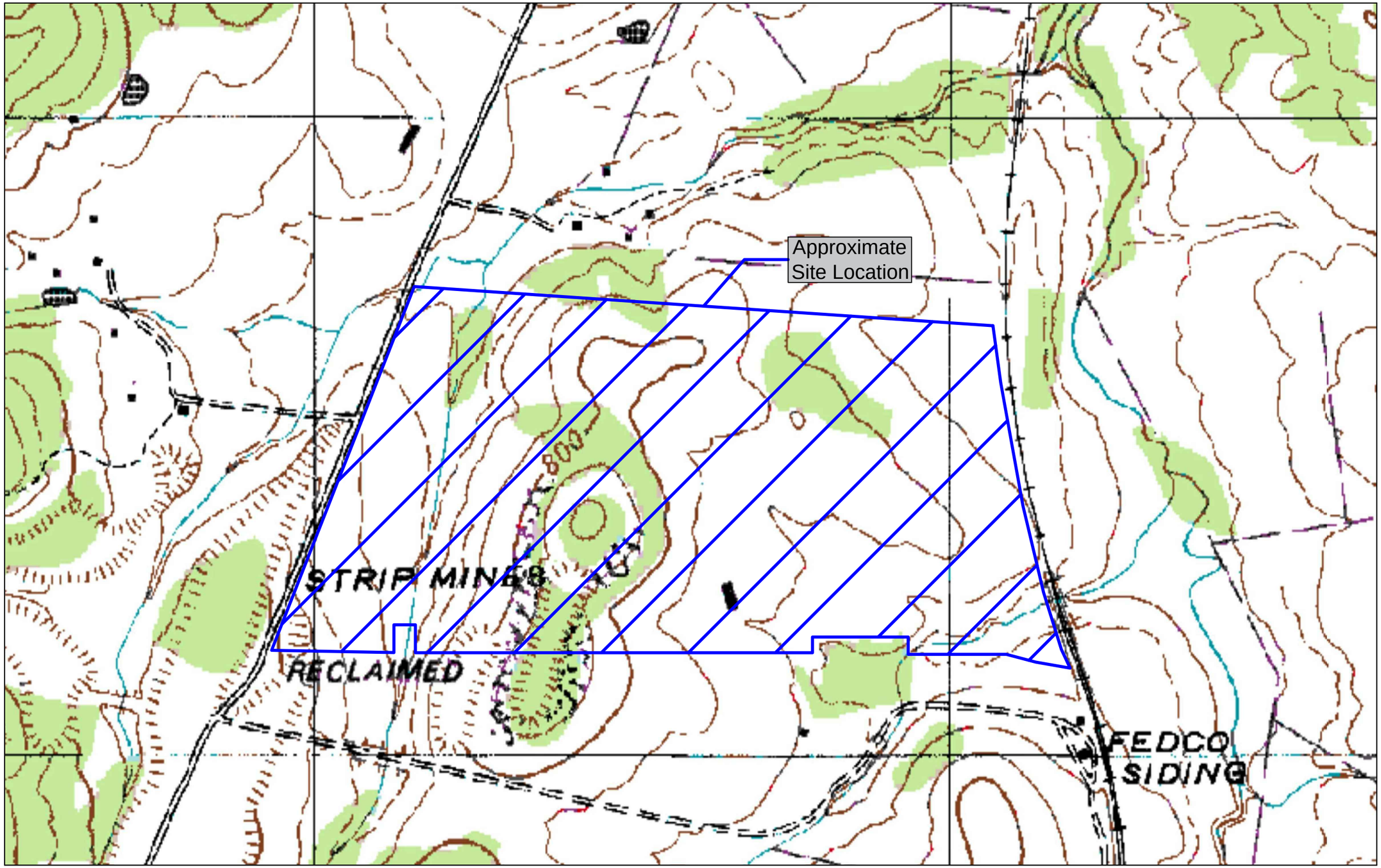
More information regarding on-site findings of the drainage feature can be found in the field data forms included in **Appendix 1.** Photographs taken during the investigation are included in **Appendix III**.

I certify under penalty of law that this report and all attachments are, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalites for submitting false information, including the possibility of fine and imprisonment for knowing violations. As specified in Tennessee Code Annotated Section 39-16-1702 (a)(4), this declaration is made under penalty of perjury.

C. Brandon Garrett, TN-QHP #1130-15
Nashville Area Environmental Manager

Figure 1

Location Map



Source Provided by: MYTOPO

GEOS
GEOServices, LLC-Geotechnical and Materials Engineers

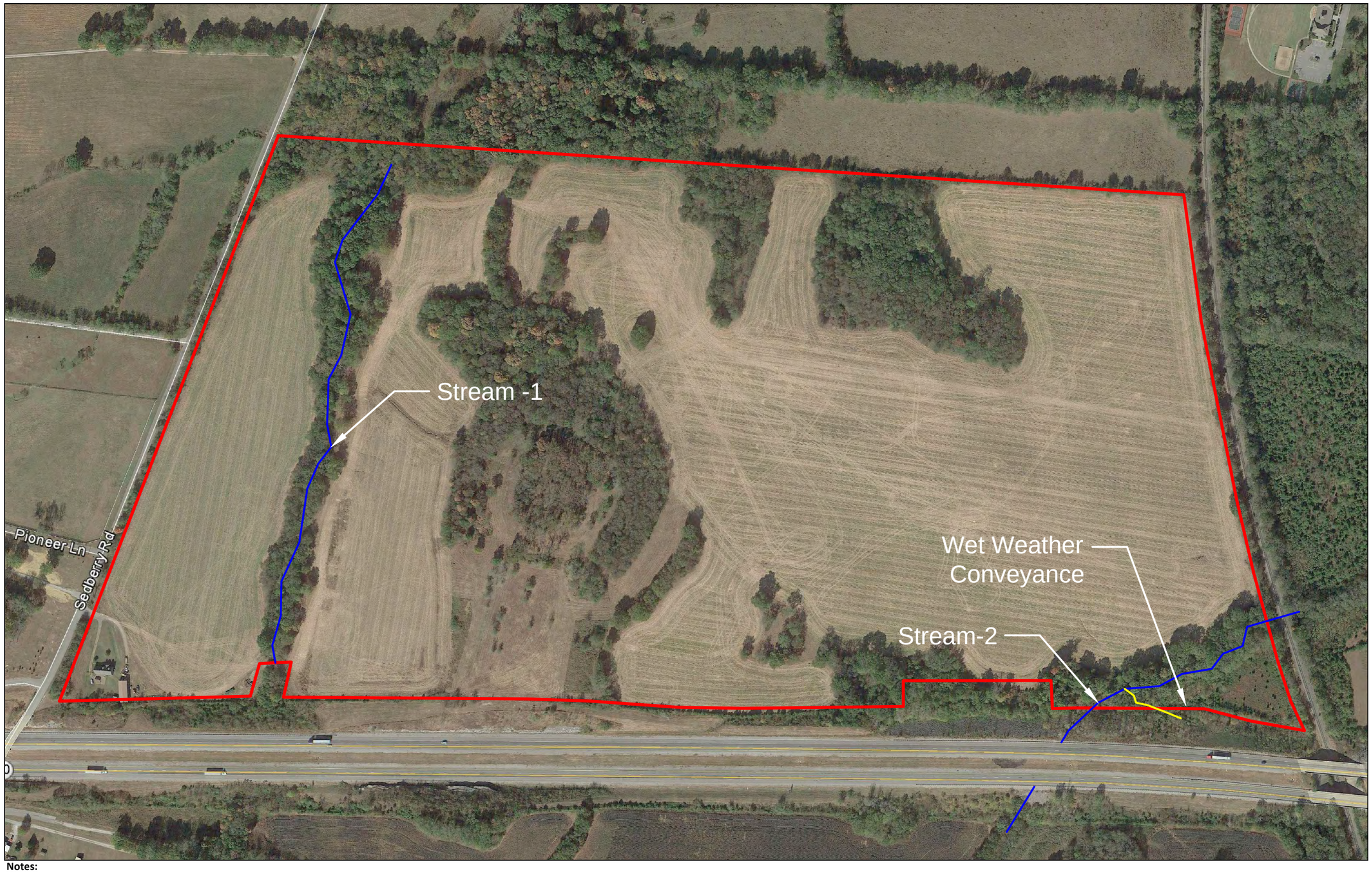
USGS Topographic Map
Sedberry Road Development Hydrologic Determination
Franklin, Tennessee

