



May 18, 2022

DELIVERED VIA EMAIL: brooke.heriges@tn.gov

Ms. Brooke Heriges
TDEC – Division of Water Resources
Nashville Environmental Field Office
711 R.S. Gass Boulevard
Nashville, Tennessee 37243

**RE: S GREENHILL HYDROLOGIC DETERMINATION
RAGANSMITH 17-024/0800**

Dear Ms. Heriges:

Attached please find materials supporting a Hydrologic Determination conducted by Ragan-Smith-Associates on one watercourse reach. The City of Mt. Juliet is planning to construct a roundabout at the intersection of S Greenhill Road and Willoughby Station Boulevard in Mt. Juliet, Wilson County, Tennessee (Figure 1). We are forwarding the accompanying Hydrologic Determination Field Data Sheets, figures, and photographs, which are provided in support of our determinations that the assessed watercourses are either streams or wet weather conveyances, as defined by Tennessee statute and associated administrative regulations.

Per TDEC Rule 0400-40-17.04, we are “seeking to qualify for the treatment provided in **§69-3-108(r)**”. The purpose of this report is to obtain TDEC’s concurrence with these hydrologic determinations for use in site planning and road improvements.

Project Site

Land cover consists primarily of residential development with maintained grassy areas. Based on a review of the USGS 7.5-minute Hermitage Topographic Quadrangle, no streams or other features are mapped within the project area. There is an irregular shaped ditch on the west side of the road that most closely resembles a V-Ditch. RaganSmith observed a Wet Weather Conveyance (WWC-1), dry under normal conditions before April 15, north of the location of the proposed roundabout. The feature sheet-flows out of the culvert and there is evidence of rill and gully erosion.

The site lies within the Stones Creek Watershed 12-digit Hydrologic Unit Code [51302030308]. The National Wetland Inventory (NWI) data observes a freshwater pond to the west, near the project area, that appears to have been filled in and developed with residential houses (Appendix 1).

Soil data from the NRCS Web Soil Survey indicates that the assessed watercourse is mapped on the Gladeville-Rock outcrop complex, Talbott silt loam 2 to 5 percent slopes and 5 to 20 percent slopes (Appendix 2). These soils units are classified as non-hydric.

NASHVILLE

315 Woodland Street
Nashville, TN 37206
(615) 244-8591

MURFREESBORO

100 East Vine Street, Suite 402
Murfreesboro, TN 37130
(615) 546-6050

CHATTANOOGA

1410 Cowart Street, Suite 200
Chattanooga, TN 37408
(423) 490-9400



Hydrologic Determinations

Katie Slezak (QHP-IT) of RaganSmith conducted the hydrological determination within the review area on April 11, 2022. Based on climatological analyses utilizing the USACE Antecedent Precipitation Tool (APT), the determination was conducted under normal conditions (Appendix 3). The local area received 1.07 inches of rain in the previous 7 days and no precipitation fell within the 48-hours preceding the site visit (0.48 inches of precipitation was recorded on the day of the site visit but it fell after the HD was conducted).

The watercourses addressed in this hydrologic determination are mapped on Figure 2 and are summarized in Table 1. The Hydrologic Determination Field Data Sheet for the watercourse has been included in Appendix 4. Representative photographs of the assessed watercourse have been included in Appendix 5.

Table 1. Summary of the assessed watercourse with hydrologic determination, coordinates of beginning and end points, and watershed acreages

Name	Determination	Begin (Lat, Long)	End (Lat, Long)	Watershed Acres
WWC-1	WetWeather Conveyance	36.2070, -86.5547	36.2070, -86.5543	< 1 acre

Request for Concurrence

We attest that all information submitted herein and in the accompanying attachments is true, accurate, and complete. We appreciate your review of this information and request your concurrence of our hydrologic determinations and wetland delineation. Please contact us at (615) 244-8591 if we may provide additional information or address your questions regarding our findings.

Sincerely,

RAGAN-SMITH-ASSOCIATES, INC.

