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DEPARTMENT FOR ENVIRONMENTAL PROTECTION

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SECRETARY

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KENTUCKY DIVISION OF WATER
WELLHEAD PROTECTION PLAN
5-YEAR UPDATE FORM

Update Requirements:

This form should be used for the 5-year update submittal requirements of the Kentucky Wellhead Protection Program (WHPP) in compliance with 401 KAR 4:220 and SDWA Section 1428. Once the form is complete, please sign and send to:

Kentucky Division of Water
Watershed Management Branch
Attention: Dale Booth
300 Sower Boulevard, 3rd Floor
Frankfort, Kentucky 40601 or dale.booth@ky.gov

For assistance, contact Dale Booth at (502) 782-6895 or dale.booth@ky.gov

System Information:

PWS Name: **North Marshall Water District No 1**

PWS ID Number: **KY0790319**

AI Number: **2955**

Contact Person/Title: **Shannon Elam, General Manager**

Mailing Address: **P.O. Box 850, 96 Carroll Road, Benton, KY 42025**

Telephone: **270-527-3208**

Email: **nmwdsupervisor@gmail.com**

System Type*: **Community**

*Community; Non-Transient/Non-Community; Transient/Non-Community

Source*: **Field of 6 Wells (5- active; 1- inactive)** *Well(s) or Spring(s) and total number of each

AKGWA #(s): **Well #1/ 00005067; Well #2/00005068; Well #3/00005071; Well #4/00005072; Well #5/00005069; Well #6/00005070**

County: **Marshall**

ADD: **PADD**

WWD Permit #: **0537** Permitted Amount (mgd): **1.1-1.6**

Population Served: **Residential: 16276; Wholesale: 2970**

Overall Susceptibility Rating*: **Medium** *High, Medium or Low

WHPP Changes Summary: **North Marshall Water District withdraws its source water from two aquifers. Four of the wells are finished in alluvial sands and gravels above the rock line. The remaining two wells are finished in fractured bedrock of the Fort Payne formation. The aquifer of the Fort Payne formation is reported to be confined below the site. Water withdrawals are permitted for 1.1 to 1.6 million gallons per day (MGD), with current average monthly water withdrawals of 1.13 MGD (2017-2023) under Permit #0537. The WHPA delineation includes approximately 384 acres of mostly deciduous forest and pasture/hay land use with minor amounts of residential development and two types of potential contaminant sources which are residential septic systems and roads. The overall susceptibility rating is medium. North Marshall Water District's management strategies include education and outreach via Consumer Confidence Reports (CCR), Water Supply Protection Area road signs along the boundary of the WHPA, and the development of Groundwater Protection Plans (GPPs) for all activities that have the potential to pollute groundwater.**

Update Form Instructions:

Please complete each section that applies to any system or WHPP updates and submit the supporting documentation. Please indicate if a section is not applicable to this update. **Sections 4 and 6 through 11 are required for every 5-year update.**

Please sign certification on the last page upon completion.

Section Updates:

Section 1: Treatment Plant

If the treatment plant location has changed then provide a new location map below. This can be a county roadmap or a GIS-produced map. Please use the area below to provide relevant details, or to indicate that no change has occurred.

The 2.880 MGD Tatumsville Water Treatment Plant is still located at 4062 Briensburg Tatumsville Rd, Gilbertsville, KY 42044. The wellfield lies along Stice Creek in the northeastern portion of Marshall County.

Section 2: Water Withdrawal and Water Quality

If there have been changes in water withdrawal rates or water quality since the last submittal, provide a discussion of the relevant details in the space below (include new Water Withdrawal Permit Number if applicable). Include supporting documentation as an attachment.