DATE:
05/04/2018

GEOS Project No.
34-181192

FIGURE:
1

Figure 2
Site Layout/ Field Determinations



Notes:

1) Site Source Provided by: Client
2) Aerial Provided by: Google Earth Pro, (10/23/2016)

GEOS
GEOServices, LLC-Geotechnical and Materials Engineers

Site Vicinity
Sedberry Road Development Hydrologic Determination
Franklin, Tennessee

DATE:
05/04/2018

GEOS Project No.
34-181192

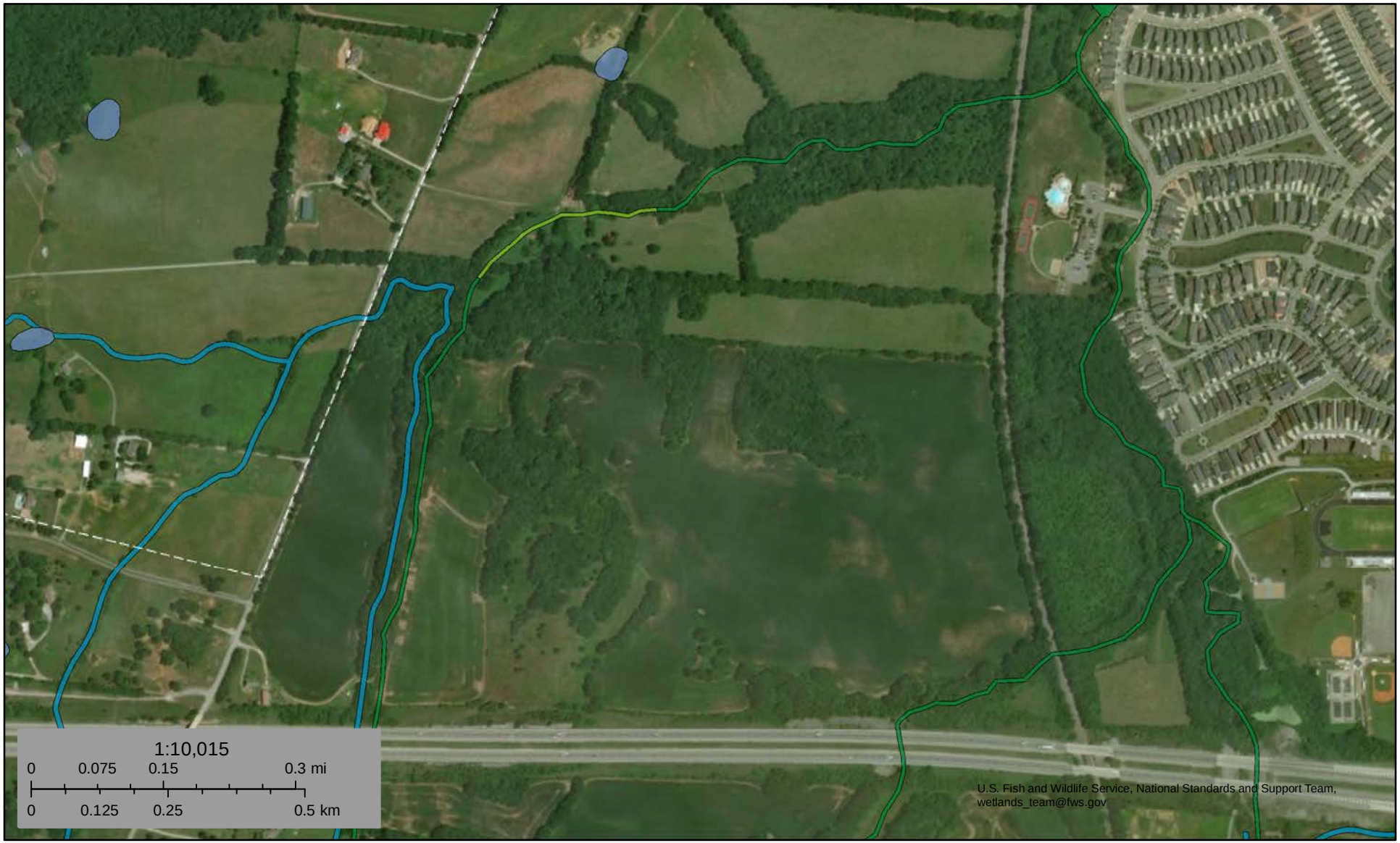
FIGURE:
2

Figure 3

National Wetland Inventory Map

U.S. Fish and Wildlife Service
National Wetlands Inventory

Sedberry Road Development



May 7, 2018

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

Figure 4

NRCS Soil Survey Map

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Williamson County, Tennessee

May 7, 2018

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

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Contents

Preface.....2
How Soil Surveys Are Made.....5
Soil Map.....8
Soil Map.....9
Legend.....10
Map Unit Legend.....11
Map Unit Descriptions.....12
Williamson County, Tennessee.....14
ArA—Armour silt loam, 0 to 2 percent slopes.....14
ArB—Armour silt loam, 2 to 5 percent slopes.....15
ArB2—Armour silt loam, 2 to 5 percent slopes, eroded.....16
ArC2—Armour silt loam, 5 to 12 percent slopes, eroded.....16
CaB—Captina silt loam, phosphatic, 2 to 5 percent slopes.....17
DnB2—Donerail silt loam, 2 to 5 percent slopes, eroded.....18
DoB2—Donerail silt loam, concretionary, 2 to 5 percent slopes, eroded....19
DoC2—Donerail silt loam, concretionary, 5 to 12 percent slopes, eroded..20
Eg—Egam silt loam, phosphatic.....21
Gu—Gullied land.....22
HbB2—Hampshire silt loam, 2 to 5 percent slopes, eroded.....22
HbC2—Hampshire silt loam, 5 to 12 percent slopes, eroded.....23
Hu—Huntington silt loam, phosphatic.....24
Lp—Lindell silt loam, 0 to 2 percent slopes, occasionally flooded.....25
MbA—Maury silt loam, 0 to 2 percent slopes.....26
MbB2—Maury silt loam, 2 to 5 percent slopes, eroded.....27
MbC2—Maury silt loam, 5 to 12 percent slopes, eroded.....28
MoD—Ashwood-Mimosa-Rock outcrop complex, 5 to 15 percent slopes..28
Mp—Mine pits and Dumps.....30
SrC3—Stiversville clay loam, 5 to 12 percent slopes, severely eroded.....30
StB2—Stiversville silt loam, 2 to 5 percent slopes.....31
StC2—Stiversville silt loam, 5 to 12 percent slopes, eroded.....32
StD2—Stiversville silt loam, 12 to 20 percent slopes, eroded.....33
References.....35

