Dewberry

# Paeonian Springs Water and Wastewater Feasibility Study

Loudoun County

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Dewberry Project No: 50079946


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# PAEONIAN SPRINGS
# WATER AND WASTEWATER FEASIBILITY STUDY

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# Abbreviations

| | |
|---|---|
| AACE | Association for the Advancement of Cost Engineering |
| AOSS | Alternative Onsite Sewage Systems |
| A3 | Agricultural/Residential |
| BNR | Biological Nutrient Removal (TN < 8 mg/L) |
| BOD | Biological Oxygen Demand |
| CR1 | Countryside Residential-1 |
| CR2 | Countryside Residential-2 |
| CTC | Certificate to Construct |
| CTO | Certificate to Operate |
| DE | Diatomaceous Earth |
| DHR | Department of Historic Resources |
| DIP | Ductile Iron Pipe |
| EDM | Engineering Design Manual |
| ENR | Enhanced Nutrient Removal |
| gpd | Gallons Per Day |
| gpm | Gallons Per Minute |
| HDPE | High-Density Polyethylene |
| LCCO | Loudoun County Codified Ordinance |
| LPS | Low Pressure System |
| LW | Loudoun Water |
| MBR | Membrane Bioreactor |
| MCL | Maximum Contaminant Level |
| MCLG | Maximum Contaminant Level Goal |
| MPN | Multiple-Portion Decimal-Dilution |
| MSL | Mean Sea Level |
| O&M | Operation & Maintenance |
| OPCC | Opinion of Probable Construction Cost |
| PVC | Polyvinyl Chloride |
| RC | Rural Commercial |
| SBR | Sequencing Batch Reactor |
| SCAT | Sewage Collection and Treatment |
| SHDR | Sewage Handling and Disposal Regulations |
| SHPO | State Historic Preservation Office |
| TL-3 | Treatment Level 3 Effluent |
| TM | Technical Memorandum |
| TN | Total Nitrogen |
| TSS | Total Suspended Solids |
| VDEQ | Virginia Department of Environmental Quality |
| VDH | Virginia Department of Health |
| VDOT | Virginia Department of Transportation |
| VPDES | Virginia Pollutant Discharge Elimination System |
| W&OD | Washington & Old Dominion Trail |
| WWTP | Wastewater Treatment Plant |

# Executive Summary

Paeonian Springs is an unincorporated community located in the Rural Policy Area of Loudoun County, Virginia. A group of homeowners and businesses from Paeonian Springs has applied to the Loudoun County Water and Wastewater program. The community created a boundary for the purposes of the application. The boundary includes 216 parcels with 122 of those parcels containing potentially eligible structures. 92 signatures were included with the application.

The parcels are currently being served by individual, on-site wastewater disposal systems for sewage disposal and individual wells for potable water. The average age of the existing wastewater disposal systems is over 35 years with the septic systems having a median age of 38 years as noted in the application. Many of the systems cannot be replaced or expanded due to a variety of factors such as small lot sizes, poor soils, proximity to wells and other infrastructure.

Properites are currently served water by individual wells. The median age of wells is 37 years and over 30 wells are more than 50 years old as noted in the community application. Older wells tested poorly for water quality and have received recommendations from the Loudoun County Health Department for chlorination. The well water has also tested for low pH which is corroding the copper pipelines of homes, causing leaks.

In recognition of the on-going problems related to a lack of community wastewater and water systems, the residents of Paeonian Springs submitted an application to the Loudoun County Water and Wastewater Program (administered by Loudoun County with the support from Loudoun Water) for assistance with both their water and wastewater needs. Paeonian Springs qualified for a water and wastewater feasibility study.

This feasibility study reviewed the existing conditions of the current systems, analyzed water distribution and treatment solutions as well as wastewater collection, treatment, and disposal solutions. The purpose of this study is to determine the technical feasibility of potential solutions to Paeonian Springs' water and wastewater issues. Alternatives considered for both water and wastewater systems included: Continuation of use of existing systems, construction of community systems, and connection to nearby municipalities.

The recommended water system includes a new community system with a groundwater well site containing three (3) wells and associated treatment system and distribution piping to convey drinking water to the Paeonian Springs residents. A potential groundwater site north of Paeonian Springs was preliminarily selected in this feasibility study. On site, the wells would pump groundwater before treatment and distribution. Based on the limited information analyzed as part of this report, a groundwater treatment system is assumed necessary based on nearby groundwater systems and history of groundwater quality in this area. Based on nearby systems, the water treatment system that was assumed in this report is a greensand filter that is capable of treating groundwater with heavy metals. Further investigation of the potential sites would be required prior to constructing a community water system, including a Phase II hydrogeological assessment. Additionally, in order to meet Loudoun County requirements for fire protection, seven (7) or more underground holding tanks would need to be installed throughout the community.

Based on the location of the existing community, availability of capacity at nearby systems and permitting constraints associated with new discharges, a community wastewater system with a subsurface discharge is recommended. The subsurface discharge will require land acquisition for the drainfield. Numerous sites within 2 miles of the community boundary were identified as potential drainfield sites. A desktop analysis of the geology of each site was performed and several feasible sites were identified. For the purpose of this report, a preliminary drainfield site was selected for preparing preliminary cost estimates. The wastewater collection system options for Paeonian Springs include a gravity system; a low pressure system; or a combination of the two systems. Based on the topography of the existing community, it is recommended that Paeonian Springs install a low pressure sewer system to collect sewage and convey it to a pump

station. The pump station would convey sewage through a force main to a treatment system on a preliminarily selected drainfield parcel west of Paeonian Springs. There are multiple treatment systems that are feasible for a system of this size. Once again, in order to provide a conservative cost estimate, a membrane bioreactor (MBR) is recommended. One of the main advantages of an MBR is its ability to meet low total nitrogen effluent limits, which would minimize the land area required for the nitrogen dilution area.

Preliminary cost estimates for the project, which include the well water system, water treatment and disinfection system, water distribution system, low pressure sewer collection system, interim pump station, wastewater treatment plant, drainfield, design, permitting and land acquisition is approximately $23,900,000.

# Section 1 – Project Background

## Feasibility Study Purpose

The purpose of this study is to determine the technical feasibility of potential solutions to Paeonian Springs' water and wastewater issues. The scope of this study will consider the following components:

- The existing water and wastewater systems
- Proposed conveyance systems
- Proposed treatment systems
- Land acquisition requirements
- Permitting requirements
- Capital costs and operation and maintenance costs

The information provided in this study may be utilized by the community as a basis for planning and design of a community water distribution system and sanitary sewer collection, treatment and disposal system.

## Paeonian Springs Overview

Paeonian Springs, established in 1890, is an unincorporated community in Loudoun County, Virginia. It is located at the intersection of Route 9 (Charles Town Pike) and Route 7 (Harry Byrd Highway) as shown in **Figure 1**. It is approximately five miles northwest of Leesburg and seven miles east of Purcellville. When the community was established during the late 19th century, it was a resort town for citizens trying to escape the city and suburban life of Washington, DC. Citizens would use the Washington & Ohio Railroad to travel to Paeonian Springs. Paeonian Springs' tourist attraction was its spring water. The water came from a spring house and was claimed to have medicinal value. The community began to decline in the 1920s after the Pure Food and Drug Act was passed making it difficult to claim the healthy nature of the spring water. Now, Paeonian Springs is known for its restored Victorian houses, country cottages, and open spaces. The community was listed on the National Register of Historic Places in 2006. Paeonian Springs is located in the Catoctin Creek Watershed, which is a part of the Chesapeake Bay Watershed.

Paeonian Springs currently has no public water distribution system or sanitary sewer system. The lots are served by individual wells for drinking water and individual, on-site wastewater treatment facilities such as septic systems, alternative on-site sewage (AOSS), pump and haul, and privy systems. The existing individual wells are aging (median age of 37 years) and many are too shallow and do not have proper casings. Certain wells have tested poorly for water quality and have a low pH, contributing to pipe corrosion. The average age of the on-site wastewater systems is over 35 years with a median age of 38 years for septic systems. The older section of the community is comprised of tightly grouped houses on smaller lots with parcel sizes of 0.18 to 0.25 acres. Of 216 parcels, the average size of the parcels in the community is approximately 0.7 acres. Due to the small lot sizes, age of the existing individual wastewater systems, and hydric soils in the area, there are limited options for the home owners in the event a system fails.

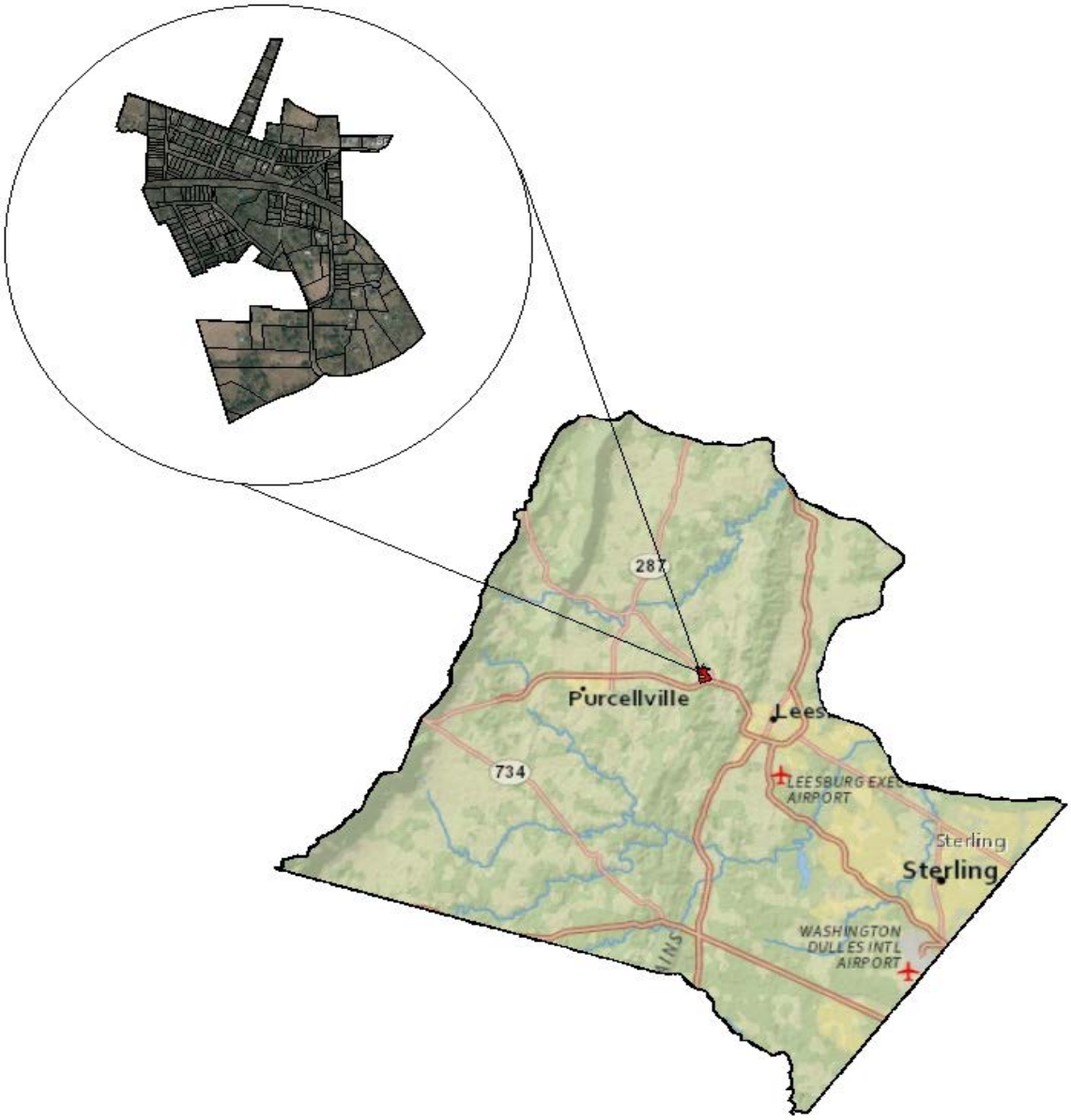


**FIGURE 1: PAEONIAN SPRINGS LOCATION MAP**

In 2017, Paeonian Springs submitted an application to the Loudoun County Community Water and Wastewater Program for assistance in addressing their current water and wastewater issues. This program, administered by Loudoun County in partnership with Loudoun Water, is designed to address water and wastewater problems in Loudoun County, Virginia. The community applied to the program as a group of homeowners and businesses as Paeonian Springs is not defined by any formal boundary and therefore does not have a defined number of parcels. The community created a boundary for the purposes of the application. The boundary includes 216 parcels with 122 of those parcels containing potentially eligible structures. Eligible structures are defined as occupied and unoccupied residences, as well as other structures that traditionally have indoor plumbing, such as churches, businesses, and community centers. 92 signatures were included with the application.

# Section 2 – Community Overview

## Existing Characteristics

Community Characteristics

Paeonian Springs is a small community with lot sizes ranging from .05 to approximately 8 acres. The community is bisected by the Washington & Old Dominion Trail, a 45-mile paved rail trail popular for cycling, running and walking among other activities. As can be seen in **Figure 1**, the majority of the parcels in the area are small and tightly grouped with lots less than 1 acre. There are over thirty (30) houses on less than .3 acres. The older section of the community has some houses dating back to the late1800s.

Topography

Paeonian Springs has generally sloping topography throughout the community. The high point of the community is approximately 676 feet above Mean Sea Level (MSL) while the low point is approximately 496 feet above MSL. Another notable low point in the community is at 504 feet above MSL. Additionally, there are two tributaries of South Fork Catoctin Creek that flow through the community. **Figure 2** shows the general topography of the boundary area.

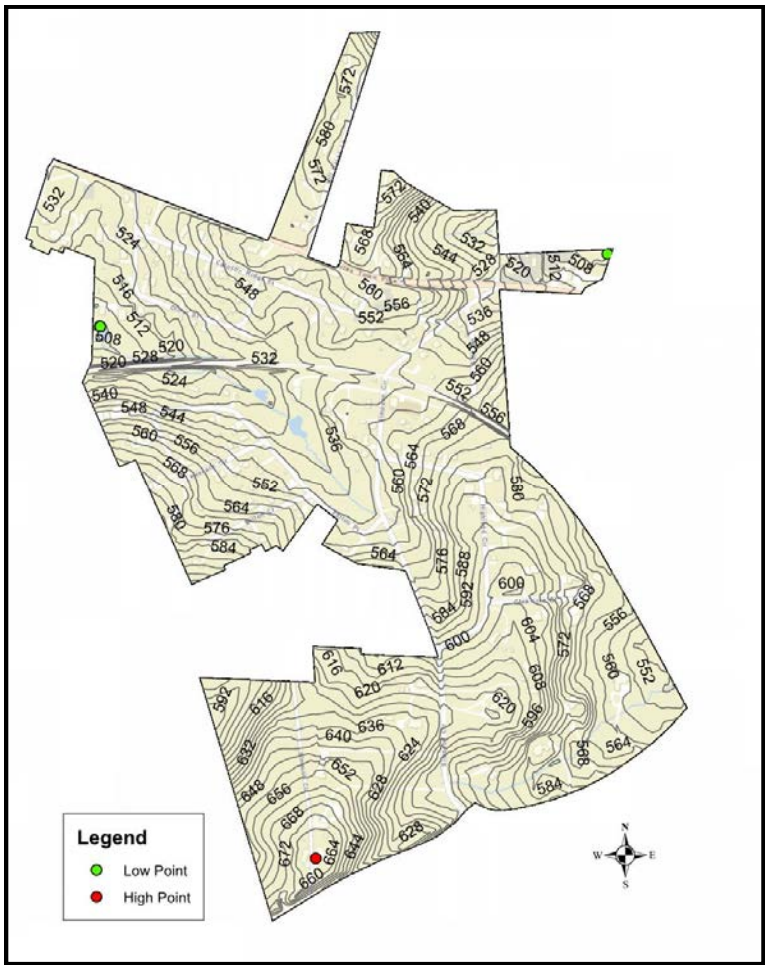


FIGURE 2: TOPOGRAPHY

## Planned Land Use and Zoning

The Loudoun County 2019 General Plan (2019 GP) places the project area within the Rural Policy Area Area (RPA) in an area designated as the Rural North and Rural Historic Village place types. The Rural North place type is planned to develop with agricultural and rural economy uses with limited residential development. The County's policies for the Rural Historic Villages are aimed at maintaining the traditional development pattern and distinguishing features of the individual villages, while accommodating opportunities for small-scale growth where appropriate to enhance existing residential and commercial areas. The policies of the 2019 GP support the construction of community water and wastewater systems in the Rural Policy Area when it would address a potential public health risks to an existing rural community. The boundaries of the Rural Historic Village Place Type for Paeonian Springs are similar to the area identified by the residents as the project area as shown in **Figure 3**.

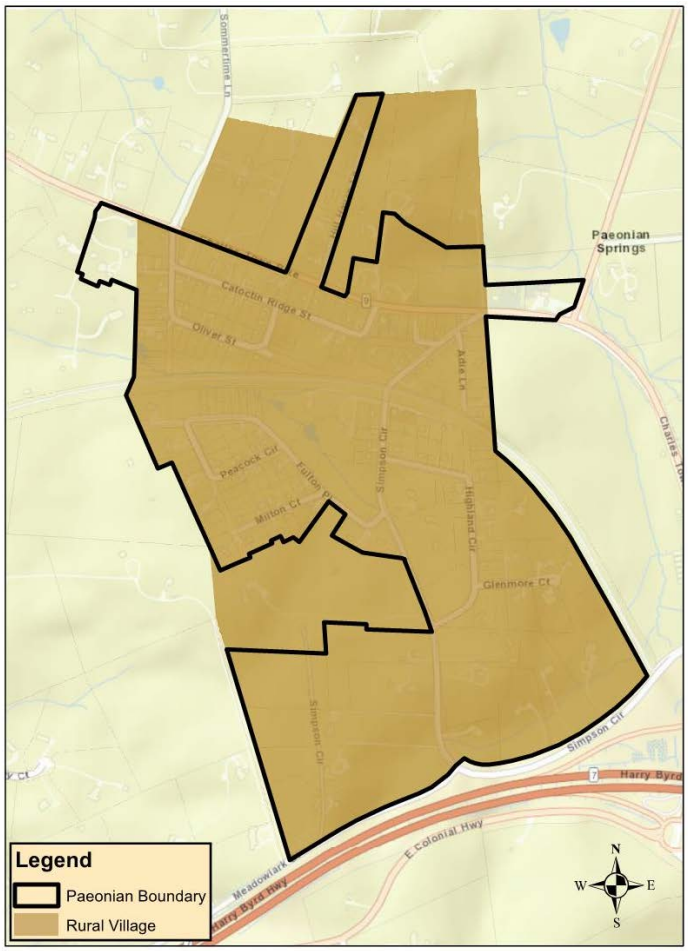


**FIGURE 3: LAND USE MAP**

Properties within the project area also governed under the provisions of the County's Revised 1993 Zoning Ordinance. The project area contains four different Zoning Districts and is also located within the Village Conservation Overlay District (VCOD) which is a County-designated zoning overlay which has additional development and site design requirements. **Figure 4** shows the VCOD and **Figure 5** shows the zoning map for the project area.

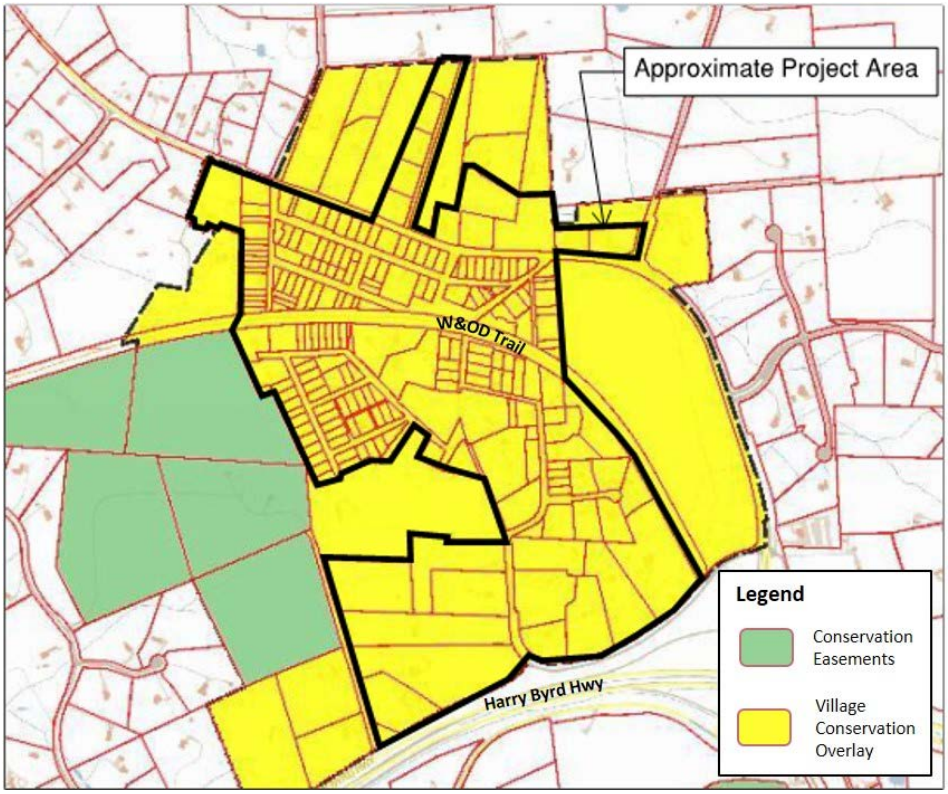


FIGURE 4: VILLAGE CONSERVATION OVERLAY DISTRICT

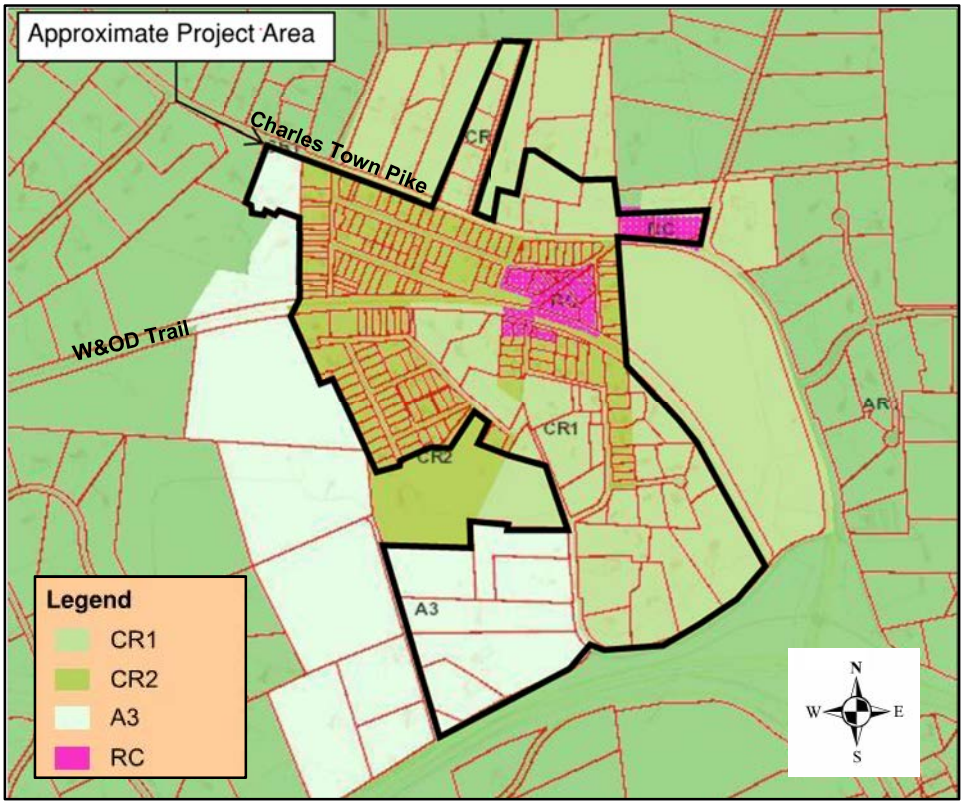


FIGURE 5: ZONING MAP

The following is a brief narrative of the applicable Zoning Districts shown in **Figure 5**.

Planning & Zoning

The project falls under four zoning areas:

- *Countryside Residential-1 (CR1)*: *CR1* describes the zoning for residential properties with a maximum density of 1 unit per acre. Residential properties with this zoning are not served by public water and sewer. They are typically in clusters or hamlets.

- *Countryside Residential-2 (CR2)*: CR2 is the zoning description for residential properties with a maximum density of 2 units per acre. At lower population densities these zoned areas can be served by on-site well and wastewater systems. The County allows higher densities when the area is served by public water and/or sewer facilities.

- *Agricultural/Residential (A3)*: A3 zoning permits agricultural and low density residential with a maximum density of one unit per 3 acres. These properties are predominantly agricultural in nature and residential can be in clusters or hamlets.

- *Rural Commercial (RC)*: RC zoning is for commercial properties in historic villages and is compatible with the scale and the character of the existing villages. The minimum lot size is typically 10,000 square feet and the structures are pulled up to street with parking in rear or on street.

It should be noted that the lots within the project area predated the current zoning ordinance. These lots typically do not meet required parcel size and density specifications and/or setbacks for potable water wells and sewerage systems. Additional coordination with the Loudoun County Department of Planning and Zoning will be required to address land use and zoning issues with the project.

**National Register of Historic Places (NRHP):** The project area encompasses portions of the Paeonian Springs National Register Historic District (NRHP ID#0600352). **Figures 6** and **7** show the project area and the boundaries of the historic district. Any proposed above ground structures will likely need to be architecturally altered to blend in with the district. Additionally, coordination with Virginia Department of Historic Resources (DHR), Virginia State Historic Preservation Officer (SHPO) and the Loudoun Preservation Society are recommended.

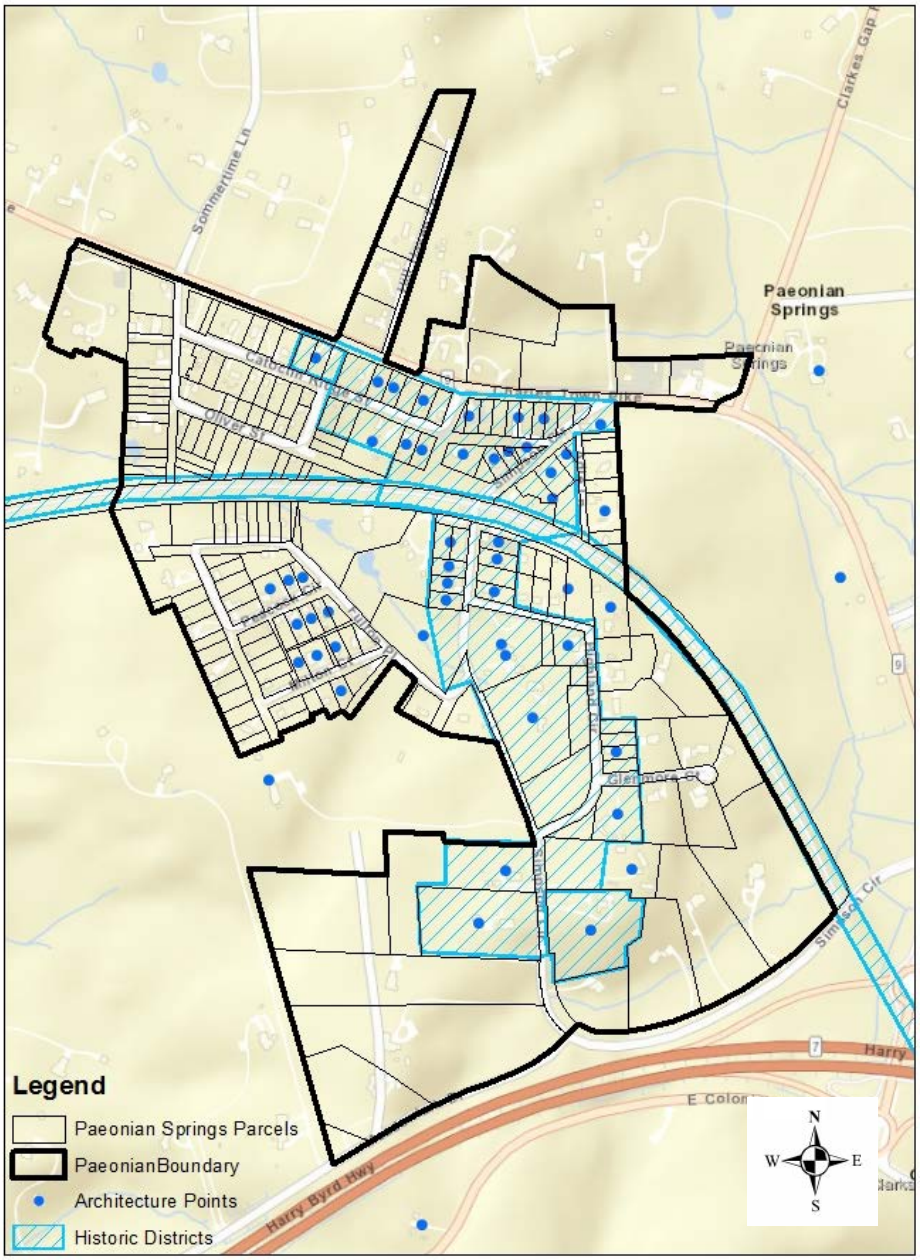


**FIGURE 6: PAEONIAN SPRINGS HISTORIC DISTRICT AND PLACES**

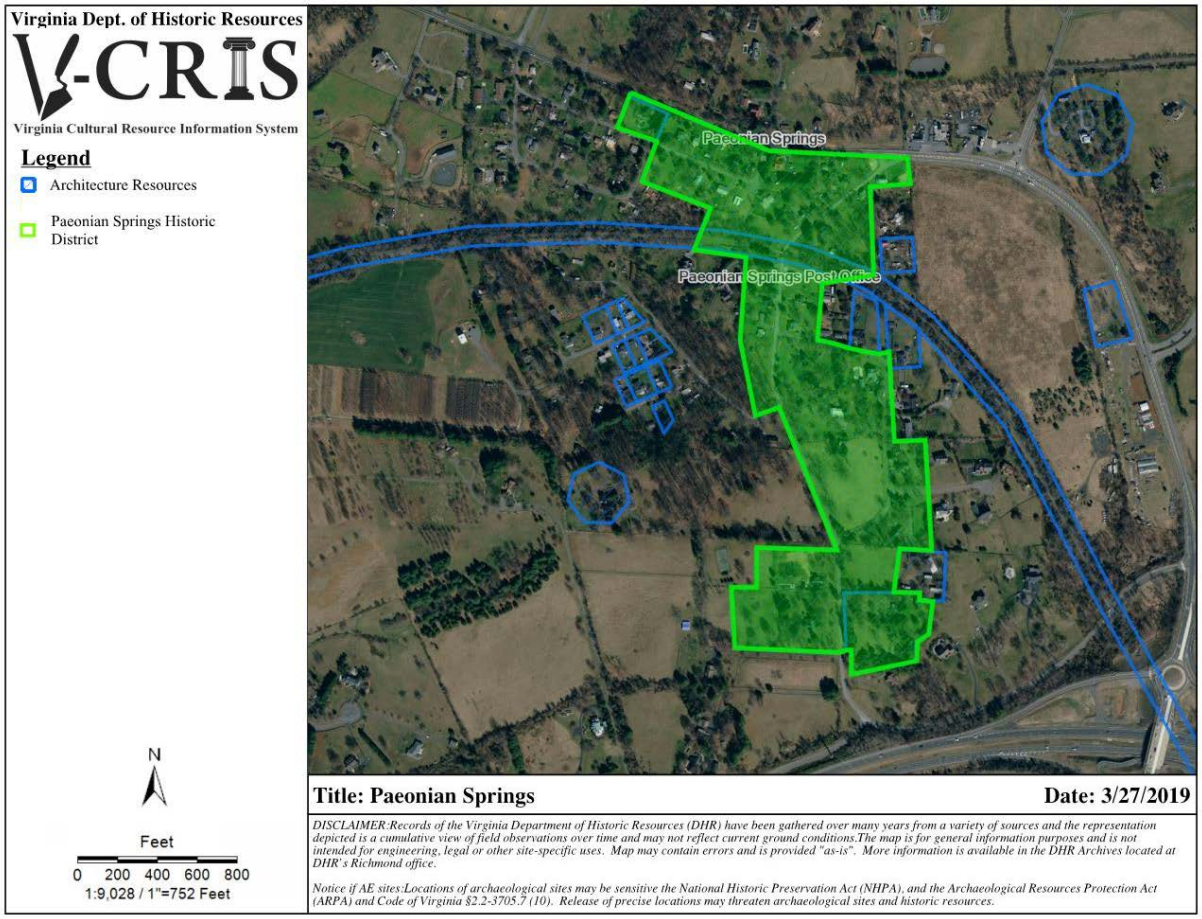


**FIGURE 7: PAEONIAN SPRINGS HISTORIC DISTRICT (NHRP #0600352 DHR #053-5072)**

**Virginia Department of Historic Resources (DHR):** Due to the fact that Paeonian Springs is listed as a National Register Historic District (DHR #053-5072), architectural and archaeological sites are also notable features of the study area. **Figure 8** shows the known architectural and archeological sites within the project area and their status. There is one DHR eligible site within the project area and one NRHP/VLR site - See **Table 1**. In design, further investigation and consideration would be required to ensure minimal disruption of these sites.

**TABLE 1: PAEONIAN SPRINGS DHR IDENTIFICATION**

| DHR ID Number | Status | Property Association |
|---|---|---|
| 053-0276 | Eligible | Washington & Old Dominion Railroad Historic District |
| 053-5072 | NRHP/VLR | Paeonian Springs Historic District |

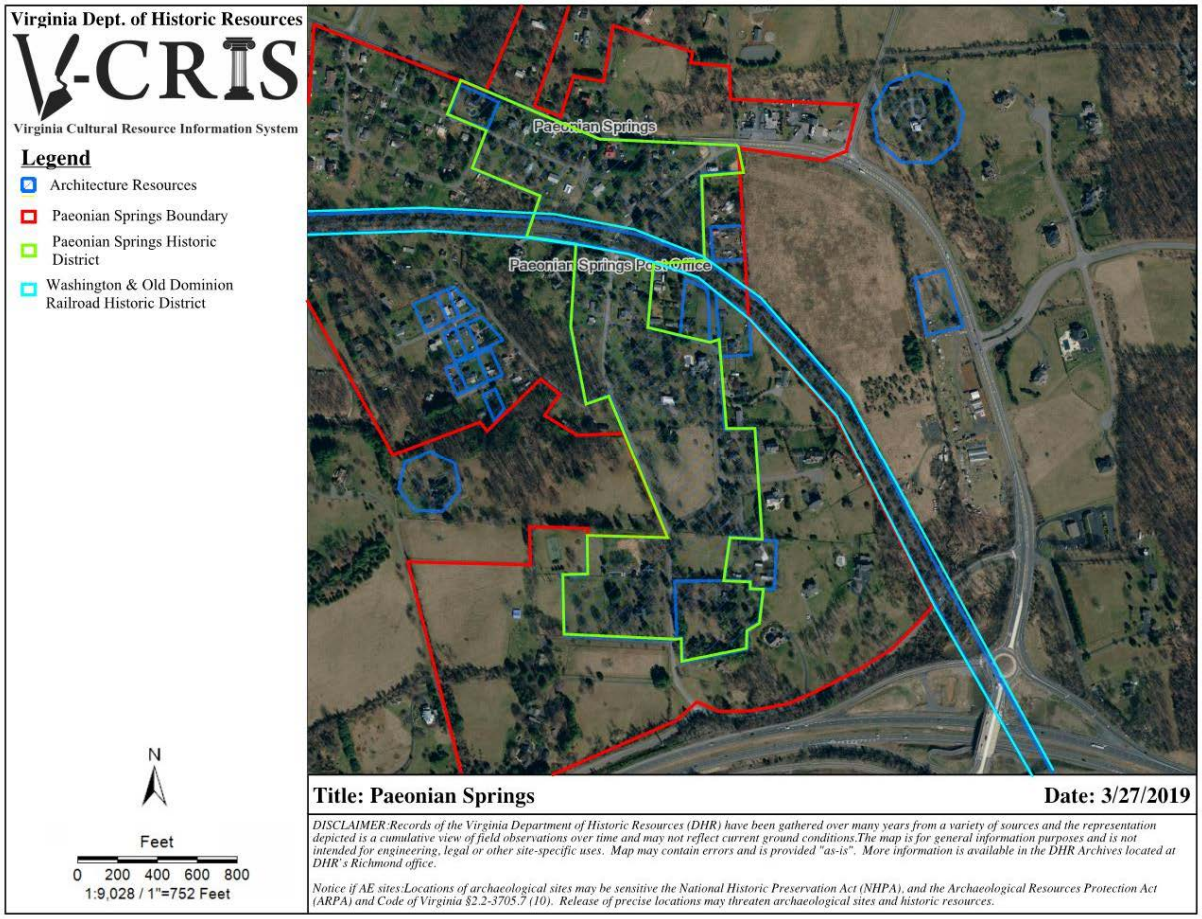


**FIGURE 8: PAEONIAN SPRINGS ARCHITECTURAL AND ARCHEOLOGICAL SITES**

**Village Conservation District and Historic District:** The project is located in the Paeonian Springs Village Conservation District. The revised 1993 Zoning Ordinance for Loudoun County states that "land within the Village Conservation District may be used as permitted in the underlying district, and subject to additional neighborhood development standards." As shown in **Figure 4**, all parcels within the project area fall in the Village Conservation District.

# Section 3 – Applicable Codes and Standards

In addition to important land zoning and related policies being considered, there are regulations for the water and wastewater system to be noted. The design, construction and operation of a public water and/or wastewater systems are subject to several regulatory requirements set forth by the state, local and federal government. This section will review applicable regulations for this project area. A summary of critical requirements is as follows:

- Loudoun Water Engineering Design Manual
- Virginia Department of Environmental Quality (VDEQ) Sewage Collection and Treatment Regulations (SCAT)
- Virginia Department of Health (VDH) (inclusive of Loudoun County Health Department)
- Chapter 1066 of the Loudoun County Codified Ordinance (LCCO)
- Chapter 1067 of the Loudoun County Codified Ordinance (LCCO)
- Sewage Handling and Disposal Regulations (SHDR) developed by the Virginia Department of Health (VDH) (12VAC5-610)
- Regulations for Alternative Onsite Sewage Systems (AOSS) developed by the Virginia Department of Health (VDH) (12VAC5-613)
- Waterworks Regulations developed by the Virginia Department of Health (VDH) (12VAC5-590)

## Loudoun Water Engineering Design Manual (EDM)

The Loudoun Water Engineering Design Manual provides detailed information regarding water and wastewater and the associated systems within Loudoun County. This manual was used in developing the general planning of the alternative layouts for the water and wastewater systems. Chapter 7 includes Community Water Systems while Chapter 8 covers Community Wastewater Systems. Both chapters were referenced in development of this feasibility study. Additionally, fire protection regulations were pulled from Chapter 7 of this manual.

## VDEQ Sewage Collection and Treatment (SCAT) Regulations

The SCAT regulations provided by the VDEQ govern the design, construction, and operation of sewage systems that serve more than one resident or a non-residential sewage source and the wastewater treatment system discharges to a surface water. For this study, regulation 9VAC25-709-460 was applicable. By SCAT regulations, these systems require:

- A preliminary engineering conference with VDEQ.
- A VPDES permit application to obtain a permit to build a new sanitary system (this may include a preliminary engineering report and drawings).
- A VDEQ permit to construct referred to as a Certificate to Construct (CTC).
- A VDEQ permit for operation referred to as a Certificate to Operate (CTO).

## Chapter 1066 of the Loudoun County Codified Ordinance (LCCO)

Chapter 1066 of the LCCO provides detailed information for the permitting, design, and maintenance of onsite sewage treatment systems utilizing subsurface disposal in Loudoun County, Virginia. This code supplements Chapter 1067 of the LCCO and is applicable to the community if the disposal method selected is a drainfield. Important requirements specific to Loudoun County are listed below:

- A permit from the Loudoun County Department of Health is required for installation, construction, and repair of onsite sewage treatment systems.
- Drainfields shall not be placed on slopes greater than 25%
- **Table 2** lists the minimum setback distances for subsurface disposal facilities

TABLE 2: MINIMUM SETBACK DISTANCES FOR SUBSURFACE FACILITIES

| Structure/Topographic Feature | Minimum Distance (ft.) |
|---|---|
| Wells (Water Sources) | 100 |
| Driveways | 5 |
| Impounded Waters | 50 |
| Streams | 50 |
| Property Lines | 10 |
| Basements | 20 |
| Top Edge of Banks and Cuts | 20 |
| Sinkholes, Perennial Sinking Streams | 100 |
| Wetlands | 50 |

## Chapter 1067 of the Loudoun County Codified Ordinance (LCCO)

The purpose of this chapter of the LCCO is to protect water quality, water supplies, and prevent the failure of non-conventional onsite sewage disposal systems in order to protect the health and safety of Loudoun County residents. The operation and maintenance requirements listed in this code are applicable if a drainfield is selected as the disposal method. These requirements are specific to Loudoun County. Some key requirements are listed below:

- Agreement approved by the County Attorney and executed by the Health Officer and property owner
- No non-conventional onsite sewage disposal system shall be permitted within a source water protection area
- Annual inspection by an individual licensed by the Virginia Department of Professional and Occupational Regulation or certified by the Virginia Department of Health
- Loudoun County Code of Ordinances, Chapter 1066 provides minimum separation distances between a drainfield and various structures.