North Marshall Water District is authorized to withdrawal from 1.1 to 1.6 MGD of water a field of six (6) wells along Stice Creek authorized under Permit # 0537 which was last revised in 2020. Since the last update (2017-2023), average monthly water withdrawals have varied from 1.001 to 1.206 MGD with maximum monthly withdrawals varying from 1.205 to 1.524 MGD. The 2003 Phase I WHPP reported average water withdrawals growing steadily from 1.1 to 1.2 MGD over ten years with 1.5 MGD as the maximum. So, over the last twenty (20) years the average and maximum water withdrawals have remained relatively consistent. However, at the end of 2023 production at the Carter Brien Plant was suspended so the Tatumsville Water Treatment Plant will have to increase production to account for the difference. Population in Marshall County is projected to decline from 2020-2050, however seasonal and recreation demands are prevalent in this region of the state due to the lake and associated state and federal parks.

North Marshall Water District currently withdraws from six (6) wells drilled at 100 and 400 feet deep. The shallower wells are finished in alluvial sands and gravels and the deeper wells are finished in fracture bedrock of the Fort Payne formation in the Jackson Purchase region. The Jackson Purchase, or Mississippi Embayment Region is in western Kentucky where Cretaceous and Tertiary sediments occur at the surface. The Jackson Purchase is the northeastern part of the upper Mississippi Embayment, a part of the Gulf Coastal Plain. The Mississippi River Valley is situated along the axis of the embayment. Because most of the Cretaceous, Tertiary and Quaternary deposits are unconsolidated sediment instead of rock, they are easily eroded, and, consequently, this part of Kentucky is relatively flat lying, with numerous lakes, ponds, sloughs, and swamps. It is bounded by the Tennessee River on the east, Ohio River on the north and Mississippi River on the west. The area is underlain by unconsolidated deposits of sand, gravel, silt, and clay. These deposits are on top of limestone that dips relatively steeply to the west. Groundwater occurs within the unconsolidated granular aquifers and is generally abundant. Several water systems on the northern edge of the embayment do utilize fractured zones with the underlying Fort Payne formation. The water from the bedrock is generally of good quality with some locations requiring iron removal prior to distribution. Water from this zone for the North Marshall District meets primary and secondary standards.

In 2023, the Kentucky Division Water conducted analyses of finished water for per- and poly-fluoroalkyl substances (PFAs) for North Marshall Water District Tatumsville Water Treatment which did not detect the analytes. However, the District's Carter Brien Water Treatment Plant was removed from service due to levels of PFOA and other PFAS substances exceeding maximum contaminant levels (MCLs). The Jackson Purchase physiographic region showed a decreasing trend in fluorides, sulfates, and orthophosphate and increasing trends in potassium and selenium. (Report on the Condition of Ambient Groundwater in Kentucky 2018).

Section 3: Change or Modification to Groundwater Source

If the system has changed or modified the wells or springs being used, provide the following: 1) a description of changes/modifications; 2) copies of the relevant form(s) (Kentucky Water Well Record, Well Maintenance & Plugging Record, Well Inspection Form or Spring Inventory Record); and 3) any other information relating to well construction (i.e., installation logs, driller's logs, lithological or geophysical logs), below.

The active delineated wellfield is composed of six (6) wells, including Well #1 which was constructed in 1966 to depth of 100 feet, Wells #2, #5, and # 6 which were constructed during the 1970s to a depth of 100 feet, and Wells # and #4 which were constructed during the 1980s to a depth of 400 feet. Currently Well #1/00005067 is inactive but is planned to be rehabilitated and put back into production and Well #4 is being repaired and rehabilitated to be also be put back into production, so the District will amend the associated water withdrawal permit.

Section 4 (REQUIRED): Planning Team

Effective water supply protection requires community involvement and public awareness. Identify the planning team consisting of a leader and at least two team members, with their respective titles, below.

Leader:

Shannon Elam, General Manager

Team Members:

Jamie Lenord, District Chairman

Jeremiah Noles, Field Manager

Mike Penney, Office Manager

Roger Colburn, Engineering Technician

Kevin Spraggs, Marshall County Judge Executive

Section 5: WHPA Delineation

If the system is revising a Wellhead Protection Area (WHPA) delineation, or if a new groundwater source has been added since the last submittal, provide a site-specific description of the local geology and aquifer. Include references for published literature. Provide a summary of any aquifer tests (i.e. pumping tests, slug tests, tracer tests), including data gathering and evaluation methods. Show calculations and supporting data for each WHPA delineated or revised. Include the detailed hydrogeologic report as an attachment.

