

May 4, 2022

Via Electronic Mail

Ms. Brooke Heriges
Tennessee Department of Environment & Conservation
Division of Water Resources
711 R.S. Gass Blvd.
Nashville, Tennessee 37243

Re: Hydrologic Determination
9829 Concord Road
Brentwood, Williamson County, Tennessee

Dear Ms. Heriges:

Attached, please find materials supporting recent Hydrologic Determinations conducted on the above-referenced site on March 22, 2022. We are forwarding the accompanying Hydrologic Determination Field Data Sheets, figures, and photographs, which are provided in support of our determinations that the indicated reaches of the assessed drainages meet the technical criteria for a stream and alternatively, as a wet weather conveyance, as defined by Tennessee statute and associated administrative regulations.^{1,2}

This report is submitted with the knowledge of the property owner and prospective developer³. Per TDEC Rule 0400-40-17-.04, the writer of this report is **“seeking to qualify for the treatment provided in §69-3-108(r)”**. The purpose of this report is to obtain TDEC’s concurrence with this hydrologic determination to inform site planning for a proposed development on the property.

Construction and use of the proposed development may require watercourse alterations to accommodate property development and associated infrastructure. The owner and prospective site developer will consider practicable alteration alternatives pending determination of jurisdiction.

Project Site

Assessed drainages (D-1 & D-2) are located on an approximately 3-acre site comprising shrub-scrub vegetation and partially forested.

¹ Tennessee Code Annotated §69-3-103 (43) (A-D)

² TDEC Rules of the Tennessee Department of Environment & Conservation Division of Water Resources 400-40-17

³ Paragon Group. Ms. Haley Bass. 1400 5th Ave N, Nashville, Tennessee 37208. 270.983.2247

May 4, 2022

Ms. Heriges

Land cover in the drainage basin is predominantly open lawns/forest and residential properties. The assessed drainage is located within the Mill Creek Upper Watershed 12-digit hydrologic unit code (HUC) boundary (051302020101).

A depiction of the assessed reaches is provided in Figure 2, HD assessment points are provided in Figure 2, and locations of photographs are provided in Figure 3.

Hydrologic Determination Findings and Request for Concurrence

For the purposes of this hydrologic determination, the assessed watercourse was scored using TDEC's Hydrologic Determination Protocols. The watercourse was evaluated on March 22, 2022. Prior to the site visit, the 7-day antecedent precipitation was 4.85 inches of rainfall, and 0.00 inches of rainfall was recorded during the 48-hours preceding the site visit.

Wet Weather Conveyance

Primary Field indicator #3 was determinative of the hydrologic status of D-2 as a wet weather conveyance throughout its assessed reach. Hydrologic Determination Field Data Sheets are attached.

Stream

Secondary field indicators were determinative of the hydrologic status of D-1 as a stream throughout its assessed reach. Hydrologic Determination Field Data Sheets are attached.

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 determinations. Please contact us at (615) 460-9797 if we may provide additional information or address your questions regarding our findings.