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Williamson County, Tennessee
Survey Area Data: Version 12, Sep 25, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 17, 2011—May 5, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
ArA	Armour silt loam, 0 to 2 percent slopes	0.9	0.5%
ArB	Armour silt loam, 2 to 5 percent slopes	11.9	7.0%
ArB2	Armour silt loam, 2 to 5 percent slopes, eroded	1.1	0.7%
ArC2	Armour silt loam, 5 to 12 percent slopes, eroded	2.4	1.4%
CaB	Captina silt loam, phosphatic, 2 to 5 percent slopes	7.5	4.4%
DnB2	Donerail silt loam, 2 to 5 percent slopes, eroded	0.2	0.1%
DoB2	Donerail silt loam, concretionary, 2 to 5 percent slopes, eroded	1.3	0.7%
DoC2	Donerail silt loam, concretionary, 5 to 12 percent slopes, eroded	0.1	0.1%
Eg	Egam silt loam, phosphatic	0.6	0.4%
Gu	Gullied land	3.5	2.1%
HbB2	Hampshire silt loam, 2 to 5 percent slopes, eroded	1.8	1.1%
HbC2	Hampshire silt loam, 5 to 12 percent slopes, eroded	6.2	3.6%
Hu	Huntington silt loam, phosphatic	25.2	14.8%
Lp	Lindell silt loam, 0 to 2 percent slopes, occasionally flooded	13.6	8.0%
MbA	Maury silt loam, 0 to 2 percent slopes	2.1	1.2%
MbB2	Maury silt loam, 2 to 5 percent slopes, eroded	17.9	10.5%
MbC2	Maury silt loam, 5 to 12 percent slopes, eroded	20.2	11.9%
MoD	Ashwood-Mimosa-Rock outcrop complex, 5 to 15 percent slopes	2.8	1.6%
Mp	Mine pits and Dumps	16.1	9.5%
SrC3	Stiversville clay loam, 5 to 12 percent slopes, severely eroded	1.8	1.1%
StB2	Stiversville silt loam, 2 to 5 percent slopes	7.3	4.3%
StC2	Stiversville silt loam, 5 to 12 percent slopes, eroded	22.5	13.2%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
StD2	Stiversville silt loam, 12 to 20 percent slopes, eroded	3.0	1.8%
Totals for Area of Interest		**169.8**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Williamson County, Tennessee

ArA—Armour silt loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2td2z
Elevation: 500 to 850 feet
Mean annual precipitation: 48 to 58 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 190 to 230 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Armour and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Armour

Setting

Landform: Stream terraces
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Concave, convex
Across-slope shape: Linear, convex
Parent material: Silty alluvium over clayey residuum weathered from phosphatic limestone

Typical profile

A - 0 to 19 inches: silt loam
Bt - 19 to 58 inches: silty clay loam
BC - 58 to 79 inches: clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 11.6 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: B
Hydric soil rating: No

ArB—Armour silt loam, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2td31
Elevation: 500 to 850 feet
Mean annual precipitation: 48 to 58 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 190 to 230 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Armour and similar soils: 90 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Armour

Setting

Landform: Stream terraces
Landform position (two-dimensional): Footslope, toeslope
Landform position (three-dimensional): Base slope, tread
Down-slope shape: Concave, convex
Across-slope shape: Linear, convex
Parent material: Silty alluvium over clayey residuum weathered from phosphatic limestone

Typical profile

A - 0 to 19 inches: silt loam
Bt - 19 to 58 inches: silty clay loam
BC - 58 to 79 inches: clay

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 11.6 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Hydric soil rating: No

ArB2—Armour silt loam, 2 to 5 percent slopes, eroded

Map Unit Setting

National map unit symbol: kkpp
Elevation: 450 to 700 feet
Mean annual precipitation: 46 to 60 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 190 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Armour and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Armour

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Parent material: Loamy alluvium derived from interbedded sedimentary rock

Typical profile

H1 - 0 to 13 inches: silt loam
H2 - 13 to 60 inches: silty clay loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 11.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: B
Hydric soil rating: No

ArC2—Armour silt loam, 5 to 12 percent slopes, eroded

Map Unit Setting

National map unit symbol: kkpr
Elevation: 450 to 700 feet

Mean annual precipitation: 46 to 60 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 190 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Armour and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Armour

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Parent material: Loamy alluvium derived from interbedded sedimentary rock

Typical profile

H1 - 0 to 13 inches: silt loam
H2 - 13 to 60 inches: silty clay loam

Properties and qualities

Slope: 5 to 12 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 11.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Hydric soil rating: No

CaB—Captina silt loam, phosphatic, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: kkqd
Elevation: 700 to 1,400 feet
Mean annual precipitation: 42 to 46 inches
Mean annual air temperature: 54 to 57 degrees F
Frost-free period: 160 to 195 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Captina and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Captina

Setting

Landform: Stream terraces
Landform position (three-dimensional): Tread
Parent material: Silty or loamy colluvium over clayey residuum weathered from limestone

Typical profile

H1 - 0 to 9 inches: silt loam
H2 - 9 to 24 inches: silty clay loam
H3 - 24 to 40 inches: silty clay loam
H4 - 40 to 60 inches: silty clay loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: About 24 inches to fragipan
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 16 to 34 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Hydric soil rating: No

DnB2—Donerail silt loam, 2 to 5 percent slopes, eroded

Map Unit Setting

National map unit symbol: kkqy
Mean annual precipitation: 46 to 60 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 190 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Donerail and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Donerail

Setting

Landform: Flats
Landform position (three-dimensional): Dip
Parent material: Clayey alluvium derived from limestone

Typical profile

H1 - 0 to 7 inches: silt loam
H2 - 7 to 23 inches: silty clay loam
H3 - 23 to 40 inches: silty clay loam
H4 - 40 to 70 inches: clay

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 10.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Hydric soil rating: No

DoB2—Donerail silt loam, concretionary, 2 to 5 percent slopes, eroded

Map Unit Setting

National map unit symbol: kkr0
Mean annual precipitation: 46 to 60 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 190 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Donerail and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Donerail

Setting

Landform: Flats
Landform position (three-dimensional): Dip
Parent material: Clayey alluvium derived from limestone

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 24 inches: silty clay loam
H3 - 24 to 40 inches: silty clay
H4 - 40 to 70 inches: clay

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches

Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 10.7 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Hydric soil rating: No

DoC2—Donerail silt loam, concretionary, 5 to 12 percent slopes, eroded

Map Unit Setting
National map unit symbol: kkr1
Mean annual precipitation: 46 to 60 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 190 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition
Donerail and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Donerail