## Sewage Handling and Disposal Regulations (SHDR)

The SHDR Regulations developed by the VDH assures that all sewage is handled and disposed of in a safe and sanitary manner. These requirements are enforced when a system utilizes a subsurface discharging treatment plant. Listed below are key provisions that may have potential impacts:

- Type III sewage disposal system (subsurface disposal) requires submission of an application, a preliminary conference with the local health department, and submission of formal plans, specifications, and design criteria are required to obtain a construction permit.
- Obtain a sewage handling permit that is issued by the commissioner. The application is directed to the district or local health department. The process includes an application, conference, initial inspection of equipment, approval of disposal site.

## Alternative Onsite Sewage Systems (AOSS)

An Alternative Onsite Sewage System (AOSS) is a treatment method that does not result in a point discharge. The Regulations for AOSS developed by the VDH establish standards for the design, operation, performance, and maintenance of alternative onsite sewage systems. Specific requirements are listed below:

- Large AOSS shall comply with a TN limit of 5 mg/l (12VAC5-613-90B)
- Site and soil characterization is required.
- AOSS permits need to be renewed every five (5) years
- The site shall not be flooded during the wet season
- TL-3 effluent treated to produce BOD5 and TSS concentrations of 10mg/l or less (12VAC5-612-10)

## Virginia Department of Health (VDH)

The Virginia Department of Health (VDH) regulates water and wastewater systems to ensure certain conditions to ensure proper treatment and safe water and wastewater resources. The following regulations are relevant to this study:

- Should a subsurface discharging treatment plant be utilized, the collection and treatment system designed will be governed by VDH.
- Large AOSS with flows greater than 10,000 gallons per day must provide effluent quality of 8 mg/l TN or demonstrate compliance with 5 mg/l within 2-ft of the point of effluent application to the soil (GMP 2013-01)
- Regulation GMP 1995-02 provides the method used to estimate the ground water nitrate concentration below mass drainfields.

## Waterworks Regulations

The waterworks regulations developed by VDH are standards to ensure distributed water is safe for drinking. It specifies necessary groundwater monitoring, quality requirements and treatment techniques. These regulations will inform the future operation and maintenance of the system.

## Site Plan & Approval Process

### Permitting

Extensive permitting will be required to install a water and/or wastewater system within the Paeonian Springs community. Permitting considerations to be made during design include:

- Environmental Permitting
- Virginia Department of Transportation Permitting
- Easement Approvals
- W&OD Trail Permitting

Special considerations and permit/approval processes will be required due to the work which could potentially be performed in the vicinity of the W&OD Trail as well as Route 9.

### Commission Permit

The Loudoun County Zoning Ordinance requires that any public utility must have the general or approximate location, character, and extent approved by the Planning Commission as being substantially in accord with the adopted comprehensive plan before the public facility can be constructed or established. Since this project would provide a public utility where one does not currently exist, a Commission Permit process would be required.

The Commission Permit process is a six (6) to nine (9) month legislative approval process that requires Loudoun County staff review, a Planning Commission public hearing, and ratification by the Board of Supervisors. Loudoun County staff will review the application and provide a recommendation to the Planning Commission for granting the Commission Permit. In a meeting with the Planning Department staff in July, 2019, staff expressed concern with the limits of the study boundary and stated that a major consideration in evaluation of the Commission Permit is “public health need”. This study evaluated potential solutions to service all properties within the community defined boundary. Due to this, it should be noted that County staff referral comments may have disagreement in what constitutes “public health need” and the service area boundaries based on the guidance of the Loudoun County 2019 General Plan.

This study does not pose alternative solutions to address potential revisions to the community boundary. If the applicant does not wish to amend the boundary based on potential staff referral comments, this may result in staff not supporting the Commission Permit.

The Planning Commission has the purview to approve a Commission Permit even with a Staff recommendation of denial. Furthermore, the Board of Supervisors may ratify the Planning Commission's decision or overrule the Commission by a majority vote. The staff recommendation is only that, a recommendation, but it is Dewberry's opinion that the Community and its advocates will need to be able to strongly justify the rationale for the proposed community boundary to avoid challenges during the legislative process.

### Historic District Considerations & Challenges

Due to the historic nature of this community, further analysis of potential architectural and archaeological sites will be required. These investigations, to be performed with design, may dictate some design parameters and will require additional permitting and approvals. It is recommended that a pre-submission meeting with Loudoun County occur during preliminary design phases to understand the impacts on the Historic District.

# Section 4 – Current & Potential Demand/Flows

Current and potential flows for both water demand and wastewater generation are necessary to properly size each system. This section first presents the current and potential demand for the Paeonian Springs water system followed by the current and potential sewage flows for the wastewater system.

## Water: Estimated Current and Potential Demands

Virginia Department of Health standards were referenced for flow regulations. **Table 3** provides the VDH Capacity of Waterworks regulations for daily water consumption rates that are to be used in calculating the estimated demand for Paeonian Springs.

**TABLE 3: WATER DEMAND ESTIMATES**

| Facility | Units | Demand (gpd) |
|---|---|---|
| Residential | Per Dwelling | 300 |
| Gas/Service Station | Per Vehicle | 10 |
| Restaurants | Per Seat | 50 |
| Commercial/Office Space | Per 1,000 Sq. Ft. | 200 |

### Current Development

Paeonian Springs currently has 122 occupied parcels with structures greater than 120 sq. ft. The current demand eliminates vacant parcels as well as structures that do not require water service (i.e. sheds). The current assumed water demand of Paeonian Springs is shown in **Table 4** below.

**TABLE 4: CURRENT WATER DEMANDS**

| Current Development | | | | |
|---|---|---|---|---|
| | Quantity | Demand | Unit | Estimated Flow (gpd) |
| Eligible Structures | | | | |
| Residential Parcels | 115 | 300 | gpd/dwelling | 34,500 |
| Restaurant/Market | 1 | 50 | gpd/seat | 1,000 |
| Commercial | 10,410 | 200 | gpd/1000 sq. ft. | 2,082 |
| Gas Station | 500 | 10 | gpd/vehicle | 5,000 |
| Total | | | | 42,600 (29.6 gpm) |

[1]Contributing demands were taken from 12VAC5-590-690

### Potential Demand

The potential water demand assumes all parcels are occupied and require water service as shown in **Table 5**. For the determination of future water demands, the most conservative approach was taken, assuming all 216 parcels within the Paeonian Springs Community are developed. Due to the current design layout, existing structures and community zoning, this approach is highly conservative.

**TABLE 5: FUTURE WATER DEMANDS**

| Potential Future Demand | | | | |
|---|---|---|---|---|
| | **Quantity** | **Demand** | **Unit** | **Estimated Flow (gpd)** |
| **Potential Eligible Structures** | | | | |
| Residential Parcels | 209 | 300 | gpd/dwelling | 62,700 |
| Restaurant/Market | 20 | 50 | gpd/seat | 1,000 |
| Commercial | 10,410 | 200 | gpd/1,000sq. ft. | 2,082 |
| Gas Station | 500 | 10 | gpd/vehicle | 5,000 |
| Total | | | | 70,800 (49.2 gpm) |

[1]Contributing demands were taken from 12VAC5-590-690

Assuming a peak factor of 2, the peak flow can be estimated for the current and potential future demand as 59 gpm and 98 gpm respectively.

However, there are several additional requirements that need to be met when determining the required quantity of water to serve the community. These requirements are as follows:

- Loudoun Water – 1.2 gpm per connection
- Loudoun County – 1.0 gpm per connection
- Virginia Water Works Regulations – 0.5 gpm per connection

The most conservative estimate for the required quantity of water for the Paeonian Springs community based on Loudoun Water requirements of 1.2 gpm/connection. Therefore, the existing and potential future demand for the water system would be 146 gpm and 259 gpm, respectively, equivalent to 210,000 gpd and 372,000 gpd, respectively (122 connections or 216 connections).

## Wastewater: Estimated Current and Potential Sewage Flows

For the collection, treatment, and disposal system for the community, a flow estimate was then performed. The flow estimates are based upon different factors such as current and potential future population, current and future land use and densities, and current and future commercial/industrial uses. **Table 6** provides the Sewage Collection and Treatment (SCAT) regulations for sewage flow estimates that are to be used in calculating the flow estimates for Paeonian Springs.

**TABLE 6: CONTRIBUTING SEWAGE FLOW ESTIMATES**

| Discharge Facility | Units | Flow (gpd) |
|---|---|---|
| Residential | Per Dwelling | 300 |
| Gas/Service Station | Per Vehicle | 10 |
| Restaurants | Per Seat | 50 |
| Commercial/Office Space | | The greater of 0.16 gpd/sq. ft. OR 30 person per acre |

In determining the potential parcels, the unique characteristics of Paeonian Springs zoning were taken into account. According to Loudoun County General Plans, Paeonian Springs is a Rural Historic Village. This characterization means the County limits growth in and around this area. New residential and non-residential development is limited to uses that are compatible with the existing structure and development patterns. Additionally, the County will only allow compatible development to occur within villages that have adequate public facilities.

Looking forward in the Draft Loudoun Comprehensive Plan (version date: June 20, 2019), the County's approach for rural villages is to limit new residential, business, and commercial activities to uses that are

compatible with the historic development patterns, community character, and visual identity of the individual villages. New development is intended to preserve open space and maintain the character of rural areas.

Due to the unique characteristics of the zoning of Paeonian Springs, a substantial increase in density is not expected within the community. Therefore, two scenarios were considered to determine the amount of land required to hold a wastewater treatment facility, drainfield, reserve drainfield, and nitrogen dilution area. A description of each scenario is written below:

### Current Development

Scenario 1 assumes that 122 parcels connect to the sanitary sewer system. The current development case only includes parcels that have structures greater than 120 sq. ft. This scenario eliminates vacant parcels (those with no structure) and parcels that contain sheds and other small buildings not in need of a sewage connection. **Table 7** provides the flow estimate for the current development.

**TABLE 7: CURRENT SEWAGE FLOWS**

| Current Development | | | | |
|---|---|---|---|---|
| | **Quantity** | **Demand** | **Unit** | **Estimated Flow (gpd)** |
| **Eligible Structures** | | | | |
| Residential Parcels | 115 | 300 | gpd/dwelling | 34,500 |
| Restaurant/Market | 20 | 50 | gpd/seat | 1,000 |
| Commercial | 10,406 | 0.16 | gpd/sq. ft. | 1,665 |
| Gas Station | 500 | 10 | gpd/vehicle | 5,000 |
| Total | | | | 42,165 |

[1]Contributing sewage flow demands were taken from the SCAT regulations

### Potential Flows

Scenario 2 assumes that all parcels are occupied and connect to the system.

VDEQ assumes that a typical household has an estimated flow of 300 to 350 gallons per day (gpd), or 100 gpd per person. A conservative flow of 300 gpd per occupied parcel (Scenario 1) and total parcels (Scenario 2) was used. Although this is not the most conservative flow per VDEQ regulations, this is a conservative flow for the Paeonian Springs area. The actual number of occupants per building within the study area is assumed to be three (3) or less. **Table 8** provides the flow estimate for the potential future flows.

**TABLE 8: FUTURE SEWAGE FLOWS**

| Potential Future Flows | | | | |
|---|---|---|---|---|
| | **Quantity** | **Demand** | **Unit** | **Estimated Flow (gpd)** |
| **Eligible Structures** | | | | |
| Residential Parcels | 209 | 300 | gpd/dwelling | 62,700 |
| Restaurant/Market | 20 | 50 | gpd/seat | 1,000 |
| Commercial | 10,406 | 0.16 | gpd/sq. ft. | 1,665 |
| Gas Station | 500 | 10 | gpd/vehicle | 5,000 |
| Total | | | | 70,365 |

[1]Contributing sewage flow demands were taken from the SCAT regulations

The projected flow calculations are conservative, assuming all 216 parcels will connect to the community system. It is possible that not all 216 parcels will connect. There are parcels within the Paeonian Springs study area with functioning septic systems and others within the community that have adequate land area to install a new septic system if necessary. Varied topography within the Paeonian Springs Community may

pose challenges for new septic systems, where necessary, alternative approaches can be utilized to overcome these challenges, such as fill systems in accordance with 12VAC5-610-597.

A technical memorandum was developed that outlined potential flows for the community and is included as **Appendix A**. This memorandum was developed in order to preliminarily size a potential drainfield. Based on the aforementioned document, the estimated potential future flow is 70,365 gpd with a peak flow of 175,912 gpd (utilizing a 2.5 peaking factor).

## Water Demand and Sewer Flow Summary

As outlined above, two scenarios have been analyzed for both the water and sewer systems. Scenario 1 was utilizing the current development of the community, while scenario 2 assumed all parcels within the community. A summary of the demand and flows from these scenarios are shown in **Table 9** below:

**TABLE 9: DEMAND/FLOW SUMMARY**

| | Water Demand | Sewage Flow[1] |
|---|---|---|
| Scenario 1: Existing Development | 210,000 GPD | 42,165 GPD |
| Scenario 2: Potential Future Flows | 372,000 GPD | 70,365 GPD |

[1]- Sewage flows are represented as average daily flow.

It is good practice to design the collection and distribution systems for the community recognizing the potential need to serve the entire community and all its parcels. However, the well system, water treatment system and wastewater treatment system can be designed and constructed in phases to accommodate existing development initially and then additional connections should the need arise. In addition, peaking factors will need to be included in the design of the wastewater system. Typical peaking factors for a community of this size could range from 2.0 to 4.0. Peaking factor selection will be made during design. Subsequent sections of this report assume construction of the sewer collection and water conveyance systems, and land acquisition to serve all parcels. The treatment (water and sewer) capacity will assume construction to meet the needs of the community as it currently exists.

# Section 5 – Water System Evaluation

## Preliminary Existing System Analysis

Review of Existing Data and Hydrological Reports

The Paeonian Springs community has 164 wells according to GIS data. Of these wells, 20 are classified as abandoned. **Figure 9** below shows the wells and abandoned wells which were obtained from the Loudoun County GIS data.

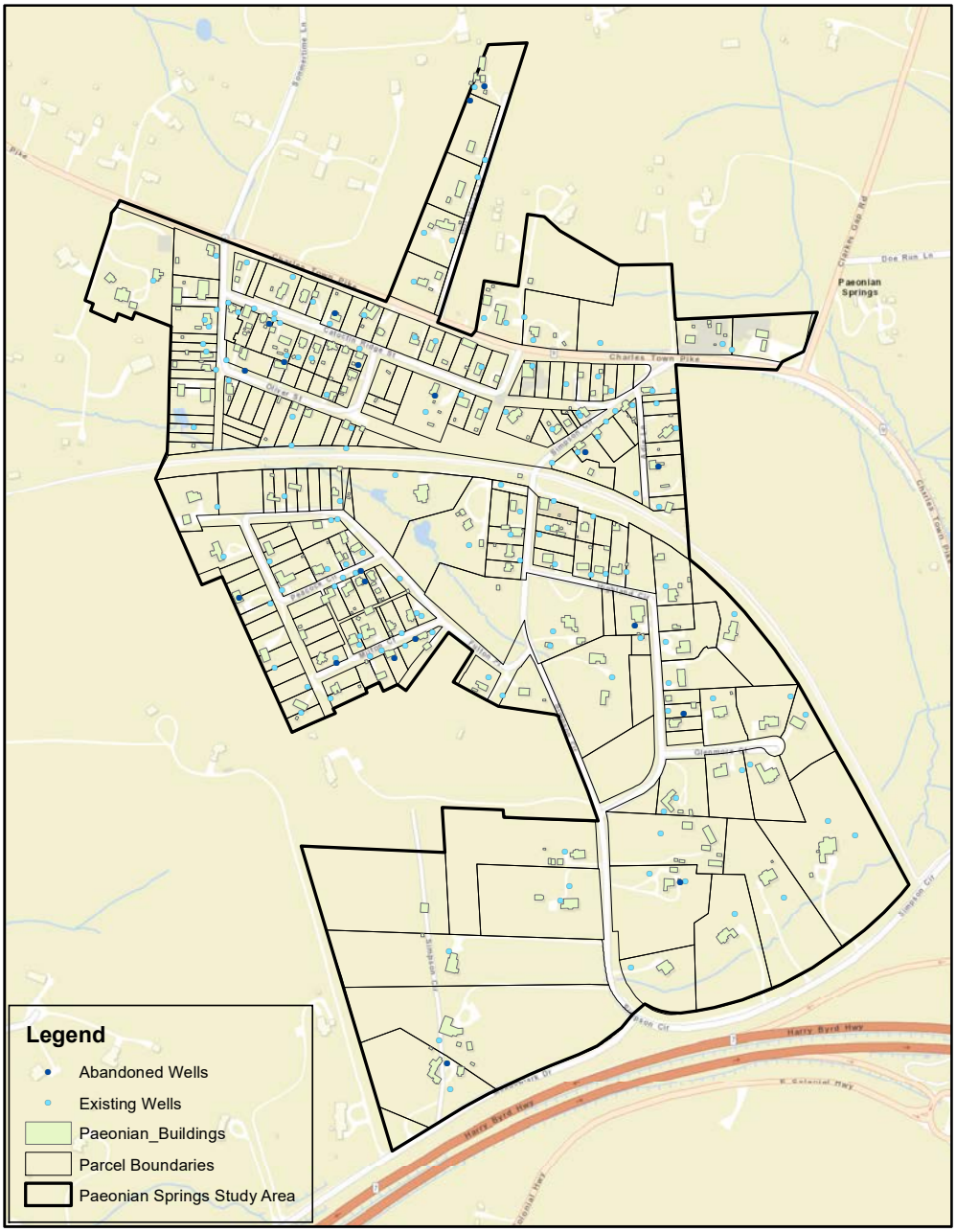


FIGURE 9: PAEONIAN WELLS

According to the community application, within Paeonian Springs, one (1) house has no running water, three (3) houses are without a source of water (one (1) without a well, two (2) with wells on adjacent parcels) and thirty-eight (38) have documentation from the Loudoun County Health Department regarding inadequate well construction, quality, or quantity. The relevant Loudoun County Health Department documents are included in the Paeonian Springs Project Assistance Application, which is included as **Attachment 4** to **Appendix A** (Soil Investigation Technical Memorandum) to this report. The median age of wells is 37 years and over 30 wells are more than 50 years old as detailed in the community application. Furthermore, according to the application and the Health Department records, wells have tested low in pH, causing pipe corrosion, and poorly for water quality, leading to recommendations from the Health Department for chlorination.

### Review of Health Department Records

In reviewing existing community information, Dewberry and Loudoun Water conducted a meeting with Loudoun County Health Department (LCHD), local representatives of the Virginia Department of Health (VDH). From this meeting, it was understood that substandard systems can be considered fairly common within the Paeonian Springs Community.

Following discussion with LCHD, Dewberry conducted research through VDH's open-information online database, Online Responsible Management Entity (RME). The online database includes all records of well and sewer system applications, inspections and results. Per discussion with VDH, systems within the community do not undergo routine inspections, instead, inspections are performed following a complaint or prior to real-estate transfer.

As previously stated, the median age of water wells is 37 years and most wells are currently functional. In the past, the major issue for wells has been water quality issues such as the presence of *Escherichia coli*, fecal coliform, other forms of coliforms and sediment. The major issue for most current wells is that they do not meet current construction standards, such as setback standards. Some parcels do not have water wells on their property but share from wells on adjacent parcels. There is one vacant parcel with no source of water. Currently, numerous wells within the community do not meet current water quality standards, construction and connection standards and multiple wells will need to be upgraded to provide safe drinking water to those residents. At least thirty-six (36) wells are not in compliance with VDH standards, four (4) parcels have no water source and one (1) has no running water.

Furthermore, it should be noted that these numbers do not necessarily reflect the full extent of existing community well conditions. Records of some parcels are non-existent and due to the lack of routine inspection, some wells could have become non-compliant since last inspection. The information is not comprehensive as older wells do not have records, setback concerns are not necessarily addressed in reports, and construction standards may not be met.

## Water Treatment & Distribution

As mentioned, the existing community relies on individual wells for potable water. Following review of the existing community conditions, several alternatives were considered for the community including:

- Alternative #1 - Continued use of existing wells
- Alternative #2 - New Communal Groundwater Well and Treatment
- Alternative #3 - Connection to Nearby Systems

The following sections of this report detail each of these alternatives.

### Alternative #1 - Continued Use of Existing Wells

Continued use of the wells may be an alternative for some existing homes within the community. Based on record research through the Online RME system, several of the wells have a history of deficiencies that will need to be addressed. In addition, discussions with the Health Department have indicated that

groundwater in portions of this community may not meet minimum standards for quality. The feasibility of installing new wells for existing portions of the community cannot be determined at this stage of the study.

This alternative would include repair and rehabilitation of the existing wells within the community, construction of new wells for non-compliant wells, or upgrades to wells that currently have deficiencies and/or poor quality.

Alternative #2 - Community Water Treatment Alternatives

The next alternative would be construction of a community well system and associated treatment system for the entire community. The wells would pump groundwater to a treatment facility that would be designed to treat the raw groundwater to required standards prior to distribution. This alternative would require a conveyance system be installed to distribute water from the treatment facility to the individual homes.

Each community well will need to be tested for Total Coliforms per the Virginia Waterworks Regulations. The Virginia Water Works Regulations require a calculation of the geometric mean of 20 bacteriological tests which must yield a multiple-portion decimal-dilution (MPN) of three (3) or fewer, otherwise, treatment for the well is required. The well will also need to be tested for pH, turbidity, iron, and other water contaminants. The water treatment technology will depend on the water quality of the well. **Table 10** shows the Maximum Contaminant Level (MCL) and Maximum Contaminant Level Goal (MCLG) for different water quality measurements:

**TABLE 10: DRINKING WATER STANDARDS[1]**

| Water Quality Measurement | MCL | MCLG |
|---|---|---|
| Total Coliform Bacteria | Cannot be detected in more than one monthly sample | 0 |
| E. Coli Bacteria | Routine sample and repeat sample are Total Coliform positive, and E. Coli Positive | 0 |
| Turbidity | Conventional or Direct Filtration<br>Cannot have levels over 1 NTU. Samples must be less than or equal to 0.3 NTUs in at least 95% of the samples in a month.<br><br>Filtration Other Than Conventional or Direct<br>Cannot exceed 5 NTUs. | 0 |
| Copper | 1.3 ppm | 0 |
| Lead | 15 ppm | 0 |
| Cryptosporidium | TT | 0 |
| Giardia lamblia | TT | 0 |
| Arsenic | 0.010 mg/L | 0 |
| Nitrate | 10 | 10 |

1-National Primary Drinking Water Regulations (EPA)

If groundwater from the wells require treatment, the Virginia Waterworks Regulations require that the groundwater under the direct influence of surface water be treated by conventional or direct filtration, slow sand filters, diatomaceous earth (DE) filters, or alternative filtration technology depending on the type of treatment required. Applying granular filtration will only remove turbidity and suspended solids. It will not remove any harmful bacteria. Alternative filtration, such as membrane filters, are able to remove harmful bacteria in the water. Three applicable drinking water treatment technologies are described below:

Microfiltration Membranes: Microfiltration uses semi-permeable membranes with small pores. The membrane filters remove bacteria, Giardia, and Cryptosporidium which reduce the chlorine dosage necessary for disinfection. They are not effective in removing dissolved contaminates.

Greensand Filtration: These filters are made from glauconite greensand which has a special coating of manganese oxide. The manganese oxide oxidizes iron and manganese in the water as it comes into contact

with the filter media. As the water flows through the greensand filter, these elements form solids that are filtered out of the water. These filters are capable of removing dissolved solids but are unable to remove bacteria.

Activated Carbon Filters: Activated Carbon Filters are effective for removing heavy metals such as copper, lead, and mercury. Water flows through the active carbon filters, which are typically made of coconut shells, wood, or coal. The chemicals adsorb to the carbon. Activated carbon filters are capable of removing organic contaminates. They are not able to remove dissolved solids, coliform, bacteria, lead, and arsenic.

At a minimum, it is recommended that the well include chlorine disinfection even if the well has suitable water quality and meets the Virginia Waterworks Regulations. Based on nearby community systems (Beacon Hill), it is assumed that a greensand filtration system will be required to treat for solids and heavy metals.

As part of this study, Emery & Garrett Groundwater Investigations developed groundwater identification report. Emery & Garrett Groundwater Investigations performed a desktop analysis of the soils and groundwater hydrology in and around the community to identify potential areas where the community could locate a community well (Phase I). The full report provided by Emery & Garrett is included in this report as **Appendix B**.

To determine how much groundwater will be needed for Paeonian Springs, the most stringent groundwater capacity guidelines were followed. The groundwater well for the community will need to develop 1.2 gpm per residential connection (259 gpm) per Loudoun Water regulations.

It is estimated that Paeonian Springs has a groundwater recharge value of 10-inches per year, providing a minimum capacity of approximately 133,550 gpd (93 gpm) based on the 179 acre Paeonian Springs project site. This recharge value is less than the required 259 gpm per the Loudoun Water regulations. Therefore, Emery & Garrett developed a 1,000-ft-buffer area to obtain additional recharge value in order to meet the demand requirements. The buffer is needed to ensure the conservative flow requirements can be met. The buffer does not impact the community or the feasibility study.

Due to the lack of open land within the project area and the higher density of residences, a buffer around the community boundary was created in order to maximize chances of successfully developing high yielding groundwater sources (wells). Additionally, the buffer acts to provide potential production wells with greater additional groundwater recharge. Insufficient recharge is available within the Paeonian Springs boundary to support the full development of the required 259 gpm of groundwater supply capacity. Emery & Garrett identified five (5) potential sites for groundwater development zones, shown in **Figure 10.**

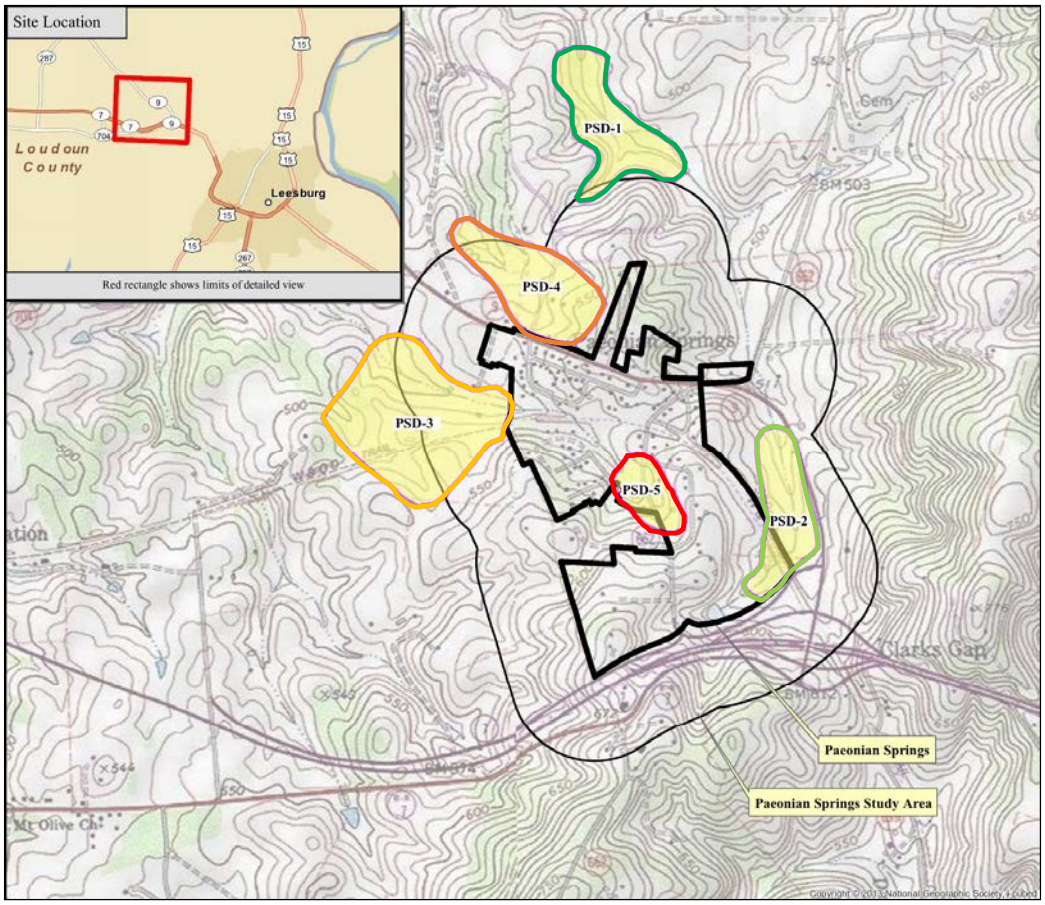


**FIGURE 10: EMERY & GARRETT RECOMMENDED SITES**

These sites were ranked according to their overall hydrogeological favorability illustrated in **Figure 11**.

**FIGURE 11: SITE RANKING**

All power spectral density (PSD) sites are zoned as Countryside Residential and/or Agricultural Rural. The Countryside Residential zoning is low density residential areas with a variety of uses, allowing for residential as well as agricultural use. Agricultural rural zoning allows for rural economy uses such as agriculture, horticulture and animal husbandry. Each site is adjacent or overlapping existing buildings within the area. The number of parcels each site overlaps as well as other considerations are summarized in **Table 11** below.

**TABLE 11: SITE CONSIDERATIONS**

| Site | Zoning | No. of Overlapping Parcels | Other Considerations |
|---|---|---|---|
| **PSD-1** | AR-1, CR-1 | 11 | N/A |
| **PSD-2** | CR-1 | 3 | Adjacent to Major Thoroughfare, Rte 9 |
| **PSD-3** | AR-1 | 9 | Overlaps W&OD Trail |
| **PSD-4** | AR-1,CR-1 | 12 | Adjacent to Rte 9, Crosses Local Road |
| **PSD-5** | CR-1,CR-2 | 6 | Crosses Local Roads |

For the purpose of this feasibility study, it will be assumed that PSD-1 will be used as the site for the community well system – See **Figure 12**. It was chosen due to its hydrogeological favorability, the limited number of existing structures immediately within the area and its setback from major roads. Further study of all potential well sites will be required in design phase.

Per Loudoun Water's Engineering Design Manual Chapter 7.2.J.7, a minimum of three (3) community wells are required (**Figure 12**). Furthermore, for the purposes of this study, all three wells will be assumed to be placed on the PSD-1 site. Two (2) wells will act as the primary sources of water with a third well for redundancy. Further hydrogeological testing will be required to ensure that the wells are all independent of one another. If it is determined that the wells are not independent, alternative well sites will be required.

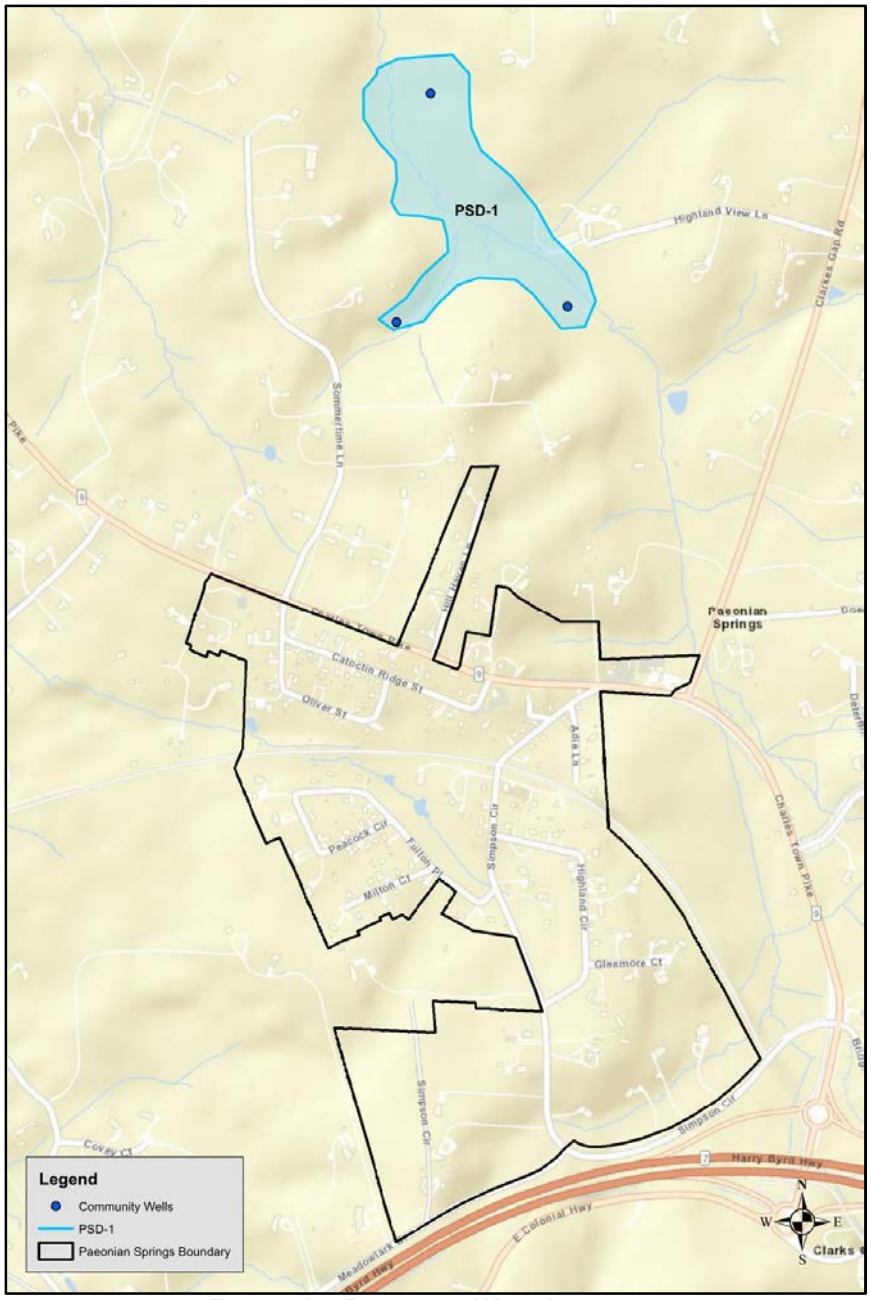


FIGURE 12: POTENTIAL WELL LOCATION

Alternative #3 – Connection to Nearby Utility (or Community System)

Paeonian Springs could be provided water from a nearby utility or community system with sufficient capacity to serve its residents. There are several potential connection points that should be considered. These connections include:

- Beacon Hill
- Raspberry/Selma Estates
- Town of Leesburg
- Hamilton

Locations of these service areas are shown on **Figure 13** below.

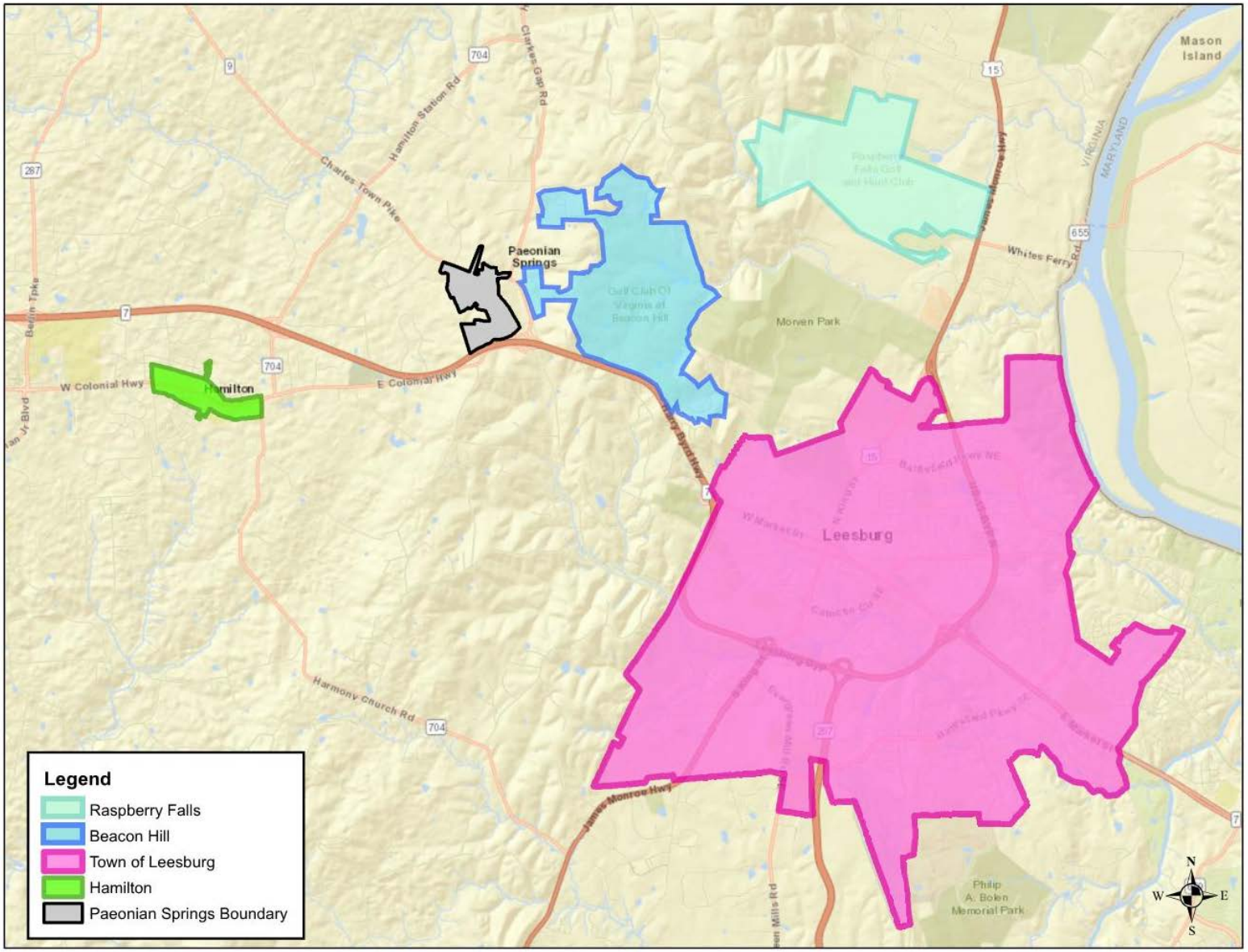


FIGURE 13: POTENTIAL NEIGHBORING WATER SYSTEM CONNECTIONS

Connection to these systems would require sufficient well and treatment capacity to serve Paeonian Springs. Additionally, a water main would need to be installed to convey potable water to the community. Based on preliminary discussions with Loudoun Water, both existing community systems (Raspberry and Beacon Hill) do not have spare capacity (well or treatment) to serve the Paeonian Springs community. In addition, while technically feasible, connection to the Town of Leesburg would require an extensive water main and supplemental support appurtenances. Furthermore, connection to the Town of Leesburg would require construction of a new water main through existing developments and along a major thoroughfare, Harry Byrd Hwy (Route 7). It should be noted that since this community is located in the rural policy area (RPA), approvals through the Board of Supervisors would be required for any of these nearby connections.

Water System Recommendation

In order to recommend a water system, a simple alternative matrix was developed to better present the water alternatives and recommendation criteria. The alternatives were considered based on six (6) criteria:

- Constructability
- Public Impacts
- Costs
- Approvals/Acceptance
- Environmental Impacts
- Operations & Maintenance

Each alternative was given a rating of one (1) to five (5), with the larger number being more favorable as shown in **Table 12** and full analysis of the water system is shown in **Table 13**.

**TABLE 12: SCORING BREAKDOWN**

| Rating Score | |
|---|---|
| 5 | Very Good |
| 4 | Good |
| 3 | Fair |
| 2 | Poor |
| 1 | Very Poor |
| **Note:** Higher Score Equals | |

Of the alternatives outlined above, the most feasible alternative for water treatment is the construction of a community well and treatment system to provide potable water to the Paeonian Springs community (Alternative #2).

### TABLE 13: PAEONIAN SPRINGS WATER ALTERNATIVES

| Paeonian Springs Water Alternatives | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Alternative Number** | **Constructability** | **Public Impacts** | **Costs** | **Approval/Acceptance** | **Environmental Impacts** | **Operations & Maintenance** | **Average Score** |
| **Alternative #1 Continued Use of Existing Systems** | Community may have issues with new well construction based on parcel sizes and setback requirements. | Continued use of existing systems may not address issues with poor well quality or connection. Could cause public health hazard | Upgrade of existing systems would have lower initial capital costs. Long term O&M costs would be the responsibility of the property owner. | Existing wells may need to be repaired or replaced. No need for additional land acquisition. Minor permitting approvals. | No new or additional environmental impacts. | Continued homeowner O&M. Yearly inspections and upkeep. | **2.3** |
| **Raw Score** | **1** | **1** | **3** | **3** | **4** | **2** | |
| **Alternative #2 New Communal Groundwater Well & Treatment** | Requires road work and restoration. Special consideration for crossing W&OD trail. | Public impacts during construction. Greatly reduce risk of ongoing public health impacts due to communal system. | High initial capital costs and connection fees. | Easements and land acquisitions necessary for well/treatment facility and distribution system. | Potential tributary impacts with seasonal streams for distribution piping. | New community system that will need O&M in accordance with VDH requirements. Ongoing water fees. | **2.8** |
| **Raw Score** | **3** | **4** | **2** | **2** | **3** | **3** | |
| **Alternative #3 Connection to Nearby Utility (or Community System)** | Requires road work and restoration. Special consideration for crossing W&OD trail. Significant impacts due to extended water main in rural policy area. | Public impacts during construction. Greatly reduce risk of ongoing public health impacts due to connection to nearby system. | Highest initial capital costs and connection fees. | Board of Supervisors approval required. Easement and land acquisitions most likely necessary. | Potential tributary impacts with seasonal streams for distribution piping. | No additional treatment facility for maintenance. Ongoing water fees for residents. | **2.5** |
| **Raw Score** | **2** | **4** | **1** | **1** | **3** | **4** | |

Alternative #2 was deemed the most feasible. Prior to design, additional study is recommended. Since the treatment and conveyance systems depend on the well yield, location and quality, a phase II hydrogeological assessment is recommended. This will include conducting geophysical surveys within the potential groundwater development zones to identify specific locations for drilling exploratory test wells. Permission will need to be obtained from the private landowners with emphasis on gaining property access for the higher ranked sites (PSD-1, PSD-2, PSD-3). Phase II must be completed before any potential test wells that could serve the Paeonian Springs community can be identified.