Very truly yours,

BDY ENVIRONMENTAL LLC



Matthew D. Reed

Senior Project Scientist

Tennessee Qualified Hydrologic Professional, #1167-TN18

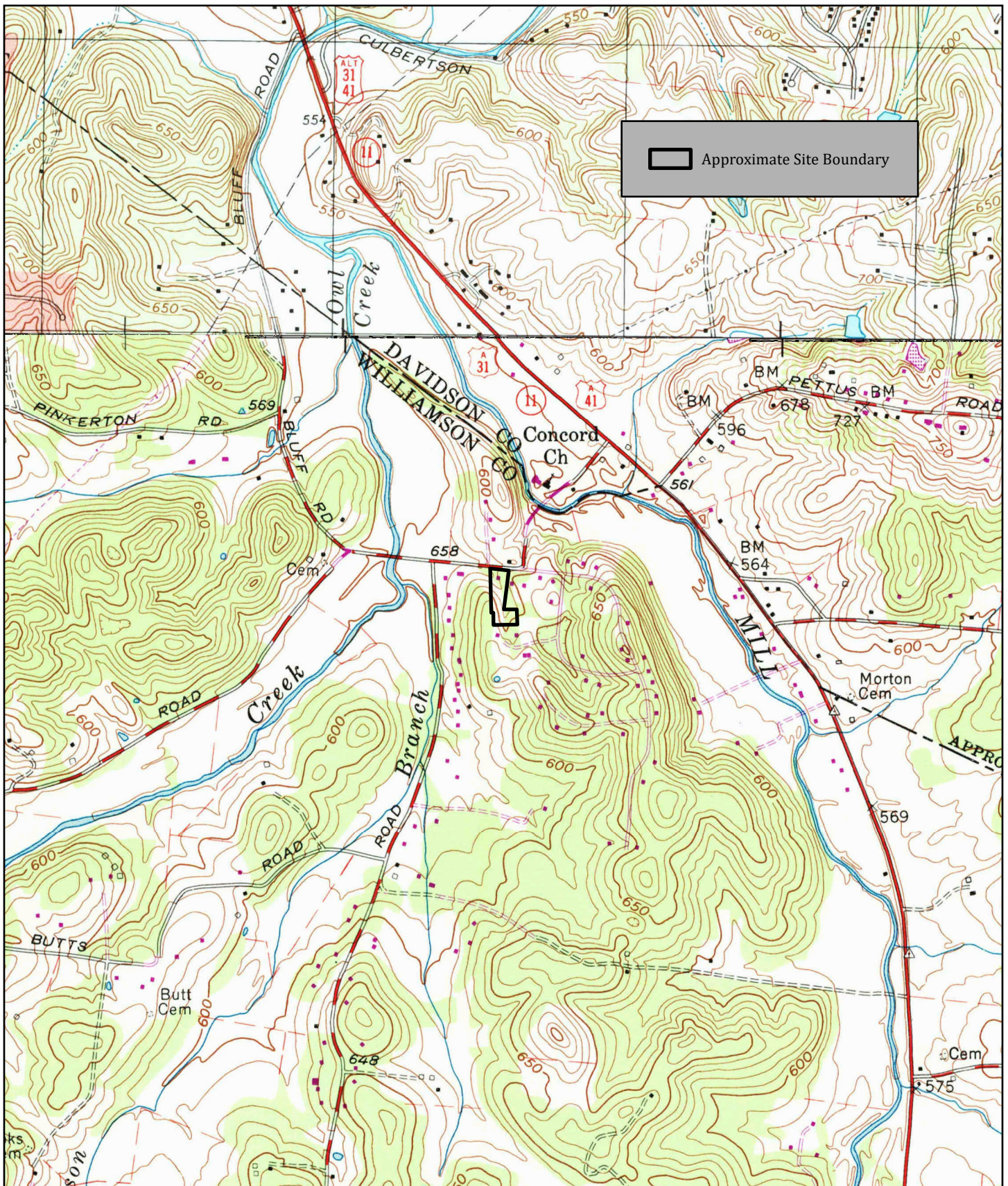


Figure 1. Site Location
9829 Concord Road
Brentwood, Williamson County, Tennessee