Setting
Landform: Flats
Landform position (three-dimensional): Dip
Parent material: Clayey alluvium derived from limestone

Typical profile
H1 - 0 to 6 inches: silt loam
H2 - 6 to 22 inches: silty clay loam
H3 - 22 to 40 inches: silty clay
H4 - 40 to 70 inches: clay

Properties and qualities
Slope: 5 to 12 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 10.6 inches)

Interpretive groups
Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Hydric soil rating: No

Eg—Egam silt loam, phosphatic

Map Unit Setting

National map unit symbol: kkr4
Elevation: 800 to 1,300 feet
Mean annual precipitation: 52 to 56 inches
Mean annual air temperature: 54 to 57 degrees F
Frost-free period: 170 to 190 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Egam and similar soils: 92 percent
Minor components: 8 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Egam

Setting

Landform: Flood plains
Landform position (three-dimensional): Tread
Parent material: Clayey alluvium

Typical profile

H1 - 0 to 20 inches: silt loam
H2 - 20 to 40 inches: silty clay loam
H3 - 40 to 55 inches: silty clay loam

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 36 to 48 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: High (about 9.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Dunning

Percent of map unit: 8 percent
Landform: Depressions

Hydric soil rating: Yes

Gu—Gullied land

Map Unit Composition

Gullied land: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gullied Land

Typical profile

H1 - 0 to 60 inches: variable

HbB2—Hampshire silt loam, 2 to 5 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2v5bh
Elevation: 510 to 1,020 feet
Mean annual precipitation: 46 to 61 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 154 to 233 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Hampshire and similar soils: 90 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hampshire

Setting

Landform: Flats
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Clayey residuum weathered from limestone and shale over gravelly residuum weathered from limestone, sandstone, and shale

Typical profile

Ap - 0 to 7 inches: silt loam
Bt1 - 7 to 12 inches: silty clay loam
Bt2 - 12 to 30 inches: clay
2B/C - 30 to 47 inches: very channery clay loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: 39 to 59 inches to paralithic bedrock
Natural drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Moderate (about 6.6 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Hydric soil rating: No

HbC2—Hampshire silt loam, 5 to 12 percent slopes, eroded

Map Unit Setting
National map unit symbol: 2v5bj
Elevation: 420 to 1,070 feet
Mean annual precipitation: 46 to 61 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 154 to 233 days
Farmland classification: Not prime farmland

Map Unit Composition
Hampshire and similar soils: 87 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hampshire

Setting
Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Clayey residuum weathered from limestone and shale over residuum weathered from limestone, sandstone, and shale

Typical profile
Ap - 0 to 7 inches: silt loam
Bt1 - 7 to 12 inches: silty clay loam
Bt2 - 12 to 30 inches: clay
2B/C - 30 to 47 inches: very channery clay loam
2Cr - 47 to 57 inches: bedrock

Properties and qualities
Slope: 5 to 12 percent
Depth to restrictive feature: 39 to 59 inches to paralithic bedrock
Natural drainage class: Well drained

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Moderate (about 6.6 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Hydric soil rating: No

Hu—Huntington silt loam, phosphatic

Map Unit Setting
National map unit symbol: kks7
Mean annual precipitation: 46 to 60 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 190 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition
Huntington and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Huntington

Setting
Landform: Flood plains
Landform position (three-dimensional): Tread
Parent material: Loamy alluvium derived from limestone, sandstone, and shale

Typical profile
H1 - 0 to 10 inches: silt loam
H2 - 10 to 60 inches: silt loam

Properties and qualities
Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: High (about 11.6 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w

Hydrologic Soil Group: B
Hydric soil rating: No

Lp—Lindell silt loam, 0 to 2 percent slopes, occasionally flooded

Map Unit Setting

National map unit symbol: 2td2y
Elevation: 500 to 850 feet
Mean annual precipitation: 48 to 58 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 190 to 230 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Lindell and similar soils: 90 percent
Minor components: 4 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lindell

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Fine-loamy alluvium derived from limestone and siltstone

Typical profile

Ap - 0 to 7 inches: silt loam
Bw - 7 to 15 inches: silt loam
Bg - 15 to 52 inches: silt loam
Cg - 52 to 79 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 12 to 16 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 11.2 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: B/D

Hydric soil rating: No

Minor Components

Norene

Percent of map unit: 4 percent
Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: Yes

MbA—Maury silt loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: kksn
Mean annual precipitation: 46 to 60 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 190 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Maury and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Maury

Setting

Landform: Flats
Landform position (three-dimensional): Talf
Parent material: Loess over clayey residuum and/or alluvium derived from limestone

Typical profile

H1 - 0 to 12 inches: silt loam
H2 - 12 to 24 inches: silty clay loam
H3 - 24 to 60 inches: silty clay

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 11.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 1
Hydrologic Soil Group: A
Hydric soil rating: No

MbB2—Maury silt loam, 2 to 5 percent slopes, eroded

Map Unit Setting

National map unit symbol: kksq
Mean annual precipitation: 46 to 60 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 190 to 200 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Maury and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Maury

Setting

Landform: Flats
Landform position (three-dimensional): Rise
Parent material: Loess over clayey residuum and/or alluvium derived from limestone

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 20 inches: silty clay loam
H3 - 20 to 60 inches: silty clay

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 11.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: A
Hydric soil rating: No

MbC2—Maury silt loam, 5 to 12 percent slopes, eroded

Map Unit Setting

National map unit symbol: kksr
Mean annual precipitation: 46 to 60 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 190 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Maury and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Maury

Setting

Landform: Flats
Landform position (three-dimensional): Rise
Parent material: Loess over clayey residuum and/or alluvium derived from limestone

Typical profile

H1 - 0 to 8 inches: silt loam
H2 - 8 to 20 inches: silty clay loam
H3 - 20 to 60 inches: silty clay

Properties and qualities

Slope: 5 to 12 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: High (about 11.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Hydric soil rating: No

MoD—Ashwood-Mimosa-Rock outcrop complex, 5 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2v63p

Elevation: 540 to 1,230 feet
Mean annual precipitation: 48 to 58 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 190 to 230 days
Farmland classification: Not prime farmland

Map Unit Composition

Ashwood and similar soils: 45 percent
Mimosa and similar soils: 35 percent
Rock outcrop: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ashwood

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Clayey residuum weathered from limestone

Typical profile

Ap - 0 to 5 inches: silty clay loam
BA - 5 to 9 inches: silty clay
Bt - 9 to 36 inches: clay
R - 36 to 46 inches: bedrock

Properties and qualities

Slope: 5 to 15 percent
Depth to restrictive feature: 20 to 39 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: D
Hydric soil rating: No

Description of Mimosa

Setting

Landform: Escarpments
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Linear
Parent material: Clayey residuum weathered from limestone

Typical profile

Ap - 0 to 6 inches: silt loam
Bt - 6 to 50 inches: clay
C - 50 to 55 inches: clay
R - 55 to 65 inches: bedrock

Properties and qualities

Slope: 5 to 15 percent
Depth to restrictive feature: 39 to 59 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: C
Hydric soil rating: No