It should be noted that Phase III, Phase IV, Phase V, and Phase VI assessments will be required to locate the community wells and obtain State and County approval for the community wells. Once the wells have been located, the water quality will need to be tested to determine the level of treatment required.

A summary of the phases are provided in **Table 14:**

**TABLE 14: HYDROGEOLOGIC SITE ASSESSMENT PHASES**

| | |
|---|---|
| **Phase I (Completed)** | Identification of potential sites for groundwater development. |
| **Phase II** | Geophysical surveys within the potential groundwater development zones. Identification of locations for drilling exploratory test wells. |
| **Phase III** | Drilling of selected test wells. Estimate of yield and water quality. |
| **Phase IV** | Production wells will be established from sufficient test wells in Phase II |
| **Phase V** | 48-72 hour pumping test for each production well |
| **Phase VI** | Preparation of the final hydrogeological report to be submitted to State and County agencies for approval |

For the purpose of this feasibility study, it will be assumed that a greensand filtration system will be required to treat for solids and heavy metals. And additionally, chlorine injection will be utilized for disinfection.

Treatment and disinfection of well water is required prior to distribution. Liquid sodium hypochlorite can be pumped into the well discharge piping and water main. The primary well, nearest the community, will be located in a prefabricated building with the chlorination dosage tank a few feet from the well casing. The building should include the following:

- Filtration Units
- Polyethylene tank for 1% sodium hypochlorite storage
- Two wall bracket mounted liquid metronics or equal flow paced chemical metering pumps (one used as standby)
- Pressure Bladder Tank
- Electric Heater
- Exhaust Fan
- Circuit Breaker
- Lighting
- Light/Fan Switch
- SCADA System & Other Communication Requirements

Per VDH regulation 12VAC5-590-840, a 50-ft radius well lot will need to be established to ensure that a 50-ft separation distance will be met with future construction. Furthermore, it should be noted that 50-ft is the minimum separation distance. Based on site conditions, local pollutants and other factors, the required setback may be greater than 50-ft. This lot will need to be graded to direct surface water away from the

well. The well lot will require a 12-ft wide paved access road with a 4-ft shoulder in order to meet the 20-ft minimum width for emergency vehicles.

If the proposed location for the well does not provide sufficient quantity and quality of water, additional wells and a treatment system may be required. At this stage of the analysis, the need for these additional items cannot be determined.

Water Conveyance Alternatives

The purpose of the water conveyance system is to provide water to each individual connection with proper pressure and flow. Loudoun Water Engineering Design Manual (EDM) requires a minimum of 40 psi for all customers. Using the preliminary well location, topography, road alignments, and existing structures, a preliminary water main alignment was created (**Figure 14**). The length of water distribution piping along Hill Haven Ln would require design to ensure adherence to the LW EDM maximum dead-end length of 500 feet.

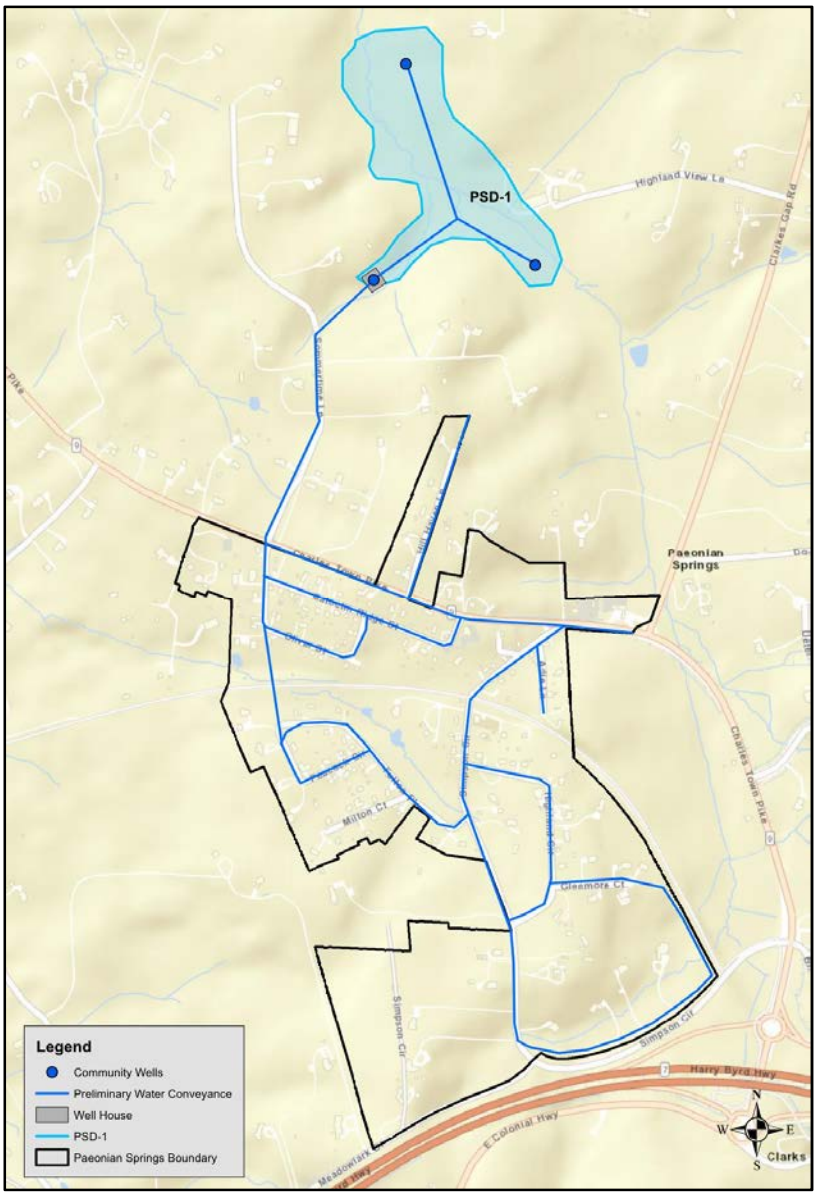


**FIGURE 14: PRELIMINARY WATER MAIN LAYOUT**

The entire length of the water main is approximately 28,000 LF. Preliminary sizing calculations were conducted for the main for either new Ductile Iron Pipe (DIP) or Polyvinyl Chloride (PVC) piping using the demand and length of pipe. The calculations assume that the wells and water treatment are located in PSD-1. Assuming that the entire 28,000 LF of pipe is the same size, a 6-inch main would provide a minimum of 63 psi throughout the main. For these preliminary calculations, a starting pressure of 75 psi was assumed.

A model will need to be performed to calculate the actual pipe size required in different areas of Paeonian Springs once a well location is established. This model will need to take into account the elevation and connection locations. Depending on the depth of the well, pipe losses and elevation of connections, booster pumps and bladder tanks may be required to maintain necessary pressure throughout the system. Location and size of these pump systems cannot be determined at this level of study. For the purpose of cost estimating, it is assumed that the well pump will be sufficiently sized to provide adequate pressure throughout the system. Furthermore, a water model would be necessary to determine water age and other water quality factors throughout the system. These considerations will be necessary to correctly size the piping and the system.

Based on the varying topography of Paeonian Springs, approximately ten (10) air release valves and ten (10) blow-offs will need to be installed. The air release valves will be located at the local high points of the system to release air pockets that might form in the main. Blow-off valves will be located at low points along the main to release pressure and air. The air release and blow-off valves will need to be sized during design. Installing deeper water mains may result in the removal of several air relief and/or blow-off valves.

### Fire Protection

As previously mentioned, Paeonian Springs is composed of agricultural residential (A-3), countryside residential-1 (CR-1), countryside residential-2 (CR-2), and rural commercial (RC) zones.

Loudoun County has special provisions for communities like Paeonian Springs where an extension of a central water supply system or community water system is not available. Section 2.3 of the Loudoun County's Facility Standards Manual states that water supply facilities shall provide fire protection to serve areas where water systems are not available for fire protection. These areas require storage tanks that consist of either two (2) tanks that provide a minimum of 15,000 gallons of storage, or one (1) tank that provides a minimum of 30,000 gallons of storage. These storages must be spaced every 2,600 linear feet of roadway. These communities can also designate a natural water sources (stream, river, creek) as a water supply facility if the natural water source is capable of providing 1,000 gpm of water for thirty (30) minutes for fire protection year round. Other natural water sources, like ponds, quarries, and other open bodies of water can be designated as a water supply facility if they have a normal depth of five (5) feet at the draft pipe and contain a minimum of 30,000 gallons of water year round.

Using the well for fire protection is not feasible due to the quantity of water that would be required from the well. Therefore, using day tanks or a natural water source as outlined above are the two feasible options for the community and should be considered as the project moves towards design. For Paeonian Springs, approximately seven (7) holding tanks would be necessary to provide adequate fire protection as required by the Loudoun County Facilities Standards Manual. Holding tanks would be underground structures following the standard county detail for dry drafting fire hydrants. For the purpose of this report, no further discussion or cost estimating is provided for the fire protection systems.

### Irrigation

If a water distribution system is constructed to serve Paeonian Springs' residents, existing private wells will need to be repurposed or abandoned. All wells will require disconnection from the residences. Following disconnection, the well can be repurposed to be maintained and used as a noncommercial irrigation well. Alternatively, the well can be abandoned through a variety of methods as defined by 12VAC5-630-450.

# Section 6 - Wastewater System Evaluation

## Preliminary Existing System Analysis

Review of Existing Data

Paeonian Springs currently has no central wastewater collection or treatment facilities. The sewage in the community is being treated using on-site sewage disposal systems. The community has 163 registered drainfields as shown in **Figure 14**. Of these systems, there are alternative onsite sewage systems (AOSS), conventional, pump and haul systems, pit privies (outhouse), some unknown, and three (3) are classified as abandoned. There are three (3) pump and haul systems and at least four (4) privies based on GIS data and Loudoun County research. The average age of the existing wastewater disposal systems is over 35 years with the septic systems having a median age of 39 years as noted in the community application. Twenty (20) of the drainfields were installed after the year 2000.

The Water and Wastewater application that was submitted by the community (**Appendix A, Attachment 4**) differs from some of the GIS data and Loudoun County research, stating that there are currently one hundred fifteen (115) existing septic systems, three (3) pump and hauls, and five (5) pit privy systems with the median age of the wastewater infrastructure in the community being 39 years. A summary of the types of systems at the existing community is as follows:

Conventional On-Site Sewage Disposal Systems

A conventional on-site sewage disposal system consists of septic tanks with conveyance to a subsurface drainfield.

Alternative On-Site Sewage Disposal Systems

The VDH regulations define an alternative on-site sewage disposal system as “a conventional onsite sewage system and does not result in a point discharge.” Examples of these systems include dosing systems, mounds or fill systems, filters, low-pressure dispersal systems, and drip dispersal systems.

Pump and Haul Systems

A pump and haul system consists of a septic tank where the sewage is pumped out when filled and hauled by a vehicle to a point of disposal.

Pit Privy (Outhouse)

A Pit Privy is a disposal facility with a seat, a lid, and is a lined pit with a vent stack. These types of disposal systems are located outside and separate from the dwelling. Virginia prohibits the installation of pit privies in new homes. The Uniform Statewide Building Code of Virginia states that pit privies at existing homes should be abandoned within one year of the availability of sanitary sewers.

Review of Health Department Records

The median age of sewage systems is 39 years and most are conventional systems. The remaining systems are alternative onsite septic systems (AOSS), pump and haul, privies, and portables. In the past, the major issues for septic systems were deficiencies such as leaking and alarms not working. The major issue for more than half of the current sewage systems is that there are no known reserve areas for drain fields. By current VDH standards, the lack of reserve area for drainfields is non-compliant with health department requirements. If any of these parcels applied for an onsite sewer permit, the lack of reserve drainfield area could be grounds for rejection of the application.

Most parcels cannot supply enough reserve area due to lack of acreage, lack of funding or soil properties. Notably, there are three pump and haul septic systems that replaced previously failing sewage systems in the last couple years. These three sites are of particular interest as LCHD has identified that pump and haul systems are considered a last resort option when addressing system deficiencies. The cost associated with continuous pump and haul operations is very expensive.

Furthermore, there are multiple bed systems throughout the Paeonian Springs community. These systems are no longer accepted under new applications by the LCHD, who locally represents the Virginia Department of Health (VDH). The existing bed systems are grandfathered in, allowing for their continued use. These systems are considered unacceptable by LCHD if, and only if, the system fails.

A fraction of the systems are AOSS and these systems have been randomly checked since their installation with few issues. More than half of the parcels do not have a known reserve area for their drain fields and even more parcels have deficiencies whether they have drain fields or other sewage systems. As with the water system records, these records may not be totally inclusive.

Based on the current, poor condition of the majority of the sewage systems within the community and the numerous compliance issues, the sewer systems are considered to be under 'substantial compliance.' That is, the health department accepts the existing systems as they currently function and therefore does not actively pursue condemnation and replacement of these systems. If any substantially compliant system were to reach failure, the health department will require replacement.

Failed systems have the potential to affect the health of nearby residents and neighbors. The lack of reserve drainfields, the substantial compliance prevalent in the community, and existence of pump and haul sites, generally present the poor condition of the sewage systems within the community.

**Figure 15** shows existing drainfields and **Figure 16** shows the currently known extent of the inadequate septic systems within the study area according to Loudoun County Health Department investigations.

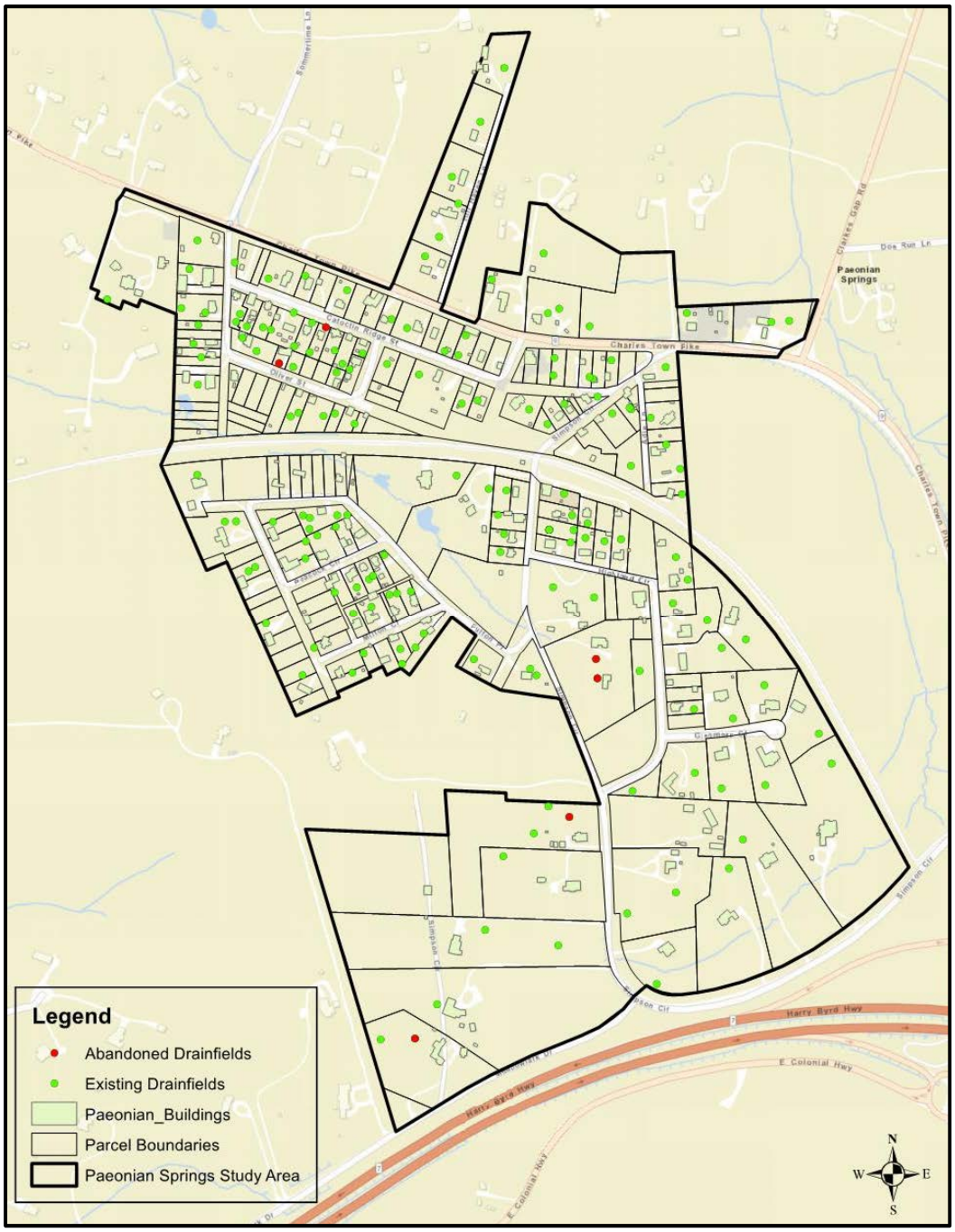


**FIGURE 15: PAEONIAN SPRINGS DRAINFIELDS**

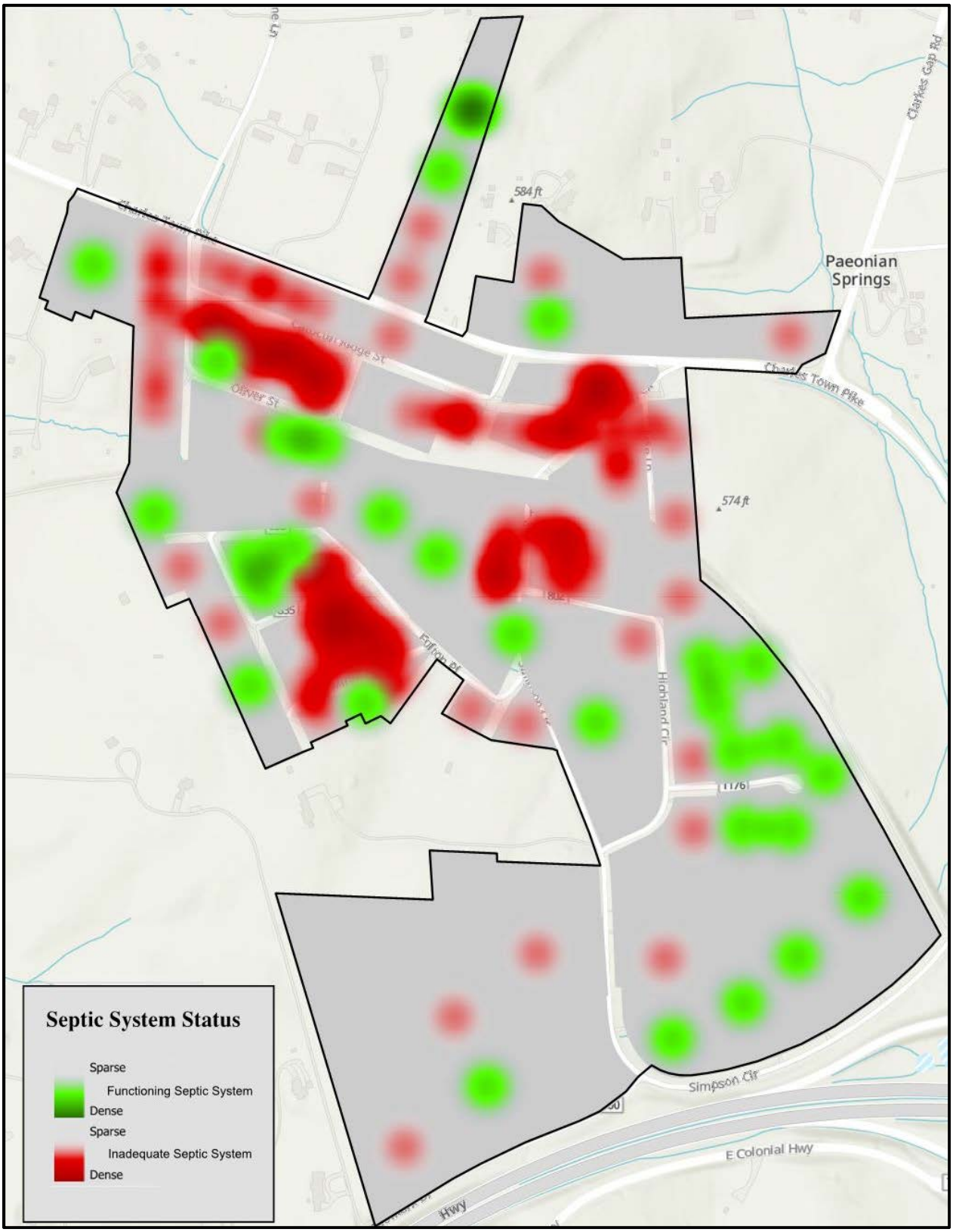


**FIGURE 16: COMMUNITY SEPTIC SYSTEM STATUS***

*Septic system information derived from Loudoun County Desktop Research

## Wastewater Treatment and Collection Alternatives

As outlined above, Paeonian Springs has no formal collection or treatment systems. Therefore, a collection system will need to be installed to convey sewage from each individual parcel to a central location where it can be pumped or treated and then subsequently discharged. To address the sewage flows from Paeonian Springs, there are four options which will be explored in this section:

- Upgrade Existing On-Site Systems
- Subsurface Discharging Wastewater Treatment Facility
- Surface Water Discharging Wastewater Treatment Facility
- Pump Station Connection to a Nearby Municipal System

Treatment Alternative #1: Continued Use of Existing On-Site Systems

Based on the conversations with Loudoun County Health Department personnel, the age and condition of the existing systems and the limited lot sizes and areas, it is not feasible to upgrade existing systems for every parcel to meet current standards and provide a more robust wastewater collection and treatment system. Over the course of this study, at least one (1) additional parcel has had to convert to a pump and haul system due to system failure. The current number of pump and haul systems in the community is three (3).

Treatment Alternative #2: Subsurface Discharging Wastewater Treatment Facility

A wastewater treatment facility with subsurface discharge can be utilized. This would require construction of a wastewater treatment facility in the vicinity of Paeonian Springs. The WWTP would be constructed adjacent to a drainfield and would need to treat either the current development of 42,700 gpd or the potential future flows of up to 70,900 gpd. The land area required for the drainfield and dilution area would be 32 or 52 acres respectively. Per desktop evaluation by Marsh & Legge Land Surveyors (Marsh & Legge), the proposed dispersal method with TL-3 effluent secondary treatment levels is drip irrigation with an installation depth of approximately 18 to 20 inches. The primary challenge with this alternative is the acquisition of property to construct the necessary facility and drainfield.

Dewberry contracted Marsh & Legge to investigate potential parcels for suitability as drainage fields. Ten (10) parcels were investigated by Marsh & Legge. The ten (10) parcels were chosen in a Soil Investigation Technical Memorandum (TM), submitted November 1, 2018, and included as **Appendix A**.

Using Dewberry calculations, Marsh & Legge considered drainfields for capacity of 42,165 gallons per day with the required size being 158,119 square feet of dispersal area (percolation rate of 75 minutes per inch).

The total area needed for this project at potential future flows is estimated to be approximately 52 acres while the current development condition would require 32 acres. A TL-3 effluent quality was designed for, in determination of parcel area, which is further discussed in the following section. With this design parameter, the proposed drainfield requires a surrounding nitrogen dilution buffer area.

The VDH GMP 1995-02 was used to calculate the estimated land requirements for each scenario. This method is based on the inches of rainfall per year, infiltration rate, pre-existing Total Nitrogen concentration, and design flow. This calculation assumes that the TN concentration at the effluent pipe is 8 mg/L and there is no pre-existing TN concentration. The estimated land requirements for each scenario are shown in **Table 15**:

### TABLE 15: ESTIMATED LAND REQUIREMENTS[1]

| Scenario | Flow (gpd) | TN at Effluent | Land Required (acres)[2] |
|---|---|---|---|
| Current Development | 42,700 | 8 mg/L | 32 |
| Potential Future Flows | 70,900 | 8 mg/L | 52 |

[1]Assumes the treatment plant selected is capable of providing TL-3 treatment. Higher level of treatment will reduce land requirements.
[2]Land requirements include the drainfield, 100% reserve drainfield, dilution area, and wastewater treatment plant

As detailed in Appendix A, twenty-five (25) 50+ acre parcels within two (2) miles of the community were shortlisted to ten (10) parcels. The ten (10) parcels were selected based on their flatter slopes, close proximity of 1.9 miles or less to Paeonian Springs, limited amount of water features and the existence of ten (10) or less existing structures (buildings, wells, drainfields).

**Table 16** shows the aforementioned shortlisted, ten (10) parcels which Marsh & Legge investigated.

### TABLE 16: RECOMMENDED PARCELS

| Parcel ID[1] | Parcel Size (acres) | Distance from Paeonian (mi)[2] |
|---|---|---|
| Parcel #1 - 383404530000 | 144 | 1.3 |
| Parcel #2 - 382282803000 | 60 | 1.7 |
| Parcel #5 - 310261450000 | 50 | 1.9 |
| Parcel #8 - 306193182000 | 58 | 0.5 |
| Parcel #10 - 383388802000 | 313 | 1.5 |
| Parcel #12 - 310463273000 | 72 | 1.4 |
| Parcel #13 - 304283694000 | 223 | 1.4 |
| Parcel #16 - 381207702000 | 111 | 0.7 |
| Parcel #21 - 305281781000 | 53 | 1.0 |
| Parcel #22 - 310174360000 | 266 | 1.9 |

[1] Parcel numbers were generated by Dewberry and serve no purpose other than identification.
[2] Distance from Paeonian Springs measured as a straight line distance from community boundary to parcel boundary.

Marsh & Legge performed a desktop soil analysis for each of the ten (10) parcels identified above. Their findings are summarized in **Appendix C**. The Virginia Department of Health's Sewage Handling and Disposal Regulations and Chapter 1066 of the Loudoun County Code were used in determination of the "best" soils for the potential drainfield sites.

Of the ten (10) parcels examined in the desktop soil analysis, five (5) were considered viable for use as a potential drainage field as summarized in **Table 17** and highlighted in **Figure 17**.

### TABLE 17. FEASIBLE POTENTIAL DRAINAGE FIELDS

| Parcel ID | Conflicts |
|---|---|
| Parcel #1 - 383404530000 | Existing houses, drainfields and wells on property |
| Parcel #10 - 383388802000 | Existing houses, drainfields and wells on property |
| Parcel #13 - 304283694000 | - |
| Parcel #16 - 381207702000 | - |
| Parcel #22 - 310174360000 | - |

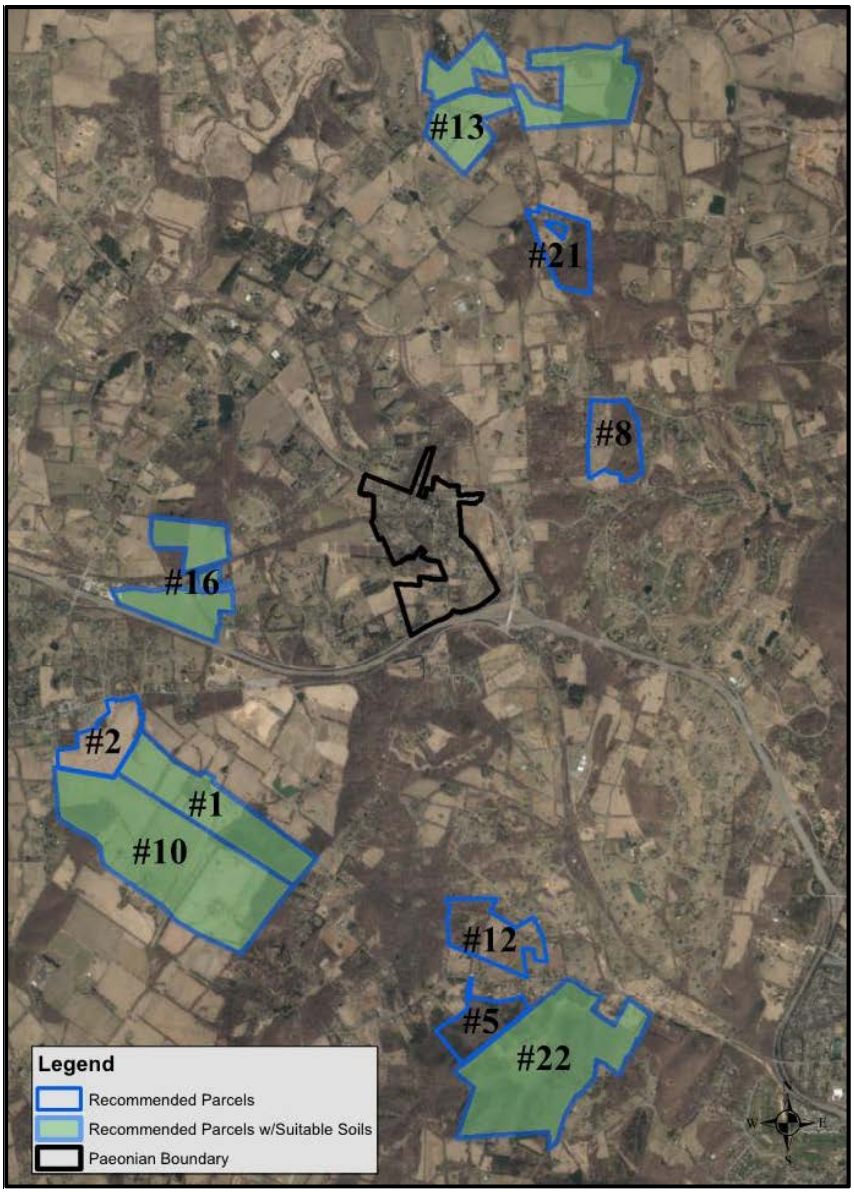


FIGURE 17: PAEONIAN AREA COLLECTION AREAS (SERVICE AREAS)

The five (5) recommended parcels with suitable soil shown in the figure above were each considered as potential drainfields for this feasibility study. As summarized in **Table 17**, two (2) parcels have existing features making them unsuitable or unlikely to be used as drainfields when compared to the other available parcels. The two (2) parcels with existing structures are parcels #1 and #10. This exclusion factor leaves three (3) potential parcels for use as a drainfield in this feasibility study.

The three (3) parcels were further narrowed down as follows: To use parcel #22, a force main would need to cross under a major roadway in the area, Harry Byrd Highway (Route 7). This would greatly increase the overall cost associated with construction of the force main. Due to this factor, parcel #22 was removed from consideration as potential drainfields, leaving parcels #13 and #16 to be considered. Both parcels #13 and #16 consist of three tracts of land separated by roads. Due to their similar configurations and soil suitability as drainfields, location was the final factor considered in determining the drainfield parcel to be used in this feasibility study. Parcel #16 was selected for cost estimating purposes as a potential site for a drainfield due to its close proximity to Paeonian Springs. For the purpose of the feasibility study, parcel #16 will be used as the potential location of the drainfield for discharge of effluent sewage flows.

It should be noted that under any scenario, easement acquisition and agreements from these property owners will be required prior to design. Based on the information gathered during the desktop analysis, there are five (5) sites that are feasible for siting a drainfield. The drainfield and reserve area can be divided amongst these parcels if easement acquisition becomes difficult. There will be increased costs associated with additional force mains to convey sewage to these parcels. However, these factors cannot be finalized at this stage of the study. Therefore, as outlined above, parcel #16 will be used as the potential treatment and discharge site for this study. Moving forward, land acquisition for only the current development may be purchased, however, this may limit the potential for discharging future flows.

The wastewater treatment system selected will depend on the level of treatment required to meet the effluent limits for subsurface disposal. GMP 2013-01 requires large alternative onsite sewage systems (AOSS) with flows greater than 10,000 gallons per day to either demonstrate an effluent quality of 8 mg/L Total Nitrogen (TN) or meet a TN concentration of 5 mg/L 24-inches from the point of effluent application to the soil. For the purpose of this feasibility study, it is assumed that the treatment technology for the Paeonian Springs community will meet treatment level 3 (TL-3) requirements with an effluent quality of 8 mg/L TN at the discharge. **Table 18** below shows the TL-3 effluent quality limits for Biological Oxygen Demand (BOD), Total Suspended Solids (TSS) and Total Nitrogen.

**Table 18: Required Effluent Quality[1]**

| BOD | TSS | TN |
|---|---|---|
| 10 mg/L | 10 mg/L | 8 mg/L |

[1]Required effluent quality at the WWTP discharge

A nitrogen dilution buffer area will need to surround the proposed drainfield site. A nitrogen dilution buffer area is the land immediately adjacent to the drainfield that is used to dilute the nitrogen concentration in the treated effluent. The size of the nitrogen dilution area is based on the TN concentration of the treated effluent, existing nitrogen concentration in the ground water, design flow, inches of rainfall per year, and infiltration rate. According to 12VAC5-613-90B, TN concentration in the groundwater cannot exceed 5 mg/L at the project boundary, which in this case is the edge of the nitrogen buffer area.

It is important to note that a higher level of treatment (effluent TN concentration of < 8 mg/l) will reduce the land requirements. Advanced treatment systems for this scale are available on the market. These systems can achieve ENR or BNR effluent limits that approach 5 mg/L or 3 mg/L. While the ongoing operation and maintenance costs associated with these systems is much higher than that of more conventional treatment systems designed to meet effluent TN limitation of 8 mg/L, these systems would greatly reduce the land area required for nitrogen dilution area.

Furthermore, the TN limit of 5 mg/l at the project boundary can incorporate multiple nitrogen removal methods (12VAC5-613-90B). This includes any pretreatment prior to subsurface disposal, vegetative uptake with shallow soil treatment, and denitrification. For instance, if a shallow drip or elevated sand mound system is installed, it is reasonable to assume a 50% gross TN reduction loss of the applied effluent. If vegetated beds are used, it is reasonable to assume a 20% gross TN reduction loss (GMP 1995-02).

The treatment system can be located within the existing community or outside the existing community. The land area required for a treatment system of this magnitude is approximately 0.75 acres. This land area would encompass the influent sewer, treatment system, reserved treatment system area, control building, accessory structures and effluent discharge. This does not include the drainfield or dilution area. This system could also be located outside the community at the same location of the drainfield and dilution area. For the purpose of laying out a wastewater collection system, it is assumed that the treatment system will be located at the aforementioned subject parcel #16. This will require the construction of a raw sewage pump station to convey sewage from the community to the treatment area. The potential location of this

pump station is towards the western boundary of the community. This approximate area has been preliminarily selected due to its location relative to the assumed drainfield parcel and topography.

Treatment Alternative #3: Surface Water Discharging Wastewater Treatment Facility

This alternative would require construction of a Wastewater Treatment Plant (WWTP) in or around Paeonian Springs. Effluent from the WWTP would be discharged into the South Fork Catoctin Creek, a tributary of the Potomac River. The location of the effluent pipe would need to be determined in the preliminary stages of design and coordinated through VDEQ. An effluent pump station and force main may be required to convey treated effluent to an approved discharge location.

The South Fork of Catoctin Creek is considered to be an impaired stream by the Virginia Department of Environmental Quality. This classification means that special authorization would be required to discharge treated effluent into the creek. The impaired stream will likely require adherence to strict permit conditions and will entail acquisition of nutrient credits in order to be approved for discharge into the Chesapeake Bay watershed.

In adhering to an Environmental Protection Agency (EPA) federal mandate, nutrient loading into the Chesapeake Bay is highly regulated. In response to this mandate, the Commonwealth of Virginia enacted a nutrient credit program to provide “credits” for effluent discharge into the Chesapeake Bay drainage area. These credits are used by municipalities, utilities and private owners to allow discharge of effluent into these areas and prevent excess nutrient loading. There are currently no credits available for purchase from the state of Virginia.

Existing credits can be purchased or leased for a period of time from three (3) to five (5) years within Virginia. However, current regulations do not allow new dischargers to purchase credits directly. Alternatively, out of state sales of credit could become available for this alternative but this is exceedingly rare.

The treatment system required for this alternative would be required to meet advanced effluent discharge requirements.

Treatment Alternative #4: Connection to Nearby System

Another alternative for treatment would be to convey the sewage from Paeonian Springs to a nearby treatment system that would accept and treat the flow. There are two (2) systems in the area that could be considered.

- Town of Leesburg
- Hamilton

Following roadways, Hamilton is approximately four (4) miles southwest of Paeonian Springs away while the Town of Leesburg is approximately five (5) miles southeast – See **Figure 18**. Connection to these systems is most likely feasible but there are major considerations necessary in determining the feasibility.

Paeonian Springs is zoned in the Rural Policy Area. Any connection to a main system would require approval from the Loudoun County Board of Supervisors. Additionally, the existing systems must be considered. The systems within these municipalities may not have the capacity or availability for additional flows. However, it is technically feasible to convey sewage from Paeonian Springs to a nearby system.

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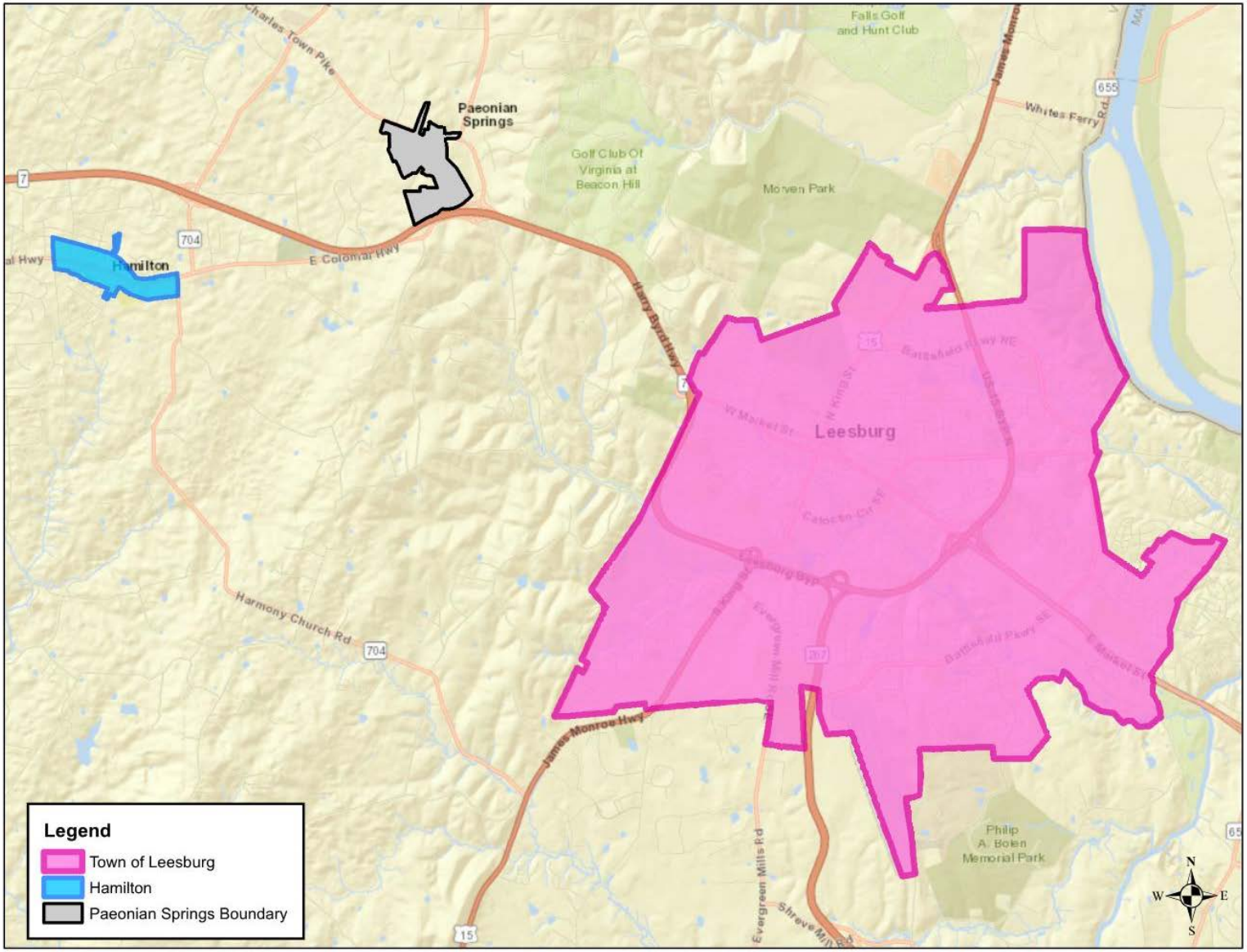



FIGURE 18: POTENTIAL NEIGHBORING WASTEWATER SYSTEM CONNECTIONS

Wastewater Treatment System Recommendation

Similar to the water system, an alternative matrix was developed to analyze the four (4) potential alternatives. The same rating scores were used as shown above in **Table 11** with higher scores meaning the alternative is more favorable. From this analysis, it was determined that Alternative #2 was the preferred alternative. **Table 19** summarizes the analysis.