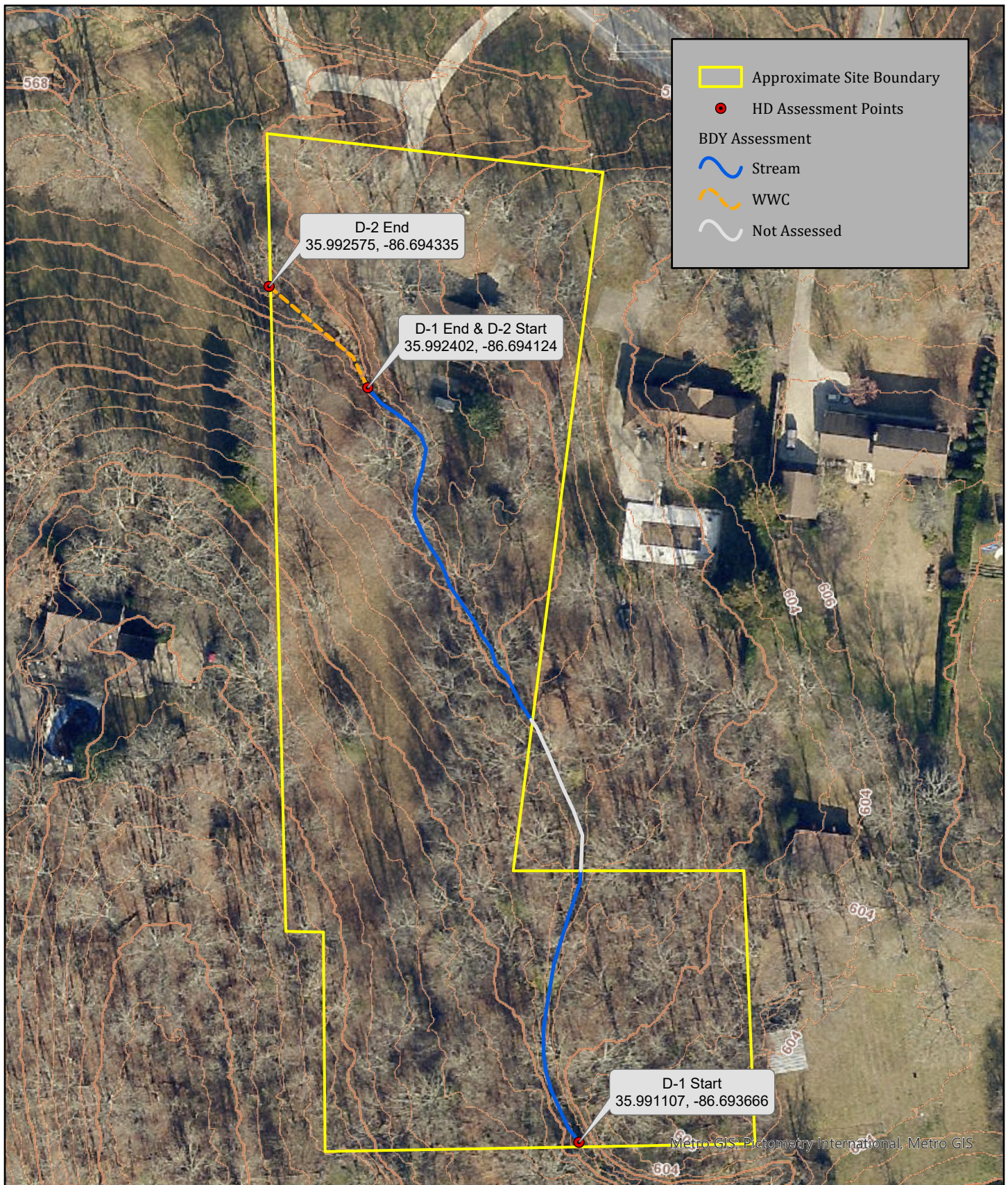


Figure 2. HD Summary
9829 Concord Road
Brentwood, Williamson County, Tennessee

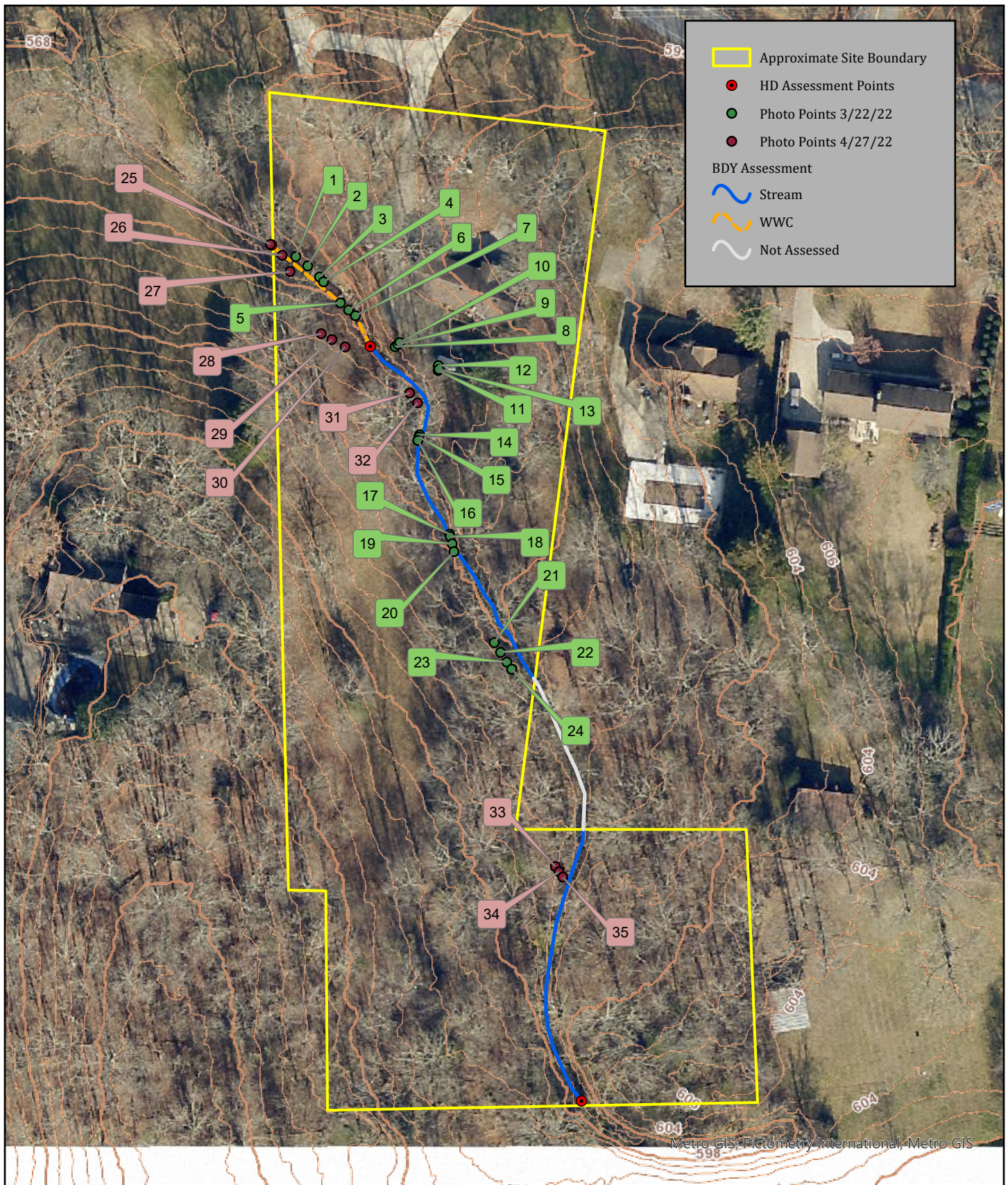


Figure 3. Photo Points
9829 Concord Road
Brentwood, Williamson County, Tennessee



1. View of D-2, facing downstream.



2. View of D-2, facing downstream.



3. View of D-2, facing upstream.



4. View of D-2, facing upstream.



5. View of D-2, facing upstream.



6. View of D-2, facing downstream.



7. View of D-2, facing down.



8. View of D-1, facing upstream.



9. View of D-1, facing down.



10. View of D-1 , facing downstream.



11. View of D-1 , facing downstream.



12. View of D-1, facing upstream.



13. View of D-1, facing upstream.



14. View of D-1, facing downstream.



15. View of D-1, facing downstream.



16. View of D-1, facing upstream.



17. View of D-1, facing downstream.



18. View of D-1, facing down.



19. View of D-1, facing down.



20. View of D-1, facing upstream.



21. View of D-1, facing downstream.



22. View of D-1, facing downstream.



23. View of D-1, facing down.



24. View of D-1, facing upstream.



25.

View of D-2, facing upstream.



26.

View of D-2, facing downstream.



27. View of D-2, facing downstream.



28. View of D-2, facing downstream.



29. View of D-2, facing upstream.



30. View of D-2, facing down.



31. View of D-1, facing upstream.



32. View of D-1, facing downstream.



33. View of D-1, facing upstream.



34. View of D-1, facing upstream.



35.

View of D-1, facing upstream.