The current WHPA for North Marshall Water District has not changed for this update and encompasses 384.02 acres of mostly deciduous forest and pasture/hay land use with minor amounts of residential development. Please refer to the table below for the WHPA

delineation:

Zone	Time of Travel (TOT)	Acres
1	180-day	35.82
2	10-year	240.40
3	Hydrologic boundary	384.02

Section 6 (REQUIRED): WHPA Map

Provide a WHPA map that shows each groundwater source labeled with the appropriate AKGWA #, all protection zones identified and the Contaminant Source Inventory (CSI) point locations. If no changes have occurred since the last submittal, then a copy of the most recent WHPA/CSI map can be resubmitted. To view the most recent delineations for your system, please visit the [Source Water Protection Viewer](#). Please contact program staff for assistance.

See attached WHPA Map. The wellhead protection area for the six (6) active public water system wells is further delineated into three (3) zones based on time of travel (TOT) and the hydrological boundary for potential contaminants, including:

Zone 1: 180-day time of travel

Zone 2: 10-year time of travel

Zone 3: Hydrologic boundary

Section 7 (REQUIRED): Contaminant Source Inventory

Provide an updated CSI in table format. This can be created using the spreadsheet template provided, and copied into the space below. If no changes occurred since the last update, the table can be pulled from previous WHPP documents. Each contaminant source listed should have a Contaminant Source ID # that corresponds to the WHPA map in Section 6. The CSI table must show the susceptibility determination ranking for each contaminant source. Include a brief narrative discussion of the overall system susceptibility. For more information on potential sources of contamination, please visit the DOW's [Web Tools for SWP Planning website](#). Please contact program staff for assistance.

See attached CSI. North Marshall Water District currently withdraws from a wellfield that has a delineated protection area of approximately 384 acres of mostly mostly deciduous forest and pasture/hay with minor amounts of residential development. There are two (2) potential contaminant sources which are residential septic systems and roads. There are no official records via the Geological Map Service from Kentucky Geological Survey of private water wells within or around the WHPA but they are more than likely present. The overall susceptibility rating is medium.

Section 8 (REQUIRED): Management Strategies

Provide a discussion of the previous and newly proposed management strategies to prevent source water contamination. This discussion must include the previous management strategies that were implemented as well as the goals that were met. Next, include any NEWLY proposed management strategies, associated goals, implementation plans and the party responsible for implementation. For information about wellhead protection strategies please visit the DOW’s [Source Water Protection Strategies website](#).

Previous Management Strategy Update:

North Marshall Water District has pursued public education and outreach to manage the WHPA including using the Consumer Confidence Report (CCR), Water Supply Protection Area road signs along the boundary of the WHPA, and the development of Groundwater Protection Plans (GPPs) for all activities that have the potential to pollute groundwater.

Newly Proposed Management Strategies:

North Marshall Water District will continue to pursue public education and outreach to manage the WHPA including using the CCR and the development of GPPs.

Section 9 (REQUIRED): Contingency and WHP Planning

Provide a description of Contingency and WHP Planning. Complete the Emergency Response Phone List, Procedures for Public Notification, identification of Potential Future Problems and the procedures to establish Alternative Water Supplies. This section must also address how often the WHPP will be reviewed and updated.

Emergency Response Phone List

Fill in all Blanks and Phone Numbers with appropriate information.