Katie Slezak, QHP-IT
Environmental Specialist

KS:djb

Attachments

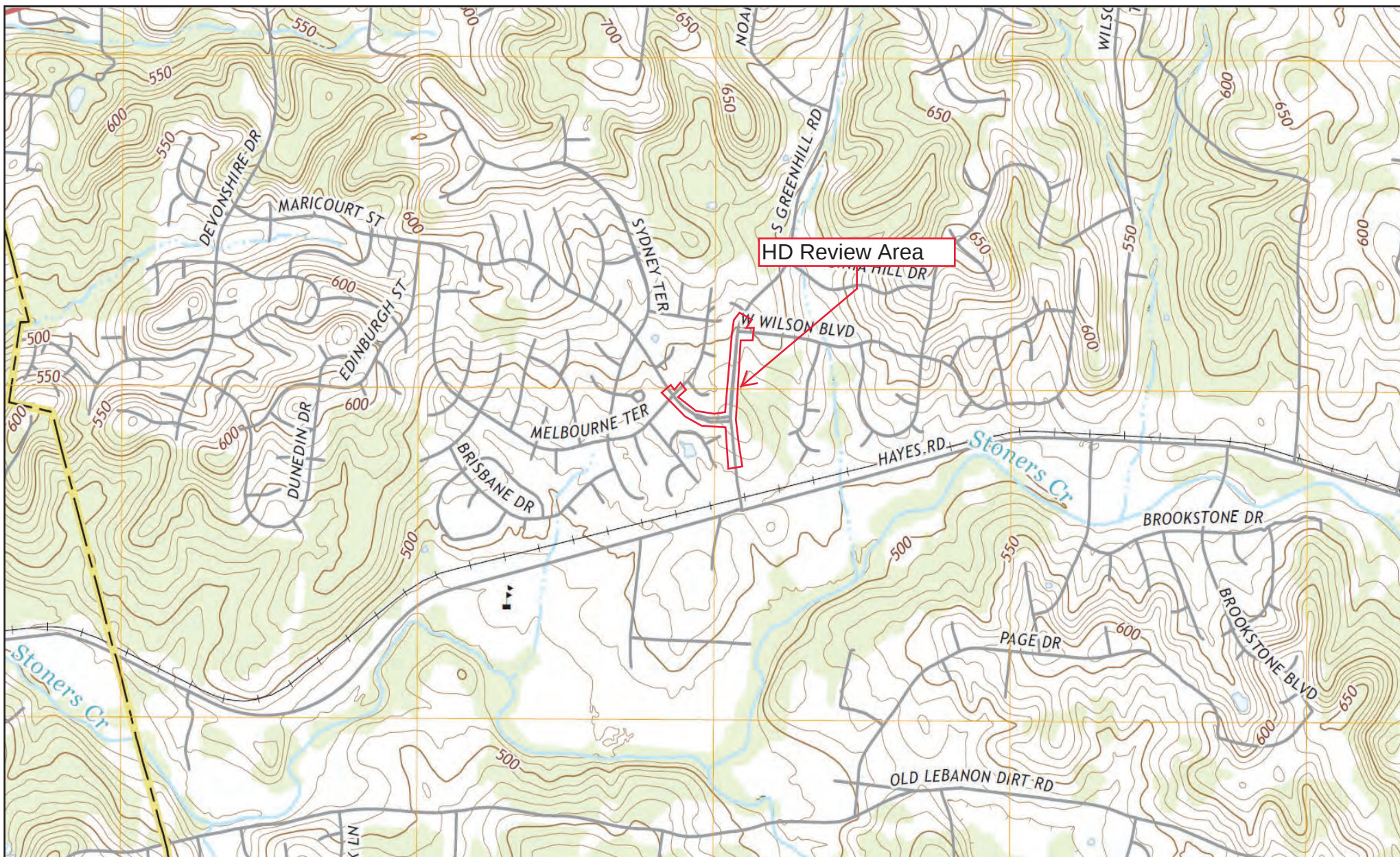
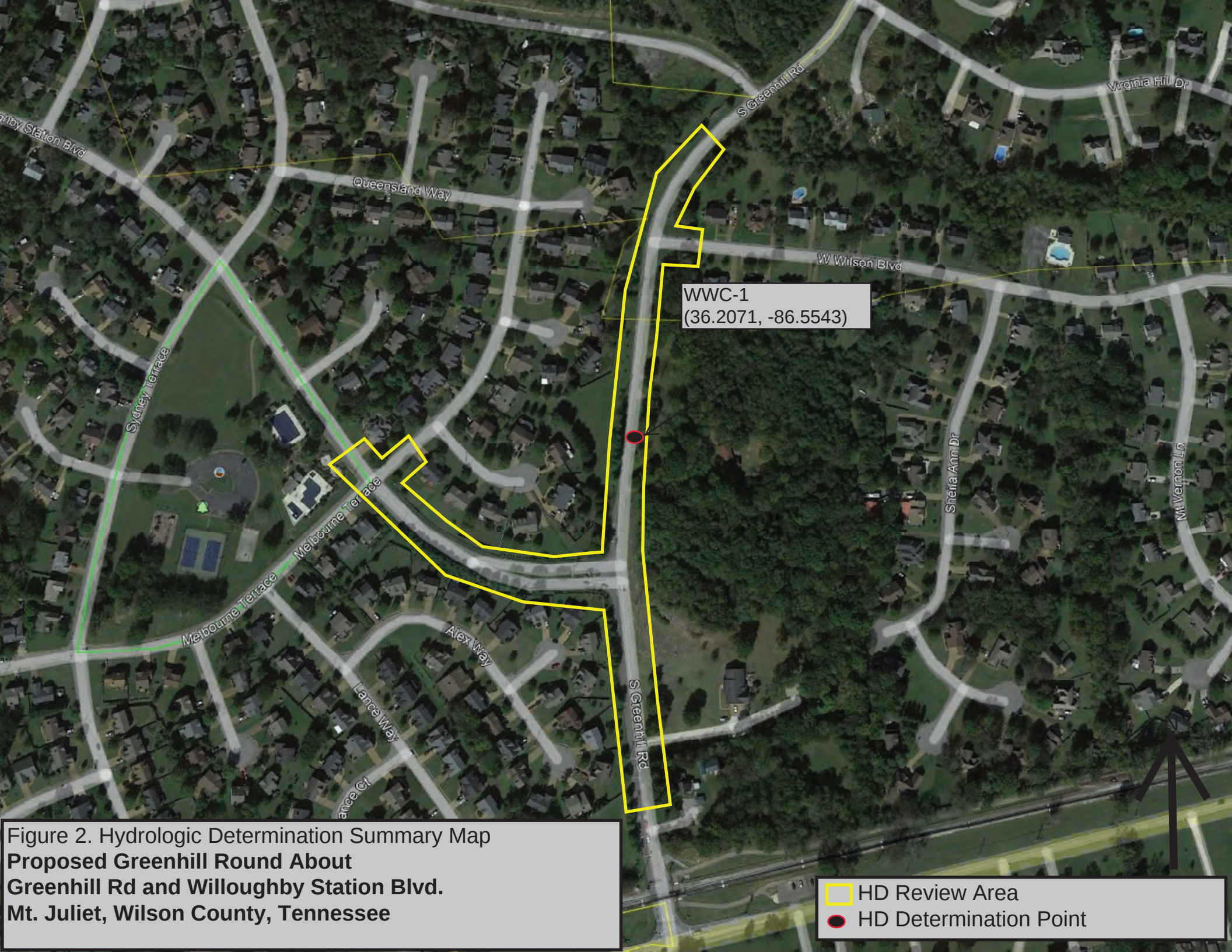