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Unnamed Tributary to Owl Creek		Date/Time: 3/22/22
Assessors/Affiliation: M.Reed BDY / TNQHP #1167-TN18		Project ID :
Site Name/Description: 9829 Concord Road		D-1
Site Location: 9829 Concord Road, Brentwood, TN		
HUC (12 digit): Mill Creek Upper (051302020101)		Lat/Long:
Previous Rainfall (7-days) : 4.85"		D-1 Start: 35.991107, -86.693666; D-1 End: 35.992402, -86.694124
Precipitation this Season vs. Normal : <input checked="" type="checkbox"/> abnormally wet <input checked="" type="checkbox"/> elevated <input type="checkbox"/> average <input type="checkbox"/> low <input type="checkbox"/> abnormally dry <input type="checkbox"/> unknown		
Source of recent & seasonal precip data : APT		
Watershed Size : ~ 20 Acres	County: Williamson	
Soil Type(s) / Geology : Culleoka silt loam & Armour silt loam / Hermitage Formation		Source: <small>Geo Quad / Web Soil Survey</small>
Surrounding Land Use : Residential / Forested		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : <input checked="" type="checkbox"/> Severe <input type="checkbox"/> Moderate <input type="checkbox"/> Slight <input type="checkbox"/> Absent		

Primary Field Indicators Observed

Primary Indicators	NO	YES	
1. Hydrologic feature exists solely due to a process discharge	<input checked="" type="checkbox"/>	<input type="checkbox"/> WWC	
2. Defined bed and bank absent, vegetation composed of upland and FACU species	<input checked="" type="checkbox"/>	<input type="checkbox"/> WWC	
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	<input checked="" type="checkbox"/>	<input type="checkbox"/> WWC	<input type="checkbox"/> N/A
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	<input checked="" type="checkbox"/>	<input type="checkbox"/> WWC	<input type="checkbox"/> N/A
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	<input checked="" type="checkbox"/>	<input type="checkbox"/> Stream	
6. Presence of fish (except <i>Gambusia</i>)	<input checked="" type="checkbox"/>	<input type="checkbox"/> Stream	
7. Presence of naturally occurring ground water table connection	<input checked="" type="checkbox"/>	<input type="checkbox"/> Stream	
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	<input checked="" type="checkbox"/>	<input type="checkbox"/> Stream	
9. Evidence watercourse has been used as a supply of drinking water	<input checked="" type="checkbox"/>	<input type="checkbox"/> 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 = Stream
Secondary Indicator Score (if applicable) = 27.25 OR N/A

Justification / Notes :

Stream was previously channelized. Watercourse sinks at geologic contact between the Hermitage formation and the Carters limestone.

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 10)	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	0.5	1	1.5
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 1		Yes = 3 <input type="checkbox"/>	

B. Hydrology (Subtotal = 7.75)	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 channel bed or sides of channel	No = 0 1		Yes = 1.5 <input type="checkbox"/>	

N/A
N/A

C. Biology (Subtotal = 9)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel bed ¹	3	2	1	0
21. Rooted plants in the thalweg ¹	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macroinvertebrates (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 bed ²	0	0.5	1	1.5

¹ Focus is on the presence of terrestrial plants.

² Focus is on the presence of aquatic or wetland plants.

Total Points = **27.25**

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

Notes :

- 1) Continuous bed and bank present
- 3) Some riffle-pool sequence observed throughout reach
- 8) Recent alluvial deposits observed in lower reach.
- 10) A few minor headcuts observed
- 14) Continuous flow observed but no springs/seeps easily identified
- 15) Continuous flow observed throughout assessed reach
- 17) Some sediment on plants/debris
- 18) Drift piles observed throughout reach.
- 22) Crayfish observed
- 24) Frogs observed
- 25) Two caddisfly cases observed
- 26) Filamentous algae observed in some areas
- 27) Iron oxidizing bacteria observed in upper reach.