### TABLE 19: PAEONIAN SPRINGS WASTEWATER ALTERNATIVES

| Paeonian Springs Wastewater Alternatives | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Alternative Number** | **Constructability** | **Public Impacts** | **Costs** | **Approval/Acceptance** | **Environmental Impacts** | **Operations & Maintenance** | **Average Score** |
| **Alternative #1 Continued Use of On-Site Systems** | Land area not available on some existing lots. May not be feasible for certain lots to construct new individual systems. | Each property would require upgrades. No improvement may be viable for several lots causing potential health concerns. | Lower capital costs for upgrading and constructing new systems. | Minimal approval requiremetns for existing systems. Pump and haul systems may be required for approval through LCHD. | High potential for severe, negative impacts if non-compliant systems. | Homeowner ongoing operation and maintenance. Failing systems may require pump and haul and frequent pumping costs. | **1.5** |
| **Raw Score** | **1** | **1** | **3** | **2** | **1** | **1** | |
| **Alternative #2 Subsurface Discharging Wastewater Treatment Facility** | Requires road work and restoration. Special consideration for crossing W&OD trail. | Construction impacts for duration of project, traffic management. Potential disruption of W&OD Trail. | High initial capital costs for treatment system and drainfield area. | Extensive easement and land acquisition requirements for treatment and drainfield areas. | New treatment facility will centralize potential failure for non-compliance. | New community system to operate and maintain. Ongoing sewer fees paid by homeowners. | **2.3** |
| **Raw Score** | **3** | **2** | **2** | **1** | **3** | **3** | |
| **Alternative #3 Surface Water Discharging Wastewater Treatment Facility** | Requires road work and restoration. Special consideration for crossing W&OD trail. | Construction impacts for duration of project, traffic management. Potential disruption of W&OD Trail. | High initial capital costs, especially with credit acquisition. | Easements and land acquisition necessary. Nutrient credits may be required, which are not currently available. | Increased risk of environmental impacts due to surface water discharge facility. New outfall required. | New community system to operate and maintain. Ongoing sewer fees paid by homeowners. | **2.0** |
| **Raw Score** | **3** | **2** | **1** | **1** | **2** | **3** | |
| **Alternative #4 Connection to Nearby System** | Requires extensive construction, along and underneath major thoroughfares. | Construction impacts for duration of project within Paeonian Springs and surrounding communities,traffic management. | Highest initial capital costs and connection fees. | Board of Supervisors approval required. Easements most likely required. | Pipes may cross environmentally sensitive areas. | No additional treatment facility. New pump station required to convey sewage to existing collection system. Ongoing sewer fees paid by homeowners. | **2.0** |
| **Raw Score** | **1** | **1** | **1** | **2** | **3** | **4** | |

### Wastewater Collection Alternatives

There are three (3) potential sewage collection systems for implementation of Alternative #2 for the community of Paeonian Springs. The alternatives include:

- Gravity Sewers
  Gravity sewers are heavily dependent on the topography of the area. These systems convey wastewater by gravity and are typically used in dense communities. Gravity sewers do not require a power source, but require manholes for maintenance and potential lift stations to move waste from lower to higher elevations. So, initial construction costs are typically high but require little maintenance outside of periodic inspection and cleaning.

- Low Pressure Collection Systems (LPS)
  Low pressure collection systems pump wastewater in a pressurized pipe network. Each connection has a grinder pump that contributes flow to the system. These systems are suitable for areas with irregular terrain, rocky conditions, or high water tables. LPS will require air release valves at high points, cleanouts at endpoints, and isolation valves at pipe connections.

- Combination
  Another option that can be considered for the community of Paeonian Springs is a combination of a gravity system and an LPS. A combination of the two collection alternatives would reduce the number of pumps required for an LPS as well as avoid excessive depth requirements typical of gravity sewers. Pumps would only be placed in areas where sewage is unable to flow by gravity. However, this would require the maintenance of a system that has fundamentally different operational and maintenance requirements.

### Collection Alternative 1: Gravity Sewer, Two (2) Pump Stations

For the first collection system alternative, a gravity sewer system with a pump station was considered. The Paeonian Area was separated into two collection areas (or service areas), North Collection System and South Collection System, for this alternative. **Figure 19** shows this division of collection systems.

The initial design concept included two sewer systems to collect flows independently of each other for each collection area. Within the individual collection systems, the flows are directed to the lowest point of elevation, from where they will be pumped to the selected treatment system and drainfield area.

Preliminary considerations for layout of a gravity sewer system began with examination of the topography of the area. Generally gravity sewer systems follow the topography of the land as flows are directed from higher elevations to lower points of elevation.

The lowest elevation within the Paeonian Springs Boundary is approximately 500 feet while the highest elevation is approximately 676 feet. Within the Paeonian Springs Boundary, the general topography of the land could allow for gravity sewers to carry flows to the pump station located in the north collection area.

While the majority of the collection areas can be serviced with a gravity system there are several low lying sections of the community where gravity sewer are not suitable due to the excessive depth necessary for gravity sewers to work in this area. Two of these areas are outlined in **Figure 19**.

The outlined areas are unsuitable for gravity sewers due to their low elevations compared to the surrounding area. The sewage flows cannot be transported from these low elevations through the higher elevations by gravity sewer alone. Because of these areas in the community, which cannot be serviced by a gravity sewer system alone, and others like them the implementation of a gravity sewer is not feasible for this community.

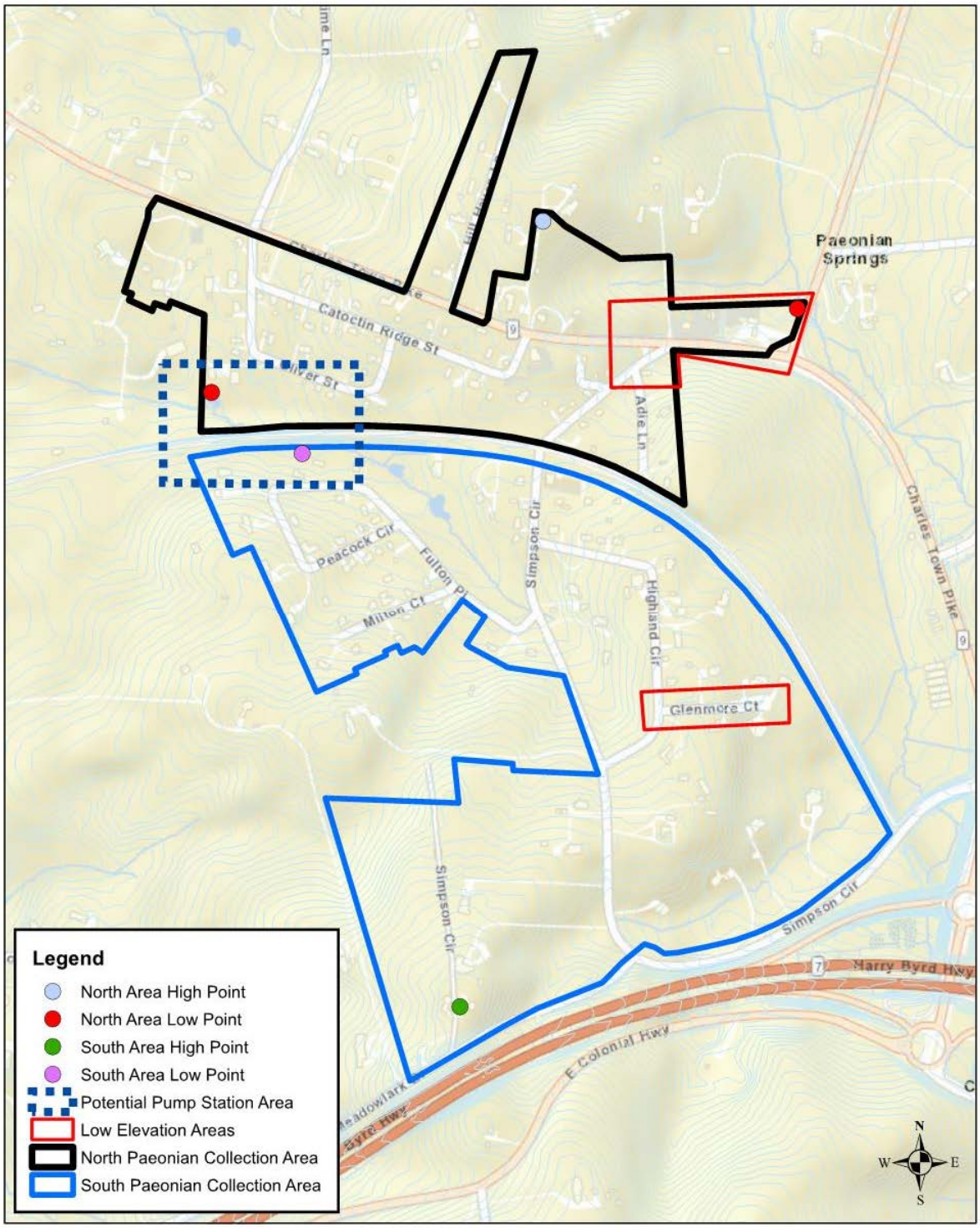



**FIGURE 19: GRAVITY SEWER SYSTEM CONSIDERATIONS**

### Collection Alternative 2: Low Pressure System

A low pressure system would allow for all homes and businesses within the area to be serviced despite the differences in elevation. For this layout, a pump station would also be necessary even though the pressurized system can transport the sewage across the elevation changes within the community. **Figure 20** shows a potential layout for a low pressure system.

The low pressure sewer system can follow the ground profile of the area and allows for installation near the ground surface (minimum burial depth of 4'). These systems are much shallower than gravity systems and have more flexibility in installation and design, allowing for routing around utilities and other potential conflicts. This system would require air release valves at high points, flushing stations near end points and isolation valves at pipe connections.

Grinder pumps or septic tank effluent pumps would pump the sewage into the force main. Once in the force main, the water can be carried in any direction, allowing for flexibility in transport and placement of the pump station.

This alternative includes one sewer system that serves the whole of Paeonian Springs. The flows are collected and transported to a pump station near the northwest border of Paeonian Springs prior to being pumped to the treatment and drainfield location.

The sewer system would follow VDOT right-of-ways, requiring easements for the pump station and several locations where the LPS system could be located through yards to reduce length of pipe.

Individual customer flows would enter the sewer system through force lateral connections to the LPS main. On each customer's property, grinder pumps would need to be installed. The grinder pumps would be connected to the LPS main in the street via 1.25" HDPE or PVC piping. The LPS main diameter in the street would vary based on the number of connections and elevations. During design, an LPS model would be developed to finalize pipe sizing, however, anticipated pipe diameters for a community such as this would range from 1.25" to 4".

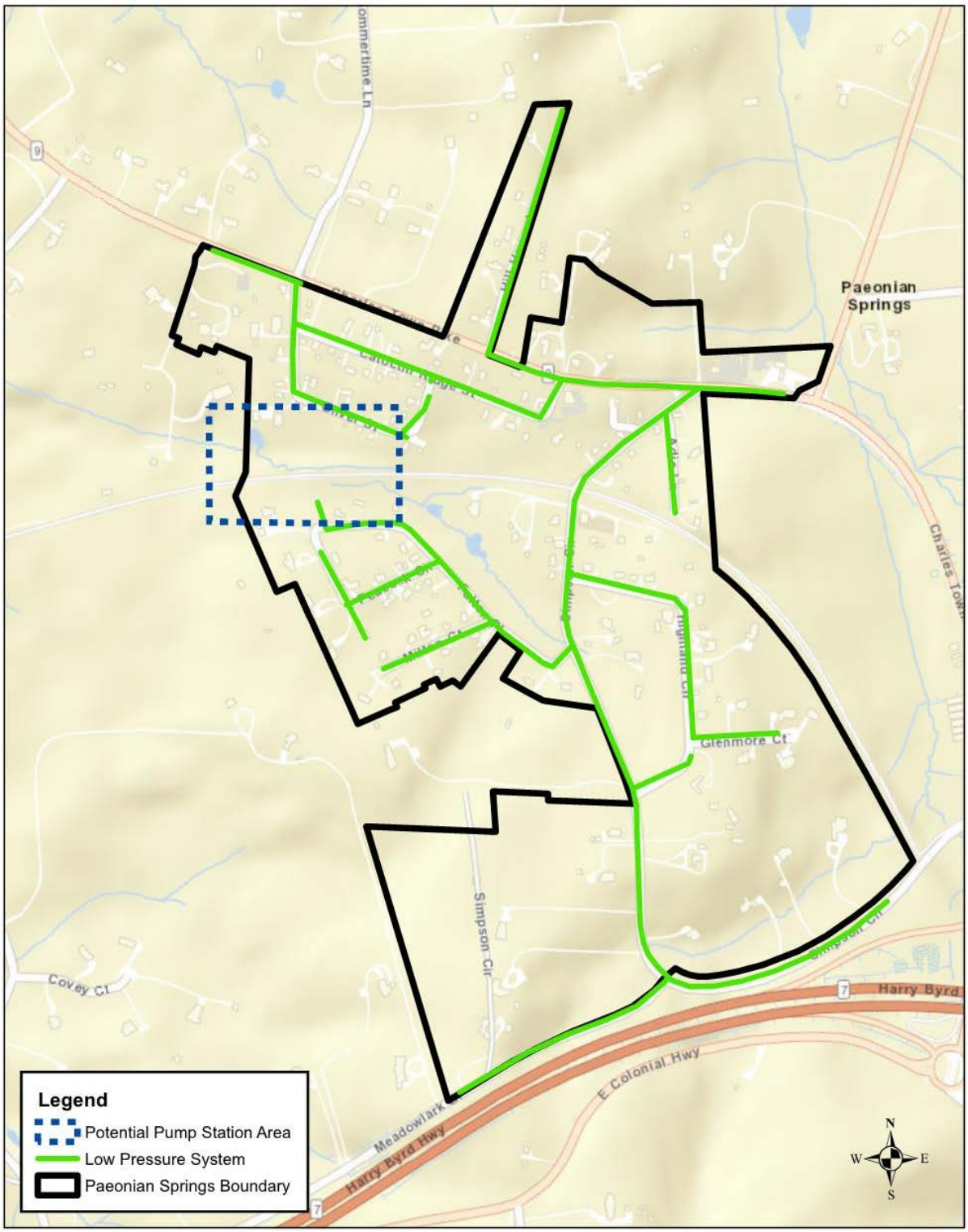



**FIGURE 20: ALTERNATIVE 2 SEWER LAYOUT**

Collection Alternative 3: Combination System

Another option for sewer systems within the Paeonian Springs Area is a combination sewer. This system would consist of both low pressure sewer and gravity sewers. In this alternative, as in the gravity system consideration a pump station near the W&OD trail is being considered. The layout is shown in **Figure 21** below.

For the gravity sewer, manholes would be necessary at elevation changes and cleanouts would need to be installed on customers' properties. For the low pressure system, the system would require air release valves at high points, flushing stations near end points and isolation valves at pipe connections. Additionally, customers would need to install grinder pumps where they could not be served by gravity.

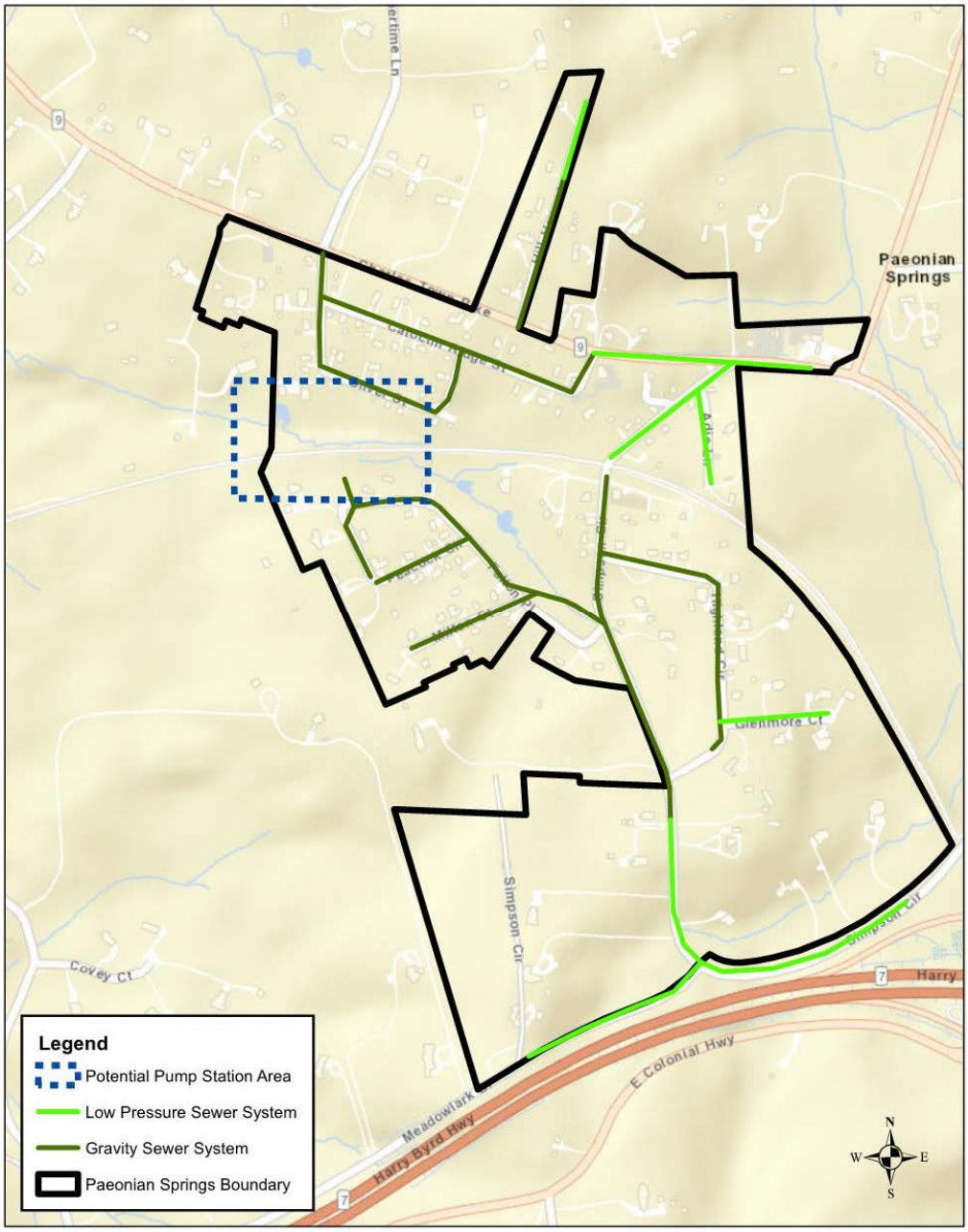



FIGURE 21: ALTERNATIVE 3 COMBINATION SEWER LAYOUT

Of the alternatives considered, two are technically feasible. The Paeonian Springs community could be served by either a low pressure system or a combination system. For both systems, the sewage would be pumped to a treatment site outside of the community boundary.

Wastewater Conveyance System & Treatment Recommendation

Following review, it was determined that an LPS collection network would be recommended to convey sewage to a centralized community pump station within the community. The overall wastewater system recommendation is the construction of a LPS collection network that would convey sewage to a centralized community pump station. This system was chosen over a combination sewer as it would allow shallow excavation, trenchless installation where necessary and provides flexibility throughout with layout and pipe location.

The proposed interim pump station would pump the raw sewage to an offsite treatment plant located at the drainfield site where it would be treated by a wastewater treatment system capable of meeting TL-3 effluent limitations. It is assumed the force main to the drainfield could potentially follow the W&OD trail with placement of the pipe to the north of the trail. It should be noted, that during design and modeling of the LPS system, the need for the interim pump station may be eliminated. It cannot be determined at this stage of the project if this pump station will be necessary, therefore, in order to be conservative, construction of a pump station and force main within the community is being included – See **Figure 22**. In addition, it should be noted that obtaining easements and permissions to construct a force main parallel to the W&OD trail will be required. Should the force main need to be routed in another direction, additional costs may be realized.

There are numerous treatment technologies that could be installed for Paeonian Springs that can meet 8 mg/L effluent limits. These technologies include extended aeration systems, activated sludge treatment, membrane bioreactors (MBR) or sequencing batch reactors (SBR). Due to the capacity and treatment levels required for this system, fixed film systems are not recommended. Fixed film systems pose challenges with operator flexibility and meeting more stringent effluent limitations, leading to the inability to meet permit requirements.

As stated above, treatment technologies that can meet TN effluent limits of less than 8 mg/L or 5 mg/L provide additional benefit by reducing the nitrogen dilution area requirements. In order to provide a conservative estimate, this study assumes the installation of an MBR treatment system which has the highest initial capital cost. There are several manufacturers that provide this technology and can meet 8 mg/L TN effluent limits.During design, the appropriate treatment system will be confirmed. The drainfield and dilution area would be located on the same parcel and would total approximately 52 acres, accounting for both the current and potential future drainfield, dilution areas and reserve drainfield requirements. The treatment system can be installed in phases to treat current flows under the first phase. Should additional flow develop in the community, the treatment system could be expanded to serve that need. This would save initial capital costs by allowing installation of a smaller treatment system while allowing for expandability without the need to obtain additional land area.

It should be noted that the land area required will depend on the treatment level of the wastewater treatment plant and quantity of effluent being discharged. Another consideration that needs to be addressed during design of this system are commercial properties that have the potential of releasing fats, oils, and/or grease to the collection system and treatment plant. Grease and oil can cause issues at the treatment plant as it is more difficult to biologically degrade. Therefore, grease interceptors should be installed at these locations to limit the potential for ongoing operation and maintenance issues.

In summary, the recommended alternative for the wastewater system would be the construction of a LPS collection network, interim pump station to pump raw sewage to a treatment plant, construction of a treatment plant capable of treating the current development of the community, construction of a drainfield capable of discharging the current development of the community and land acquisition required for the equipment associated with the current development of the community. Subsequent sections of this report use this assumption for costing.

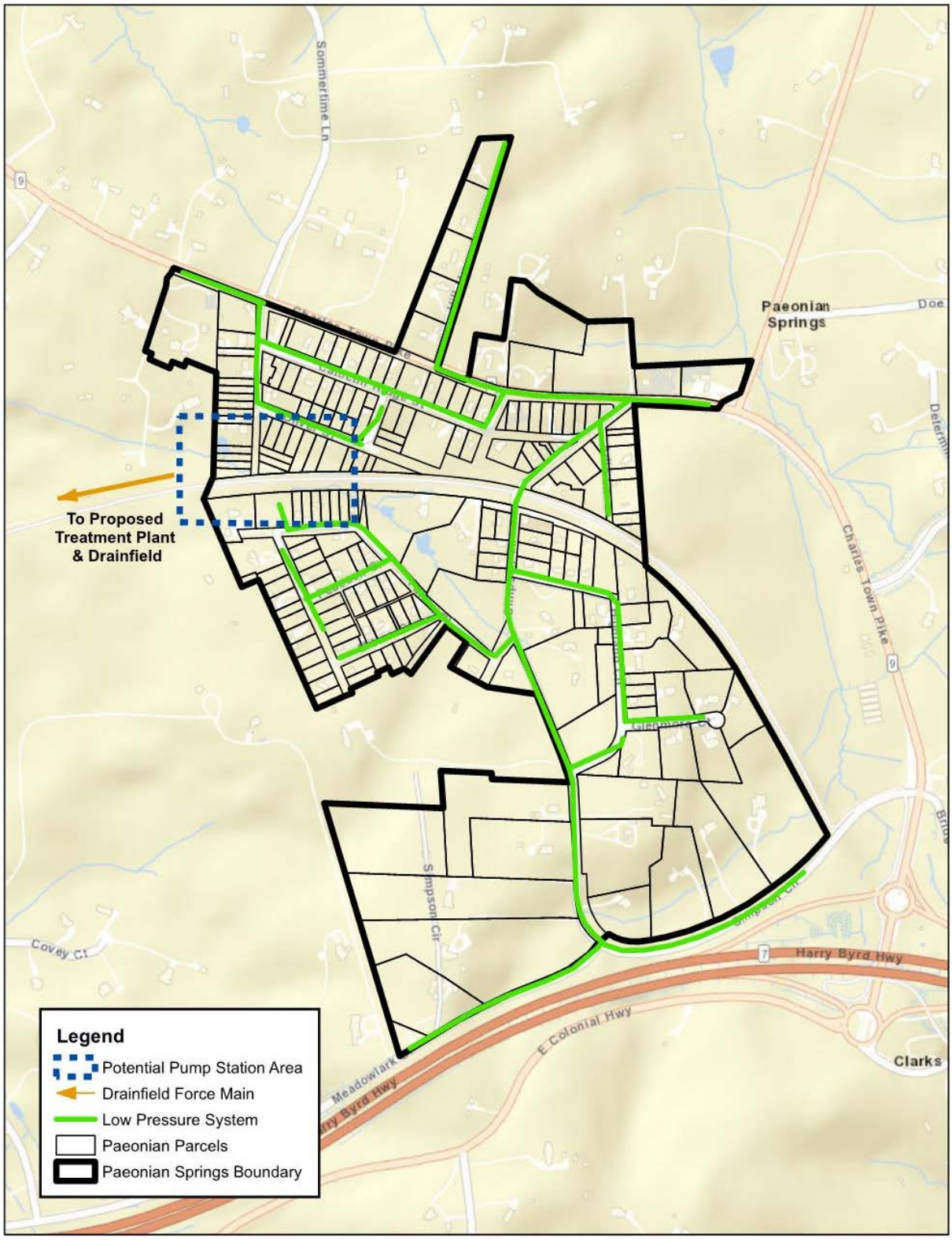



FIGURE 22: PRELIMINARY WASTEWATER SYSTEM LAYOUT

# Section 7 – Estimated Costs & Schedule

The following section summarizes parametric costs for the construction and operation of both a water system and wastewater system that would serve the community of Paeonian Springs. These parametric costs are preliminary costs to present probable costs for implementation of the outlined systems. These costs are not design level detail. They present a large cost range with a low and high range cost included, -20% and +30%, respectively.

The costs have been developed using feasibility level costing estimates for the recommended alternatives outlined above. There are several unknowns associated with these estimates that are further explained in the subsequent sections.

It should be noted that the cost estimates are preliminary. They include the necessary system components and the associated construction. The cost estimates prepared for both the water and wastewater systems represent preliminary values associated with the current population of Paeonian Springs. Soft costs including design, permitting & surveying were calculated as 15% of total construction cost. Furthermore, land acquisition is not included in the individual summaries, but is captured in the overall system summary (**Table 24**).

## Water System

Water System Capital Costs

As outlined above, the recommended water system to serve the community will consist of a communal well system and water distribution piping throughout the service area. The well and piping is anticipated to be designed and constructed to serve only as potable water and not for fire protection or irrigation demands.

In addition, it is assumed that the necessary quantity of groundwater is available at the location outlined above and that the quality of the water does not require advanced treatment. **Table 20** below summarizes the preliminary cost estimate for the potential water system.

**TABLE 20 : WATER SYSTEM CAPITAL COSTS**

| Water System Summary | |
|---|---|
| **Item** | **Total** |
| Design, Permitting, & Surveying | $ 1,380,000.00 |
| Water Distribution System | $ 3,671,500.00 |
| Water Treatment System | $ 2,813,800.00 |
| Individual Parcel Improvements | $ 183,000.00 |
| Road Restoration & Site Work | $ 2,531,300.00 |
| **Total Capital Costs** | **$ 10,580,000.00** |
| **Low Range Estimate (-20%)** | $8,464,000 |
| **High Range Estimate (+30%)** | $13,754,000 |

If homeowners connect to the community water system, existing wells can be transitioned to be used for irrigation purposes. If homeowners will not be using wells for irrigation, each parcel will need to properly abandon the existing wells that are located on their parcel. Licensed well drillers will permanently seal an inactive well to prevent excess nutrients, pesticides, and other pollutants from entering surface and groundwater. Well abandonment depends on depth, whether or not there is an existing pump that needs to

be pulled, and location. The average cost range of well abandonment is $800-$1,500. For the purpose of this feasibility study, it will be assumed that well abandonment will cost $1,500 per parcel and every parcel will abandon the well. As outlined above, it may not be necessary to abandon each well. Should homeowners choose to utilize the existing wells for irrigation, these costs may decrease. Well owners will need to obtain a Well Abandonment Permit from Loudoun County and pay the $300 permit fee.

With all these considerations, the capital costs for constructing the proposed water system is approximately $10.6 million. The high and low range estimates for construction could range from $8.5 to $13.8 million.

### Water Operation and Maintenance Costs

In addition to the capital costs associated with the implementation of these systems, there are long term costs associated with the operation and maintenance. All systems require electrical power as well as regular inspection and upkeep. For the water system, the wells will need to be maintained and the chlorine supplied.

The estimated operation and maintenance costs for the water system includes maintenance of parts, operator time, routine maintenance and power costs. The preliminary operation and maintenance cost estimate for the water system is shown in **Table 21.**

**TABLE 21: WATER SYSTEM O&M COSTS**

| Estimated O&M Costs for a Water Treatment System | | |
|---|---|---|
| **Estimated Maintenance Costs** | | |
| **Item** | **Unit** | **Cost** |
| Maintenance Parts (consumables/repair) | $/year | $2,750 |
| General Equipment Maintenance[1] | $/year | $9,100 |
| Facility Maintenance[2] | $/year | $2,150 |
| **Estimated Operational Costs** | | |
| **Item** | **Unit** | **Cost** |
| Standard Operating Personnel[3] | $/year | $67,018 |
| Routine Maintenance[4] | $/year | $10,400 |
| Power Cost[5] | $/year | $9,500 |
| Chemicals | $/year | $7,000 |
| **Total** | | **$108,000** |
| **Low Range Estimate (-20%)** | | $86,000 |
| **High Range Estimate (+30%)** | | $140,000 |

[1]Includes costs associated with monthly, annual and semi-annual maintenance of equipment

[2]Includes maintenance costs associated with the well area including leaf removal, grass trimming, etc…

[3]The cost of 1 operator for three (3) four (4) hour visits per week at $107.40 per hour

[4]Time spent in addition to standard maintenance to maintain technology specific equipment. Assumes 2 hour per week at $107.40 per hour

[5]Assumes 200 kWh/day at $0.13/kWh

## Wastewater System

Wastewater System Capital Costs

As discussed above, the recommended wastewater system will consist of a low pressure sewer system, interim pump station and force main to a wastewater treatment system, and a drainfield with nitrogen dilution area. The system also requires laterals and grinder pumps to be installed on individual customers' properties. **Table 22** summarizes the preliminarily assessed associated costs for the recommended system.

TABLE 22: WASTEWATER SYSTEM CAPITAL COSTS

| Wastewater System Summary | |
|---|---|
| **Item** | **Total** |
| Design, Permitting, & Surveying | $ 1,594,800.00 |
| Collection System | $ 3,729,500.00 |
| Treatment and Disposal System | $ 3,150,000.00 |
| Individual Parcel Improvements | $ 1,952,000.00 |
| Road Restoration & Site Work | $ 1,800,000.00 |
| **Total Capital Costs** | **$12,226,000.00** |
| **Low Range Estimate (-20%)** | $9,781,000 |
| **High Range Estimate (+30%)** | $15,894,000 |

As outlined above, there is a cost associated with individual parcels including the installation of the grinder pump, modification to the house lateral connection and construction of a 1-1/4" pressure service lateral. In addition, there will be costs associated with the proper abandonment of the existing systems. For the purpose of this feasibility study, the connection cost for each parcel includes the installation of the LPS equipment. This includes the grinder pump and tank, valve assembly, and service line and lateral connection piping, and electrical components. A typical low pressure system lateral connection is shown in **Figure 23**.

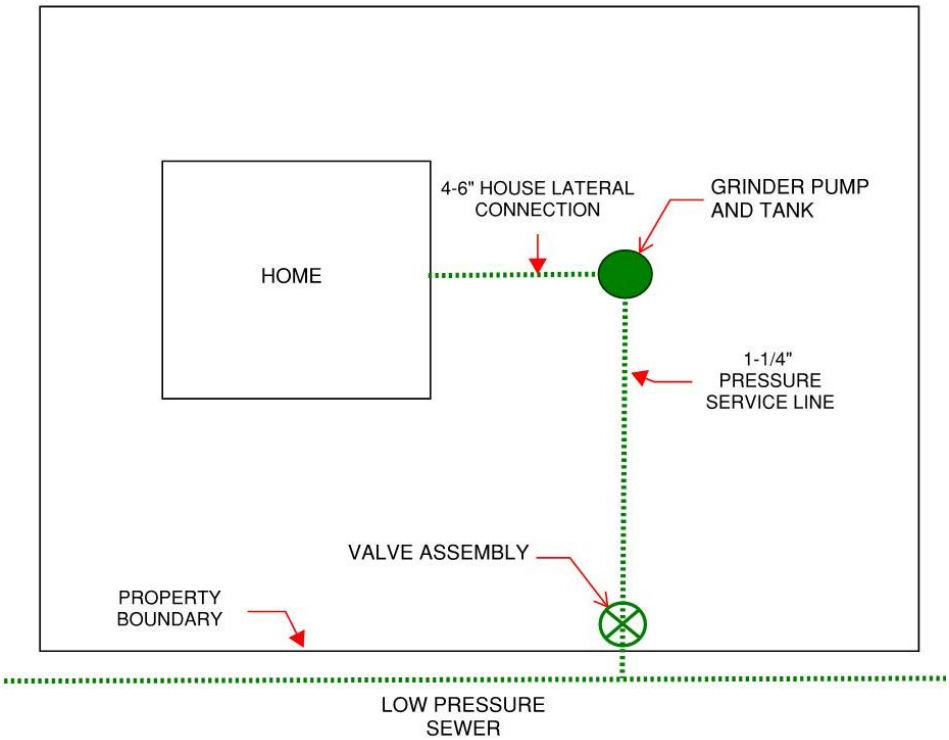



**FIGURE 23: LOW PRESSURE SYSTEM LATERAL CONNECTION**

Homeowners will also need to properly abandon existing septic systems prior to connecting to the wastewater collection system. There are multiple factors that impact the cost of septic abandonment. These factors include tank size, distribution piping, drainfield size and type, and location. Costs of septic abandonment typically range from $1,000 to $5,000. For the purpose of this feasibility study, it will be assumed that septic abandonment will cost $5,000. Owners will need to obtain a Sewage Disposal System Abandonment Permit from Loudoun County. There is no fee associated with this permit.

The total cost estimated for these individual parcel improvements is approximately $16,000 per parcel as shown in the summary above.

Wastewater Operation and Maintenance Costs

For the wastewater system, the interim pump station will require monitoring to prevent failure or overflow. Additionally, the MBR treatment system will require removal of sludge, regular maintenance to ensure proper system functionality and upkeep to prevent failure. There is little associated cost of maintaining the drainfields.

There are also costs associated with the upkeep of the LPS system, specifically as it relates to the grinder pumps. In addition, operating and maintaining the interim pump station will require operator effort and time. The time and effort required for the interim pumping station has been included while the individual costs for each grinder pump has not been included.

The estimated operation and maintenance costs for the wastewater system includes maintenance of parts, operator time, routine maintenance and power costs. The preliminary operation and maintenance cost estimate for the wastewater system is shown in **Table 23**.

TABLE 23: MBR TREATMENT WASTEWATER SYSTEM O&M COSTS

| Estimated O&M Costs for a Wastewater System | | |
|---|---|---|
| **Estimated Maintenance Costs** | | |
| **Item** | **Unit** | **Cost** |
| Maintenance Parts (consumables/repair) | $/year | $21,000 |
| General Equipment Maintenance[1] | Per year | $77,330 |
| Facility Maintenance[2] | Per year | $2,150 |
| Pump Station Maintenance Parts | Per year | $3,250 |
| **Estimated Operational Costs** | | |
| **Item** | **Unit** | **Cost** |
| WWTP Standard Operating Personnel[3] | $/year | $67,018 |
| Pump Station Operating Expenses | $/year | $44,678 |
| Routine Maintenance[4] | $/year | $11,170 |
| Power Cost[5] | Per year | $11,900 |
| Chemicals | $/year | $2,000 |
| Sludge Hauling[6] | $/year | $5,000 |
| **Total** | | **$245,000** |
| **Low Range Estimate (-20%)** | | $196,000 |
| **High Range Estimate (+30%)** | | $319,000 |

[1]Includes costs associated with monthly, annual and semi-annual maintenance of treatment equipment

[2]Includes maintenance costs associated with the treatment facility including leaf removal, grass trimming, etc…

[3]The cost of 1 operator for three (3) four (4) hour visits per week at $107.40 per hour. Pump Station Expenses assume two (2) four (4) hour visits per week.

[4]Time spent in addition to standard maintenance to maintain technology specific equipment. Assumes 2 hour per week at $107.40 per hour

[5]Assumes 250 kWh/day at $0.13/kWh for both Pump Station and WWTP

[6]Assumes $2500/haul of 5,000 gallons

## Cost Summary

The cost estimates outlined above represent a preliminary opinion of probable construction cost (OPCC) for the current homeowners. The OPCC prepared for this feasibility is considered an Association for the Advancement of Cost Engineering International's (AACE) Class IV cost estimate which is used for detailed strategic planning for economic and technical feasibility. The Class IV estimate prepared includes a range for the estimate of -20% and 30%. The cost estimates developed as part of this study are based on the assumptions outlined throughout the report. This includes the community boundary, drainfield location, drainfield size and treatment type. Costs will be further refined as the project progresses through the Commission Permit process and enters into preliminary design.

The capital costs for both projects are shown in **Table 24** below. Soft costs, totaling 15% of the total capital costs are included, as shown in the above tables for design, permitting and surveying. In addition to these capital costs, land acquisition costs need to be considered. It is assumed that 35 acres total would be necessary, which would include the interim pump station, water treatment plant, wastewater treatment plant, drainfield and dilution area. This land area would serve only the existing Paeonian Springs residents. Should treatment capacity (water and sewer) be sized to account for potential future flows and demands within the community, 55 acres would be required. This additional land requirement would increase capital costs by approximately $600,000, which would represent a 2.5% increase in total capital costs.

TABLE 24: CAPITAL COST SUMMARY

| Paeonian Springs Water/Wastewater Cost Summary | |
|---|---|
| **Item** | **Total** |
| Water System | $10,580,000.00 |
| Wastewater System | $12,226,000.00 |
| **Capital Cost Total** | **$22,800,000.00** |
| **Low Range Estimate (-20%)** | $18,200,000.00 |
| **High Range Estimate (+30%)** | $29,600,000.00 |
| **Land Acquisition (35 Acres @ $30,000/acre)** | $1,100,000.00 |
| **Project Total (Including Capital Cost, Soft Cost and LA)** | **$23,900,000.00** |

**Table 25** summarizes the life cycle analysis of community well and water treatment facility, water conveyance system, wastewater treatment facility, wastewater collection system, and all associated O&M costs mentioned in this study. The analysis accounts for a 30 year life cycle with a 3% interest.

TABLE 25: PRESENT WORTH ANALYSIS

| Present Worth Analysis | | |
|---|---|---|
| | Full Build-Out | |
| **Disposal Method** | **Water System** | **Wastewater System** |
| **Initial Capital Cost** | $9,200,000.00 | $10,600,000.00 |
| **Yearly O&M Costs** | $108,000.00 | $245,000.00 |
| **Lifecycle (yrs)** | 30 | 30 |
| **Interest Rate** | 3% | 3% |
| **Net Present Cost** | $11,300,000.00 | $15,400,000.00 |

## Project Schedule

An implementation schedule is dependent on the design, permitting and approval process with outside stakeholders. For the purposes of this report, it is being assumed that prior to Notice to Proceed (NTP) for design, the necessary land acquisition has taken place.

TABLE 26: ESTIMATED SCHEDULE

| Description | Approximate Date |
|---|---|
| Notice to Proceed | 0 days, NTP |
| Complete Survey and Preliminary Design Initiated | 12 weeks |
| Submit 60% Design Drawings and Specifications | 28 weeks |
| Submit 90% Design Drawings and Specifications | 36 weeks |
| Submit 100% Design Drawings and Specifications | 44 weeks |
| Receive Necessary Approvals and Permits | 48 weeks |
| Advertise for Bids | 54 weeks |
| Award Contract and Issue Notice to Proceed | 58 weeks |
| Water Distribution/Wastewater Collection System Completed | 110 weeks |
| Pump Station Construction Completion | 136 weeks |
| Force Main Completion – Construction Completed | 154 weeks |
| Water/Wastewater Treatment Plants Completed | 180 weeks |
| System Startup and Functional Testing | 196 weeks |

# Section 8 – Summary & Conclusions

Based on this evaluation, two (2) alternatives, one (1) water system and one (1) wastewater system, were determined to be the most feasible options to address ongoing water and wastewater concerns within Paeonian Springs.

Water System – Alternative #2

For the water system, a well site with greensand filtration and chlorine injection is preferred. Per LW EDM requirements, three (3) wells will be required.

Relative to the other alternatives, Alternative #2 offers a practical and feasible alternative to provide the community with drinking water. This alternative does not require extensive construction or community disruption outside of the vicinity of Paeonian Springs. Furthermore, this system will ensure the health of the community.

Wastewater System – Alternative #2

For the wastewater collection system, a low pressure system with a community treatment facility is preferred. This alternative would facilitate sewage collection and proper treatment.

For both water and wastewater systems, continued use of existing facilities will be very challenging for Paeonian Springs. Many systems are non-compliant with VDH regulations, posing a health risk to members of the community. Furthermore, connection to a nearby utility would entail high capital costs, extensive land acquisition and approval processes, while a new surface water discharging facility does not appear to be feasible due to the need for nutrient credits.

# Appendix A

Soil Investigation Technical Memorandum

Dewberry

**MEMORANDUM**

**Date:** October 15, 2018 (Updated 3/26/2019)

**To:** Chris Mata, P.E. – Loudoun Water

**From:** Paul Longo, P.E. - Dewberry

**Subject:** Paeonian Springs Soil Investigation Technical Memorandum

## Background Information:

Paeonian Springs is an unincorporated community located in the rural policy area of Loudoun County, Virginia. The community is not defined by any formal boundary and has applied to the Loudoun County Water and Wastewater Program as a consortium of homeowners and businesses. The consortium consists of 122 parcels of the 216 parcels that make up Paeonian Springs.