Description of Rock Outcrop

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s

Mp—Mine pits and Dumps

Map Unit Composition

Mine pits and dumps: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

SrC3—Stiversville clay loam, 5 to 12 percent slopes, severely eroded

Map Unit Setting

National map unit symbol: kktq
Mean annual precipitation: 46 to 60 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 190 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Stiversville, severely eroded, and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stiversville, Severely Eroded

Setting

Landform: Flats
Landform position (three-dimensional): Rise
Parent material: Loamy residuum weathered from limestone, sandstone, and shale

Typical profile

H1 - 0 to 4 inches: clay loam
H2 - 4 to 16 inches: clay loam
H3 - 16 to 40 inches: channery clay loam
Cr - 40 to 50 inches: bedrock

Properties and qualities

Slope: 5 to 12 percent
Depth to restrictive feature: 24 to 48 inches to paralithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Hydric soil rating: No

StB2—Stiversville silt loam, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2v5bs
Elevation: 460 to 1,090 feet
Mean annual precipitation: 46 to 60 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 180 to 205 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Stiversville and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stiversville

Setting

Landform: Hillslopes
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Loamy residuum weathered from limestone, sandstone, and shale

Typical profile

Ap - 0 to 7 inches: silt loam
Bt1 - 7 to 25 inches: clay loam
Bt2 - 25 to 45 inches: parachannery clay loam
Cr - 45 to 55 inches: bedrock

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: 39 to 59 inches to paralithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: A
Hydric soil rating: No

StC2—Stiversville silt loam, 5 to 12 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2v5bt
Elevation: 460 to 1,100 feet
Mean annual precipitation: 46 to 60 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 180 to 205 days
Farmland classification: Not prime farmland

Map Unit Composition

Stiversville and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stiversville

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loamy residuum weathered from limestone, sandstone, and shale

Typical profile

Ap - 0 to 7 inches: silt loam
Bt1 - 7 to 25 inches: clay loam
Bt2 - 25 to 45 inches: parachannery clay loam
Cr - 45 to 55 inches: bedrock

Properties and qualities

Slope: 5 to 12 percent
Depth to restrictive feature: 39 to 59 inches to paralithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: A
Hydric soil rating: No

StD2—Stiversville silt loam, 12 to 20 percent slopes, eroded

Map Unit Setting

National map unit symbol: 2v5bv
Elevation: 440 to 1,010 feet
Mean annual precipitation: 46 to 60 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 180 to 205 days
Farmland classification: Not prime farmland

Map Unit Composition

Stiversville and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Stiversville

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loamy residuum weathered from limestone, sandstone, and shale

Typical profile

Ap - 0 to 7 inches: silt loam
Bt1 - 7 to 25 inches: clay loam
Bt2 - 25 to 45 inches: parachannery clay loam
Cr - 45 to 55 inches: bedrock

Properties and qualities

Slope: 12 to 20 percent
Depth to restrictive feature: 39 to 59 inches to paralithic bedrock
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Hydric soil rating: No

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Appendix I

Field Data Sheets

STREAM-1

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4

County: Williamson	Named Waterbody: N/A	Date/Time: 5/01/18 1 PM
Assessors/Affiliation: B. GARRETT / GEOS TN-QHP # 1130-15		Project ID : 34-181192
Site Name/Description: Sedberry RD Development		
Site Location: Sedberry RD (PARCEL 131 007.01)		
USGS quad: Spring Hill	HUC (12 digit): 051302040201	Lat/Long: 35.823725° -86.909814°
Previous Rainfall (7-days) : 0.50 inches		

Precipitation this Season vs. Normal : very wet wet (average) dry drought unknown

Source of recent & seasonal precip data : Weatherunground / NOAA - seasonal

Watershed Size : Feature - 167.5 ACRES Approx. Photos: (Y) or N (circle) Number : 8 (1-8)

Soil Type(s) / Geology : Egam, Lindell, Huntingdon Source: NRCS

Surrounding Land Use : Agriculture / Residential

Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) :

Severe Moderate Slight (Absent)

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	NA	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase		(Stream)
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	NA	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE : If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination = STREAM

Secondary Indicator Score (if applicable) = 32.5

Justification / Notes : Multiple species of macroinvertebrates observed throughout. STRONG SCORES IN all three indicator subjects.

Secondary Field Indicator Evaluation

A. **Geomorphology** (Subtotal = 13)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	(2)	3
2. Sinuous channel	0	(1)	2	3
3. In-channel structure: riffle-pool sequences	0	1	(2)	3
4. Sorting of soil textures or other substrate	0	1	(2)	3
5. Active/relic floodplain	0	1	(2)	3
6. Depositional bars or benches	0	(1)	2	3
7. Braided channel	(0)	1	2	3
8. Recent alluvial deposits	0	0.5	(1)	1.5
9. Natural levees	(0)	1	2	3
10. Headcuts	(0)	1	2	3
11. Grade controls	0	0.5	(1)	1.5
12. Natural valley or drainageway	0	0.5	(1)	1.5
13. At least second order channel on existing USGS or NRCS map	No = (0)		Yes = 3	

B. **Hydrology** (Subtotal = 7.5)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	(1)	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	(3)
16. Leaf litter in channel (January – September)	(1.5)	1	0.5	0
17. Sediment on plants or on debris	0	(0.5)	(1)	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	(1)	1.5
19. Hydric soils in stream bed or sides of channel	No = (0)		Yes = 1.5	

C. **Biology** (Subtotal = 12)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	(3)	2	1	0
21. Rooted plants in channel [1]	(3)	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	(0.5)	1	1.5
23. Bivalves/mussels	0	(1)	2	3
24. Amphibians	0	(0.5)	1	1.5
25. Macrobenthos (record type & abundance)	0	1	(2)	3
26. Filamentous algae; periphyton	0	1	(2)	3
27. Iron oxidizing bacteria/fungus	(0)	0.5	1	1.5
28.Wetland plants in channel [2]	(0)	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 32.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : Stonefly, caddisfly cases, Mayfly larvae, scud fly larvae, Isopods, crayfish, adult frogs, amphibian eggs observed, filamentous algae observed throughout reach

STR-2

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4

County: Williamson	Named Waterbody: N/A	Date/Time: 5/01/18 - 3pm
Assessors/Affiliation: B. GARRETT/GEOS TN-QHP# 1130-15		Project ID: 34-181192
Site Name/Description: Sedberry Road Development		
Site Location: Sedberry Road (Parcel 131 007.01)		
USGS quad: Spring Hill	HUC (12 digit): 051302040201	Lat/Long: 35.823542 -86.900620
Previous Rainfall (7-days): 0.50 inches		

Precipitation this Season vs. Normal: very wet wet (average) dry drought unknown

Source of recent & seasonal precip data: Weather underground (recent) NOAA - seasonal

Watershed Size: Approx 50 ACRES / water feature — Photos: (Y) or N (circle) Number: 8 (9-16)

Soil Type(s) / Geology: Lindell silt loam — Source: NRCS

Surrounding Land Use: Agriculture / Residential

Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes):
Severe Moderate Slight (Absent)

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	X	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase		(Stream)
6. Presence of fish (except *Gambusia*)		(Stream)
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	NA	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination = STREAM

Secondary Indicator Score (if applicable) = 32.5

Justification / Notes: Abundance of macro benthos, amphibians, crayfish minnows, bivalves observed - SEE NOTES ON BACK