Figure 1. Site Location.
Proposed Greenhill Roundabout
Intersection of S Greenhill Rd. and Willoughby Blvd.
Mt. Juliet, Wilson County, Tennessee



WWC-1
(36.2071, -86.5543)

Figure 2. Hydrologic Determination Summary Map
Proposed Greenhill Round About
Greenhill Rd and Willoughby Station Blvd.
Mt. Juliet, Wilson County, Tennessee

- HD Review Area
- HD Determination Point

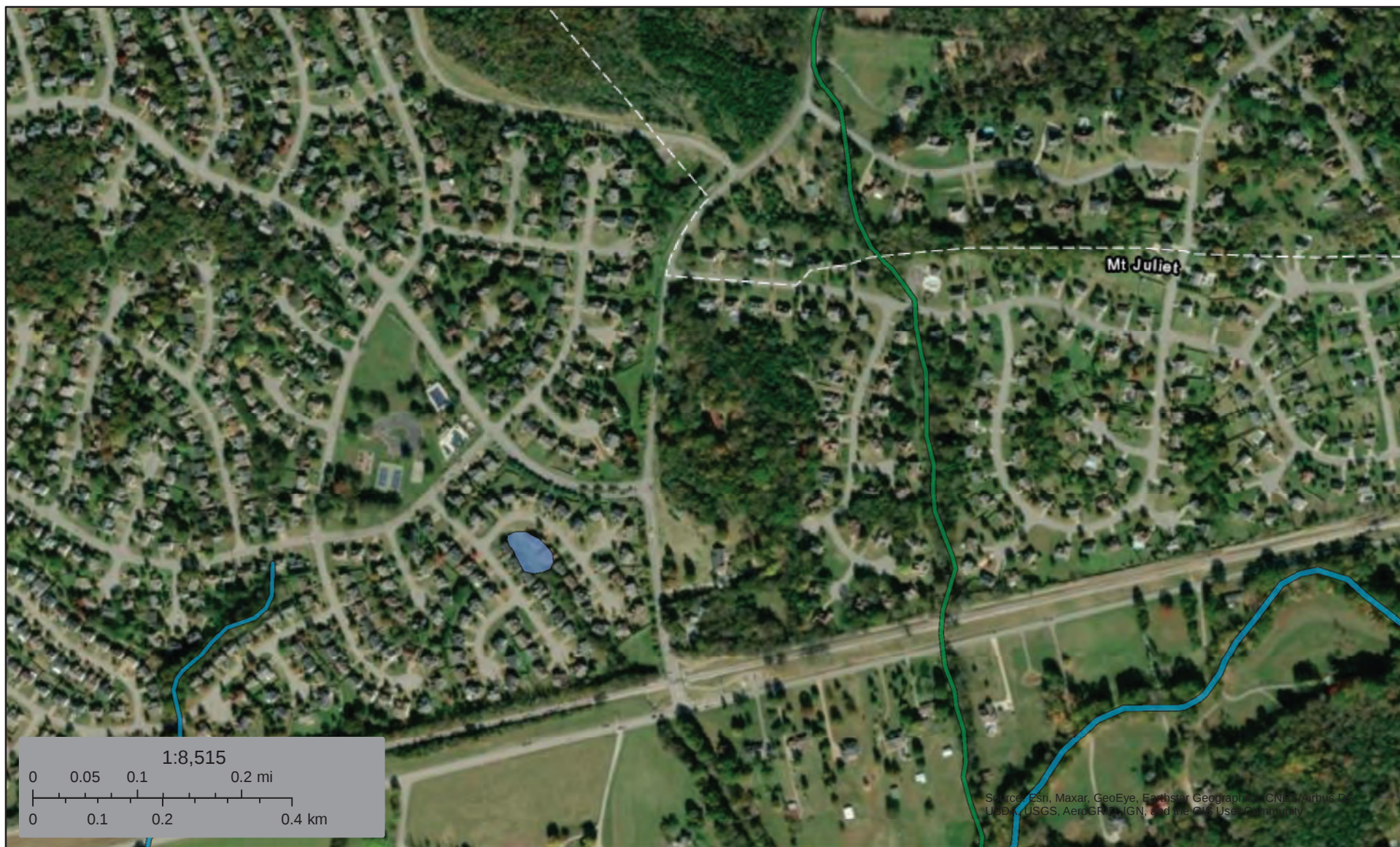
APPENDIX 1:
NWI Map



U.S. Fish and Wildlife Service

National Wetlands Inventory

Greenhill Roundabout



April 13, 2022

Wetlands

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

APPENDIX 2: Web Soil Survey

Custom Soil Resource Report Map—Hydric Rating by Map Unit



MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

Soil Rating Polygons

 Hydric (100%)
 Hydric (66 to 99%)
 Hydric (33 to 65%)
 Hydric (1 to 32%)
 Not Hydric (0%)
 Not rated or not available

Soil Rating Lines

 Hydric (100%)
 Hydric (66 to 99%)
 Hydric (33 to 65%)
 Hydric (1 to 32%)
 Not Hydric (0%)
 Not rated or not available

Soil Rating Points

 Hydric (100%)
 Hydric (66 to 99%)
 Hydric (33 to 65%)
 Hydric (1 to 32%)
 Not Hydric (0%)
 Not rated or not available

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 1:20,000.

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: Wilson County, Tennessee
 Survey Area Data: Version 14, Sep 10, 2021

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

Date(s) aerial images were photographed: Nov 2, 2019—Nov 16, 2019

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.

Table—Hydric Rating by Map Unit

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
BrB2	Bradyville silt loam, 2 to 5 percent slopes	0	3.8	6.7%
GaC	Gladeville-Rock outcrop complex, 2 to 15 percent slopes, extremely stony	0	14.1	24.7%
TaB2	Talbott silt loam, 2 to 5 percent slopes, eroded	0	11.8	20.7%
TrC2	Talbott silt loam, 5 to 20 percent slopes, eroded, rocky	0	26.9	47.1%
W	Water	0	0.4	0.7%
Totals for Area of Interest			57.1	100.0%

Rating Options—Hydric Rating by Map Unit*Aggregation Method: Percent Present**Component Percent Cutoff: None Specified**Tie-break Rule: Lower*

Soil Reports

The Soil Reports section includes various formatted tabular and narrative reports (tables) containing data for each selected soil map unit and each component of each unit. No aggregation of data has occurred as is done in reports in the Soil Properties and Qualities and Suitabilities and Limitations sections.

The reports contain soil interpretive information as well as basic soil properties and qualities. A description of each report (table) is included.

Land Classifications