The community currently has no public sanitary sewer system and each lot is served by individual, on-site wastewater treatment facilities, such as conventional and alternative onsite sewage systems, pump and haul and privy systems. The Environmental Protection Agency estimates a 15 year lifespan of alternative onsite sewage systems. Many of the parcels within the consortium have systems that have been in use for 15+ years. With the combination of small lots, and aging wastewater systems, the Loudoun County Health Department is in support of establishing a central wastewater system for the community (**Attachment 4**).

Paeonian Springs submitted an application to the Loudoun County Water and Wastewater Program for assistance in addressing their current water and wastewater issues. This program is administered by Loudoun County in partnership with Loudoun Water and is designed to address community water and wastewater problems in Loudoun County. Loudoun Water contracted with Dewberry through the County's Water and Wastewater Program to determine the feasibility of a community wastewater system for Paeonian Springs. Part of this feasibility study requires determining the optimal location for a potential wastewater treatment plant, mass drainfield, reserve drainfield, and dilution area for the community. Dewberry contracted with Marsh & Legge Land Surveyors, P.L.C. to conduct desktop soil evaluations of ten (10) potential parcels that are approximately fifty (50) acres or more for the system location. The purpose of this technical memorandum is to provide Loudoun Water with twenty-five (25) parcels, from which 10 are selected as candidates of further investigation.

## Flow Scenarios:

A sewage flow estimate is required to properly size the treatment and disposal system for the community. In determining the potential parcels, the unique characteristics of Paeonian Springs zoning were taken into account. According to Loudoun County General Plans, Paeonian Springs is a Village. This characterization means the County limits growth in and around this area. New residential and non-residential development is limited to uses that are compatible with the existing structure and development patterns. Additionally, the County will only allow compatible development to occur within villages that have adequate public facilities.

Looking forward in the Draft Loudoun Comprehensive Plan (version date: May 7,2018), Paeonian Springs is characterized as a Rural Village. The County's approach for rural villages is to limit new residential, business, and commercial activities to uses that are compatible with the historic development patterns, community character, and visual identity of the individual villages. New development is intended to preserve open space and maintain the character of rural areas.

Due to the unique characteristics of the zoning of Paeonian Springs, it is not expected that the community will substantially increase in density. Therefore, two scenarios were developed to determine the amount of

land required to hold a wastewater treatment facility, drainfield, reserve drainfield, and nitrogen dilution area. A description of each scenario is written below:

- **Current Build-Out**: Scenario 1 assumes that 122 parcels with structures greater than 120 cubic feet connect to the sanitary sewer system. The current build-out case only includes parcels that have structures greater than 120 cubic feet. This scenario eliminates vacant parcels (no structure) and parcels that contain sheds and other small buildings not in need of a sewage connection.
- **Projected Build-Out**: Scenario 2 assumes that all parcels (216) are occupied and connect to the system.

It is not expected that all 216 parcels will connect to the community system. There are parcels within Paeonian Springs with newer homes and recently installed individual septic systems. These particular parcels have septic systems that have been in use for less than the average lifespan of 15 years. Other parcels in the community have adequate land to install a new septic system. These parcels will be further investigated in the Paeonian Springs Feasibility Report.

VDEQ assumes that a typical household has an estimated flow of 300 to 350 gallons per day (gpd), or 100 gallons per day per person. A conservative flow of 300 gpd per occupied parcel (Scenario 1) and total parcels (Scenario 2) was used. **Table 1** provides the flow estimate for the current build-out. **Table 2** provides the flow estimate for the projected build-out.

**Table 1: Scenario 1 – Current Build-Out**

| Current Build-Out | | | | |
|---|---|---|---|---|
| | **Quantity** | **Demand[1]** | **Unit** | **Estimated Flow (gpd)** |
| **Eligible Structures** | | | | |
| Parcels | 115 | 300 | gpd/dwelling | 34,500 |
| Restaurant/Market | 20 | 50 | gpd/seat | 1,000 |
| Commercial | 10,406 | 0.16 | gpd/sq. ft. | 1,665 |
| Gas Station | 500 | 10 | gpd/vehicle | 5,000 |
| Total | | | | 42,165 |

[1]Contributing sewage flow demands were taken from the SCAT regulations

**Table2: Scenario 2 – Projected Build-Out**

| Projected Build-Out | | | | |
|---|---|---|---|---|
| | **Quantity** | **Demand[1]** | **Unit** | **Estimated Flow (gpd)** |
| **Eligible Structures** | | | | |
| Parcels | 209 | 300 | gpd/dwelling | 62,700 |
| Restaurant/Market | 20 | 50 | gpd/seat | 1,000 |
| Commercial | 10,406 | 0.16 | gpd/sq. ft. | 1,665 |
| Gas Station | 500 | 10 | gpd/vehicle | 5,000 |
| Total | | | | 70,365 |

[1]Contributing sewage flow demands were taken from the SCAT regulations

## Disposal Limits:

A nitrogen dilution buffer area will need to surround the proposed drainfield site. A nitrogen dilution buffer area is the land immediately adjacent to the drainfield that is used to dilute the nitrogen concentration in the treated effluent. The size of the nitrogen dilution area is based on the TN concentration of the treated effluent, existing nitrogen concentration in the ground water, design flow, inches of rainfall per year, and infiltration rate. According to the Virginia Department of Health (VDH) Regulations for Alternative Onsite Sewage Systems (12VAC5-613-90B), TN concentration in the groundwater cannot exceed 5 mg/L at the project boundary (edge of dilution area) (**Attachment 3**).

For the purpose of this technical memorandum, it is assumed that the treatment technology selected is capable of meeting treatment level 3 (TL-3) requirements. TL-3 requirements were selected based on the GMP 2013-01 (**Attachment 3**). This regulation requires large alternative onsite sewage systems (AOSS) with flows greater than 10,000 gallons per day of effluent quality of 8 mg/l TN or compliance with 5 mg/l TN within 24 inches of the point of effluent application in the soil. **Table 3** below shows the TL-3 effluent quality limits.

**Table 3: Required Effluent Quality[1]**

| BOD | TSS | TN |
|---|---|---|
| 10 mg/L | 10 mg/L | 8 mg/L |

[1]Required effluent quality at the WWTP discharge

## Drainfield and Dilution Area:

The land required for the drainfield, reserve drainfield, and dilution areas are dependent on the flow and treatment level of the effluent leaving the treatment plant. The VDH GMP 1995-02 was used to calculate the estimated land requirements for each scenario. This method is based on the inches of rainfall per year, infiltration rate, pre-existing TN concentration, and design flow. This calculation assumes that the TN concentration at the effluent pipe is 8 mg/L and there is no pre-existing TN concentration. The estimated land requirements for each scenario is shown in **Table 4**:

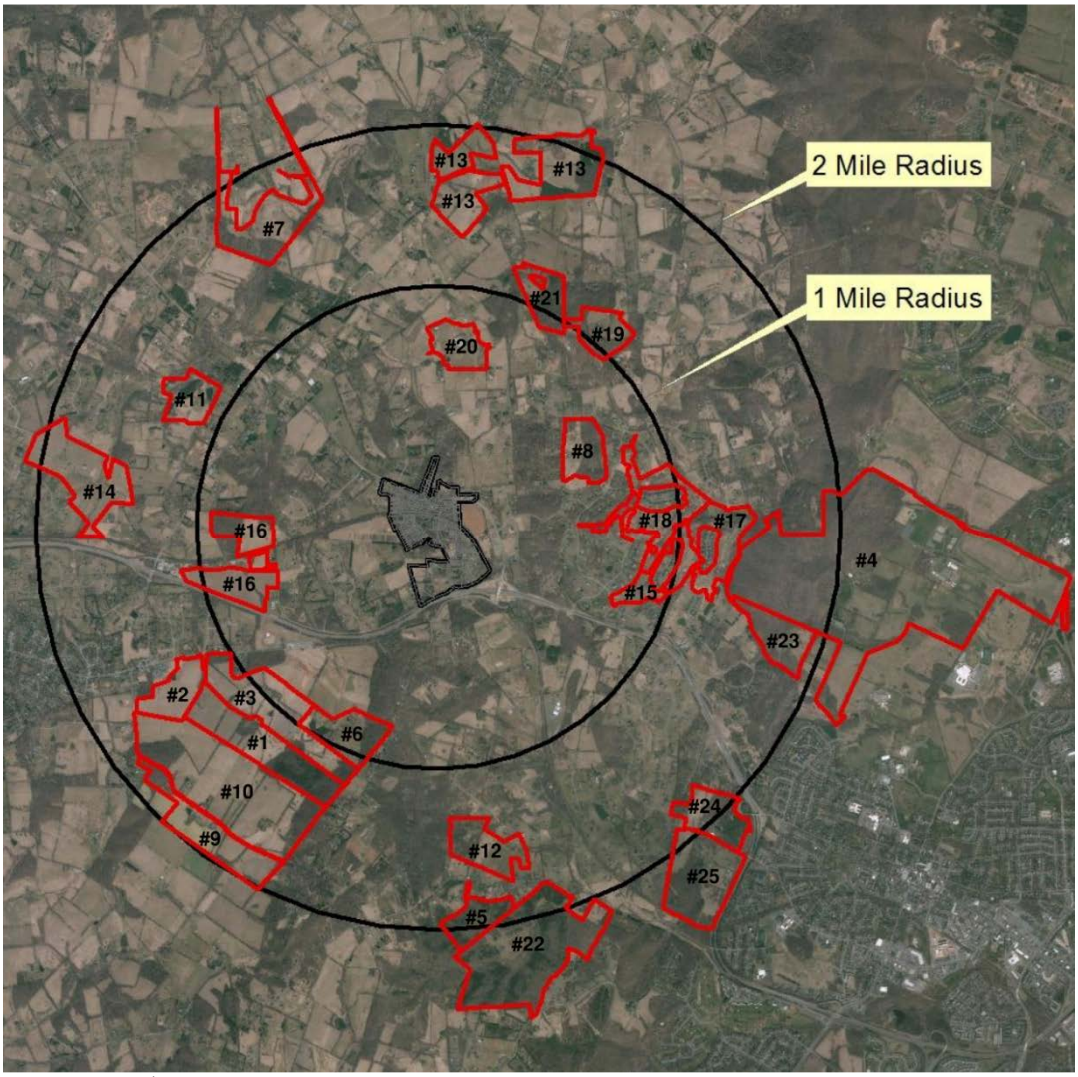
**Table 4: Estimated Land Requirements[1]**

| Scenario | Flow (gpd) | TN at Effluent | Land Required (acres)[2] |
|---|---|---|---|
| Current Build-Out | 42,700 | 8 mg/L | 32 |
| Projected Build-Out | 70,900 | 8 mg/L | 52 |

[1]Assumes the treatment plant selected is capable of providing TL-3 treatment. Higher level of treatment will reduce land requirements.
[2]Land requirements include the drainfield, 100% reserve drainfield, dilution area, and wastewater treatment plant

## Potential Parcels:

Dewberry conducted a desktop analysis of parcels near and within the community of Paeonian Springs that may be suitable for a drainfield and dilution area given the two different flow scenarios and the estimated land requirements. The parcels that were investigated were within two (2) miles of the Paeonian Springs study boundary and were 50+ acres. As illustrated in **Table 4** above, approximately 50 acres is required for the projected build-scenario. With this criteria, twenty-five (25) parcels, depicted in **Figure 1**, have been identified as feasible alternatives for the Paeonian Springs wastewater treatment plant, mass drainfield, and nitrogen dilution area. All parcels were outside of the Paeonian Springs study area. No parcels within the study area of Paeonian Springs are 50+ acres.




[1] Parcel numbers were generated by Dewberry and serve no purpose other than identification.

**Figure 1: Parcels within 2 Miles of the Study Area and 50+ Acres**

When selecting ten (10) parcels for soil investigation, it is important to consider the size of the parcel, existing and abandoned wells and drainfields, existing structures, streams and water bodies, and topography. Detailed maps of the twenty-five (25) individual parcels with the above data are provided in **Attachment 1.** These parcels are summarized in the table below.

**Table 5: Parcels within 2 Miles of the Study Area 50+ Acres**

| Parcel Number [1] | Parcel ID | Parcel Size | Distance from Paeonian (mi) [2] |
|---|---|---|---|
| 1 | 383404530000 | 144.13 | 1.3 |
| 2 | 382282803000 | 60 | 1.7 |
| 3 | 347464901000 | 144.13 | 1 |
| 4[3] | 228179141000 | 932.429 | 1.5 |
| 5 | 310261450000 | 50 | 1.9 |
| 6 | 347477942000 | 72.12 | 0.75 |
| 7 | 378108230000 | 122.04 | 1.7 |
| 8 | 306193182000 | 57.97 | 0.5 |
| 9 | 383189120000 | 108.699 | 1.9 |
| 10 | 383388802000 | 313.44 | 1.5 |
| 11 | 380386344000 | 52.86 | 1.2 |
| 12 | 310463273000 | 71.889 | 1.4 |
| 13 | 304283694000 | 223.048 | 1.4 |
| 14 | 417408338000 | 131.085 | 1.5 |
| 15 | 268165446000 | 52.918 | 0.8 |
| 16 | 381207702000 | 111.456 | 0.7 |
| 17 | 268381526000 | 75.196 | 1.3 |
| 18 | 268359708000 | 94.588 | 0.65 |
| 19 | 305100979000 | 50.567 | 1.2 |
| 20 | 305153928000 | 53.542 | 0.56 |
| 21 | 305281781000 | 53.222 | 1 |
| 22 | 310174360000 | 265.724 | 1.9 |
| 23 | 269303432000 | 67.35 | 1.5 |
| 24 | 270178372000 | 67.781 | 1.9 |
| 25 | 271375565000 | 131.692 | 2 |

[1] Parcel numbers were generated by Dewberry and serve no purpose other than identification.

[2] Distance from Paeonian Springs measured as a straight line distance from community boundary to parcel boundary.

[3] Parcel #4 is Morven Park. This parcel should not be considered as it is a Historical Site.

As mentioned above, the TN concentration must be <5 mg/L at the project boundary (edge of dilution area). Therefore, it is better to have a larger parcel in order to have enough space for the treatment plant, drainfield, reserve drainfield, and nitrogen dilution area as well as consider the possibility of an increase in sanitary sewer connections in the future. It should be noted that based on the available parcels, size of the parcels, and existing soils, multiple parcels may need to be selected to fulfill the land requirements outlined above. This may require splitting effluent flow based on the parcel size and potential area for drainfields and dilution areas.

It is also important to consider the existing/abandoned wells, drainfields, structures, streams, and utilities that are on the property as they have specific setback requirements. The setback requirements for these selected features are listed in **Table 6** below. It is recommended to conduct additional research on these features in the property to determine the optimal sites for soil investigation.

**Table 6: Minimum Horizontal Separation Distances**

| Feature | Minimum Horizontal Distance[1] |
|---|---|
| Property Lines | 5 ft. |
| Building Foundations | 10 ft. |
| Drinking Wells | |
| Class IIIA or IIIB | 50 ft. |
| Class IIIC or IV | 100 ft. |
| Natural Lakes and Impounded Waters | 50 ft. |
| Streams | 50 ft. |
| Utility Lines | 10 ft. |

1 – Minimum Horizontal Separation Distances obtained from the Loudoun County Code of Ordinances, Chapter 1066 and VDH Sewage Handling and Disposal Regulations (SHDR)

The topography of the parcel is another consideration that should be accounted for when selecting the ten (10) parcels. A steep slope can increase the velocity of the sewage flow which allows for the water to leave the solids behind and create clogs in the piping. A flat slope can decrease the velocity and leave sewage behind.

## Conclusion:

Based on the estimated flows for the Paeonian Springs community, thirty-two (32) acres will be needed for the current build-out of the study area to handle a flow of 42,700 gpd and approximately fifty-two (52) acres will be needed for the future build-out of the study area to handle a flow of 70,900 gpd based on TL-3 effluent requirements. Twenty-five (25) parcels located within two (2) miles of the community were identified that had 50+ acres of land.

The twenty-five (25) 50+ acre parcels within two (2) miles of the community were shortlisted to ten (10) parcels. The parcels that were selected had suitable topography for a drainfield, a small number of existing structures (wells, drainfields, buildings) and limited water features. The parcel analysis of the twenty-five options is available in **Attachment 2**.

Based on twenty five parcels identified above (and shown in **Attachment 1),** Dewberry believes the following parcels are the most promising. These parcels had flatter slopes, are within 1.9 miles or less from Paeonian Springs, limited amount of water features, and have ten (10) or less existing structures (buildings, wells, drainfields).

**Table 7: Recommended Parcels**

| Parcel ID | Parcel Size (acres) |
|---|---|
| Parcel #1 - 383404530000 | 144.13 |
| Parcel #2 - 382282803000 | 60 |
| Parcel #5 - 310261450000 | 50 |
| Parcel #8 - 306193182000 | 57.97 |
| Parcel #10 - 383388802000 | 313.44 |
| Parcel #12 - 310463273000 | 71.89 |
| Parcel #13 - 304283694000 | 223.05 |
| Parcel #16 - 381207702000 | 111.46 |
| Parcel #21 - 305281781000 | 53.22 |
| Parcel #22 - 310174360000 | 265.72 |

Based on this summary, it is recommended that ten (10) of these parcels be selected for further soil investigation by Marsh and Legge to determine the suitability of the soils for a mass drainfield.

## Attachments:

**Attachment 1: Map Book of the Twenty-Five (25) Selected Parcels**

**Attachment 2: Parcel Analysis**

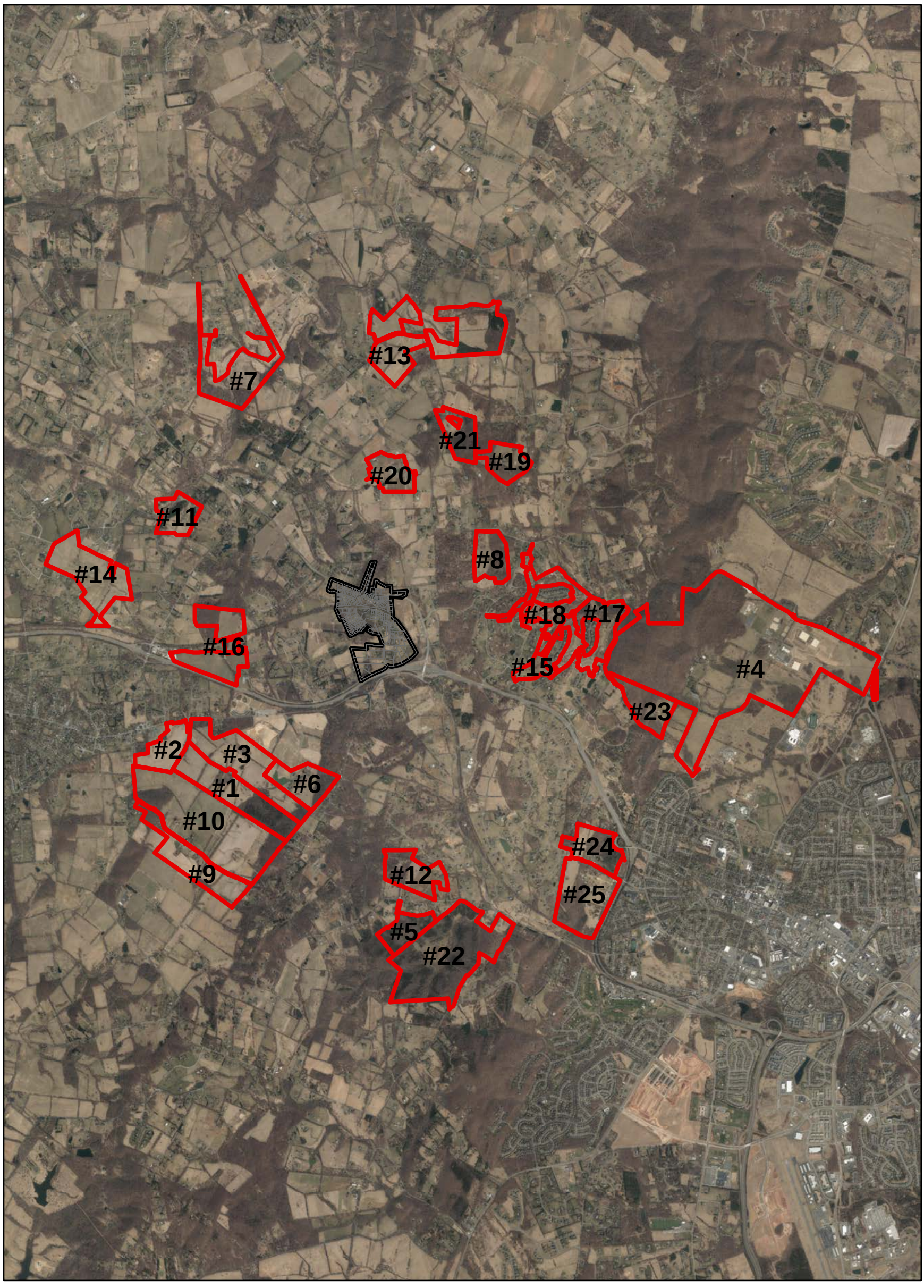
**Attachment 3: Regulatory Requirements**

**Attachment 4: Paeonian Springs Water and Wastewater Project Assistance Application**

# ATTACHMENT 1

# MAP BOOK OF THE TWENTY-FIVE (25) SELECTED PARCELS

# Potential Parcels Overview Map




N
W E
S

**Legend**

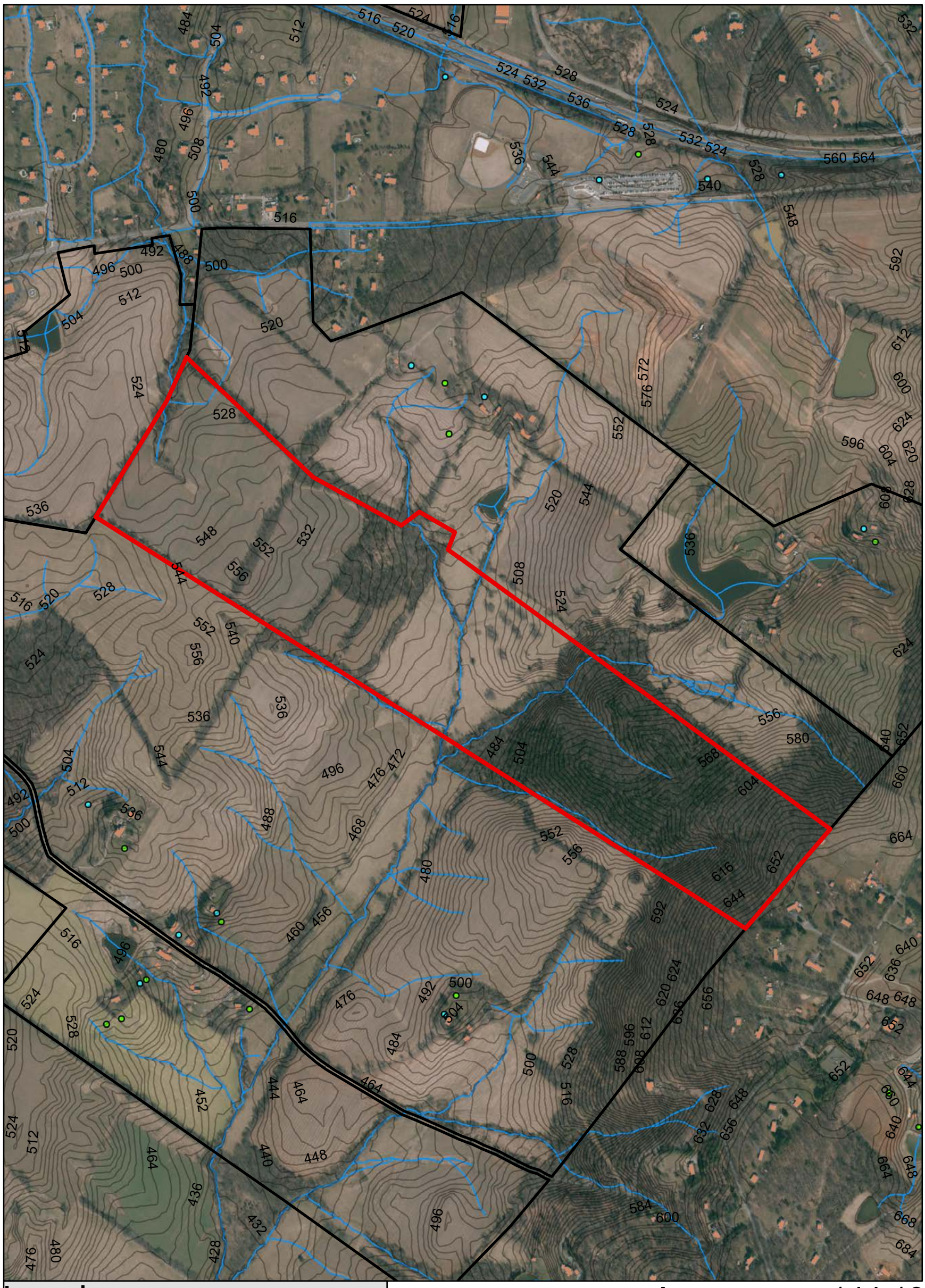
- Parcels within 2 miles and 50+ Acres
- Paeonian Boundary

Dewberry®

# Parcel ID: 383404530000

Parcel #1

Address: N/A



**Legend**

- Parcels within 2 miles and 50+ Acres
- Other Parcels within 2 miles and 50+ Acres
- Drainfields
- Wells
- Buildings
- Streams
- Paeonian Boundary

Acreage: 144.13

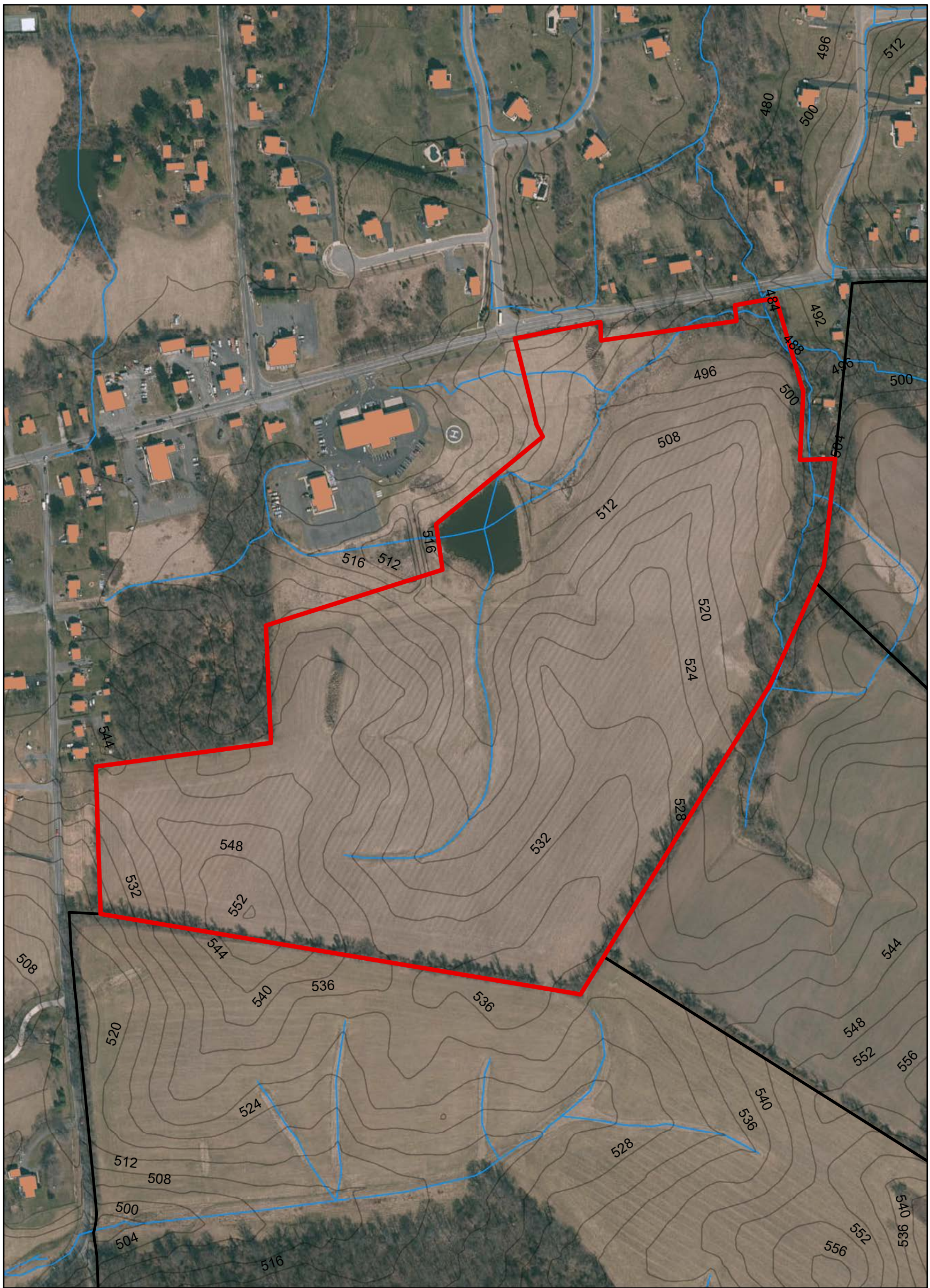
N
W E
S

Dewberry®

# Parcel ID: 382282803000

Parcel #2

Address: N/A




**Legend**

- Parcels within 2 miles and 50+ Acres
- Other Parcels within 2 miles and 50+ Acres
- Drainfields
- Wells
- Buildings
- Streams
- Paeonian Boundary

Acreage: 60

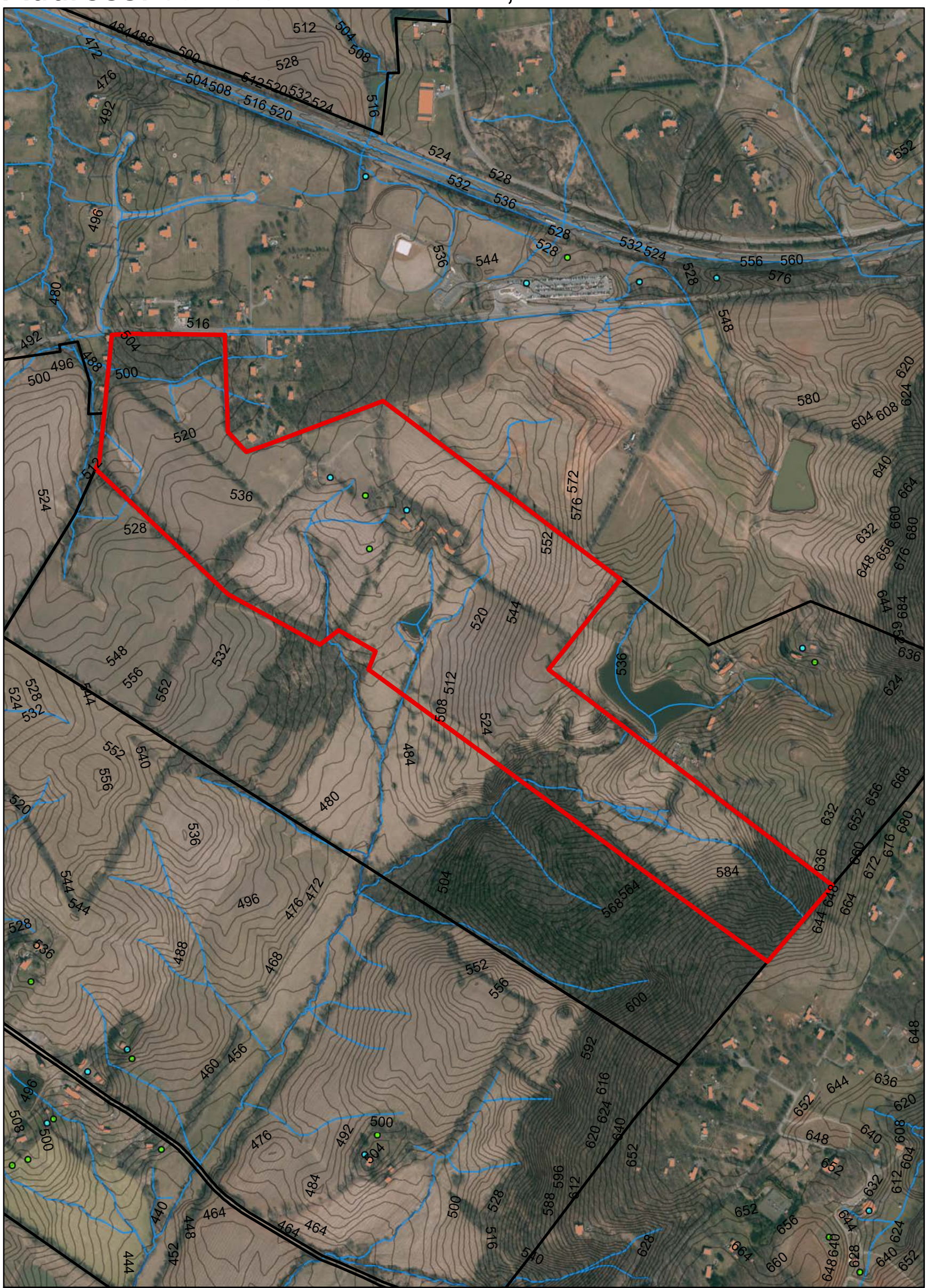
N
W E
S

Dewberry®

# Parcel ID: 347464901000

Parcel #3

Address: 39443 GABLE FARM LN, HAMILTON



**Legend**

- Parcels within 2 miles and 50+ Acres
- Other Parcels within 2 miles and 50+ Acres
- Drainfields
- Wells
- Buildings
- Streams
- Paeonian Boundary

Acreage: 144.13

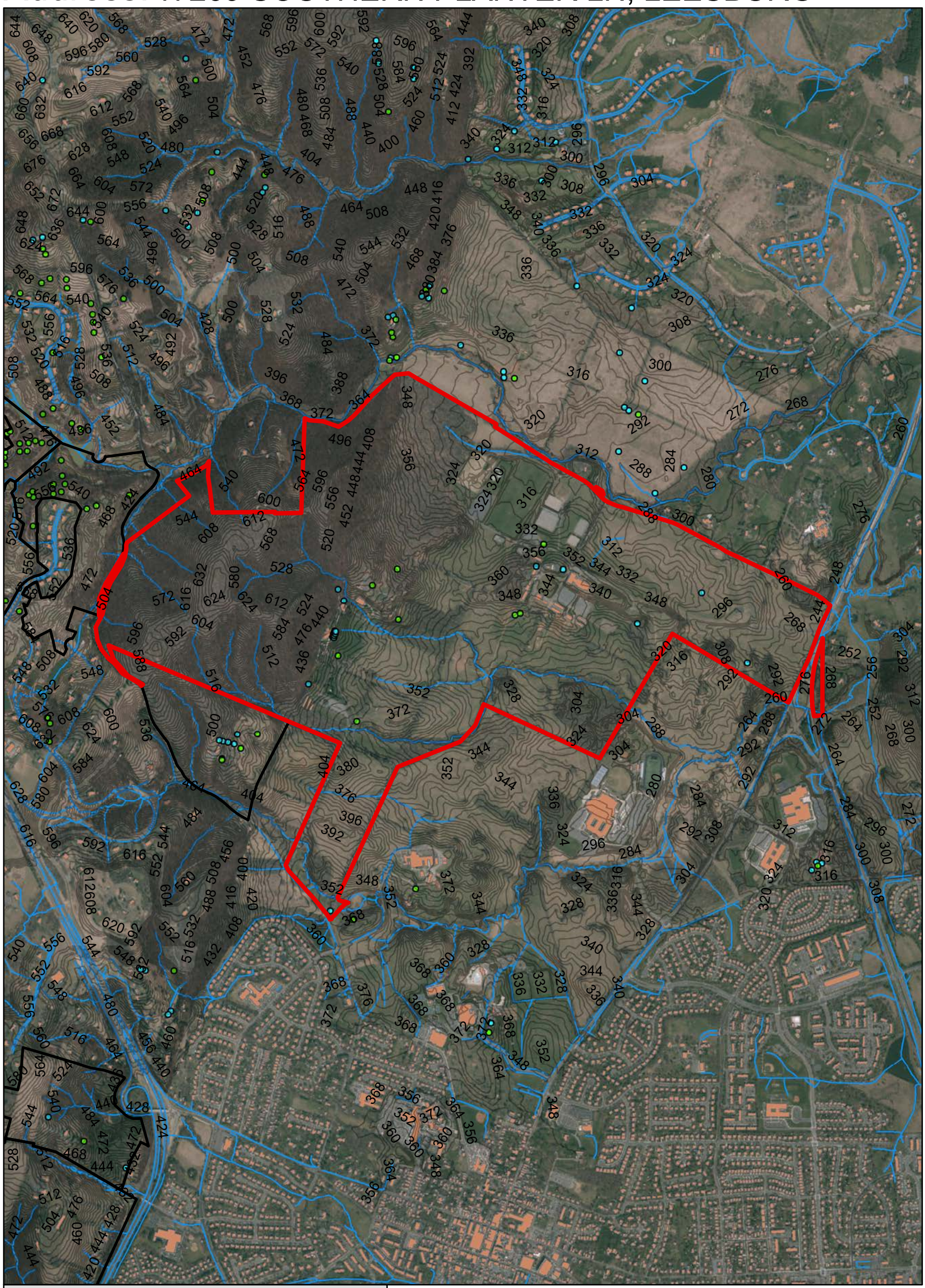
N
W E
S

Dewberry

# Parcel ID: 228179141000

Parcel #4

Address: 17269 SOUTHERN PLANTER LN, LEESBURG



**Legend**

- Parcels within 2 miles and 50+ Acres
- Other Parcels within 2 miles and 50+ Acres
- Drainfields
- Wells
- Buildings
- Streams
- Paeonian Boundary

Acreage: 932.429

N
W E
S

Dewberry®

# Parcel ID: 310261450000

Parcel #5

Address: N/A

**Legend**

- Parcels within 2 miles and 50+ Acres
- Other Parcels within 2 miles and 50+ Acres
- Drainfields
- Wells
- Buildings
- Streams
- Paeonian Boundary

Acreage: 50

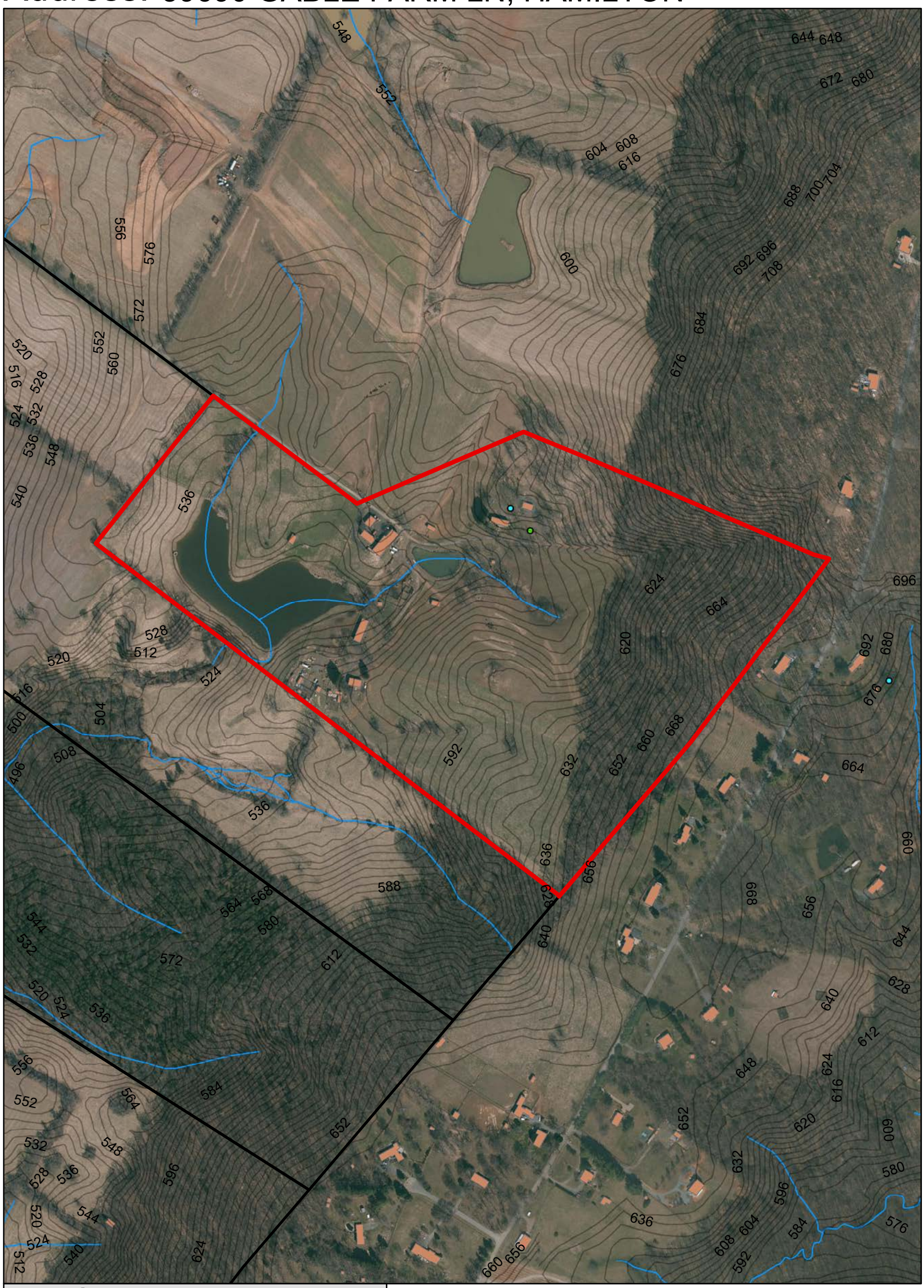
N
W E
S

Dewberry®

# Parcel ID: 347477942000

Parcel #6

Address: 39690 GABLE FARM LN, HAMILTON



**Legend**

- Parcels within 2 miles and 50+ Acres
- Other Parcels within 2 miles and 50+ Acres
- Drainfields
- Wells
- Buildings
- Streams
- Paeonian Boundary