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 11.5)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	(2)	3
2. Sinuous channel	0	(1)	2	3
3. In-channel structure: riffle-pool sequences	0	1	(2)	3
4. Sorting of soil textures or other substrate	0	1	(2)	3
5. Active/relic floodplain	(0)	1	2	3
6. Depositional bars or benches	0	1	(2)	3
7. Braided channel	(0)	1	2	3
8. Recent alluvial deposits	0	0.5	(1)	1.5
9. Natural levees	(0)	1	2	3
10. Headcuts	(0)	1	2	3
11. Grade controls	0	0.5	(1)	1.5
12. Natural valley or drainageway	0	(0.5)	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = (0)		Yes = ~~3~~	

B. Hydrology (Subtotal = ~~3.5~~ 7)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	(2)	3
15. Water in channel and >48 hours since sig. rain	0	1	2	(3)
16. Leaf litter in channel (January – September)	(1.5)	1	0.5	0
17. Sediment on plants or on debris	0	(0.5)	1	1.5
18. Organic debris lines or piles (wrack lines)	0	(0.5)	1	1.5
19. Hydric soils in stream bed or sides of channel	No = (0)		Yes = 1.5	

C. Biology (Subtotal = 13.5)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	(2)	1	0
21. Rooted plants in channel [1]	(3)	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	0.5	(1)	1.5
23. Bivalves/mussels	0	1	(2)	3
24. Amphibians	0	0.5	(1)	1.5
25. Macrobenthos (record type & abundance)	0	1	2	(3)
26. Filamentous algae; periphyton	0	(1)	2	3
27. Iron oxidizing bacteria/fungus	(0)	0.5	1	1.5
28. Wetland plants in channel [2]	0	(0.5)	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 32.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : Abundance of macrobenthos (stonefly, caddis flycase, mayfly, scuba fly, blackfly larvae, isopods, water striders) Abundance of Amphibians and minnows (large schools of minnows observed throughout reach (not examined)) Abundance of snails

WWC-1

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.4

County: Williamson	Named Waterbody: NA	Date/Time: 5/01/18 330PM
Assessors/Affiliation: B. BARRETT / GEOS TN-QHP #1130-15		Project ID: 34-181192
Site Name/Description: Sedberry Road Development		
Site Location: Sedberry Road (PARCEL 131 007.01)		
USGS quad:	HUC (12 digit): 051302040201	Lat/Long: 35.823438° -86.899863°
Previous Rainfall (7-days): 0.50 inches		
Precipitation this Season vs. Normal: very wet wet (average) dry drought unknown Source of recent & seasonal precip data: Weather underground / NOAA		
Watershed Size: 4-5 ACRES	Photos: (Y) or N (circle) Number: 2 (17-18)	
Soil Type(s) / Geology: Lindell		Source: NRCS
Surrounding Land Use: Agriculture / Residential		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes): Severe Moderate Slight (Absent)		

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	X	WWC
2. Defined bed and bank absent, dominated by upland vegetation / grass	X	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	NA	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	X	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	X	Stream
6. Presence of fish (except *Gambusia*)	X	Stream
7. Presence of naturally occurring ground water table connection	X	Stream
8. Flowing water in channel and 7 days since last precipitation in local watershed	NA	Stream
9. Evidence watercourse has been used as a supply of drinking water	X	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then STOP; absent directly contradictory evidence, determination is complete.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.4*

Overall Hydrologic Determination = ~~NW~~ WWC

Secondary Indicator Score (if applicable) = 12

Justification / Notes: Little flow in some areas no flow just standing water, channel appeared to have been draining stormwater from SR 840 small watershed size, no groundwater observed flowing into channel. Channel lined with leaves in some areas.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 5)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	(1)	2	3
2. Sinuous channel	0	(1)	2	3
3. In-channel structure: riffle-pool sequences	0	(1)	2	3
4. Sorting of soil textures or other substrate	0	(1)	2	3
5. Active/relic floodplain	(0)	1	2	3
6. Depositional bars or benches	(0)	1	2	3
7. Braided channel	(0)	1	2	3
8. Recent alluvial deposits	0	(0.5)	1	1.5
9. Natural levees	(0)	1	2	3
10. Headcuts	(0)	1	2	3
11. Grade controls	(0)	0.5	1	1.5
12. Natural valley or drainageway	0	(0.5)	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = (0)		Yes = 3	

B. Hydrology (Subtotal = ~~2.5~~ 3)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	(0)	1	2	3
15. Water in channel and >48 hours since sig. rain	0	(1)	2	3
16. Leaf litter in channel (January – September)	1.5	(1)	0.5	0
17. Sediment on plants or on debris	0	(0.5)	1	1.5
18. Organic debris lines or piles (wrack lines)	~~(0)~~	~~(0.5)~~	1	1.5
19. Hydric soils in stream bed or sides of channel	No = (0)		Yes = 1.5	

C. Biology (Subtotal = ~~4.5~~ 4.0)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel [1]	3	2	(1)	0
21. Rooted plants in channel [1]	3	(2)	1	0
22. Crayfish in stream (exclude in floodplain)	(0)	0.5	1	1.5
23. Bivalves/mussels	(0)	1	2	3
24. Amphibians	(0)	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	(1)	2	3
26. Filamentous algae; periphyton	~~(0)~~	1	2	3
27. Iron oxidizing bacteria/fungus	~~(0)~~	~~0.5~~	1	1.5
28. Wetland plants in channel [2]	(0)	0.5	1	2

[1] Focus is on the presence of upland plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 12

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : Small channel appears to drain stormwater from SR 840 appears to have small watershed size.
Macrobenthos observed - isopods, waterstrider - where water was present, some areas appeared to have standing water with little to no flow
No groundwater connections observed

Appendix II

Wetland Delineation Field Data Forms

Appendix III

Field Photographs

Photograph 1: Upstream view of STR-1 at southern property line (N 35.823725° W -86.909814°).

Photograph 2: Upstream view immediately downstream of Photo 1..

Photograph 3: Upstream view STR-1 (N 35.824298° W -86.909654°)

Photograph 4: Mayfly larvae (*Ephemeroptera*) (N 35.824298° W -86.909654°)

Photograph 5: Upstream view of STR-1 just upstream from Photo 3

Photograph 6: Downstream view of STR-1 (N 35.825576° W -86.909356°)

Photograph 7: Upstream view of STR-1 (N 35.825576° W-86. 909356°).

Photograph 8: Downstream view STR-1 (N 35.827450° W-86.908989°)

Photograph 9: Upstream view of STR-2 at southern property line (N 35.823542° W-86.900620°)

Photograph 10: Downstream view of STR-2 (N 35.823542° W -86.908989°)

Photograph 11: Downstream view STR-2 (N 35.823610° W -86.900433°).

Photograph 12: Mayfly larvae (*Ephemeroptera*) (N 35.823610° W -86.900433°).

Photograph 13: Downstream view of STR-2 (N 35.823854° W -86.899421°).

Photograph 14: Mayfly larvae (*Ephemeroptera*) located in STR-2 (N 35.823854° W -86.899421°).