This folder contains a collection of tabular reports that present a variety of soil groupings. The reports (tables) include all selected map units and components for each map unit. Land classifications are specified land use and management groupings that are assigned to soil areas because combinations of soil have similar behavior for specified practices. Most are based on soil properties and other factors that directly influence the specific use of the soil. Example classifications include ecological site classification, farmland classification, irrigated and nonirrigated land capability classification, and hydric rating.

Hydric Rating by Map Unit (TN)

This Hydric Soil Category rating indicates the components of map units that meet the criteria for hydric soils. Map units are composed of one or more major soil components or soil types that generally make up 20 percent or more of the map unit and are listed in the map unit name, and they may also have one or more minor contrasting soil components that generally make up less than 20 percent of the map unit. Each major and minor map unit component that meets the hydric criteria is rated **hydric**. The map unit class ratings based on the hydric components present are: TN Hydric, TN Predominantly Hydric, TN Partially Hydric, TN Predominantly Nonhydric, and TN Nonhydric. The report also shows the total representative percentage of each map unit that the hydric components comprise.

"TN Hydric" means that all major and minor components listed for a given map unit are rated as being hydric. *"TN Predominantly Hydric"* means that all major components listed for a given map unit are rated as hydric, and at least one contrasting minor component is not rated hydric. *"TN Partially Hydric"* means that at least one major component listed for a given map unit is rated as hydric, and at least one other major component is not rated hydric. *"TN Predominantly Nonhydric"* means that no major component listed for a given map unit is rated as hydric, and at least one contrasting minor component is rated hydric. *"TN Nonhydric"* means no major or minor components for the map unit are rated hydric. The assumption is that the map unit is nonhydric even if none of the components within the map unit have been rated.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the

Custom Soil Resource Report

upper part (Federal Register, 1994). Under natural conditions, these soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

If soils are wet enough for a long enough period of time to be considered hydric, they typically exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Vasilas, Hurt, and Noble, 2010).