Acreage: 72.12

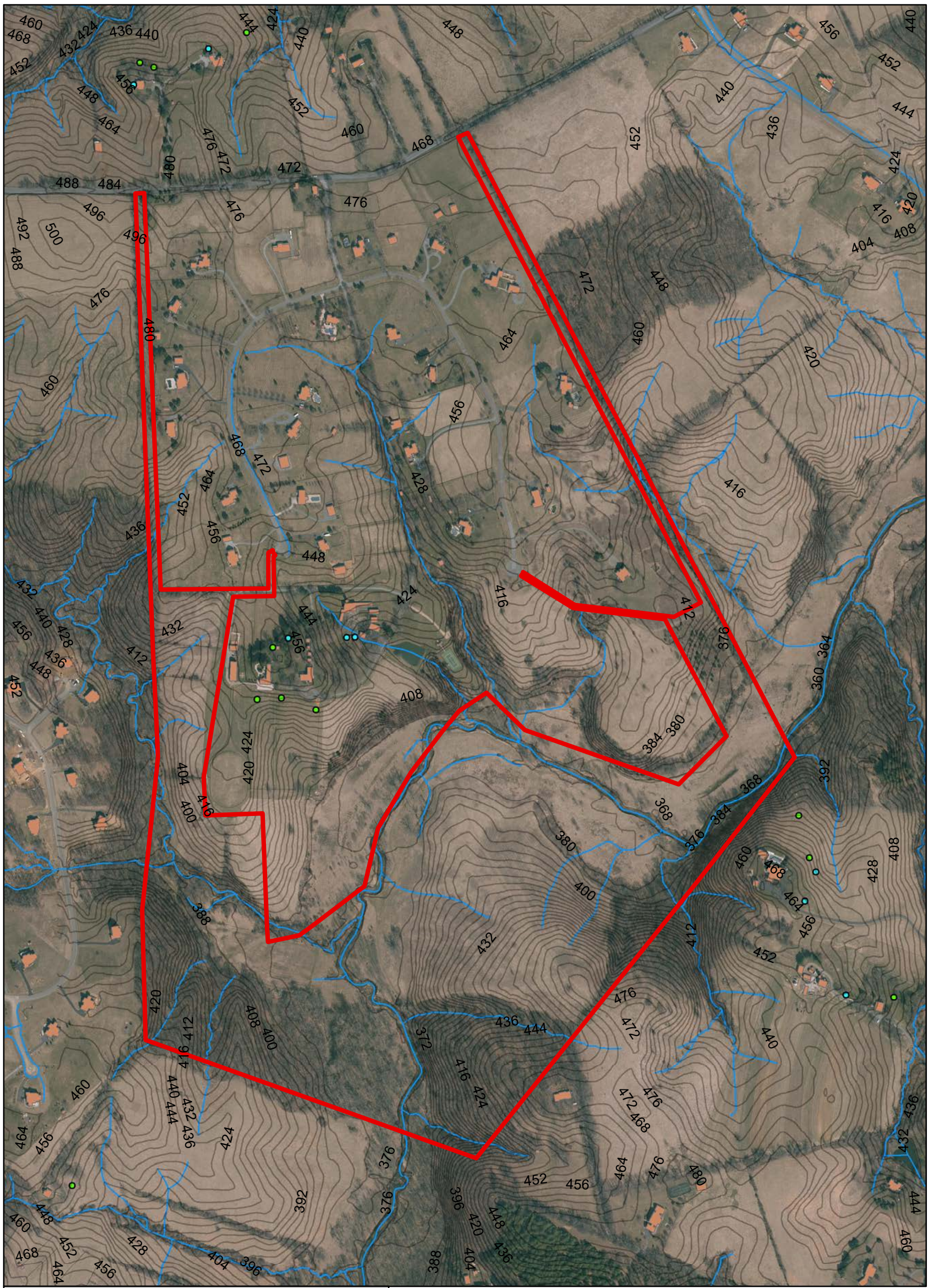
N
W E
S

Dewberry®

# Parcel ID: 378108230000

Parcel #7

Address: ROSEMONT FARM SUBDIVISION



**Legend**

- Parcels within 2 miles and 50+ Acres
- Other Parcels within 2 miles and 50+ Acres
- Drainfields
- Wells
- Buildings
- Streams
- Paeonian Boundary

Acreage: 122.04

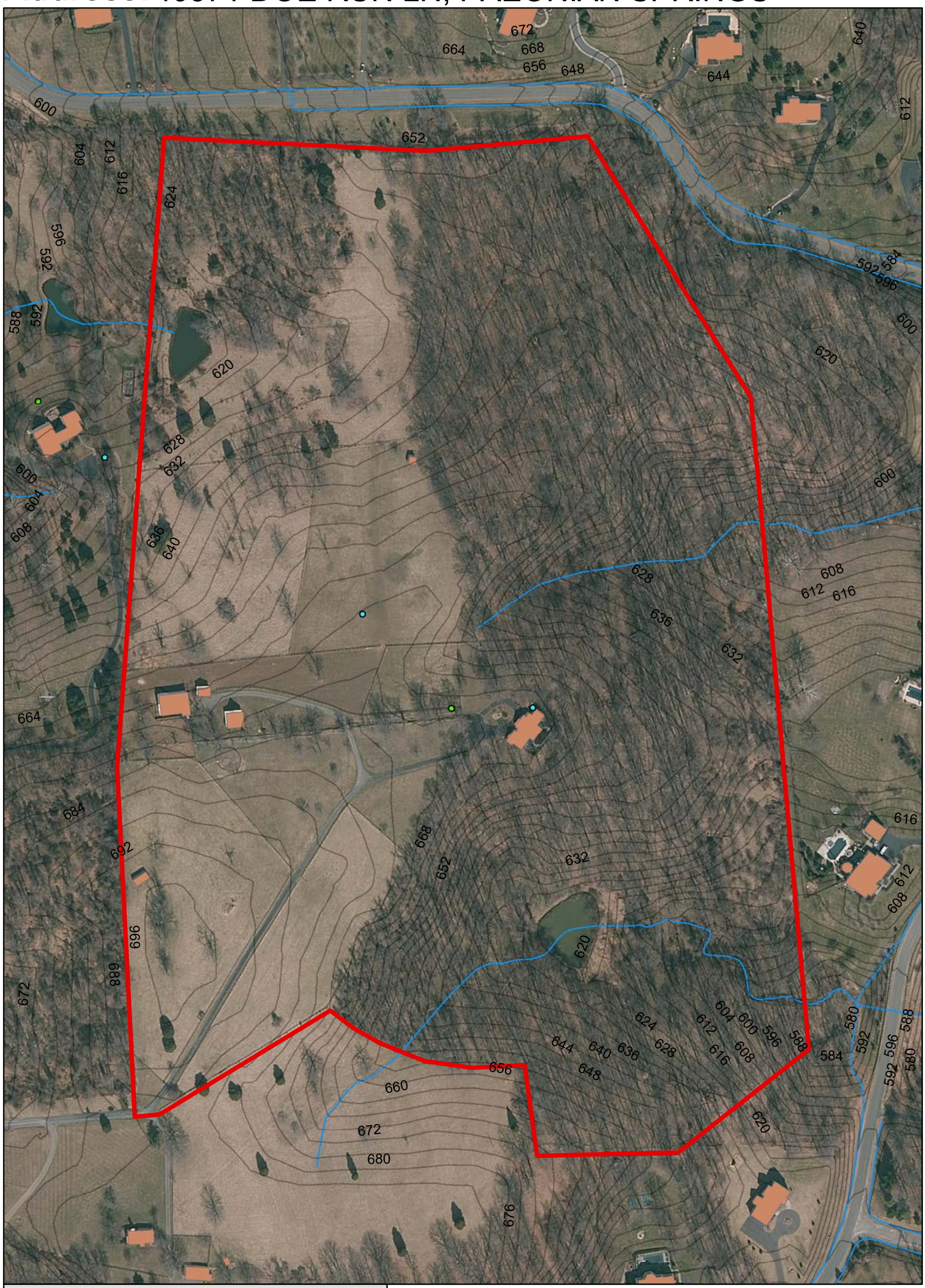
N
W E
S

Dewberry®

# Parcel ID: 306193182000

Parcel #8

Address: 40371 DOE RUN LN, PAEONIAN SPRINGS



**Legend**

- Parcels within 2 miles and 50+ Acres
- Other Parcels within 2 miles and 50+ Acres
- Drainfields
- Wells
- Buildings
- Streams
- Paeonian Boundary

Acreage: 57.97

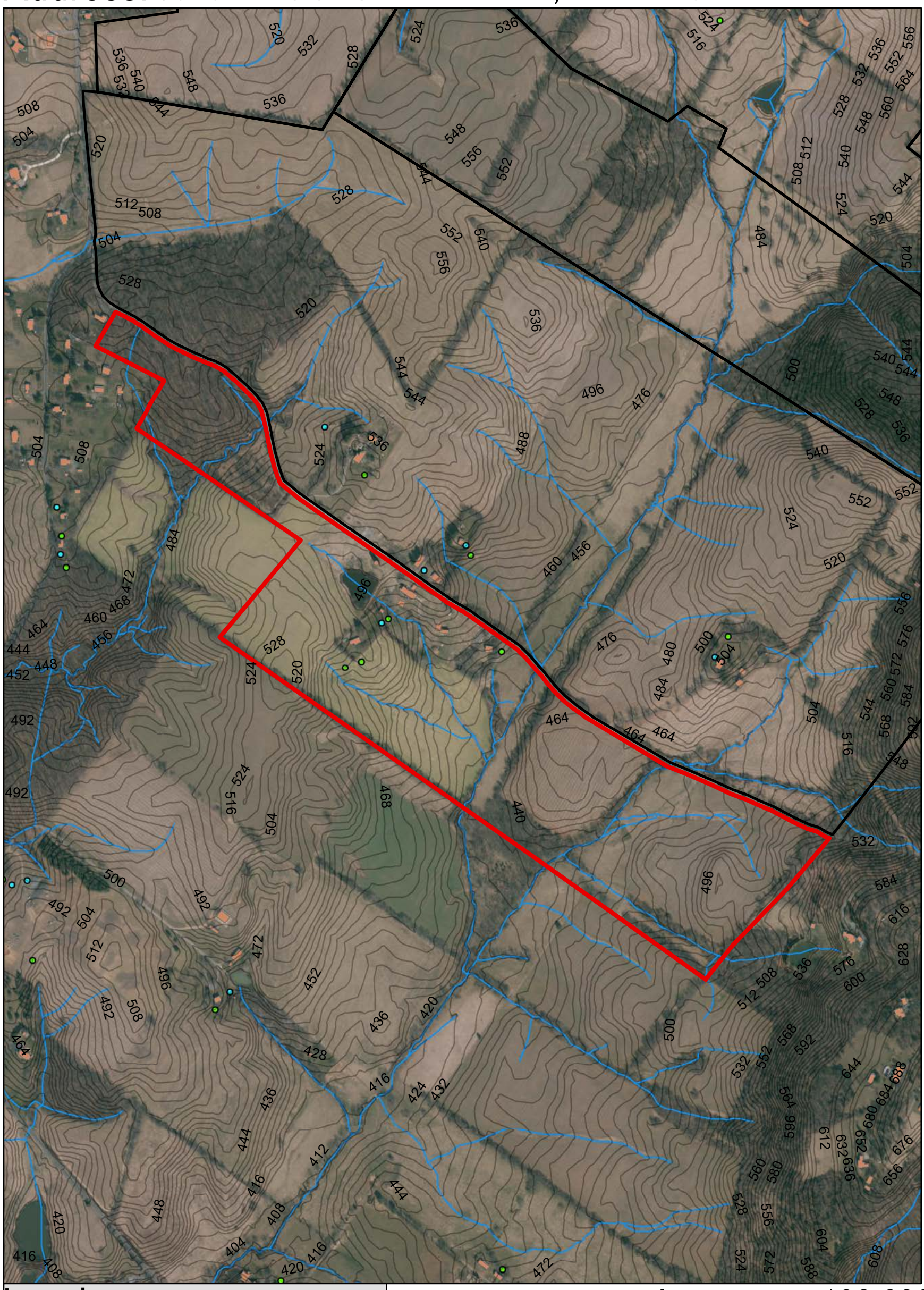
N
W E
S

Dewberry®

# Parcel ID: 383189120000

Parcel #9

Address: 39191 DIGGES VALLEY RD, HAMILTON



**Legend**

- Parcels within 2 miles and 50+ Acres
- Other Parcels within 2 miles and 50+ Acres
- Drainfields
- Wells
- Buildings
- Streams
- Paeonian Boundary

Acreage: 108.699

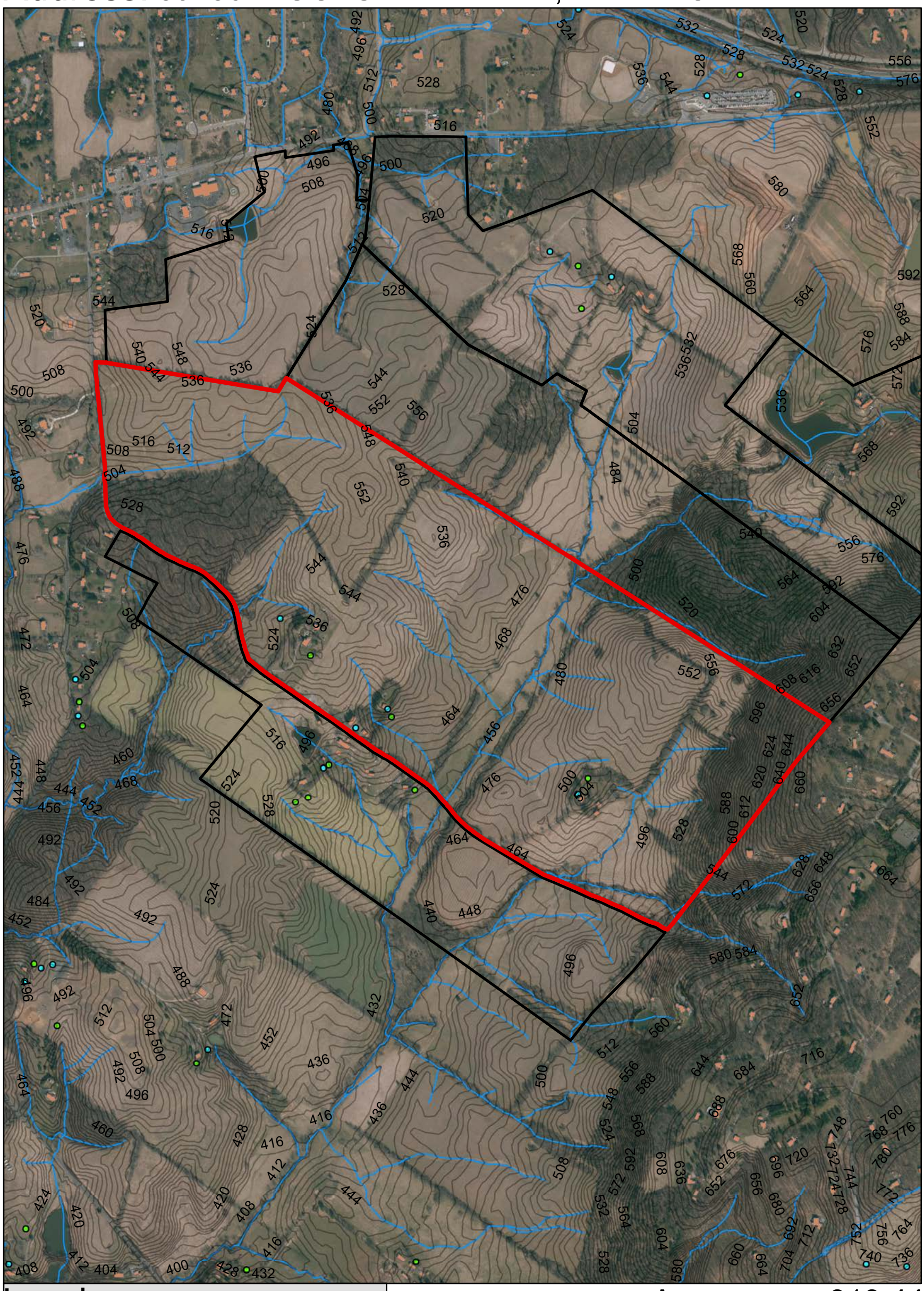
N
W E
S

Dewberry®

# Parcel ID: 383388802000

Parcel #10

Address: 39136 DIGGES VALLEY RD, HAMILTON



**Legend**

- Parcels within 2 miles and 50+ Acres
- Other Parcels within 2 miles and 50+ Acres
- Drainfields
- Wells
- Buildings
- Streams
- Paeonian Boundary

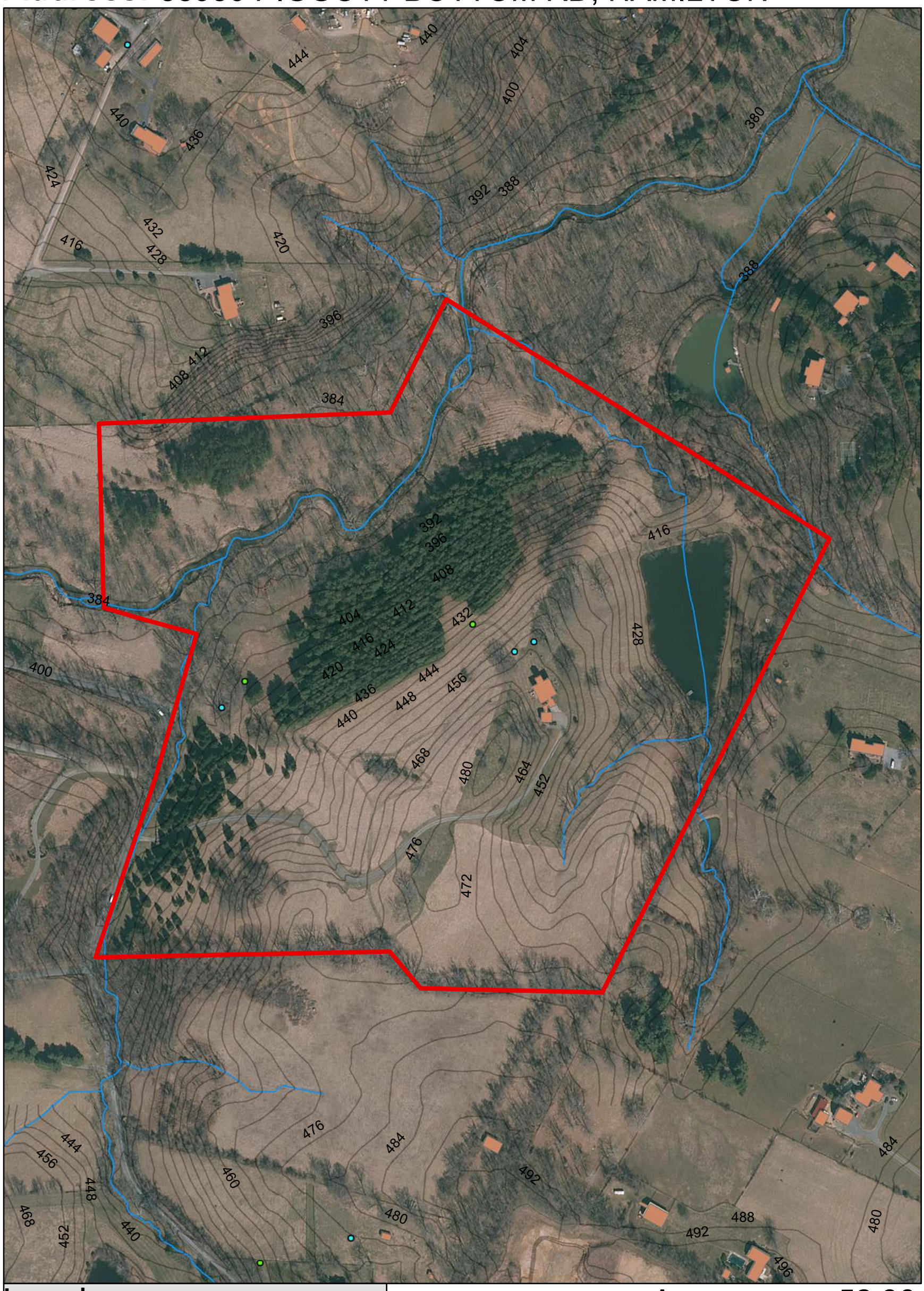
Acreage: 313.44

N
W E
S

Dewberry®

# Parcel ID: 380386344000 Parcel #11

Address: 38950 PIGGOTT BOTTOM RD, HAMILTON




**Legend**

- Parcels within 2 miles and 50+ Acres
- Other Parcels within 2 miles and 50+ Acres
- Drainfields
- Wells
- Buildings
- Streams
- Paeonian Boundary

Acreage: 52.86

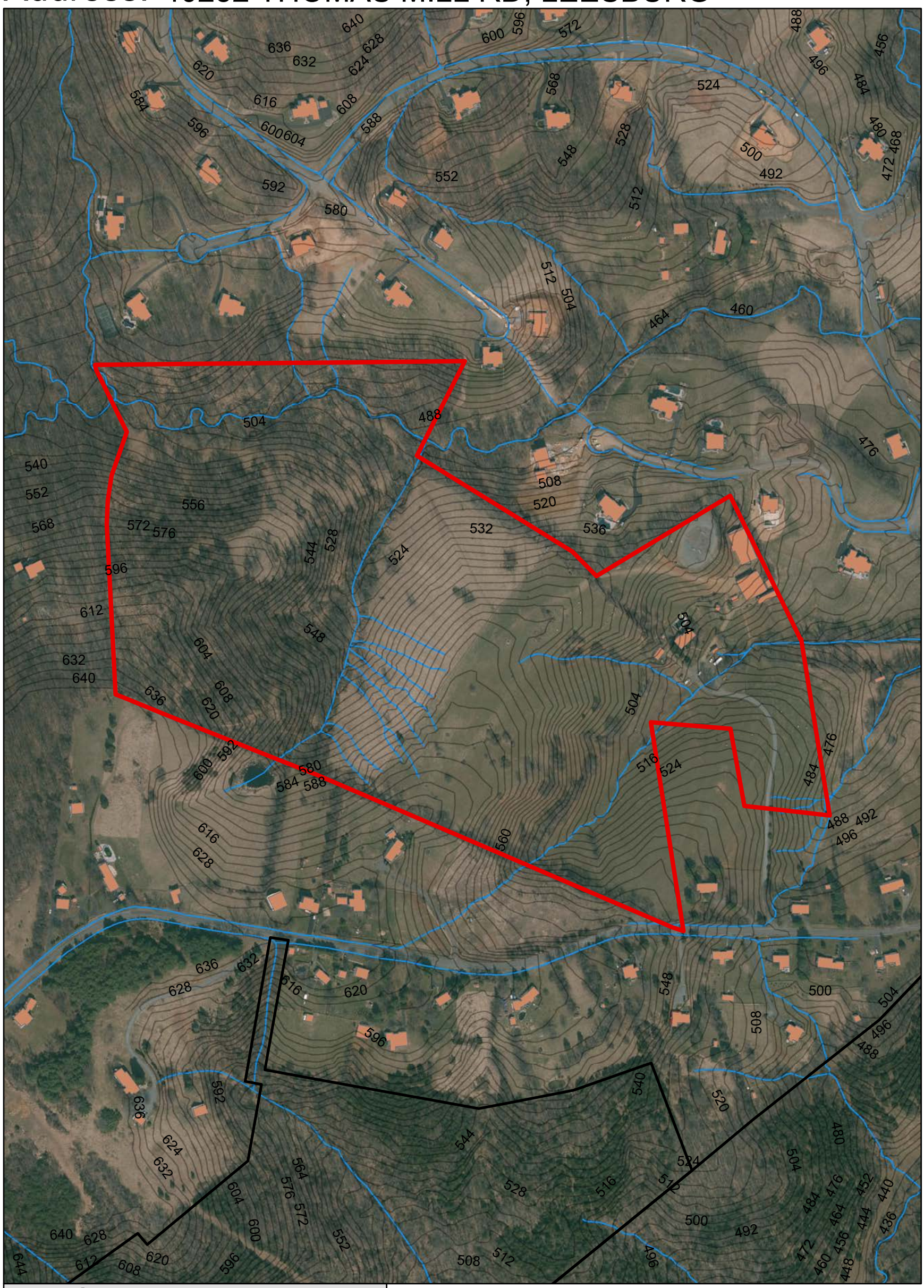
N
W E
S

Dewberry®

# Parcel ID: 310463273000

Parcel #12

Address: 40252 THOMAS MILL RD, LEESBURG



**Legend**

- Parcels within 2 miles and 50+ Acres
- Other Parcels within 2 miles and 50+ Acres
- Drainfields
- Wells
- Buildings
- Streams
- Paeonian Boundary

Acreage: 71.889

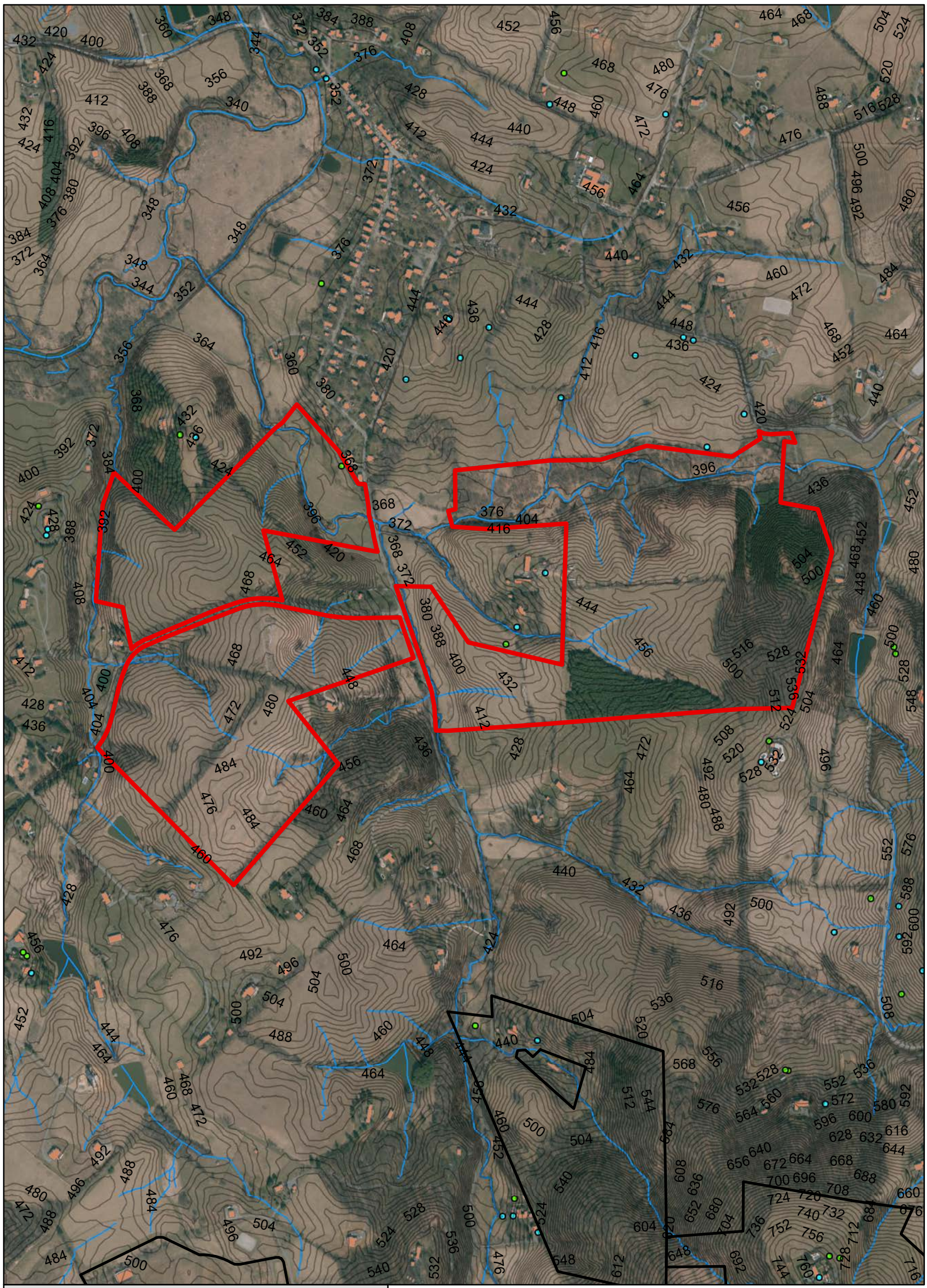
N
W E
S

Dewberry®

# Parcel ID: 304283694000

Parcel #13

Address: BURCH WAIVER SUBDIVISION



**Legend**

- Parcels within 2 miles and 50+ Acres
- Other Parcels within 2 miles and 50+ Acres
- Drainfields
- Wells
- Buildings
- Streams
- Paeonian Boundary

Acreage: 223.048

N
W E
S

Dewberry®

# Parcel ID: 417408338000

Parcel #14

Address: 16720 IVANDALE RD, HAMILTON

**Legend**

- Parcels within 2 miles and 50+ Acres
- Other Parcels within 2 miles and 50+ Acres
- Drainfields
- Wells
- Buildings
- Streams
- Paeonian Boundary

Acreage: 131.085

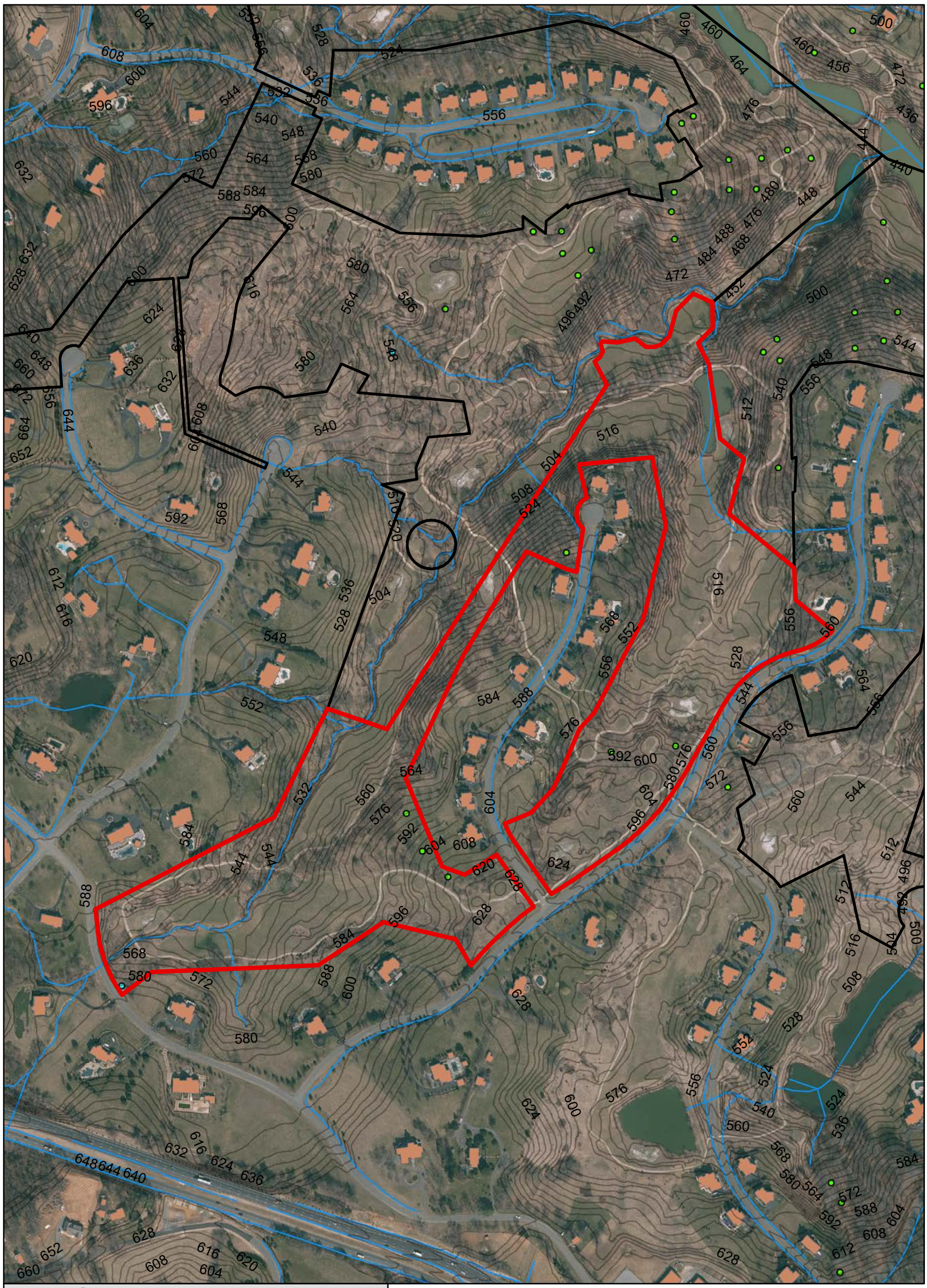
N
W E
S

Dewberry®

# Parcel ID: 268165446000

Parcel #15

Address: BEACON HILL SUBDIVISION



**Legend**

- Parcels within 2 miles and 50+ Acres
- Other Parcels within 2 miles and 50+ Acres
- Drainfields
- Wells
- Buildings
- Streams
- Paeonian Boundary

Acreage: 52.918

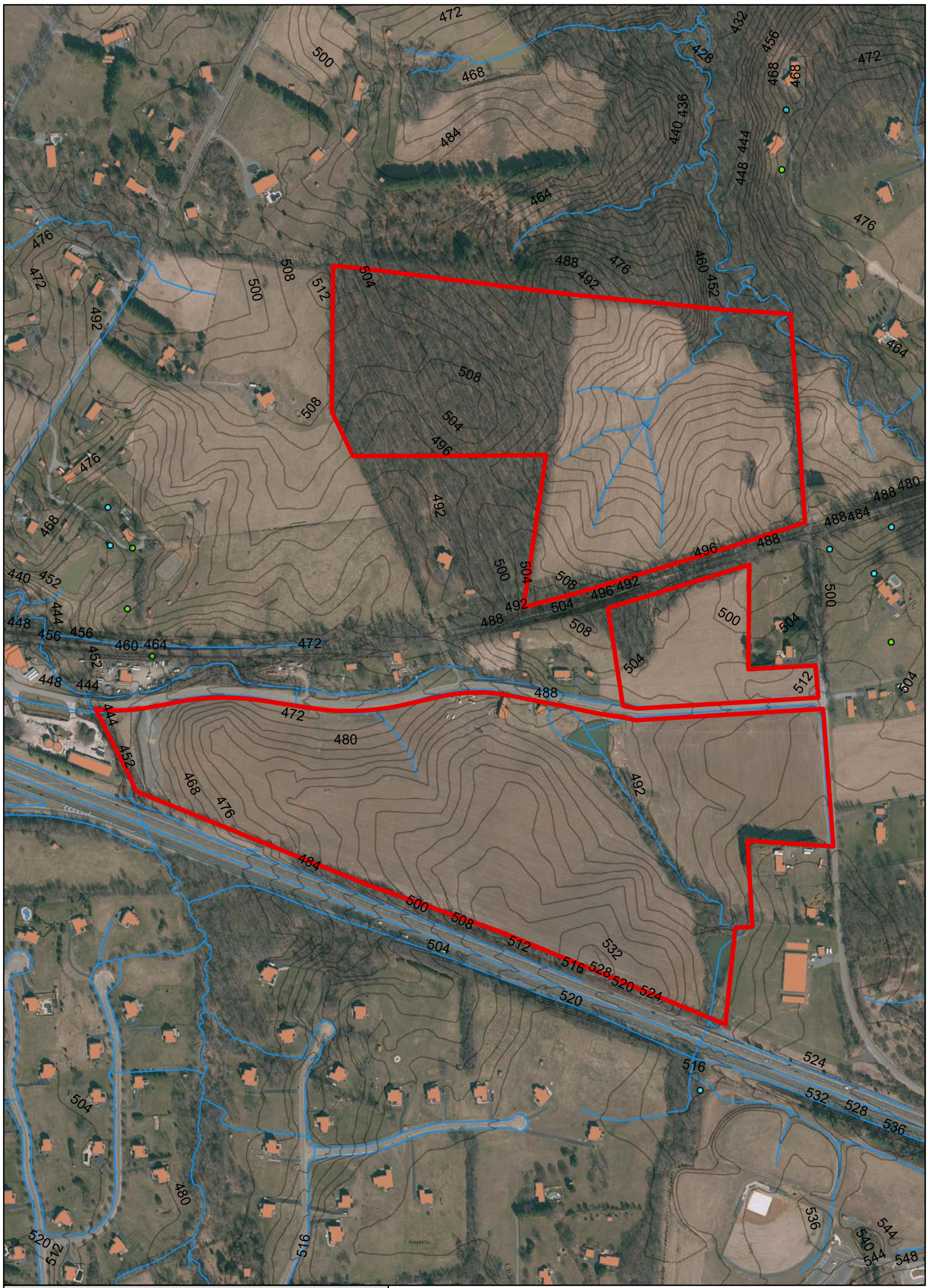
N
W E
S

Dewberry®

# Parcel ID: 381207702000

Parcel #16

Address: JACKSON DIVISION SUBDIVISION



**Legend**

- Parcels within 2 miles and 50+ Acres
- Other Parcels within 2 miles and 50+ Acres
- Drainfields
- Wells
- Buildings
- Streams
- Paeonian Boundary

Acreage: 111.456

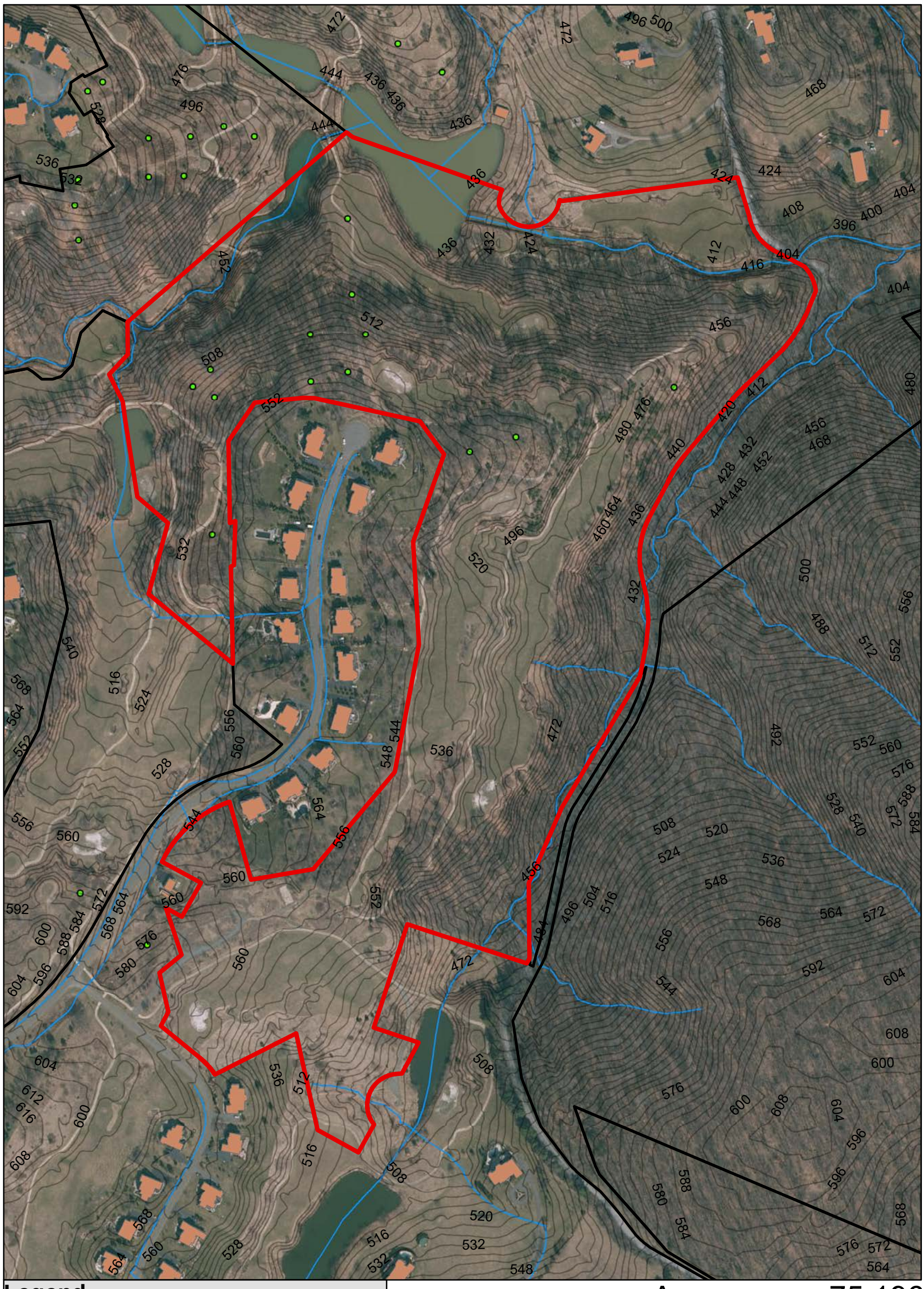
N
W E
S

Dewberry®

# Parcel ID: 268381526000

Parcel #17

Address: BEACON HILL SUBDIVISION



**Legend**

- Parcels within 2 miles and 50+ Acres
- Other Parcels within 2 miles and 50+ Acres
- Drainfields
- Wells
- Buildings
- Streams
- Paeonian Boundary