Local Emergency Response	Phone Number
Gilbertsville Fire Protection	(270) 362-7061
Marshall County Sheriff's Department	(270) 527-3112
Marshall County Emergency Management	(270) 527-4739
Local Emergency Dispatch Marshall County 911 Director	(270) 527-4733/911

State and Federal Assistance	Phone Number
Kentucky DOW (Frankfort)	(502) 564-3410
Kentucky DOW Associated Field Office (FO) Paducah Regional Office	(270) 898-8468
Kentucky Environmental Response Team 24 hour response line	(502) 564-2380 (800) 928-2380
Kentucky State Fire Marshall	(502) 573-0382

Any Other Pertinent Contacts	Any Other Pertinent Numbers
North Marshall Water District https://www.northmarshallwater.com/	(270) 527-3208
Kentucky Rural Water Association (KRWA)	(270) 843-2291

Procedures for Public Notification:

In the event of a water system emergency that would threaten the health or life of the public, use the following procedure. Prepare and broadcast an advisory, including directions for the public. Describe the public notification process and provide contacts for those media outlets. If the system uses methods other than traditional media please list them.

Customers will be notified via one call systems and other announcements would be made via newspaper, radio, and/or the North Marshall Water District website which is provided in the previous section.

Newspaper, Television, and Radio Stations	Phone Numbers
The Trib/Marshall County Tribune-Courier https://www.tribunecourier.com/	(270) 527-3162
WCBL 99.1 (FM) or 1290 (AM)	(270) 527-3102
WCKK 95.7 FM	(270) 395-5133
Marshall County Daily https://www.marshallcountydaily.com/	(270) 395-5133

Potential Future Problems:

Describe the *most likely* scenarios that could threaten the water supply.

In accordance with the CSI, faulting or failing septic systems or an accidental spill or release from the two roads that cross through the WHPA is the most likely threat to the aquifer.

Alternative Water Supply (Short and Long Term):

Describe the short term and long-term water supply alternatives that address each of the potential future problems identified above. List all current interconnections with other water systems. Discuss the capacity of each potential alternative water supply to sustain normal operations.

Over the short-term, issuing boiled water advisories, blending source water from permitted wells, and/or water could be purchased from other systems through interconnections. Over the long-term different treatment technologies/processes could be employed, constructing new wells, and/or purchasing water from other systems.

Currently North Marshall Water District can purchase and sell water to Benton Water & Sewer System, Calvert City Municipal Water Department, and Jonathan Creek Water District and can only sell water to Grand Rivers Water System.

Schedule for Update and Review:

The Wellhead Protection Plan will be reviewed regularly and updated every five years as required by regulation.

Section 10 (REQUIRED): Copies of Public Notices and Education Materials

Provide copies of wellhead protection public notices and education materials distributed.

A copy of this wellhead protection plan will be posted on the North Marshall Water District webpage (<https://www.northmarshallwater.com/>) and the link to plan will be printed on customer bills for public notice.

Section 11 (REQUIRED): Public Meeting Documentation***


Provide the record of WHPP public meeting attendance, minutes and comments.

A copy of this wellhead protection plan will be posted on the North Marshall Water District's webpage and the link to WHPP will be printed on customer bills for public notice. A copy will be provided in the attachments for documentation.

***Non-Community Water Systems are not required to have public meetings for 5-year updates, but must post a public notice in a conspicuous place. A public notice template is provided as a separate document. However, public input and associated documentation are encouraged. Please contact program staff if you have any questions.

Certification Signature (TO BE COMPLETED BY PLANNING REPRESENTATIVE):

"I certify that this document and all attachments were prepared under my direction or supervision. The information submitted is, to the best of my knowledge and belief, true, accurate, and complete."

Signature:  Date: 11/19/24

Printed Name/Title: Shannon W. Elam – General Manager

Assistance:

For any assistance, please contact Wellhead Protection Staff:

Dale Booth
(502) 782-6895
Dale.Booth@ky.gov

Allan Shingleton
(502) 782-6907
Allan.Shingleton@ky.gov

Please sign and return completed form to:

Kentucky Division of Water
Watershed Management Branch
Attention: Chip Zimmer
300 Sower Boulevard, 3rd Floor
Frankfort, Kentucky 40601
or Dale.Booth@ky.gov