The NTCHS has developed criteria to identify those soil properties unique to hydric soils (Federal Register, 2012). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria use selected soil properties that are described in "Field Indicators of Hydric Soils in the United States" (Vasilas, Hurt, and Noble, 2010), "Soil Taxonomy" (Soil Survey Staff, 1999), "Keys to Soil Taxonomy" (Soil Survey Staff, 2010), and the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

The criteria for hydric soils are represented by codes, for example, 2 or 3.

Definitions for the codes are as follows:

1. All Histels except for Folistels, and Histosols except for Folists.
2. Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, Pachic subgroups, or Cumulic subgroups that:
 - A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
 - B. Show evidence that the soil meets the definition of a hydric soil;
3. Soils that are frequently ponded for long or very long duration during the growing season.
 - A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
 - B. Show evidence that the soil meets the definition of a hydric soil;
4. Map unit components that are frequently flooded for long duration or very long duration during the growing season that:
 - A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
 - B. Show evidence that the soil meets the definition of a hydric soil;

Hydric Condition: Food Security Act information regarding the ability to grow a commodity crop without removing woody vegetation or manipulating hydrology.

References:

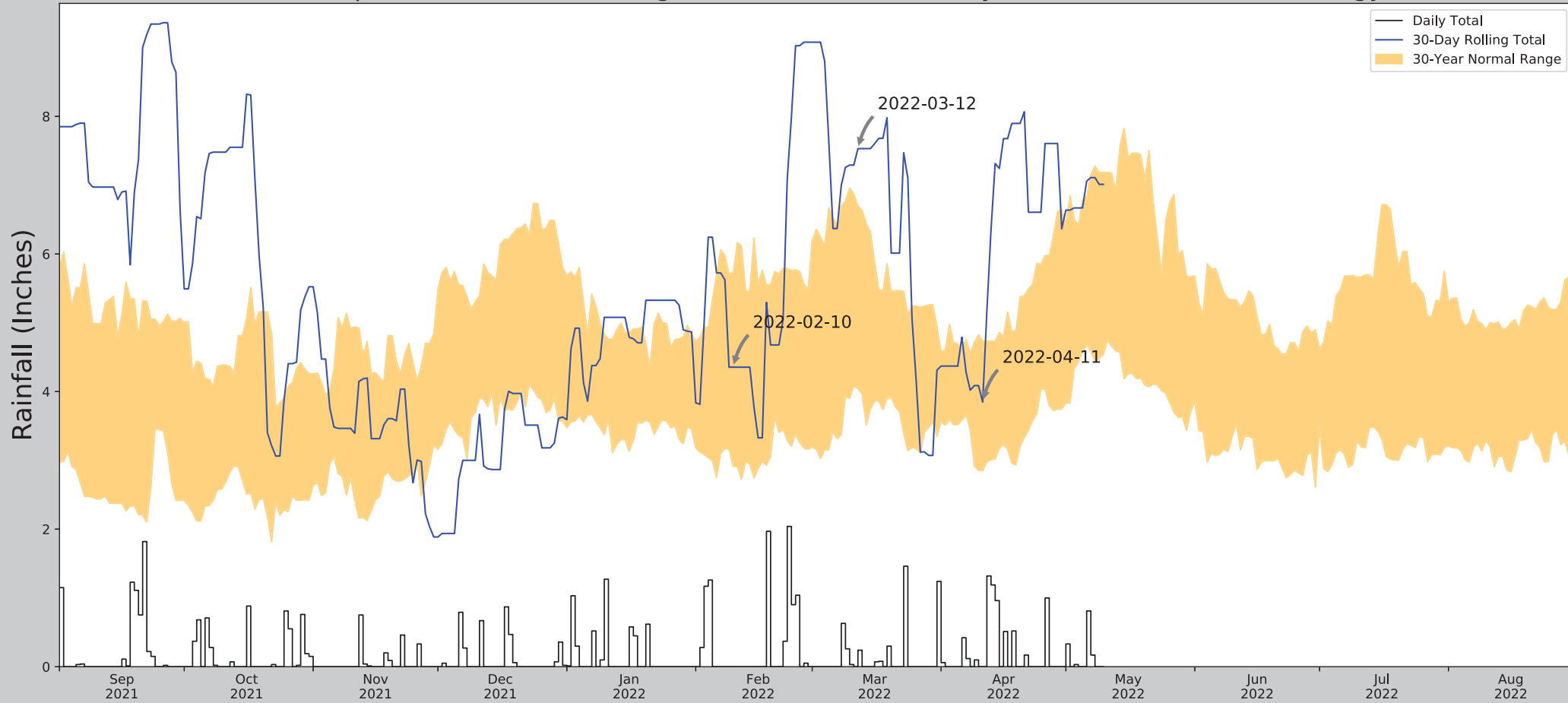
- Federal Register. July 13, 1994. Changes in hydric soils of the United States.
- Federal Register. February, 28, 2012. Hydric soils of the United States.
- Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18.
- Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service. U.S. Department of Agriculture Handbook 436.
- Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service.
- Vasilas, L.M., G.W. Hurt, and C.V. Noble, editors. Version 7.0, 2010. Field indicators of hydric soils in the United States.