Acreage: 75.196

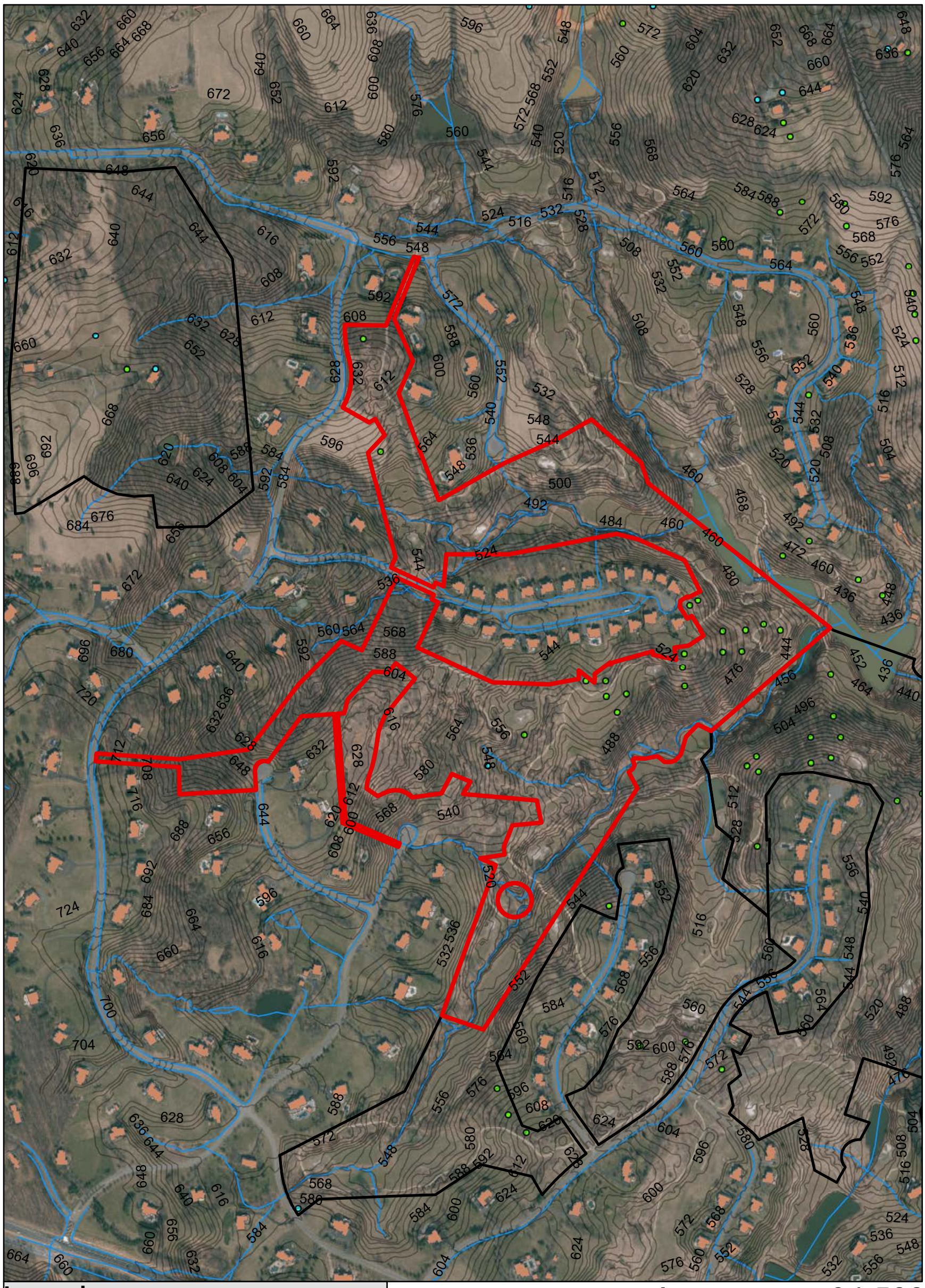
N
W E
S

Dewberry®

# Parcel ID: 268359708000

Parcel #18

Address: BEACON HILL SUBDIVISION



**Legend**

- Parcels within 2 miles and 50+ Acres
- Other Parcels within 2 miles and 50+ Acres
- Drainfields
- Wells
- Buildings
- Streams
- Paeonian Boundary

Acreage: 94.588

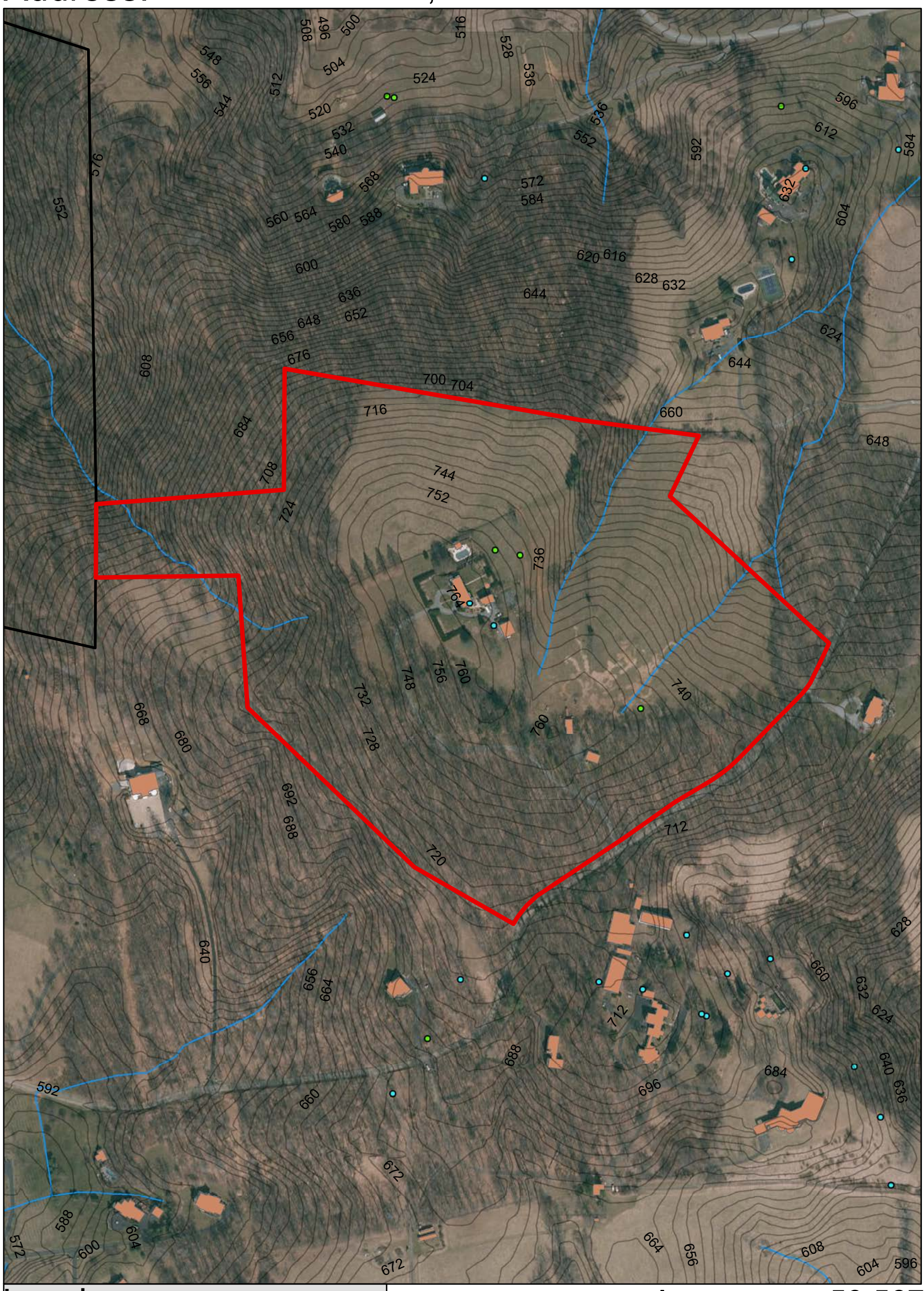
N
W E
S

Dewberry®

# Parcel ID: 305100979000

Parcel #19

Address: 40492 HURLEY LN, PAEONIAN SPRINGS



**Legend**

- Parcels within 2 miles and 50+ Acres
- Other Parcels within 2 miles and 50+ Acres
- Drainfields
- Wells
- Buildings
- Streams
- Paeonian Boundary

Acreage: 50.567

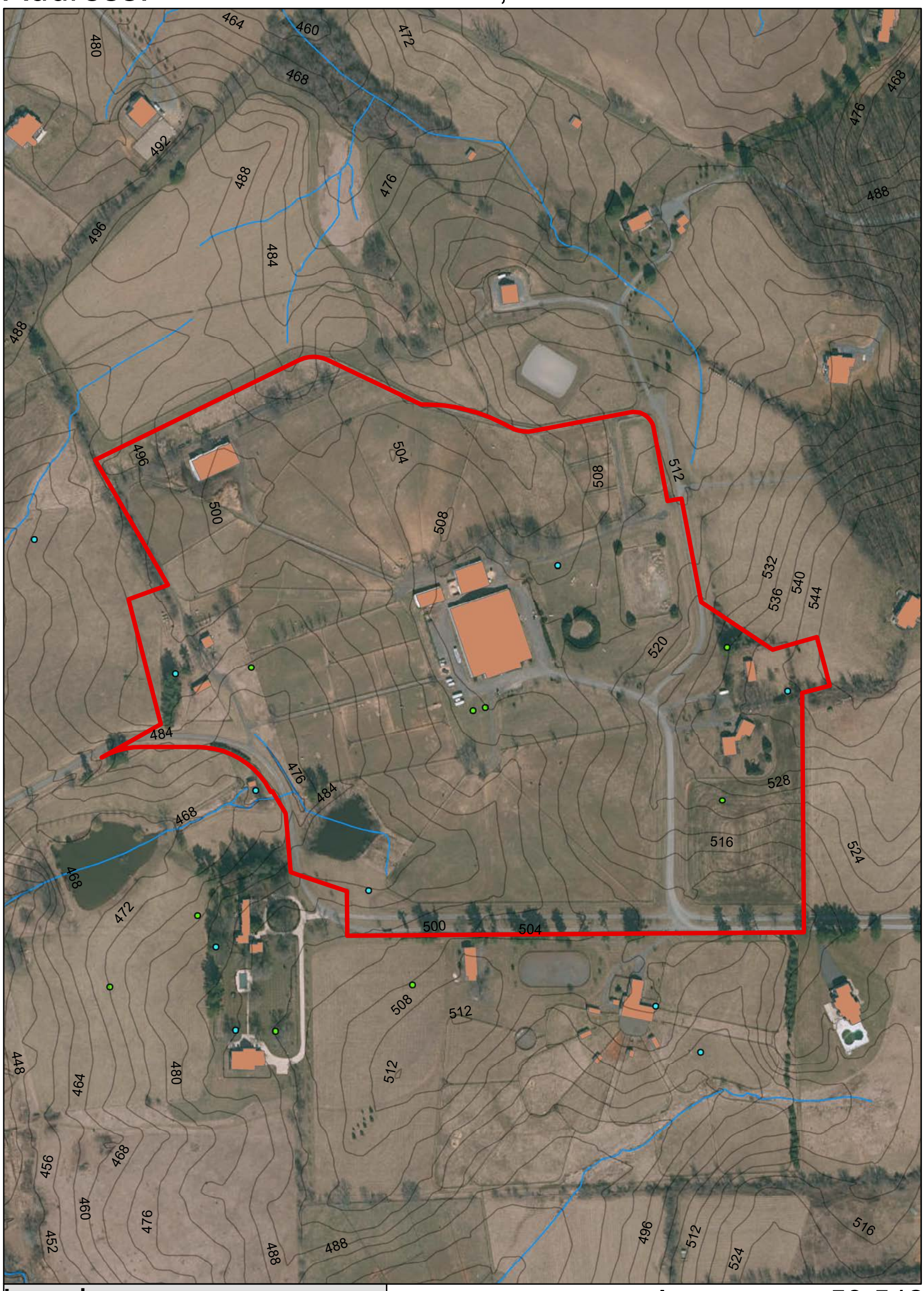
N
W E
S

Dewberry®

# Parcel ID: 305153928000

Parcel #20

Address: 39970 HEDGELAND LN, WATERFORD




Acreage: 53.542

**Legend**

- Parcels within 2 miles and 50+ Acres
- Other Parcels within 2 miles and 50+ Acres
- Drainfields
- Wells
- Buildings
- Streams
- Paeonian Boundary

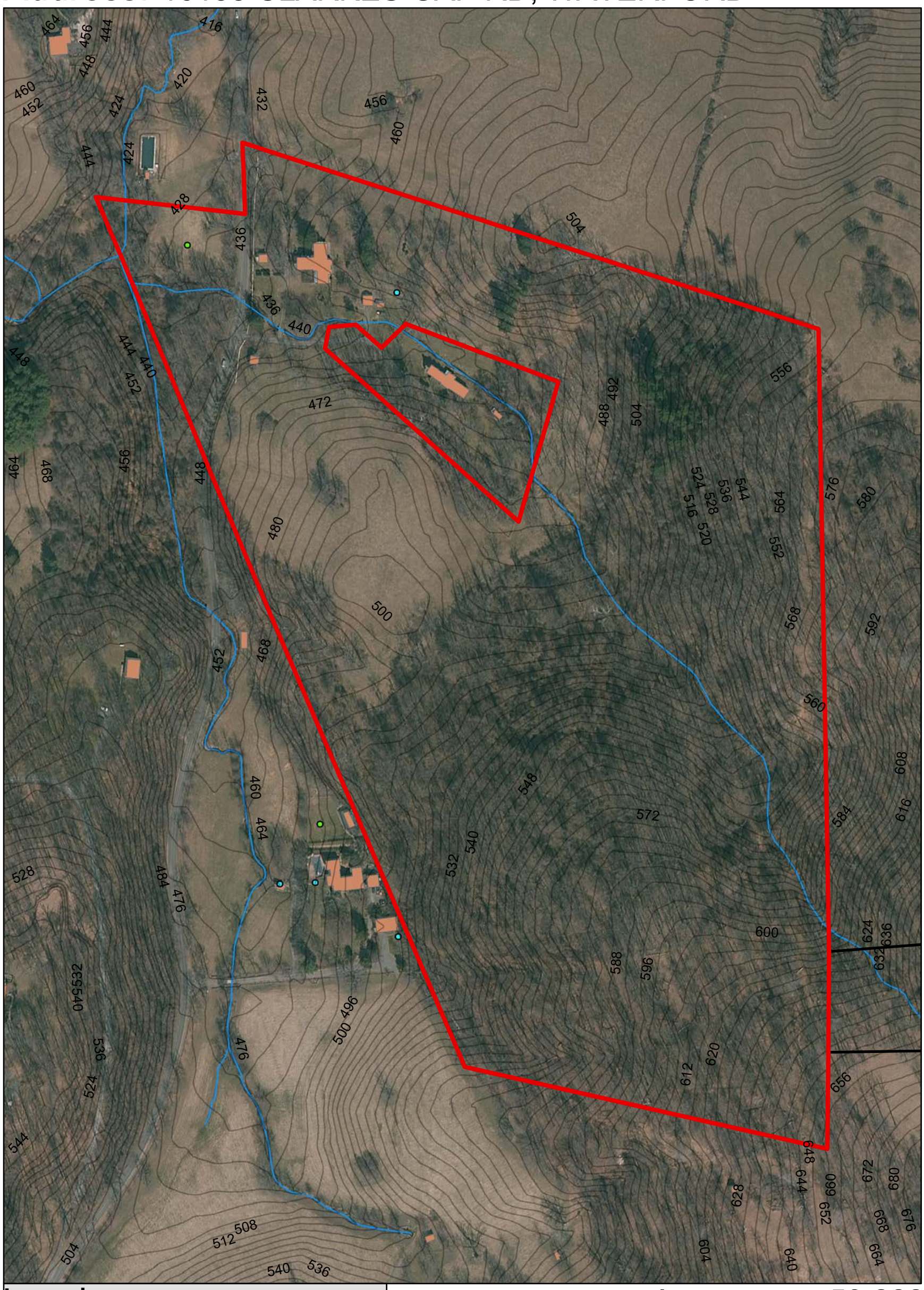
N
W E
S

Dewberry®

# Parcel ID: 305281781000

Parcel #21

Address: 16158 CLARKES GAP RD, WATERFORD



**Legend**

- Parcels within 2 miles and 50+ Acres
- Other Parcels within 2 miles and 50+ Acres
- Drainfields
- Wells
- Buildings
- Streams
- Paeonian Boundary

Acreage: 53.222

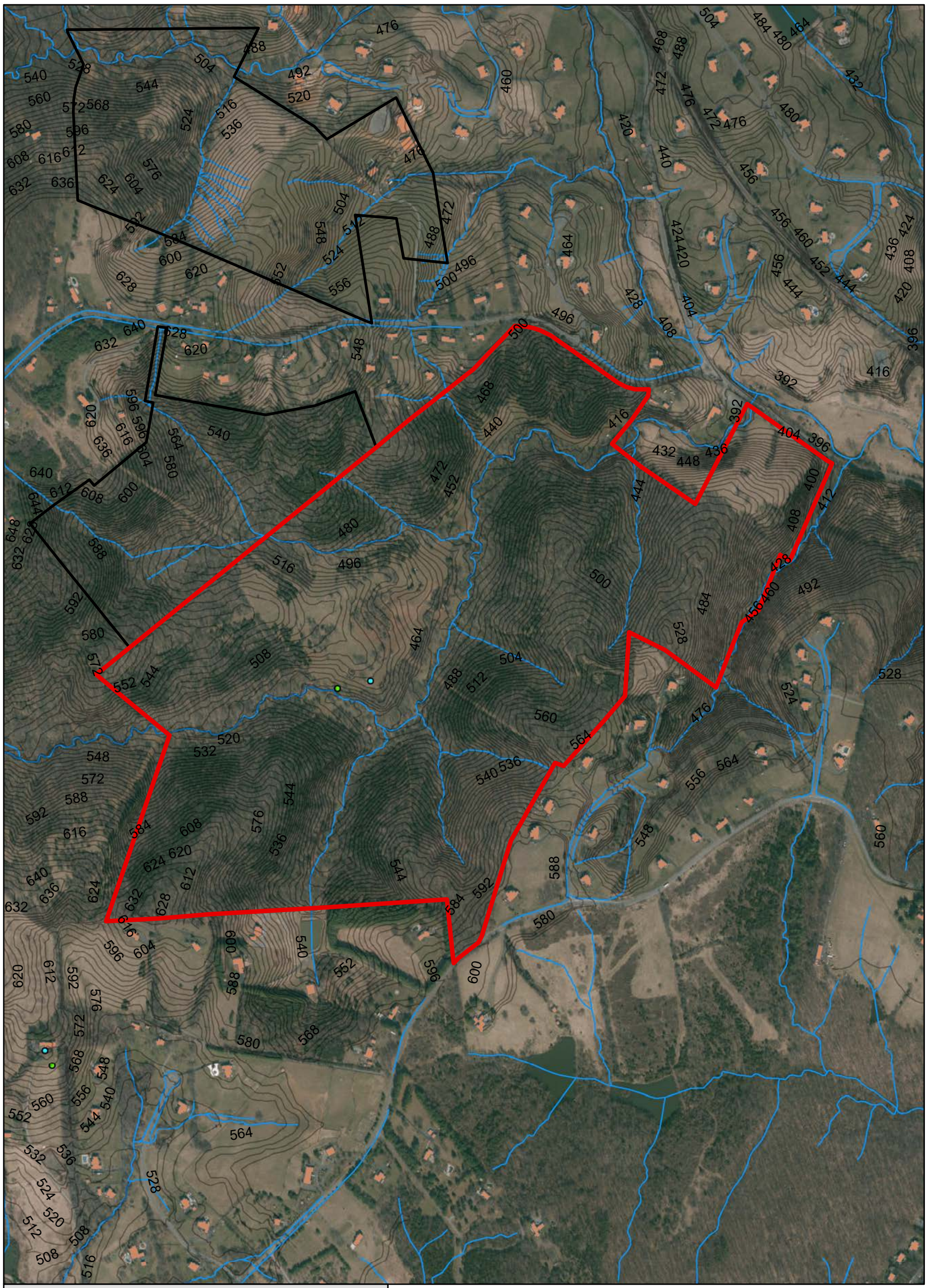
N
W E
S

Dewberry

# Parcel ID: 310174360000

Parcel #22

Address: N/A



**Legend**

- Parcels within 2 miles and 50+ Acres
- Other Parcels within 2 miles and 50+ Acres
- Drainfields
- Wells
- Buildings
- Streams
- Paeonian Boundary

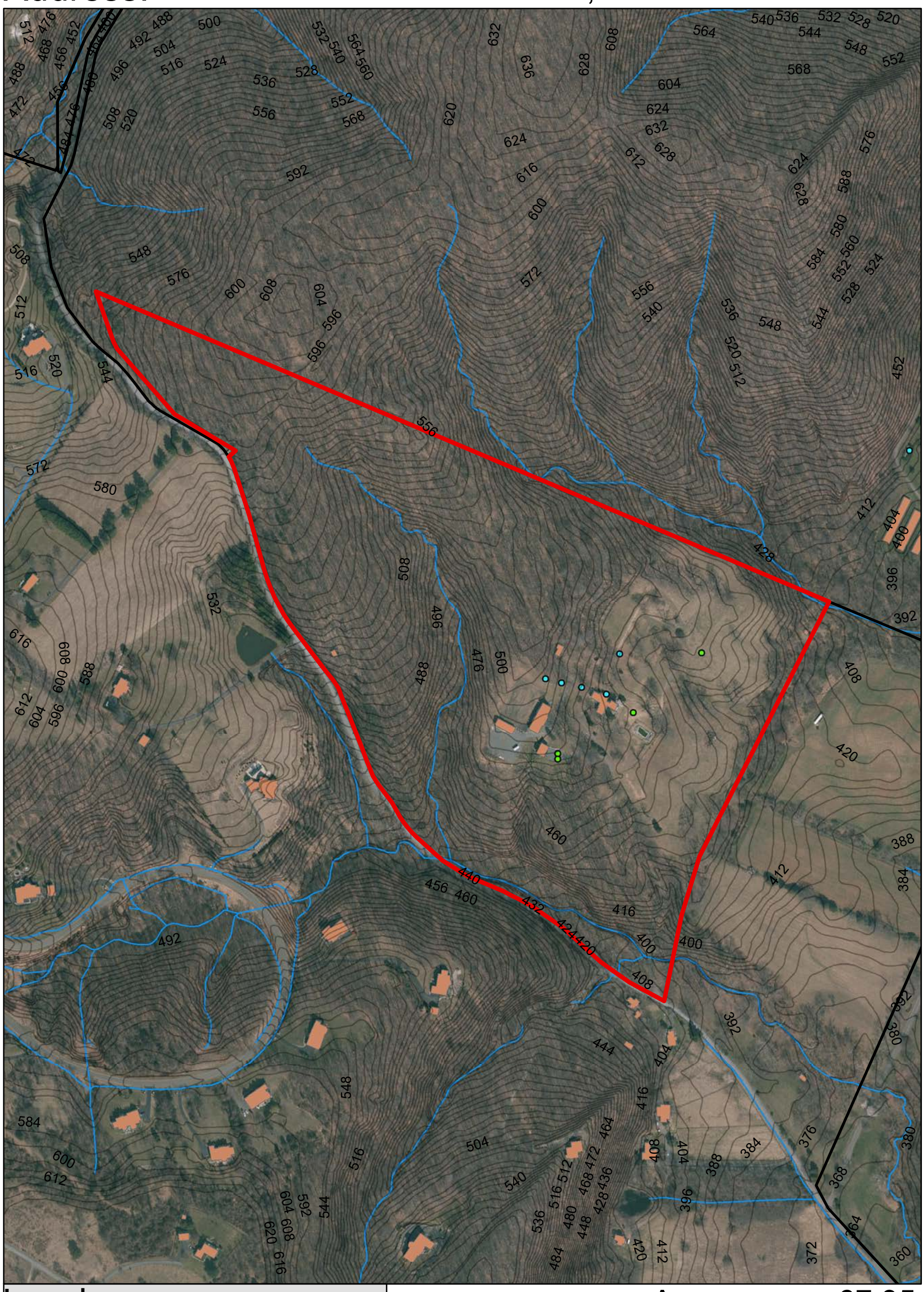
Acreage: 265.724

N
W E
S

Dewberry®

# Parcel ID: 269303432000 Parcel #23

Address: 17480 OLD WATERFORD RD, LEESBURG



**Legend**

- Parcels within 2 miles and 50+ Acres
- Other Parcels within 2 miles and 50+ Acres
- Drainfields
- Wells
- Buildings
- Streams
- Paeonian Boundary

Acreage: 67.35

N
W E
S

Dewberry®

# Parcel ID: 270178372000 Parcel #24

Address: 802 CHILDRENS CENTER RD SW, LEESBURG

**Legend**

- Parcels within 2 miles and 50+ Acres
- Other Parcels within 2 miles and 50+ Acres
- Drainfields
- Wells
- Buildings
- Streams
- Paeonian Boundary

Acreage: 67.781

N W E S

Dewberry®

# Parcel ID: 271375565000

Parcel #25

Address: 801 CHILDRENS CENTER RD SW, LEESBURG

**Legend**

- Parcels within 2 miles and 50+ Acres
- Other Parcels within 2 miles and 50+ Acres
- Drainfields
- Wells
- Buildings
- Streams
- Paeonian Boundary

Acreage: 131.692

N
W E
S

Dewberry®

# ATTACHMENT 2

# PARCEL ANALYSIS

## Potential Parcels within Two (2) Miles of Paeonian Springs and has 50+ Acres

| Parcel # | Parcel ID | Address | Subdivision | Size (Acres) | Wells | DrainFields | Structures | Total | Streams/ Bodies of Water | Distance From PS Boundary | Slope/Notes | Recommend |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 383404530000 | | | 144 | 0 | 0 | 0 | 0 | Yes | 1.3 | Steep Slopes in South East | x |
| 2 | 382282803000 | | | 60 | 0 | 0 | 0 | 0 | Yes | 1.7 | Flat, Sloping down to pond | x |
| 3 | 347464901000 | 39443 Gable Farm Ln, Hamilton | | 144 | 2 | 2 | 9 | 13 | Yes | 1 | Steeper slops in the south east | |
| 4 | 228179141000 | 17269 Southern Planter Ln, Leesburg | | 932 | 12 | 8 | 22 | 42 | Yes | 1.5 | Steep slops in the north west | |
| 5 | 310261450000 | | | 50 | 0 | 0 | 0 | 0 | Yes | 1.9 | Slopes down toward south east | x |
| 6 | 347477942000 | 39690 Gable Farm Ln, Hamilton | | 72 | 1 | 1 | 19 | 21 | Yes | 0.8 | Slopes down toward pond | |
| 7 | 378108230000 | | Rosemont Farm | 122 | 0 | 0 | 0 | 0 | Yes | 1.7 | Steep slopes in the middle and edges of parcel | |
| 8 | 306193182000 | 40371 Doe Run Ln, Paeonian Springs | | 58 | 2 | 1 | 4 | 7 | Yes | 0.5 | Relatively flat, steeper slopes on the east | x |
| 9 | 383189120000 | 39191 Digges Valley Rd, Hamilton | | 109 | 1 | 4 | 8 | 13 | Yes | 1.9 | Areas of relatively flat land, slopes down tow south east | |
| 10 | 383388802000 | 39136 DIGGES VALLEY RD, HAMILTON | | 313 | 4 | 3 | 8 | 15 | Yes | 1.5 | Relatively flat, steeper slopes in the south east | x |
| 11 | 380386344000 | 38950 PIGGOTT BOTTOM RD, HAMILTON | | 53 | 3 | 2 | 2 | 7 | Yes | 1.2 | Relatively flat, slopes toward pond | |
| 12 | 310463273000 | 0252 THOMAS MILL RD, LEESBURG | | 72 | 0 | 0 | 10 | 10 | Yes | 1.4 | Flat areas, steep slopes | x |
| 13 | 304283694000 | | Birch Waiver | 223 | 0 | 0 | 0 | 0 | Yes | 1.4 | Steep slopes mainly in east, has relatively flat areas | x |
| 14 | 417408338000 | 16720 IVANDALE RD, HAMILTON | | 131 | 4 | 2 | 7 | 13 | Yes | 1.5 | Flat | |
| 15 | 268165446000 | | Beacon Hill | 53 | 1 | 6 | 0 | 7 | Yes | 0.8 | Steeper slopes in middle of parcel. Has flatter areas in the south and east | |
| 16 | 381207702000 | | Jackson Division | 111 | 0 | 0 | 0 | 0 | Yes | 0.7 | Flat | x |
| 17 | 268381526000 | | Beacon Hill | 75 | 0 | 12 | 0 | 12 | Yes | 1.3 | Steep slopes in north and east | |
| 18 | 268359708000 | | Beacon Hill | 95 | 2 | 19 | 0 | 21 | Yes | 0.7 | Steep slopes throughout the parcel | |
| 19 | 305100979000 | 40492 HURLEY LN, PAEONIAN SPRINGS | | 51 | 2 | 3 | 7 | 12 | Yes | 1.2 | Flat, slopes away from buildings | |
| 20 | 305153928000 | 39970 HEDGELAND LN, WATERFORD | | 54 | 4 | 4 | 8 | 16 | Yes | 0.6 | Flat | |
| 21 | 305281781000 | 16158 Clarkes Gap Rd, Waterford | | 53 | 1 | 1 | 5 | 7 | Yes | 1 | Relatively flat | x |
| 22 | 310174360000 | | | 266 | 1 | 1 | 0 | 2 | Yes | 1.9 | Steeper slopes through the parcel has flat areas | x |
| 23 | 269303432000 | 17480 OLD WATERFORD RD, LEESBURG | | 67 | 5 | 4 | 5 | 14 | Yes | 1.5 | Relatively flat | |
| 24 | 270178372000 | 802 CHILDRENS CENTER RD SW, LEESBURG | | 68 | 2 | 1 | 4 | 7 | Yes | 1.9 | Steeper slopes in the mid, north of parcel | |
| 25 | 271375565000 | 801 CHILDRENS CENTER RD SW, LEESBURG | | 132 | 0 | 0 | 16 | 16 | Yes | 2.0 | Steeper slopes in south that run through the middle | |

# ATTACHMENT 3

# REGULATORY REQUIREMENTS

# Regulatory Requirements

| Regulation | Source | Description |
|---|---|---|
| 9VAC25-790-460 | Sewage Collection and Treatment Regulations (SCAT) | Provides sewage flow estimates to be used as a design basis for new sewage works. Also provides guidelines and requirements for sewer system design. |
| 12VAC5-613-90B | Regulations for Alternative Onsite Sewage Systems | Performance requirements for alternative onsite sewage systems (AOSS). Large AOSS shall comply with a TN limit of 5 mg/l at the project boundary. |
| GMP 2013-01 | Virginia Department of Health | Large AOSS with flows greater than 10,000 gallons per day must provide effluent quality of 8 mg/l TN or demonstrate compliance with 5 mg/l within 2-ft of the point of effluent application to the soil. |
| 12VAC5-612-10 | Regulations for Alternative Onsite Sewage Systems | Definition of Treatment Level-3 (TL-3). TL-3 effluent has been treated to produce BOD5 and TSS concentrations of 10mg/l or less. |
| Minimum Separation Distances | • 12VAC5-610-597 – Sewage Handling and Disposal Regulations<br>• Loudoun County Code of Ordinances, Ch. 1066 | Provides minimum separation distances between a drainfield and various structures. |
| GMP 1995-02 | Virginia Department of Health | Provides the method used to estimate the ground water nitrate concentration below mass drainfields. |

# ATTACHMENT 4

# PAEONIAN SPRINGS WATER AND WASTEWATER PROJECT ASSISTANCE APPLICATION

# Paeonian Springs

# Loudoun County Community Water and Wastewater Project Assistance 2017 Application

and supporting documents

March 31, 2017

Lana Rohrmeier
16923 Oliver St
Paeonian Springs, VA 20129
703-489-7032

March 31, 2017

Scott Fincham, Environmental Program Specialist
Department of General Services
County of Loudoun
801 Sycolin Road, SE
P.O. Box 7100
Leesburg, VA 20177-7100

Dear Mr. Fincham,

This letter is to take place of the required narrative in the village of Paeonian Springs' application for Water and Wastewater Assistance Program to describe the numerous issues within the community. I have included a summary of the issues found while speaking with residents and researching public information to assist with the scoring process of our community.

The village of Paeonian Springs is essentially the first planned subdivision in Loudoun County that dates to the late 19th century and has been officially recognized as a historic district by the U.S. National Register of Historic Places. The community is located just west of Leesburg near the junction of Route 7 and Route 9, with the central location spanning from Simpson Circle over to Catoctin Ridge Street and connecting roads in the Rural Policy Area of Loudoun County. The major issues facing our community are wetlands/hydric soils, a large number of aging wells and septic systems and very small lot sizes. The typical lifespan of a conventional septic system is 20-30 years; the average age of septic systems in the community is over 35 years. In 2000 a water and wastewater survey was performed in Paeonian Springs and at that time 13% of facilities were unsatisfactory and 27% were of unknown status.

The majority of the community is comprised of tightly packed older houses, some dating as far back as the late 1800's. This section of Paeonian Springs includes approximately half of the structures in the community; the lots which are primary house sites are approximately .129 -.3 of an acre. Many houses have waivers for reduced setbacks for their wells and septic systems because of the very small lot sizes. When septic systems fail, often there is little to no area to have a replacement system installed on properties. Alternative septic systems, which are not ideal, are a fallback for many houses. A number of houses also have deed restrictions for treating houses for wood boring insects since it could contaminate wells. Older wells are often shallow and may not have proper casings; many of these wells test poorly for water quality and can be positive for coliform bacteria. These water sources receive recommendations for chlorination from the health department. Some residents'

wells have tested at such a low pH that it corrodes copper pipes, causing leaks, pipes bursting easily and corroding water heaters so quickly that they are still within warranty when they need replacing.

It can likely be assumed that any septic systems over 35 years old do not meet current construction standards and are probably substandard. Under this assumption over 60 properties are unlikely to meet current standards, and 14 of these older systems have documented recurring issues. However not all of the systems in the community that have recurring issues are over 35 years old: there are 8 systems installed after that time period with documented issues in the county records. That is a total of over 20 septic systems that have current or recurring issues that have either been documented by the county or reported by owners, however this may not be every single malfunctioning system in the community.

Numerous lots do not have sufficient replacement area in case of a septic system failing. In the older section of Paeonian Springs the lot sizes range from .18 to .25 acre. There are over thirty houses on lots less than .3 acres. It is nearly impossible to have a replacement area on many of these without contiguous lots owned by the same homeowner. There are almost just as many homes that are less than .3 of an acre; however, the homeowner does possess contiguous lots to potentially contribute towards a septic replacement area after a boundary line adjustment is made. Each boundary line adjustment is approximately $1,800 plus the cost of having a survey performed, which adds to the potentially immense required costs for homeowners to fix a health issue resulting from inadequate septic systems.

When gathering information on the neighborhood I discovered there are five houses in the neighborhood either do not have indoor plumbing and/or a functional septic system, this includes two houses where residents are currently using outhouses. There are two properties that rely on permanent pump and haul agreements for a wastewater solution because other options were not practicable. There may also be couple unapproved pump and haul situations that the Health Department may not be aware of. More than a dozen alternative septic systems are frequently utilized in Paeonian Springs which is not ideal considering they require yearly maintenance and are considerably more expensive.

To the best of my abilities, I gathered information from public records to compile a spreadsheet that summarizes the many issues with septic systems and wells in our community. A few of the statistics gathered in that spreadsheet are listed below:

- One house does not have any running water on the property according to public records.
- Three houses without any source of water on the property (one without a well drilled, two with wells on neighbors' properties).
- Thirty-eight houses have issues with inadequate well construction, quality or quantity documented in public records or reported by owners.

- Five houses with either no indoor toilets or functioning septic systems, two of which rely on outhouses.
- There are approximately fifteen alternative onsite septic systems in the community that are documented by county records and reports from owners.
- Median age of septic systems in the community is 38 years and the median age of wells is 37 years.
- There are over thirty wells in the neighborhood that are more than 50 years old, which likely do not meet current standards.
- There are over sixty properties with septic systems over 35 years old, which are unlikely to meet current standards. Fourteen of these older systems have documented recurring issues.
- There are eight systems installed more recently than 25 years ago that have documented issues. That is a total of twenty-two septic systems that have current or recurring issues that could be found in public record or from information provided by residents.
- There are over thirty houses on lots less than .3 acres that do not have additional lots available to the owner to provide a larger area for replacing systems.
- Approximately half of the structures in the community are on lots .129 -.3 of an acre.
- In the last few years several homes in the community have been bulldozed because of either failing or lack of functional septic systems and/or wells.
- While collecting signatures for the application process 22 residents indicated they had wells with quality or quantity issues, and 10 residents indicated they had septic systems with performance issues.

It is ironic that a community with long term, ongoing problems in one of the richest counties in the country does not have a community water and/or wastewater system. It is time that Paeonian Springs receives some support from the county government for its water and wastewater issues. Some residents do not have their basic needs being met with access to indoor plumbing. The majority of residents are concerned about the state of groundwater and septic systems in Paeonian Springs and believe that a solution must be considered. In an attached letter from Loudoun County Health Department, the staff indicated that they would strongly support a community water and wastewater solution for Paeonian Springs. They cited the combination of small lots, aging and inadequate wastewater systems and wells of older construction make Paeonian Springs a priority for improved infrastructure. Aging and failing water and sewage system with limited options for repair are not in the residents' best interest. This is a public health and safety issue that should be addressed. Documentation found through the county that states Paeonian Springs has known issues going back to the early 1970's. There have been public discussion about finding a community solution for Paeonian Springs every 15 to 20 years but nothing has ever moved forward. Evidence of this can be seen in the letter from the Paeonian Springs Council that is attached. The village of Paeonian Springs has bided its time long enough and needs attention.

I sincerely hope that the information I was able to compile can assist in the scoring process. The information included in this letter summarizes what I believe, to the best of my

abilities, to be valid measurements for the severity of issues in Paeonian Springs. I look forward to hearing about the results of the eligibility and scoring review process.

Sincerely,

Lana Rohrmeier

Attached:
Map defining boundaries of Paeonian Springs for Water/Wastewater application
Letter of support from Loudoun County Health Department
Letter from Dr. Buckardt showing history of community's desires
Spreadsheet tracking information on well, septic systems and issues in community

**Map of Paeonian Springs for Water and Wastewater Application**

# Loudoun County Health Department

P.O. Box 7000
Leesburg,VA 20177-7000

Environmental Health
Phone: 703 / 777-0234
Fax: 703 / 771-5023

Community Health
Phone: 703 / 777-0236
Fax: 703 / 771-5393


March 16, 2017

**RE: Paeonian Springs Water and Wastewater needs**

Staff at the Loudoun County Health Department strongly support efforts to develop central water and wastewater infrastructure for the Paeonian Springs community. The combination of small lots, aging and inadequate wastewater systems, and wells of older construction make Paeonian Springs a priority for improved water and wastewater infrastructure.

Respectfully,

Jay D. Engelen
Roger R. Leins
J. Randolph Stoutenburgh
Richie Meroke

Yvonne Hershberger

Loudoun County Environmental Health Staff

# PAEONIAN SPRINGS COUNCIL, INC.

REC'D MAR 12 1992

P.O. Box 98, Paeonian Springs, Virginia 22129

**Board of Directors**

Dr. Henry Buckardt
President
338-6290

Virginia Peacock
Vice President
882-3693

Betty Shiflett
Secretary
338-4374

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Helen B. Simpson
J. Dabney Simpson
Marion P. Simpson
Phyllis Sloyan
Mrs. C. R. Taylor
Elizabeth Theerman
Paul Theerman
Frances Williams
George Wright
Martha Wright

March 4, 1992

Mr. Larry Wates
Sanitation Manager
Loudoun County Public Health Department
209 Gibson Street N.W.
Leesburg, VA 22075

Dear Mr. Wates:

At the November 21, 1991 meeting of the Paeonian Springs Council, Inc. the Directors reviewed the water and sewage report for Paeonian Springs prepared in 1972 by the firm of Dewberry - Nelson for the Loudoun County Board of Supervisors.

Our Council recognizes the very likely probility that much of the same situation prevails to-day in Paeonian Springs as in 1972, except for the forecast of change in population.

We therefore request assistance from your office in pursuing matters pertaining to sewer and water issues in the village of Paeonian Springs, Loudoun County, Virginia.

Sincerely yours,

Henry L. Buckardt

Dr. Henry L. Buckardt
President

Copy: Mr. Rick Roberts, Catoctin Supervisor
Board of Supervisors, Loudoun County, Virginia

## BASIC INFORMATION

1. Community Name*: Paeonian Springs

2. Street/Road Location*: ///

3. Community Description*: Historic community originally subdivided in late 1890's along the old W&OD railroad, houses range from late 19th century to newly constructed, 116 homes and 6 businesses.