Table 1: Source Inventory

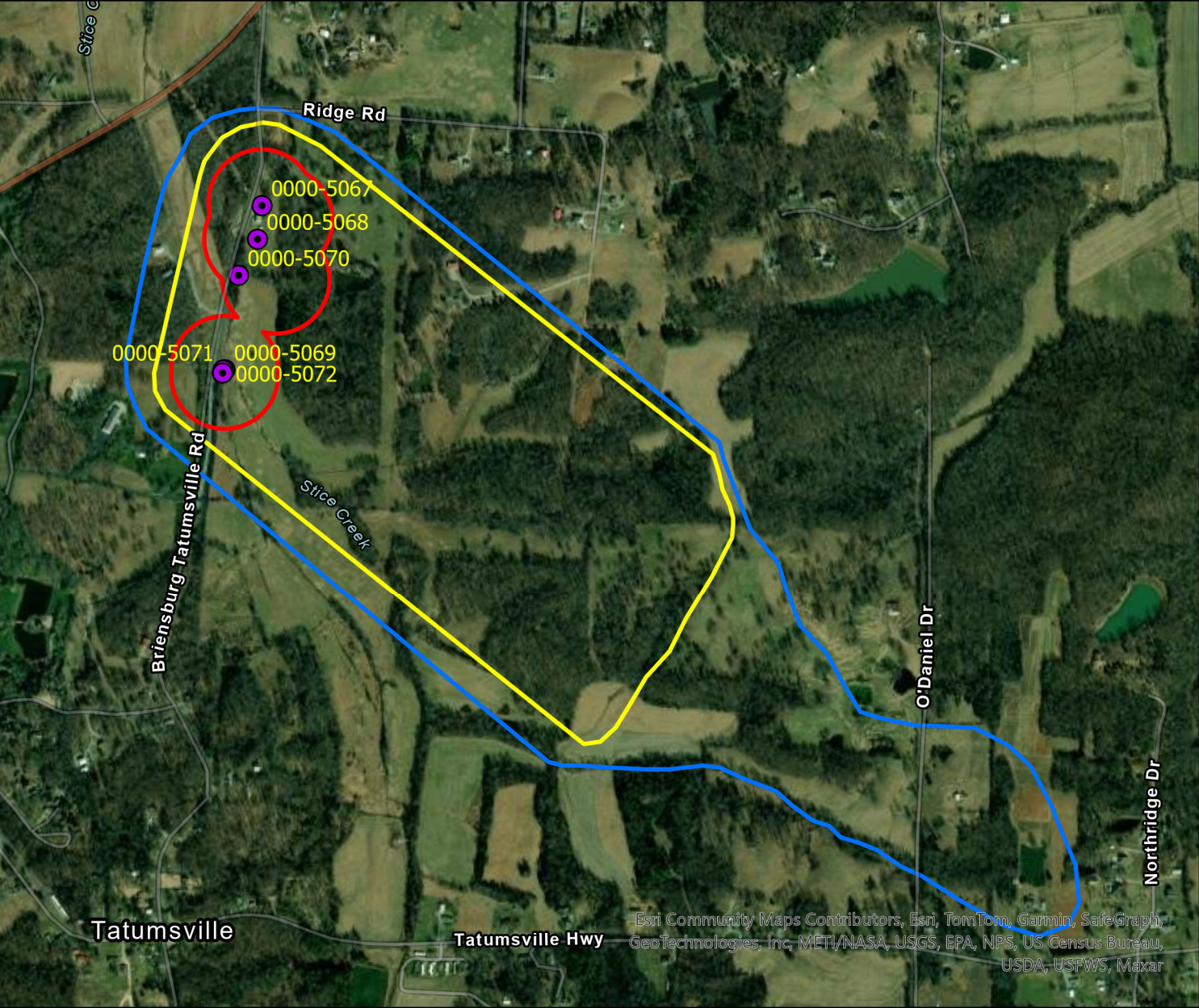
Alt Id	Agency	AKGWA#	Construction Date (yr)	Well Depth (ft)
Well 1	North Marshall Water District No 1	00005067	1966	100
Well 2	North Marshall Water District No 1	00005068	1972	100
Well 3	North Marshall Water District No 1	00005071	1983	400
Well 4	North Marshall Water District No 1	00005072	1987	400
Well 5	North Marshall Water District No 1	00005069	1978	100
Well 6	North Marshall Water District No 1	00005070	1978	100