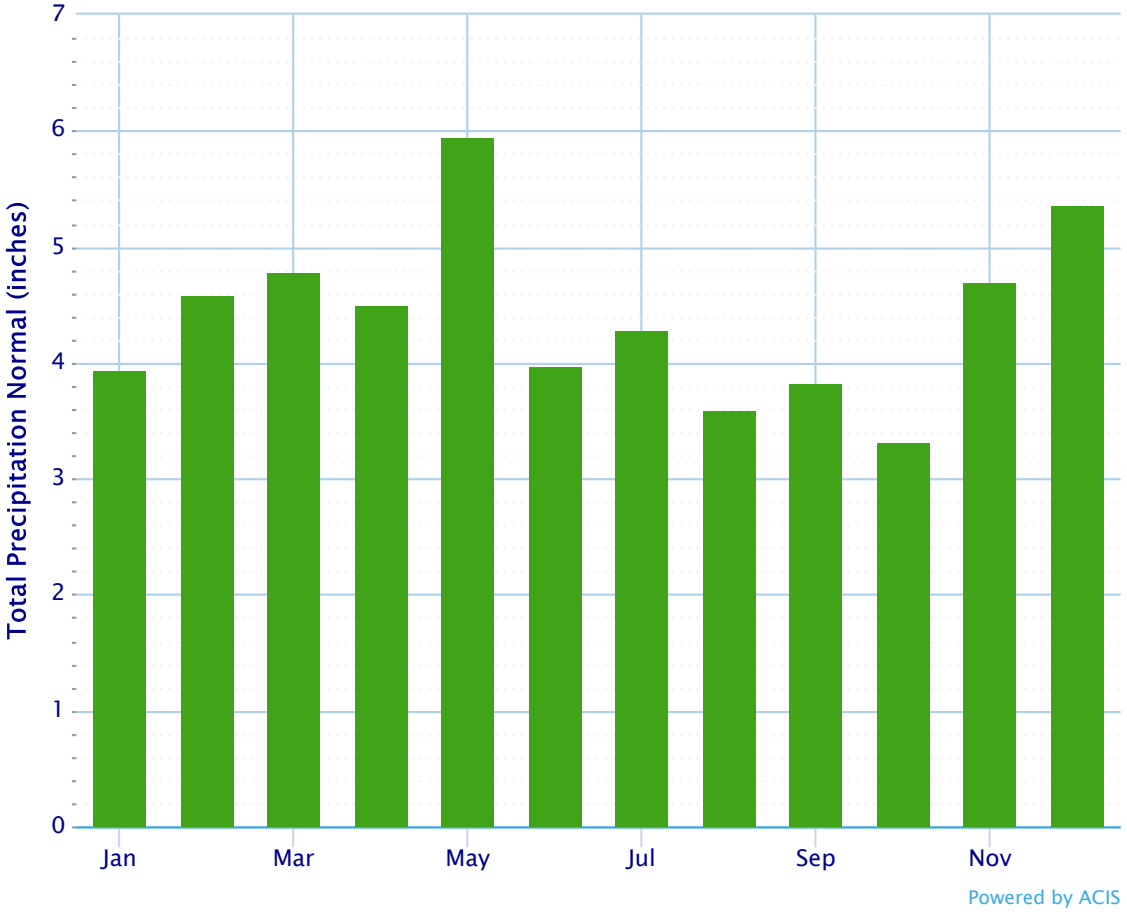
Photograph 15: Downstream view STR-2 (N 35.823969° W -86.899421°).

Photograph 16: Upstream view of STR-2 (N 35.823969° W -86.899421°).

Photograph 17: Upstream view of WWC-1 (N 35.823515° W -86.900147°).

Photograph 18: Upstream view of WWC-1 at confluence with STR-2 (N 35.823438° W -86.899863°).

Monthly Climate Normals (1981-2010) - FRANKLIN SEWAGE PLANT, TN



Month	Total Precipitation Normal (inches)
January	3.95
February	4.60
March	4.79
April	4.50
May	5.95
June	3.98
July	4.28
August	3.60
September	3.83
October	3.33
November	4.70
December	5.37
Annual	52.88

Weather History for Thompsons Station, TN [KTNTHOMP12]

Previous | Custom | May | 8 | 2018 | TO | May

Summary
April 1, 2018 - May 8, 2018

	High	Low	Average
Temperature	85.5 °F	27.3 °F	57.3 °F
Dew Point	68.7 °F	16 °F	45 °F
Humidity	99%	18%	67.8%
Precipitation	6.88 in	--	--

	High	Low	Average
Wind Speed	22.8 mph	--	2.8 mph
Wind Gust	27.3 mph	--	--
Wind Direction	--	--	South
Pressure	30.3 in	29.59 in	--