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Unnamed Tributary to Owl Creek		Date/Time: 3/22/22
Assessors/Affiliation: M.Reed BDY / TNQHP #1167-TN18		Project ID :
Site Name/Description: 9829 Concord Road		D-2
Site Location: 9829 Concord Road, Brentwood, TN		
HUC (12 digit): Mill Creek Upper (051302020101)		Lat/Long:
Previous Rainfall (7-days) : 4.85"		D-2 Start: 35.992402, -86.694124; D-2 End: 35.992575, -86.694335
Precipitation this Season vs. Normal : <input checked="" type="checkbox"/> abnormally wet <input checked="" type="checkbox"/> elevated <input type="checkbox"/> average <input type="checkbox"/> low <input type="checkbox"/> abnormally dry <input type="checkbox"/> unknown		
Source of recent & seasonal precip data : APT		
Watershed Size : ~20 acres	County: Williamson	
Soil Type(s) / Geology : Huntington silt loam / Carters Limestone		Source: <small>Geo Quad / Web Soil Survey</small>
Surrounding Land Use : Residential / Forested		
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : <div style="display: flex; justify-content: space-around; margin-top: 5px;"> <input checked="" type="checkbox"/> Severe <input type="checkbox"/> Moderate <input type="checkbox"/> Slight <input type="checkbox"/> Absent </div>		

Primary Field Indicators Observed

Primary Indicators	NO	YES	
1. Hydrologic feature exists solely due to a process discharge	<input checked="" type="checkbox"/>	<input type="checkbox"/> WWC	
2. Defined bed and bank absent, vegetation composed of upland and FACU species	<input checked="" type="checkbox"/>	<input type="checkbox"/> WWC	
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	<input type="checkbox"/>	<input checked="" type="checkbox"/> WWC	<input type="checkbox"/> N/A
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	<input checked="" type="checkbox"/>	<input type="checkbox"/> WWC	<input type="checkbox"/> N/A
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	<input checked="" type="checkbox"/>	<input type="checkbox"/> Stream	
6. Presence of fish (except <i>Gambusia</i>)	<input checked="" type="checkbox"/>	<input type="checkbox"/> Stream	
7. Presence of naturally occurring ground water table connection	<input checked="" type="checkbox"/>	<input type="checkbox"/> Stream	
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	<input checked="" type="checkbox"/>	<input type="checkbox"/> Stream	
9. Evidence watercourse has been used as a supply of drinking water	<input checked="" type="checkbox"/>	<input type="checkbox"/> 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) = 0 OR N/A

Justification / Notes :

Watercourse completely dry on 3/22/22. D-2 starts at the geologic contact with the Hermitage formation and Carters limestone

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 0)	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	0.5	1	1.5
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 = 0)	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 channel bed or sides of channel	No = 0		Yes = 1.5	

N/A
N/A

C. Biology (Subtotal = 0)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel bed ¹	3	2	1	0
21. Rooted plants in the thalweg ¹	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macroinvertebrates (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 bed ²	0	0.5	1	1.5

¹ Focus is on the presence of terrestrial plants.