Table 2: Water Withdrawal Permits & Permitted Sources

WWD Permit #	Permitted Amount (MGD)	Permitted Sources
0537	1.1-1.6	Well #1/ 00005067; Well #2/00005068; Well #3/00005071; Well #4/00005072; Well #5/00005069; Well #6/00005070
Total	1.1-1.6	6 (5-active; 1- inactive)

Section 6: WHPA Map

N. Marshall WD #1 - Tatumsville



Legend

● PWS Well

Wellhead Protection Areas

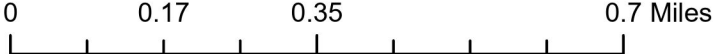
WHPA

1

2

3

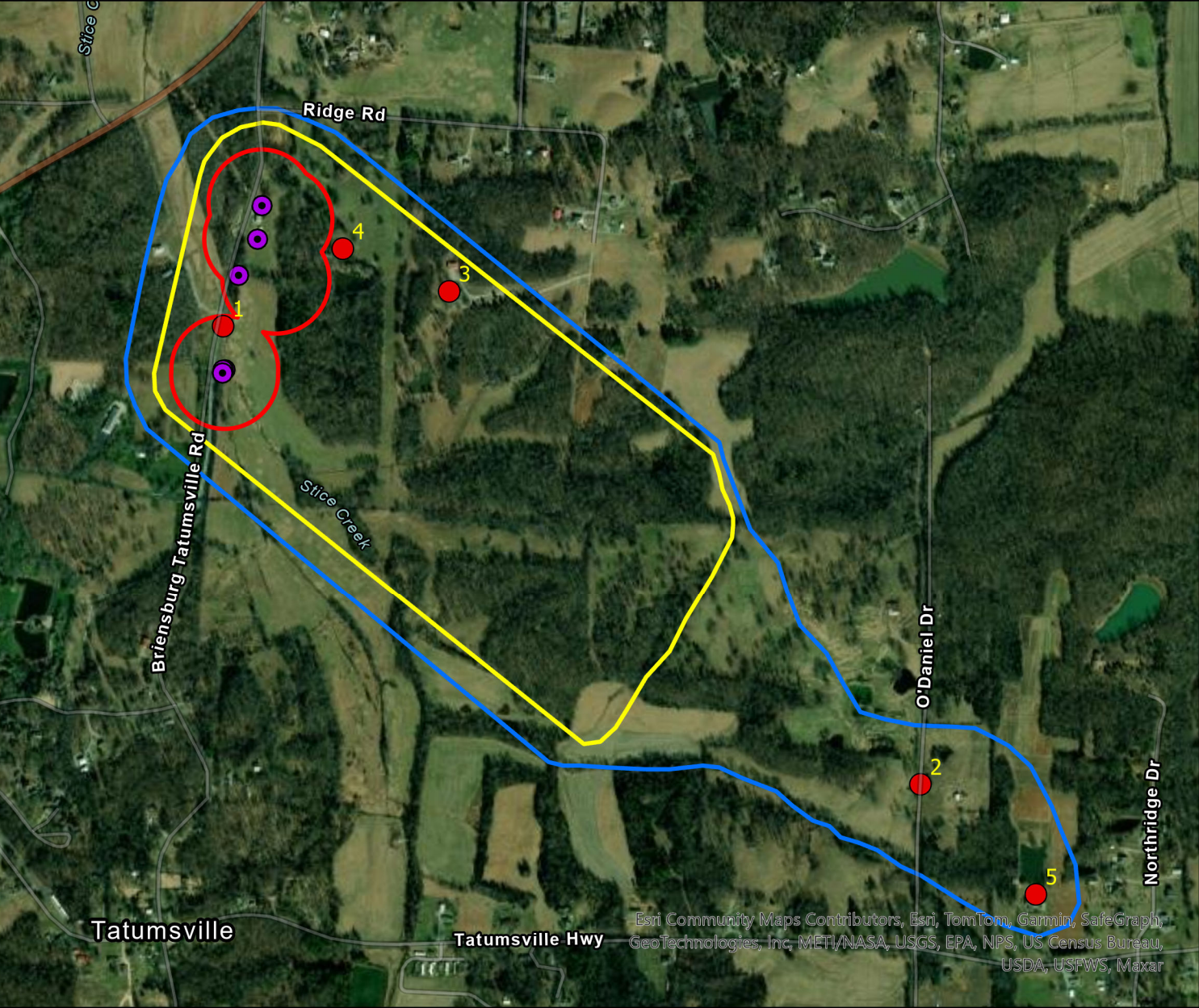
<all other values>



Esri Community Maps Contributors, Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, USFWS, Maxar

Section 7: Contaminant Source Inventory

N. Marshall WD #1 - Tatumsville

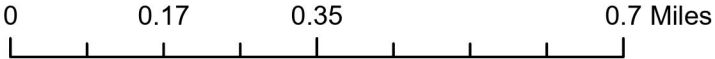


Legend

- Contaminant Source Inventory Locations
- PWS Well

Wellhead Protection Areas

- WHPA
- 1
 - 2
 - 3
 - <all other values>



Contaminant Source Inventory and Susceptibility Analysis for *North Marshall Water District No. 1 (KY0790319)*

Instructions (section may be deleted on submission):

Use the following table to list and rank potential contaminants identified during the contaminant source inventory.

Include Lat/Lon or addresses when possible. Enter the WHPA in which the contaminant occurs.

Multiple, similar sources that are clustered can be listed once with the Quantity identified.

The Proximity Ranking is based on the WHPA in which the contaminant is located (WHPA 1=3; WHPA 2=2; WHPA 3=1).

Contaminant Value is on a 1-3 scale, based upon its potential threat; consult the Contaminant Source Types_Values guide.