Report—Hydric Rating by Map Unit (TN)

Hydric Rating by Map Unit (TN)—Wilson County, Tennessee			
Map Unit Symbol	Map Unit Name	Hydric Percent of Map Unit	Hydric Category
BrB2	Bradyville silt loam, 2 to 5 percent slopes	0	TN Nonhydric
GaC	Gladeville-Rock outcrop complex, 2 to 15 percent slopes, extremely stony	0	TN Nonhydric
TaB2	Talbott silt loam, 2 to 5 percent slopes, eroded	0	TN Nonhydric
TrC2	Talbott silt loam, 5 to 20 percent slopes, eroded, rocky	0	TN Nonhydric
W	Water	0	TN Nonhydric

APPENDIX 3: Climate Analysis

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	36.2071, -86.5543
Observation Date	2022-04-11
Elevation (ft)	534.37
Drought Index (PDSI)	Severe wetness
WebWIMP H ₂ O Balance	Wet Season

30 Days Ending	30 th %ile (in)	70 th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2022-04-11	2.849213	4.734252	3.846457	Normal	2	3	6
2022-03-12	4.042914	6.696851	7.531496	Wet	3	2	6
2022-02-10	2.914173	5.72874	4.354331	Normal	2	1	2
Result							Normal Conditions - 14



Figure and tables made by the
Antecedent Precipitation Tool
Version 1.0

Written by Jason Deters
U.S. Army Corps of Engineers

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
OLD HICKORY WFO	36.2469, -86.5631	589.895	2.793	55.525	1.412	11221	90
GREEN HILL 0.3 N	36.2387, -86.5716	518.045	0.738	71.85	0.385	6	0
OLD HICKORY DAM	36.2953, -86.6569	459.974	6.204	129.921	3.598	126	0

U.S. Department of Commerce
National Oceanic & Atmospheric Administration
National Environmental Satellite, Data, and Information Service
Current Location: Elev: 538 ft. Lat: 36.2104° N Lon: -86.5736° W
Station: **GREEN HILL 1.7 S, TN US US1TNWN0014**

Record of Climatological Observations
These data are quality controlled and may not be identical to the original observations.
Generated on 05/12/2022

National Centers for Environmental Information
151 Patton Avenue
Asheville, North Carolina 28801