Graphs | Table

Weather History T able
April 1, 2018 - May 8, 2018

2018	Temperature			Dew Point			Humidity			Speed			Pressure			Precip. Accum.
Apr	High	Avg	Low	High	Avg	Low	High	Avg	Low	High	Avg	Gust	High	Avg	Low	Sum
1	62.1 °F	56.2 °F	50.4 °F	53.1 °F	46.6 °F	35.6 °F	97 %	71 %	47 %	10 mph	2 mph	14 mph	30.02 in	29.92 in	29.83 in	0 in
2	68.9 °F	56.8 °F	44.8 °F	57.6 °F	50.9 °F	44.4 °F	99 %	88 %	67 %	7 mph	2 mph	8 mph	29.93 in	29.85 in	29.78 in	0 in
3	80.4 °F	69.4 °F	58.6 °F	62.2 °F	58.1 °F	55 °F	89 %	70 %	44 %	20 mph	6 mph	27 mph	29.79 in	29.69 in	29.59 in	0 in
4	53.8 °F	45.8 °F	38.1 °F	32.4 °F	28.8 °F	25.7 °F	78 %	52 %	36 %	13 mph	4 mph	16 mph	30.17 in	30.09 in	30.01 in	0.08 in
5	57.4 °F	44.2 °F	31.3 °F	35.8 °F	26.8 °F	17.4 °F	84 %	54 %	23 %	10 mph	1 mph	11 mph	30.2 in	30.07 in	29.94 in	0 in
6	56.7 °F	48.2 °F	39.6 °F	51.4 °F	44.6 °F	30.7 °F	99 %	87 %	58 %	16 mph	2 mph	22 mph	29.95 in	29.85 in	29.75 in	0.44 in
7	43.7 °F	36.5 °F	29.3 °F	41.4 °F	32 °F	28.4 °F	98 %	86 %	77 %	19 mph	5 mph	23 mph	29.95 in	29.85 in	29.76 in	0 in
8	47.1 °F	37.1 °F	27.3 °F	30.4 °F	26.6 °F	23.2 °F	99 %	65 %	42 %	12 mph	2 mph	12 mph	29.98 in	29.89 in	29.8 in	0 in
9	61.7 °F	50.7 °F	39.7 °F	37 °F	32.6 °F	26.4 °F	79 %	50 %	31 %	12 mph	2 mph	15 mph	30.07 in	29.94 in	29.81 in	0 in
10	62.6 °F	50.8 °F	39 °F	40.1 °F	35.6 °F	32.5 °F	85 %	60 %	37 %	9 mph	2 mph	12 mph	30.15 in	30.1 in	30.04 in	0 in
11	68 °F	50.3 °F	32.7 °F	40.3 °F	35.3 °F	30.2 °F	96 %	59 %	29 %	9 mph	2 mph	11 mph	30.17 in	30.06 in	29.96 in	0 in
12	80.4 °F	66.2 °F	52 °F	47.8 °F	41.1 °F	35.4 °F	58 %	42 %	24 %	17 mph	5 mph	21 mph	30.01 in	29.91 in	29.81 in	0 in
13	79.5 °F	69.2 °F	59.2 °F	55.4 °F	50.6 °F	44.4 °F	75 %	53 %	38 %	18 mph	6 mph	22 mph	29.9 in	29.83 in	29.77 in	0 in
14	69.4 °F	61.7 °F	54 °F	63.3 °F	58.8 °F	52.2 °F	99 %	85 %	57 %	18 mph	6 mph	24 mph	29.85 in	29.76 in	29.67 in	0.87 in
15	43.7 °F	41.1 °F	38.5 °F	37.4 °F	35.4 °F	33.8 °F	88 %	82 %	73 %	14 mph	5 mph	21 mph	29.86 in	29.79 in	29.72 in	0.57 in
16	47.5 °F	40.8 °F	34.2 °F	35.2 °F	29 °F	23.4 °F	94 %	68 %	46 %	17 mph	5 mph	23 mph	29.98 in	29.9 in	29.82 in	0.01 in
17	79.3 °F	55.5 °F	31.8 °F	50.5 °F	39.6 °F	28.4 °F	92 %	59 %	30 %	19 mph	2 mph	22 mph	29.97 in	29.84 in	29.71 in	0 in
18	71.8 °F	63 °F	54.1 °F	59.5 °F	52.2 °F	41.5 °F	80 %	65 %	46 %	17 mph	4 mph	24 mph	29.85 in	29.78 in	29.72 in	0 in
19	60.6 °F	48.7 °F	37.9 °F	45.7 °F	32.7 °F	26.1 °F	86 %	59 %	42 %	17 mph	5 mph	22 mph	30.24 in	30.04 in	29.84 in	0 in
20	66.9 °F	50.7 °F	34.7 °F	39.2 °F	32.2 °F	27 °F	93 %	53 %	24 %	13 mph	2 mph	18 mph	30.3 in	30.23 in	30.16 in	0 in
21	72.9 °F	58.4 °F	44.2 °F	46.6 °F	35.3 °F	25.9 °F	66 %	41 %	23 %	12 mph	2 mph	17 mph	30.2 in	30.12 in	30.04 in	0 in
22	64.4 °F	58.7 °F	52.9 °F	57.4 °F	52.1 °F	40.3 °F	99 %	81 %	42 %	16 mph	3 mph	23 mph	30.07 in	29.89 in	29.71 in	2.32 in
23	70.3 °F	63.1 °F	56.3 °F	59.5 °F	56.3 °F	47.1 °F	99 %	86 %	49 %	17 mph	3 mph	27 mph	29.83 in	29.76 in	29.69 in	0.15 in
24	67.5 °F	61.5 °F	55.4 °F	58.5 °F	55.3 °F	52.7 °F	99 %	89 %	67 %	12 mph	3 mph	15 mph	29.87 in	29.82 in	29.76 in	0.32 in
25	71.8 °F	62.8 °F	54 °F	55.8 °F	52.7 °F	48.7 °F	97 %	75 %	47 %	11 mph	2 mph	14 mph	29.93 in	29.86 in	29.8 in	0 in
26	58.5 °F	53.6 °F	48.7 °F	54.7 °F	52.5 °F	48.2 °F	99 %	91 %	78 %	10 mph	1 mph	14 mph	29.81 in	29.77 in	29.73 in	0.18 in
27	73.8 °F	58.2 °F	42.6 °F	54.5 °F	46.9 °F	42.1 °F	99 %	69 %	35 %	14 mph	2 mph	16 mph	29.83 in	29.78 in	29.74 in	0 in
28	75.6 °F	60.4 °F	45.3 °F	51.8 °F	43.2 °F	33.4 °F	99 %	60 %	31 %	15 mph	3 mph	22 mph	30.06 in	29.93 in	29.8 in	0 in
29	64.8 °F	54.1 °F	43.3 °F	37.6 °F	28.8 °F	16 °F	79 %	42 %	18 %	13 mph	3 mph	21 mph	30.21 in	30.13 in	30.05 in	0 in
30	76.5 °F	56.4 °F	36.3 °F	47.7 °F	36.9 °F	25.9 °F	95 %	53 %	18 %	8 mph	1 mph	10 mph	30.21 in	30.12 in	30.04 in	0 in

2018	Temperature			Dew Point			Humidity			Speed			Pressure			Precip. Accum.
May	High	Avg	Low	High	Avg	Low	High	Avg	Low	High	Avg	Gust	High	Avg	Low	Sum
1	82.6 °F	63.8 °F	45.5 °F	54.9 °F	49.2 °F	41.4 °F	97 %	58 %	31 %	11 mph	2 mph	14 mph	30.13 in	30.08 in	30.02 in	0 in
2	84 °F	71.4 °F	59 °F	64.6 °F	59.1 °F	54.1 °F	88 %	65 %	46 %	11 mph	2 mph	15 mph	30.15 in	30.08 in	30 in	0 in

2018	Temperature			Dew Point			Humidity			Speed			Pressure			Precip. Accum.
Apr	High	Avg	Low	High	Avg	Low	High	Avg	Low	High	Avg	Gust	High	Avg	Low	Sum
4	79.3 °F	72.9 °F	66.6 °F	68.7 °F	63.9 °F	59 °F	97 %	76 %	64 %	12 mph	1 mph	15 mph	30.04 in	29.99 in	29.93 in	0.03 in
5	68 °F	62.3 °F	56.7 °F	66.2 °F	63.1 °F	56.3 °F	99 %	98 %	93 %	10 mph	1 mph	12 mph	29.98 in	29.92 in	29.85 in	1.68 in
6	81.9 °F	66.8 °F	51.8 °F	63.7 °F	56.6 °F	49.1 °F	99 %	82 %	43 %	23 mph	2 mph	27 mph	29.98 in	29.93 in	29.88 in	0.18 in
7	84 °F	68.4 °F	52.9 °F	62.1 °F	55.6 °F	50.7 °F	99 %	70 %	35 %	14 mph	1 mph	18 mph	30.01 in	29.97 in	29.93 in	0.05 in
8	81.5 °F	66.4 °F	51.3 °F	58.1 °F	53.2 °F	48.4 °F	98 %	71 %	35 %	7 mph	1 mph	8 mph	30.04 in	30.01 in	29.98 in	0 in

Tennessee Department of Environment & Conservation

This is to certify that

Brandon Garrett

has successfully completed the three-day course to become a
Tennessee Qualified Hydrologic Professional

TN QHP Number 1130-TN15

Tisha Calabrese Benton, Director DWR

Timothy Gangaware, TNWRRC

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION

This certifies that the recipient has earned 20 Professional Development Hours

TNQHP

Tennessee Department of Environment & Conservation

This is to certify that

Brandon Garrett

successfully completed the one-day
Tennessee Hydrologic Determination Refresher Course

July 16, 2015

Jonathon Burr, DWR

Timothy Gangaware, TNWRRC

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION

This certifies that the recipient has earned 6 Professional Development Hours

TNQHP