Hydrologic Sensitivity: The physical, chemical, geological, hydrological, and biological characteristics of the area over which, or through which, the contaminants move to the aquifer have various capabilities to detain or attenuate contaminant releases. Consult the Hydrologic Sensitivity tab.

The spreadsheet will use the values entered to calculate the Numeric Rating for each contaminant source.

- o $\text{Numeric Rating} = (\text{Proximity Value} \times 2) + (\text{Contaminant Value} \times 3) + (\text{Hydrologic Sensitivity Value})$

This will determine the Susceptibility Ranking: Numeric Rating less than 10 = Low; 10-15 = Medium; greater than 15 = High.

Please contact SWP/WHPP staff if you have any questions.

Contact:

Dale Booth; Dale.booth@ky.gov; 502-782-6895

Chip Zimmer; Edward.Zimmer@ky.gov; 502-782-7141

CSI Map ID #	Site ID	Contaminant Source Type	CS CODE	Name	Address	Lat	Lon	Quantity	Zone	Proximity Value	Contaminant Value	Hydrologic Sensitivity	Numeric Rating	Susceptibility Ranking	Contaminant Notes
1		Major Roadways	M-7	Briensburg Tatumsville Rd	WHPA 1	36.9455792	-88.3054276	1	1	1	3	2	13	MED	
2		Major Roadways	M-7	O'Daniel Dr	WHPA 3	36.9365675	-88.2872961	1	3	3	3	2	17	HIGH	
3		Residential Septic	R-4	Residential/ septic	WHPA 2	36.946418	-88.2996772	1	2	2	2	2	12	MED	
4		Residential Septic	R-4	Residential/ septic	WHPA 2	36.9472334	-88.3024247	1	2	2	2	2	12	MED	
5		Residential Septic	R-4	Residential/ septic	WHPA 3	36.9343751	-88.2842713	1	3	2	2	2	12	MED	

CSI Totals	Low	0			Overall Susceptibility Ranking					MED
	Med	4								
	High	1								

Section 10 & 11: Public Notice Documentation