Observation Time Temperature: Unknown Observation Time Precipitation: Unknown

Year	Month	Day	Temperature (F)			Precipitation					Evaporation		Soil Temperature (F)					
			24 Hrs. Ending at Observation Time		At Obs.	24 Hour Amounts Ending at Observation Time				At Obs. Time	24 Hour Wind Movement (mi)	Amount of Evap. (in)	4 in. Depth			8 in. Depth		
			Max.	Min.		Rain, Melted Snow, Etc. (in)	Flag	Snow, Ice Pellets, Hail (in)	Flag	Snow, Ice Pellets, Hail, Ice on Ground (in)			Ground Cover (see *)	Max.	Min.	Ground Cover (see *)	Max.	Min.
2022	04	01				0.00		0.0										
2022	04	02																
2022	04	03				0.00		0.0										
2022	04	04				0.00		0.0										
2022	04	05				0.45												
2022	04	06				0.09												
2022	04	07				0.05												
2022	04	08				0.00		0.0										
2022	04	09				0.00		0.0										
2022	04	10				0.00		0.0										
2022	04	11				0.48												
2022	04	12																
2022	04	13																
2022	04	14																
2022	04	15																
2022	04	16																
2022	04	17																
2022	04	18																
2022	04	19																
2022	04	20																
2022	04	21																
2022	04	22																
2022	04	23																
2022	04	24																
2022	04	25																
2022	04	26																
2022	04	27																
2022	04	28																
2022	04	29																
2022	04	30																
Summary						1.07												

Empty, or blank, cells indicate that a data observation was not reported.
*Ground Cover: 1=Grass; 2=Fallow; 3=Bare Ground; 4=Brome grass; 5=Sod; 6=Straw mulch; 7=Grass muck; 8=Bare muck; 0=Unknown
"s" This data value failed one of NCDC's quality control tests. "At Obs." = Temperature at time of observation
"T" values in the Precipitation or Snow category above indicate a "trace" value was recorded.
"A" values in the Precipitation Flag or the Snow Flag column indicate a multiday total, accumulated since last measurement, is being used.
Data value inconsistency may be present due to rounding calculations during the conversion process from SI metric units to standard imperial units.

APPENDIX 4:
Hydrologic Determination
Field Data Sheets

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: WWC-1		Date/Time: 4/11/2022 11:00am
Assessors/Affiliation: KMS - QHP-IT		Project ID :
Site Name/Description: Greenhill Round About		
Site Location: Greenhill Rd and Willoughby Station Blvd.		
HUC (12 digit): Stoner Creek (051302030308)		Lat/Long: 36.2071, -86.5543
Previous Rainfall (7-days) : 1.07 in		
Precipitation this Season vs. Normal : <u>abnormally wet</u> elevated average low abnormally dry unknown		
Source of recent & seasonal precip data : USACE APT Tool and GREEN HILL 1.7 S, TN US US1TNWN0014		
Watershed Size : < 1 acre	County: Wilson	
Soil Type(s) / Geology : Talbott silt loam, 2 to 5 percent slopes, eroded (TaB2)		Source: WSS
Surrounding Land Use : Residential		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : <u>Severe</u> 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, vegetation composed of upland and FACU species		WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions		<u>WWC</u>
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall		WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase		Stream
6. Presence of fish (except <i>Gambusia</i>)		Stream
7. Presence of naturally occurring ground water table connection		Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed		Stream
9. Evidence watercourse has been used as a supply of drinking water		Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

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 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable) =

Justification / Notes : This feature is a WWC due to it being dry in the wet season, also in a period of severe wetness before april 15th. It is clearly a drainage feature that only flows in response to rainfall (a lot of it). There are FAC UP species rooted in the channel.

APPENDIX 5: Site Photographs



Photo 001
Photo facing West towards Greenhill Rd. Conveyance is 35ft long from culvert to construction easement.



Photo 002

Photo facing SE away from Greenhill Rd, the outlet of the culvert forms a wet weather conveyance. Vegetation clearly rooted in the channel and dry during the wet season (before April 15th).



Photo 003

Again facing West towards Greenhill Rd. More evidence of vegetation in channel and clearly dry at this time.