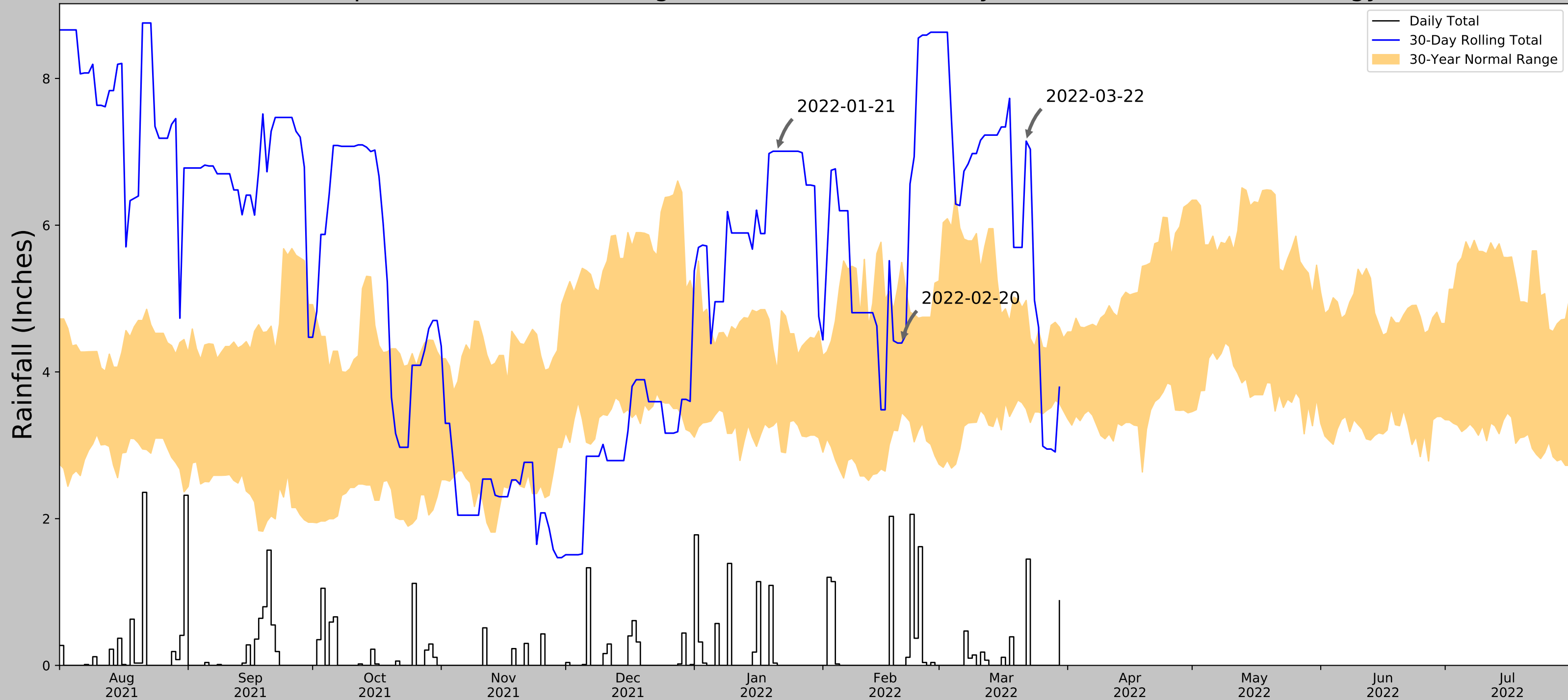
² Focus is on the presence of aquatic or wetland plants.

Total Points = 0

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

Notes :

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



Coordinates	35.992665, -86.694098
Observation Date	2022-03-22
Elevation (ft)	585.44
Drought Index (PDSI)	Extreme wetness (2022-02)
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
2022-03-22	3.494095	4.974803	7.14567	Wet	3	3	9
2022-02-20	3.447638	5.49252	4.393701	Normal	2	2	4
2022-01-21	3.333858	4.019685	7.007874	Wet	3	1	3
Result							Wetter than Normal - 16



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
NASHVILLE INTL AP	36.1189, -86.6892	600.066	8.726	14.626	4.054	11351	90
NASHVILLE BERRY FLD	36.1136, -86.6781	560.039	0.72	40.027	0.353	2	0

Hydric Rating by Map Unit—Williamson County, Tennessee









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 1:15,800.

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 16, 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: Feb 14, 2020—Mar 1, 2020

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.

Hydric Rating by Map Unit

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
ArB	Armour silt loam, 2 to 5 percent slopes	0	0.1	3.4%
ArB2	Armour silt loam, 2 to 5 percent slopes, eroded	0	0.7	27.6%
ArC2	Armour silt loam, 5 to 12 percent slopes, eroded	0	0.1	3.4%
CkD	Culleoka silt loam, 12 to 20 percent slopes	0	1.0	38.7%
HoC3	Hicks silty clay loam, 5 to 12 percent slopes, severely eroded	0	0.2	6.1%
Hu	Huntington silt loam, phosphatic	0	0.6	20.8%
Totals for Area of Interest			2.7	100.0%



U.S. Fish and Wildlife Service

National Wetlands Inventory

Wetlands



March 29, 2022

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.

Ms. Brooke Heriges

Tennessee Department of Environment & Conservation

Division of Water Resources

711 R.S. Gass Blvd.

Nashville, Tennessee 37243

Dear Ms. Heriges:

As the owner of the property identified as Williamson County Parcel ID 0330490000016033, Brentwood, Tennessee, I am authorizing the Division's visit to conduct a stream assessment as part of your review of Mr. Matt Reed's recently completed hydrologic determination on the property.

Thanks very much,

Paragon Group