## COMMUNITY APPLICATION COORDINATOR CONTACT INFORMATION

4. Primary Coordinator Name (First and Last)*: Lana Rohrmeier

Address*: 16923 Oliver St, Paeonian Springs, VA 20129

| Phone*: 703-489-7032 | E-mail: Laarthur@vt.edu | Fax: |
|---|---|---|

Back-up Coordinator Name (First and Last): Pamela Stewart

Address: 16939 Oliver St, Paeonian Springs, VA 20129

| Phone: 703-869-5075 | E-mail: pstewart1@hotmail.com | Fax: |
|---|---|---|

Optional Third Coordinator Name (First and Last): Kathlyn Rohrbaugh

Address: 39946 Peacock Cir, Paeonian Springs, VA 20129

| Phone: 301-793-1949 | Email: poltavagal@gmail.com | Fax: |
|---|---|---|

## ADDITIONAL INFORMATION

5. Service Requested*: Water [X] Wastewater [X] (Please check one or both)

6. Residential Population of Community*: ~260

7. Number of Homes in the Community*: 115

8. Number of Other Eligible Structures in Use *: 7

9. Civic Association or Home Owners' Association Name, If Applicable:
Paeonian Springs Council, Inc.

Civic Association or HOA Contact Name (First and Last): Todd Watts

Address: 40058 Glenmore Ct, Paeonian Springs, VA 20129

| Phone: 703-727-4265 | Fax: | E-mail: toddw@marketo.com |
|---|---|---|

10. Narrative description of the water or wastewater issue in the community. Use additional paper if needed.)*:
See attached cover letter.

**In the following section, please provide a numeric value for each of the questions.**

11. Number of homes and other eligible structures in the community with drinking water service*: 121

Please indicate how many of those homes and other eligible structures are in the three categories shown below:

| | | |
|---|---|---|
| Individual Wells*: 120 | Community Water System*: 0 | Other*: 0 |

12. Number of homes without any source of water on the property*: 3

13. Number of homes without running water inside the home: 1

14. Number of homes and other eligible structures in the community with wastewater service (total)*: 121

Please indicate how many of those homes and other eligible structures are in the five categories shown below:

| | | |
|---|---|---|
| Individual Septic Tanks*: 115 | Community Wastewater System*: 0 | Pump-and-Haul*: 2 |
| Permitted Discharging Systems*: 0 | Other*: 0 | |

15. Number of homes without working indoor toilets / currently using privies or outhouses*: 5

16. Number of owners of occupied homes and other eligible structures who have signed this application below*: 92

17. Percentage of owners of occupied homes and other eligible structures who have signed this application below*: 75%

By signing this form, I attest that I am the owner (or one of the owners) of the property indicated, that the information I have provided is the best available to my knowledge, and that I support this request for Loudoun County assistance with water and/or wastewater issues in my community and pledge my cooperation and assistance with this process.

For an application to be considered on behalf of a community, at least 60% of the total number of property owners within the community must sign this application. (Please attach additional sheets as needed).

| Property address | Property Identification Number (PIN) | Owner (Please print and sign name) | Date Signed | Lot Size (acres) | Current Water Source / Age | Current Wastewater Service / Age |
|---|---|---|---|---|---|---|
| 16916 ~~Berry~~ Bramble lane ~~16916 Berry Bramble Lane~~ | 307350998000 | ELIZABETH PICKETT Elizabeth Pickett | 3/7/17 | .2 | 1 / 29 | 1 / 29 |
| 16910 Berry Bramble | 307350398000 | ELIZABETH PICKETT Elizabeth Pickett | 3/7/17 | .25 | 7 / N/A | 9 / N/A |
| 16923 Oliver St | 345396680000 | Lang Rohrmeier | 3/7/17 | .6 | 2 / 49 | 1 / 32 |
| 40636 Charles Town Pike Paeonian Springs VA 20129 | 307458116000 | R D Piercy Roger D Piercy | 3/10/17 | 1.42 | 2 / 30 | 9 / 30 |
| 39959 Catoctin Ridge Paeonian Springs VA | 395307399000 | James Marraccini James P. Marraccini | 3/10/17 | .189 | 1 / 28 | 1 / 49 |
| 39881 Catoctin Ridge St | 345497412000 | Elisabeth Brooks Elisabeth Brooks | 3/11/17 | .23 | 1 / 34 | 1 / 34 |
| 39889 Catoctin Ridge St | 345498508000 | Edward Grove | 3-11-17 | .25 | 1 / 30+ | 1 / 30+ |
| 39843 Catoctin Ridge St. | 345304386000 | Heather Bartlow Heather Bartlow | 3-11-17 | .25 | 2 / [illegible] | 3 / |
| 39951 Catoctin Ridge St | 345306478000 | Hilda Black Hilda Black | 3/11/17 | .52 | 1 / 42 | 1 / 42 |



* Everything in red was added after owners signed by referencing public records

By signing this form, I attest that I am the owner (or one of the owners) of the property indicated, that the information I have provided is the best available to my knowledge, and that I support this request for Loudoun County assistance with water and/or wastewater issues in my community and pledge my cooperation and assistance with this process.

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| Property address | Property Identification Number (PIN) | Owner (Please print and sign name) | Date Signed | Lot Size (acres) | Current Water Source / Age | Current Wastewater Service / Age |
|---|---|---|---|---|---|---|
| 39851 Catoctin Ridge Ct. | 345494423000 | Boyd M. Mays / Boyd M. Mays | 3-18-17 | 3/4 | 1 / 70 | 1 / 70 |
| 39837 Catoctin Ridge ST | 345492749000 | Kenneth Beaner / Kenneth Beaner | 3-18-17 | 3/4 | 1 / 56 | 1 / 56 |
| 16930 Adic Ln Paeonian Springs, Va. 20129 | 307353361000 | Lester Thornton / Lester Thornton | 3-18-17 | 3/4 | 1 / 0 | 3 / 0 |
| 39846 Catoctin Ridge Ct | 345494745000 | Rea Flanagan / Rea Flanagan | 3.18. | .6 | 1 / 152 | 1 / 152 |
| Darrell & Jeanette Walley 39869 Catoctin Ridge Ct. | 345496515000 | Darrell E. Walley | 3-18-17 | 3/4 | 1 / 126 | 2 / 132 |
| 39885 Catoctin Ridge St Paeonian Springs VA | 345498010000 | Brian Pierce / Brian Pierce | 3-19-17 | 1/4 | 2 / 150 | 2 / 150 |
| 39864 Catoctin Ridge St Paeonian Springs VA | 345496837000 | Patrick Moran / Patrick Moran | 3-19-17 | 1/2 | 2 / 124 | 1 / 150 |
| 39886 Milton Ct Paeonian Springs VA | 345298676000 | Rita Cassidy Sheehan / Rita Cassidy Sheehan | 3/20/17 | 1/3 | 2/4 | 1 / 33 yrs. |
| 39918 Milton Ct. Paeonian Springs, VA | 345201896000 | DAVID L. Keyes / David L. Keyes | 3/20/17 | 1/2 | 2 / 50 | 2 / 50 |

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| Property address | Property Identification Number (PIN) | Owner (Please print and sign name) | Date Signed | Lot Size (acres) | Current Water Source / Age | Current Wastewater Service / Age |
|---|---|---|---|---|---|---|
| 16940 Simpson Circle ~~16879 Oliver St~~ | 345309665000 | Eric E. Zick | 3/7/17 | 1.38 | Well / 2001 | Septic / 2001 |
| 16879 Oliver St | 345492519000 | Michael Cummings | 3-7-17 | 3/4 | well / 27 | septic / 30 |
| 39960 Catoctin Ridge St. | 345405106000 | Susan Douglas | 3-7-17 | 3/4 | Well / 41 | septic / 41 |
| 39951 Catoctin Ridge ST | | Hilda Beach | 3-7-17 | not sure .52 | Well | septic Duplicate |
| 17018 HIGHLAND CIRCLE | 307256980000 | RUTH MOYER | 030717 | 2 | 1 / 20y? | 3 / 20y? |
| 39906 Milton St | 345200691000 | JOHN LANHAM | 3-7-17 | 1/2 | 60YRS WELL | SEPTIC / 55YEARS |
| 16955 SIMPSON CIR | 345301339000 | John DAVENPORT | 3-7-17 | 2.8 | 1 / 16 | 1 / 16 |
| 17043 Fulton Pl | 345205270000 | Jimmy Jones | 3/7/17 | 1/2 | WELL / 2008 | Septic / 08 |
| 17149 Simpson Cir 2 parcels | 345104244000 | Anne Bunai | 3/7/17 | 5.6 5.3 | Well 1 / 60yrs 300' | Septic 1 / 4yrs |

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| Property address | Property Identification Number (PIN) | Owner (Please print and sign name) | Date Signed | Lot Size (acres) | Current Water Source / Age | Current Wastewater Service / Age |
|---|---|---|---|---|---|---|
| 39946 Peacock Circle | 345396228000 | Kathlyn G. Rohrbaugh | 3/11/2017 | 0.689 | 2 / 41 | 1 / 41 |
| 40055 Glenmore Court | 307258016000 | Clifford F. Pinkok | 3/12/2017 | 1.325 | 2 / 17 | 1 / 11 |
| 40058 Glenmore Ct | 307259537000 | Todd Watts | 3/12/17 | 1.207 | 2 / 17 | 1 / 13 |
| 17042 Highland Cir | 307254146000 | Jacqueline Walters | 3/12/17 | 0.9 | 2 / 11 | 1 / 35 |
| 7115 Simpson Cir | 345105790000 | P. Slogan | 3/12/17 | 7.3 | 1 / 49 | 1 / 0 new |
| 17121 Simpson Circle | 345106870000 | L Kemp<br>Andy Kemp | 3/12/17 | 3.885 | 1 / 25 | 1 / 46 |
| 17026 Impsum Cir | 307250563000 | Tom Quaglia<br>Virginia Chiantella | 3/12/17 | 6.0 | 1 / 50 | 1 / 15 |
| 39925 Peacock Circle | 345395648000 | Gerald Trader | 3/12/17 | .29 | 1 / 45 | 1 / |
| 39981 Peacock Circle | 345399303000 | Lynne Snider | 3/16/17 | .23 | 2 / 52 | 1 / 12 |

By signing this form, I attest that I am the owner (or one of the owners) of the property indicated, that the information I have provided is the best available to my knowledge, and that I support this request for Loudoun County assistance with water and/or wastewater issues in my community and pledge my cooperation and assistance with this process.

For an application to be considered on behalf of a community, at least 60% of the total number of property owners within the community must sign this application. (Please attach additional sheets as needed).

| Property address | Property Identification Number (PIN) | Owner (Please print and sign name) | Date Signed | Lot Size (acres) | Current Water Source / Age | Current Wastewater Service / Age |
|---|---|---|---|---|---|---|
| 16956 SIMPSON CIRCLE<br>PAEONIAN SPRINGS, VA | 345309832000 | DONALD J. SHAW<br>Donald J. Shaw | 3/11/17 | 1/4 AC | 1 / 49 | 1 / 49 |
| 16957 Simpson Circle<br>Paeonian Springs VA | 345306640000 | Focco Delemarle | 3/11/17 | 1/2 AC | 2 / 30 | 2 / 30 |
| 6 50 Simpson Circle<br>Paeonian Springs Va. 20129 | 345308641000 | BARBARA DECKER<br>Barbara Decker | 3/11/17 | 1/4 AC | 1 / 55 | 9 / 12-15 |
| 16956 Highland Drive<br>[illegible] Simpson Cir | 345309719000 | Connie Thompson<br>Connie Thompson | 3/11/17 | .289 | 1 / 43 | 2 / 43 |
| | 307152763000 | JEFF MARTE | 3/11/17 | 3.75 | 1 / 5 | 2 / 11 |
| ~~Paeonian~~ 17224 Simpson Cir<br>Paeonian Springs, VA 20129 | 307157465000 | David E. Jackson<br>David E. Jackson | 3/11/17 | 3.62 | 1 / 16 | 1 / 16 |
| 17244 Simpson Cir<br>Paeonian Springs, VA 20129 | 307162165000 | Stephen Spears<br>Steve D. Spears | 3/11/17 | 4.29 | 1 / 11 | 3 / 9 |
| 17920 Meadowlark Dr.<br>Paeonian Springs VA 20129 | 346402686000 | Ryan Martin | 3/11/17 | . | 1 / 9 months | 2 / 65 |
| 118 CATOCTIN RIDGE ST<br>LAKE IN SPRINGS, VA 20129 | 345402316000 | Diane Flynn / DIANE FLYNN | 3/11/17 | ; | 1 / 126 | 1 / 64 |

By signing this form, I attest that I am the owner (or one of the owners) of the property indicated, that the information I have provided is the best available to my knowledge, and that I support this request for Loudoun County assistance with water and/or wastewater issues in my community and pledge my cooperation and assistance with this process.

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| Property address | Property Identification Number (PIN) | Owner (Please print and sign name) | Date Signed | Lot Size (acres) | Current Water Source / Age | Current Wastewater Service / Age |
|---|---|---|---|---|---|---|
| 39976 Peacock Cir Paeonian Springs VA 20129 | 345398421000 | Heather Day | 3/19/17 | .469 | 1 '43 | 1 '43 |
| 39914 Peacock cir Paeonian Springs, VA 20129 | 345398331000 | Shannon [illegible] | 3/19/17 | .473 | 2 ' 12 | 3 ' 10 |
| 39909 Peacock cir Paeonian Springs | 345398550000 | Russell G. Cox II | 3/19/17 | .9 | 2 '45 | 8 ' NA |
| 39911 Milton Ct Darlene Spinks | 345201472000 | Roger Wilkins Darlene Spinks | 3/19/17 | .2 | 1 '46 | 1 '46 |
| 39901 Milton Ct. Paeonian Springs, VA 20129 | 345201065000 | Melisa Baker | 3/19/17 | .4 | 1 '27 | 1 '27 |
| 39990 Peacock Circle Paeonian Springs, Va. 20129 | 345399525000 | David Houck | 3/19/17 | .25 | 1 '62 | 1 '62 |
| 39941 Peacock Circle Paeonian Springs VA | 345393828000 | Mark Evans | 3/19/17 | 1.047 | 1 '31 | 1 '31 |
| 39935 Peacock Cir Paeonian Springs VA | 345392546000 | Elizabeth Carrell Elizabeth Carrell | 3/19/17 | 1.08 | 1 '24 | 2 '23 |
| 39977 Pick Cir | 345298998000 | Robert Russell | 3/19/17 | .99 | 1 ~~'49~~ 59 | 1 ~~'57~~ |

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| Property address | Property Identification Number (PIN) | Owner (Please print and sign name) | Date Signed | Lot Size (acres) | Current Water Source / Age | Current Wastewater Service / Age |
|---|---|---|---|---|---|---|
| 40050 Glenmore Ct | 307255948000 | Allison Kearney<br>Allison Kearney | 3/18/17 | 1.0 | 1 / 12 | 1 / 12 |
| 40054 GLENMORE CT | 307257650000 | Margaret Gillis<br>Margaret Gillis | 3/18 | 1+ | 1 / 12 | 1 / 12 |
| 39924 Catoctin Ridge ST | 345402814000 | Joel Thomas<br>Joel Thomas | 3/18 | 3/4 | 1 / 56 | 1 / 56 |
| 39933 Catoctin Ridge ST | 345303091000 | Martha Riddle | 3/18 | 1.3 | 2 / 23 | 2 / 23 |
| 16899 OLIVER ST | 345392491000 | DANA D. SAUER<br>BEVERLY SAUER | 3/18 | .37 | 1 / 10 | 9 / 50+ |
| 16839 Hill Haven Lane | 345403162000 | Michael O. Billington<br>Michael O. Billington | 3/19 | 1 | 1 / 21 | 1 / 43 |
| 16153 Simpson Circle | 345302723000 | Gina Infante | 3/19 | 3 | 2 / 26 | 3 / 28 |
| 17034 Simpson Circle | 345204598000 | Tim Stanley<br>Shelly Stanley | 3/19 | 5 | 1 / 25 | 1 / 25 |
| 17006 HIGHLAND CIR | 307254982000 | BOB BUNCH | 3/19 | 1 | 1 / 20 | 3 / 20 |

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| Property address | Property Identification Number (PIN) | Owner (Please print and sign name) | Date Signed | Lot Size (acres) | Current Water Source / Age | Current Wastewater Service / Age | |
|---|---|---|---|---|---|---|---|
| 40602 CHARLESTOWN PK | | DONALD E. WALKER<br>Donald E Walker | 3-7-17 | 1A. | 2 / 30+ | 3 / 30+ | Duplicate |
| 16863 OLIVER ST. | 345492634000 | JOE SEGER<br>Joe Seger | 3-7-17 | .5 | 1 / 30+ | 1 / 30+ | |
| ~~Gwen Whit.~~<br>16953 Oliver St. | 345399075000 | Gwen M Whiting | 3/7/17 | 1 | 1 / 30+ | 1 / 30+ | |
| 16962 Simpson Cir | 345308533 | Alex D'Brula | 3-7-17 | 0.27 | 1 / 45+ | 3 / 45+ | |
| 12049 Fulton Pl. | 345206757000 | Jennifer N Eddy<br>JENNIFER N EDDY | 3.7.17 | .62 | 4 / 1 | 2 / 1 | |
| 16983 Simpson Cir. | 345306222000 | William Escobar | 3/7/17 | .27 | 3 / 63 | 2 / 63 | |
| 40051 Glenmore Ct | 307257735000 | Julia Bergeman | 3/7/17 | 1.3 | 1 / 13 | 1 / 13 | |
| 16929 Simpson Cir | 345309080000 | D. [illegible] | 03-07-17 | 0.119<br>0.15 | 1 / 9 | 1 / 9. | |
| 17166 Simpson Cir | 307153031000 | James Michael Hoffman | 03/07/2017 | 1.3 | 1 / 17 | 3 / 17 | |

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For an application to be considered on behalf of a community, at least 60% of the total number of property owners within the community must sign this application. (Please attach additional sheets as needed).

| Property address | Property Identification Number (PIN) | Owner (Please print and sign name) | Date Signed | Lot Size (acres) | Current Water Source / Age | Current Wastewater Service / Age |
|---|---|---|---|---|---|---|
| 39947 Catoctin Ridge St<br>Paeonian Springs, VA 20129 | 345305083000 | Douglas Coiner<br>[illegible] | 3/12 | .23 | 1 / 57 | 1 / 57 |
| 16946 Highland Circle<br>Paeonian Springs VA 20129 | 345308517000 | Daniel McLaughlin<br>[illegible] | 3/12 | .66 | 1 / [illegible] | 1 / [illegible] |
| 16967 Simpson Circle<br>Paeonian Springs, VA 20129 | 345306230000 | Cornelius H. Shiflett | 3/12 | .28 | 1 / 60+ | 1 / 50+ |
| 16939 Oliver St.<br>Paeonian Springs, Va 20129 | 345397279000 | Pamela G. Stewart<br>Pamela G Stewart | 3/12 | .50 | 1 / 5 | 3 / 5 |
| 16855 OLIVER ST | 345492402000 | STEWART REID | 3/12 | .40 | 1 / 47 | 1 / 47 |
| 16970 HIGHLAND CIR | 307350617000 | KEN VEDAR | 3/18 | .29 | 1 / 42 | 1 / 42 |
| 16976 Highland circle | 307351429000 | Linda Hackney<br>Linda Hackney | 3/18 | 1/4 | 1 / 42 | 1 / 42 |
| 16999 Highland Circle | 307251895000 | Derek Hotchkiss<br>[illegible] | 3/18 | 2 1/2 | 2 / 51 | 1 / 57 |
| 17030 Highland Cir. | 307255168000 | Margaret DeMar<br>M. G. DeMar | 3-18 | 1.14 | 1 / 25 | 3 / 19 |

By signing this form, I attest that I am the owner (or one of the owners) of the property indicated, that the information I have provided is the best available to my knowledge, and that I support this request for Loudoun County assistance with water and/or wastewater issues in my community and pledge my cooperation and assistance with this process.

For an application to be considered on behalf of a community, at least 60% of the total number of property owners within the community must sign this application. (Please attach additional sheets as needed).

| Property address | Property Identification Number (PIN) | Owner (Please print and sign name) | Date Signed | Lot Size (acres) | Current Water Source / Age | Current Wastewater Service / Age | |
|---|---|---|---|---|---|---|---|
| 40602 CHARLESTOWN PIKE | 307455027000 | DON WALKER/CREEKW | 3-17-17 | .08 | 2 / 138 | 2 / 138 | |
| 40522 Charlestown Pike | 345409688000 | Clyde J Melancon | 3-18-17 | .3 Ac | 1 / 15 | 1 / 15 | |
| 16861 Hill Haven Ln | 345402442000 | Wm + MARIETTA SALISBURY | 3/18/17 | 1 ACRE | 2 / 60 | 1 / 15 | |
| 16823 Hill Haven Ln. | 345403882000 | LEE GARNER | 3/18/17 | 0.99 | 1 / 28 | 1 / 28 | |
| | | | | | / | / | |
| 40325 Charlestown Pike, Hamilton, VA 20158 | 345388478000 | Geri Bolan | 3/18 | .5 | 4 / 15+ | 10 / 15 | NEEDS |
| 16920 Oliver St Paeonian Sp. Va 20129 | 345496302000 | Donna Spinks | 3/26/17 | .26 | 1 / 45 | 1 / 45 | |
| 16905 SIMPSON CIRCLE PAEONIAN SPRINGS, VA 20129 | 345309681000 | TED KALRIESS | 3/27/17 | | 1/20 | 1/20 | |

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| Property address | Property Identification Number (PIN) | Owner (Please print and sign name) | Date Signed | Lot Size (acres) | Current Water Source / Age | Current Wastewater Service / Age |
|---|---|---|---|---|---|---|
| 16950 Oliver St.<br>Paeonian Springs VA | 345399391000 | [redacted] McGahan<br>George McGahan | 3.12.17 | .25 | N/A, N/A<br>permitted | 8 ~~[illegible]~~, N/A<br>permitted |
| 16925 Simpson Circle<br>Paeonian Springs VA | 345309080000 | Maude McGahan<br>George McGahan | 3.12.17 | .14 | 1, mid 1970s | 3, early 1970s / late 1960s<br>holding tank concrete |
| | | | | | / | / |
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| Property address | Property Identification Number (PIN) | Owner (Please print and sign name) | Date Signed | Lot Size (acres) | Current Water Source / Age | Current Wastewater Service / Age |
|---|---|---|---|---|---|---|
| 39965 Peacock Circle | 345296276000 | Mary A. Yockers<br>Mary A. Yockers | 3/19/17 | 3/4 ac | / 138 | / 138 |
| 39970 Peacock Circle | 345396816000 | Vicky Jane<br>Vicky Jane | 3/21/17 | 1/2 ac. | / 141 | / 141 |
| | | | | | / | / |
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By signing this form, I attest that I am the owner (or one of the owners) of the property indicated, that the information I have provided is the best available to my knowledge, and that I support this request for Loudoun County assistance with water and/or wastewater issues in my community and pledge my cooperation and assistance with this process.

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| Property address | Property Identification Number (PIN) | Owner (Please print and sign name) | Date Signed | Lot Size (acres) | Current Water Source / Age | Current Wastewater Service / Age |
|---|---|---|---|---|---|---|
| 39875 Milton Ct. | 345299165000 | Mary McAdam<br>Mary McAdam | 3/19/17 | .5 | 1 / 45 | 1 / 45 |
| | | | | | / | / |
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| | | | | | / | / |
| | | | | | / | / |
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| | | | | | / | / |
| | | | | | / | / |

By signing this form, I attest that I am the owner (or one of the owners) of the property indicated, that the information I have provided is the best available to my knowledge, and that I support this request for Loudoun County assistance with water and/or wastewater issues in my community and pledge my cooperation and assistance with this process.

For an application to be considered on behalf of a community, at least 60% of the total number of property owners within the community must sign this application. (Please attach additional sheets as needed).

| Property address | Property Identification Number (PIN) | Owner (Please print and sign name) | Date Signed | Lot Size (acres) | Current Water Source / Age | Current Wastewater Service / Age |
|---|---|---|---|---|---|---|
| 40540 Charles Town Pike Hamilton VA 20158 | 345408321000 | Robert Zurack | 3/22/17 | 1.31 | 1 / 7 | 1 / 6 |
| | | | | | / | / |
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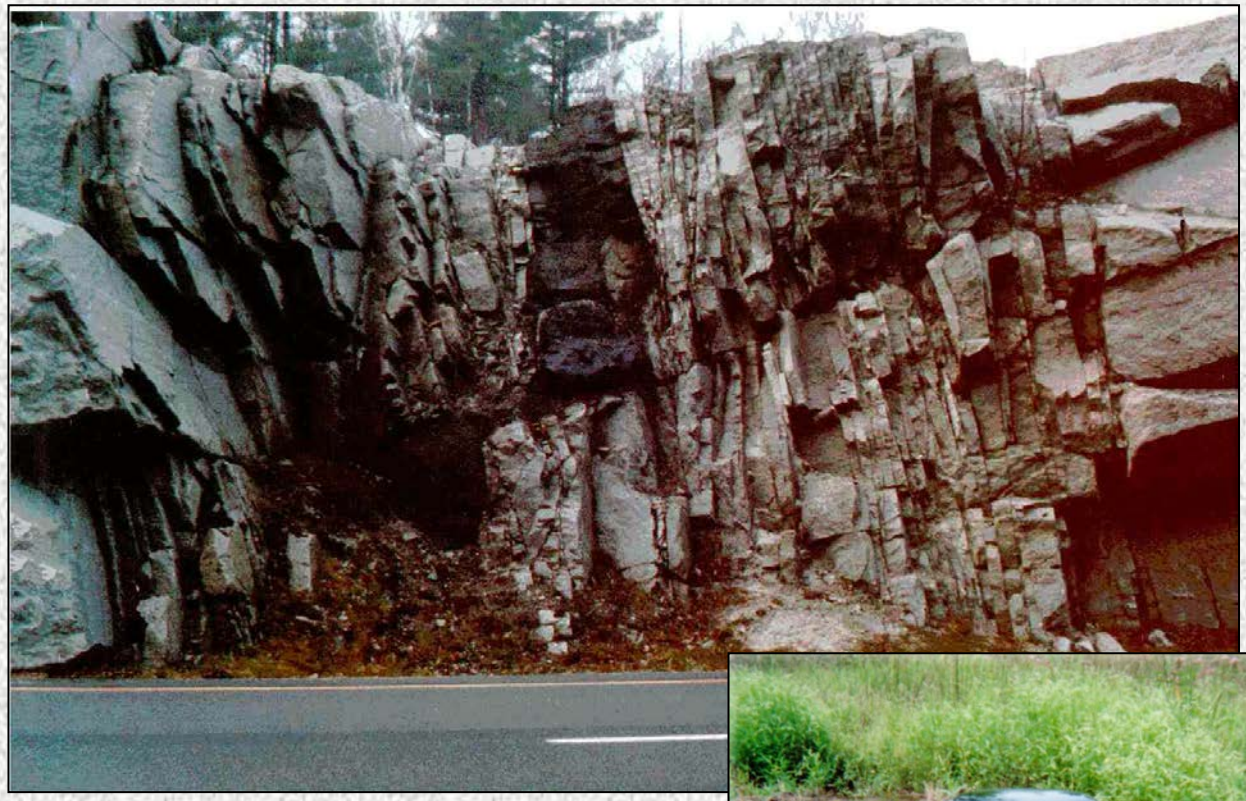
# Appendix B

Preliminary Hydrogeologic Assessment

# GROUNDWATER SUPPLY DEVELOPMENT PROGRAM
# PRELIMINARY HYDROGEOLOGIC ASSESSMENT - PHASE I

## PAEONIAN SPRINGS

## LOUDOUN COUNTY, VIRGINIA



**October 2018**

***Presented to:***

**Mr. Paul Longo, P.E.**
**Dewberry**


**EMERY & GARRETT GROUNDWATER INVESTIGATIONS, A DIVISION OF GZA**
**56 Main Street • P.O. Box 1578**
**Meredith, New Hampshire 03253**

**New England** **Mid-Atlantic** **South Atlantic**

*Emery & Garrett Groundwater Investigations,*
*A Division of GZA*
*56 Main Street • P.O. Box 1578*
*Meredith, New Hampshire 03253*
*(603) 279-4425* *www.eggi.com* *Fax (603) 279-8717*

October 3, 2018

Mr. Paul Longo, P.E.
Dewberry
Water and Wastewater Services
8401 Arlington Boulevard
Fairfax, Virginia 22031

**RE: Technical Memorandum of Preliminary Hydrogeologic Site Assessment of Paeonian Springs Study Area**

Dear Paul,

This letter serves as a summary of Emery & Garrett Groundwater Investigations (EGGI), a Division of GZA's hydrogeologic assessment of the potential availability of groundwater resources derived from bedrock aquifers underlying the Paeonian Springs Study Area in Loudoun County, Virginia (Figure 1). Paeonian Springs is an existing residential development having individual wells and septic drainfields. EGGI has been contracted to evaluate the feasibility of developing groundwater to serve as the central public drinking water supply for this residential community.

The Paeonian Springs project site encompasses approximately 179 acres. The Study Area for Paeonian Springs is defined as a 1,000-foot buffer surrounding the project site (Figure 1). Paeonian Springs consists of 216 residential lots that range in size from approximately 0.10 acres to 8 acres and average 0.8 acres. In accordance with Loudoun Water guidelines, it is necessary to develop 1.2 gpm per residential connection or 259 gallons per minute. Loudoun County requires that one gallon per minute per residential connection (216 gpm) be developed; however, the Virginia Water Works Regulations require that only 0.5 gpm per residential connection (108 gpm) be developed when constructing a community water system.

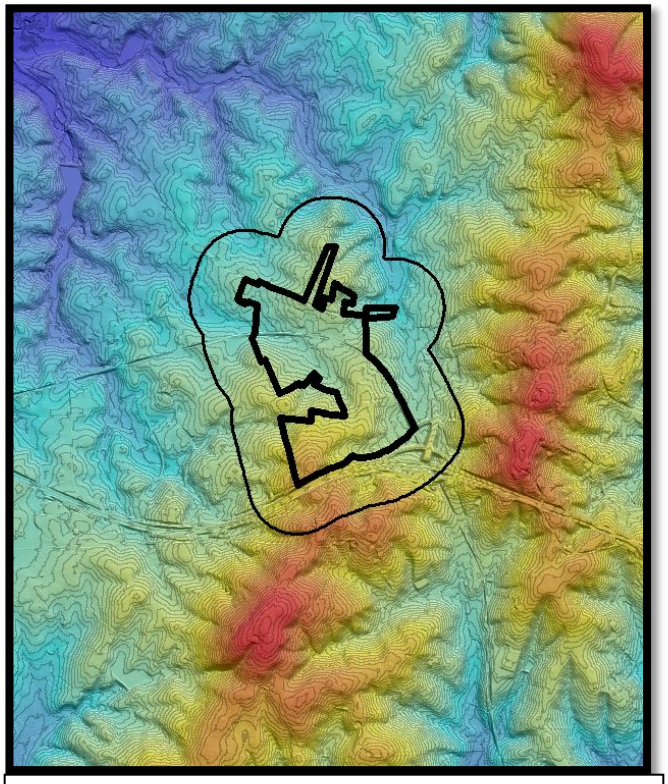
The results of the work conducted to date are summarized below and are presented on the accompanying figure. The data analyzed and evaluations performed included:

- A remote sensing analysis of high and low altitude photography and imagery;
- An assessment of the local bedrock geology through the compilation of existing geologic maps and on-site geologic mapping;
- A groundwater recharge analysis;
- A review of potential contaminant threats to groundwater quality; and
- A compilation of available existing well data.

**Remote Sensing Analysis**

A remote sensing analysis was conducted using available imagery, topographic maps, and digital elevation models (DEMs) to help characterize potential structural discontinuities that may underlie the Paeonian Springs Study Area. Many water-bearing subsurface features, such as fracture zones, bedrock discontinuities, faults, and geologic contacts, have a ground surface expression that can be detected through remote sensing analyses of photographic images and topographic maps. These surface expressions typically appear on the ground surface as topographic linear features, vegetation changes or tonal anomalies (i.e., contrast changes), and are known as lineaments. A lineament can be loosely defined as a mappable linear feature, as seen on the terrain surface, whose parts are aligned in a rectilinear or curvilinear manner.

*A total of 1,155 lineaments were identified in this investigation.* Lineaments in the Study Area were defined on four scales of platforms (Table 1). Each lineament was described by its length, azimuth (trend in degrees east of north), and location.



Example of Digital Elevation Model utilized for remote sensing

A synoptic rose diagram[1] was created as part of this analysis, which shows the prominent trends of lineaments observed within 1.5 kilometers of the Paeonian Springs project site (Plate 1). The most common trends identified by the rose diagram are, in decreasing order of prominence, 54°, 30°, 135°, 86°, and 116°. Note, however, that lineaments trending at orientations other than those shown on the rose diagram do occur locally, as shown on the map (Plate 1, View A).

[1] A rose diagram is illustrated on Plate 1and shows the orientations of lineament data. The trend of each rose petal represents lineament orientations posted in degrees east of north. Petal width is a measure of lineament data scatter and petal length is a measure of relative numbers of data in each lineament family.

From the original 1,155 lineaments, 78 coincident lineaments[2] were identified. A total of 15 of these coincident lineaments are considered to be bedrock fracture-supported[3] (Plate 1, View A). Since discontinuities in the bedrock that possess enhanced water-bearing properties often underlie coincident lineaments, the lineaments helped EGGI identify locations where geophysical surveys should be performed. (These geophysical data will ultimately determine where the best locations exist for drilling exploratory wells, if such targets exist.)

**Bedrock Geology**

Existing geologic maps (Southworth and others, 1999), indicate that the bedrock beneath the Paeonian Springs Study Area is made up of three different rock units: the Catoctin Formation (Zc), the Swift Run Formation (Zsp), and Metagranite (Ymb, Yg, and Yp) (Plate 1, View B). All rocks were poorly exposed within the Paeonian Springs Study Area.

The Catoctin Formation is comprised of greenstone (metamorphosed basalt) and localized intercalated meta-sediments that underlie the southeastern half the Study Area. The Swift Run Formation primarily consists of fine-grained phyllite in the central/northwestern half of the Study Area. Local layers of marble are interbedded within the phyllite north of Paeonian Springs (Plate 1, View B). Metagranitic rocks are located on the northwestern edge of Paeonian Springs and are locally intruded by metadiabase dikes (Zmd). The foliation[4] and compositional layering in all these rocks all trend to the north-northeast and dip to the southeast at moderate angles.

Each of these rock types has different intrinsic properties that affect its ability to store and transmit groundwater. In general terms, EGGI considers the greenstone and metagranite to be more favorable rocks for the development of groundwater resources within the Paeonian Springs Study Area than the phyllites. The phyllites are generally much less favorable for developing high yielding bedrock wells, unless solution cavities within a local layer of marble can be intercepted during drilling.

**Preliminary Groundwater Recharge Review**

Estimates of groundwater recharge in northern Virginia and Maryland have ranged from 8.4 inches per year (Pavich, 1986), to 10.5 inches per year (Richardson, 1980), to 11.3 inches per year (Nutter and Otton, 1969). For the purposes of this study, EGGI applied an average recharge value of ten inches per year to estimate available recharge within the project site.

A recharge value of ten inches per year is equivalent to approximately 477,000 gallons per day per square mile. The project site covers an area of approximately 0.28 square miles.

---

[2] Lineaments observed on images at different scales that have a similar trend (±5°) and similar location (±2 mm at the scale of the image) are referred to as coincident lineaments (Mabee, and others, 1994). The use of such coincident lineaments helps to remove the inherent subjectivity of lineament analysis (Wise, 1982) and facilitates the confident use of lineament mapping as a groundwater exploration tool.

[3] Reduction of raw lineament data to coincident lineaments and fracture-supported coincident lineaments follows the method described in Mabee and others (1994). Those coincident lineaments that are sub-parallel with nearby bedrock fracture family orientations, bedding orientations, or lithologic contacts are highlighted in magenta as "fracture-supported" coincident lineaments.

[4] Foliation is the parallel alignment of minerals developed during the metamorphism and deformation of the rocks.

Therefore, a minimum of 133,550 gpd (93 gpm) of groundwater recharge is potentially available from the Paeonian Springs project site.[5] This is less groundwater recharge than is needed to support the required production capacity, so additional groundwater recharge will have to be induced from groundwater development zones identified in the 1,000-foot buffer area or from the watersheds that extend beyond the study area.

The 1,000-foot buffer that surrounds Paeonian Springs encompasses 0.96 squares miles. This is equivalent to a groundwater recharge amount of approximately 457,920 gpd or 318 gpm.

The actual amount of groundwater recharge received by the local bedrock aquifer and the extent of pumping impacts will need to be determined through the hydrologic testing (pumping tests) of potential production wells.

**Preliminary Review of Potential Contaminant Threats to Groundwater Quality**

The quality of groundwater resources can be adversely affected by land uses that allow groundwater contaminants to migrate into underlying bedrock aquifers. Therefore, one element of this groundwater resource investigation was to review the presence of potential contaminant threats to groundwater quality. This survey was carried out to a distance of 1,000 feet from the project site (Plate 1, View C). The sources used to investigate potential threats to groundwater quality included Environmental Data Resources (EDR) of Southport, Connecticut (a private firm that conducts contaminant threat searches) (Appendix A) and a review of Loudoun County GIS data on the location of existing drainfields, chemical storage tanks and other potential contaminants.

EDR identified six sites within the boundaries of Paeonian Springs and one within the 1,000-foot buffer (Plate 1, View C).

Loudoun County GIS data identified numerous drainfields and five chemical storage tanks (Plate 1, View C). In subdivisions that have small lot sizes, such as Paeonian Springs, nitrate leaching from closely-spaced drainfields can cause elevated nitrate concentration in the groundwater.

As the exploration process moves forward and potential test well drilling targets are selected, consideration will be given to the proximity of the potential groundwater contamination to any potential new source of water for the Paeonian Springs.

**Existing Wells**

Many homes proximal to and within the Paeonian Springs are served by groundwater from individual domestic wells. Well records compiled from the Loudoun County GIS database are shown on Plate 1, View C. Reported airlift yields from the GIS wells range from 0 to 75 gpm and the well depths range from 63 to 1,000 feet (Table I on Plate 1). The average yield of the wells is 11 gpm and their average depth is 338 feet, respectively.

[5] This is considered a rough estimate only, as topography, vegetation, soil type, slope, the amount impermeable surfaces, and geomorphology of the landscape all impact recharge rates.

Overall, these data show that yields of bedrock wells in the local area are highly variable but generally of moderate yield, which suggests it is possible to develop moderate yielding Production Wells in the study area.

**Recommendations / Conclusions**

The hydrogeologic assessment of the Paeonian Springs Study Area has served to identify five potential Groundwater Development Zones identified as PSD-1, PSD-2, PSD-3, PSD-4, and PSD-5. These Zones are considered the best candidate areas for developing potable groundwater resources proximal to Paeonian Springs. These areas are priority ranked according to their overall hydrogeological favorability for yielding appreciable groundwater resources.

*Based upon the hydrogeologic data collected in Phase I, EGGI recommends that this groundwater exploration program proceed to Phase II.* Phase II will include conducting geophysical surveys within selected Groundwater Development Zones to aid in the selection of exploratory test well sites. The geophysical surveys (Phase II) will be conducted in two parts for this project. Magnetometer/VLF surveys initially will be conducted to obtain additional insights into the geology underlying the property. Electrical resistivity surveys will then be conducted in order to locate site specific proposed exploratory test well targets.

The geophysical surveys should be conducted on selected land parcels where permission to gain access onto private or public property can be obtained and where it is technically feasible to conduct the surveys.[6] EGGI has successfully obtained permission for thousands of landowners over the years to conduct such geophysical investigations and would be happy to assist in this matter. Conducting Phase II investigations will result in the following:

- Identification of specific exploratory test well drilling sites.
- Provide a relative favorability "priority" ranking of the proposed exploratory test well drilling targets in all Zones;
- Provide additional estimates of potential groundwater yield; and
- Provide a recommended drilling order for the subsequent Phase III, exploratory test well drilling program.

I hope you find the information contained within this report to be responsive to your needs. If you have any questions, please do not hesitate to contact me.

Best regards,

Mark B. Wingsted, P.G.
Project Manager/Senior Hydrogeologist

COMMONWEALTH OF VIRGINIA
MARK B WINGSTED
No. 2801002055
CERTIFIED PROFESSIONAL GEOLOGIST

[6] Geophysical surveys can be conducted where access permission is granted and where parcel size is sufficient to allow geophysical surveys. Furthermore, because public supply wells have specific sanitary setback requirements, some land parcels may need to be combined to obtain sufficient setbacks from property boundaries.

**Limitations**

EGGI has collected and evaluated the available technical data according to professionally accepted scientific standards. The recommendations provided herein represent EGGI's professional opinion based upon the hydrogeologic data collected and do not constitute a warranty written or implied.

**References**

Mabee, S.B., Hardcastle, K.C., and Wise, D.U., 1994, A Method of Collecting and Analyzing Lineaments for Regional-Scale Fractured-Bedrock Aquifer Studies, *Ground Water,* Vol. 21, No. 6, 884-894.

Nutter, L.J., Otton, E.G., 1969, Ground-Water Occurrence in the Maryland Piedmont, Maryland Geological Survey, Report of Investigations No. 10.

Pavich, M.J., 1986, Processes and Rates of Saprolite Production and Erosion on a Foliated Granitic Rock in the Virginia Piedmont: in Colman, S.M. and Dethier, D.P., eds, Rates of Chemical Weathering of Rocks and Minerals: Academic Press, Inc., New York, p. 541-591.

Southworth, S., Burton, W.C., Schindler, J.S., and Froelich, A.J., 1999, Digital Geologic Map of Loudoun County, Virginia, USGS Open-File Report 99-150.

Richardson, C.A., 1980, Groundwater in the Piedmont Upland of Central Maryland: U.S. Geol. Survey, Water Res. Invest. 80-118.

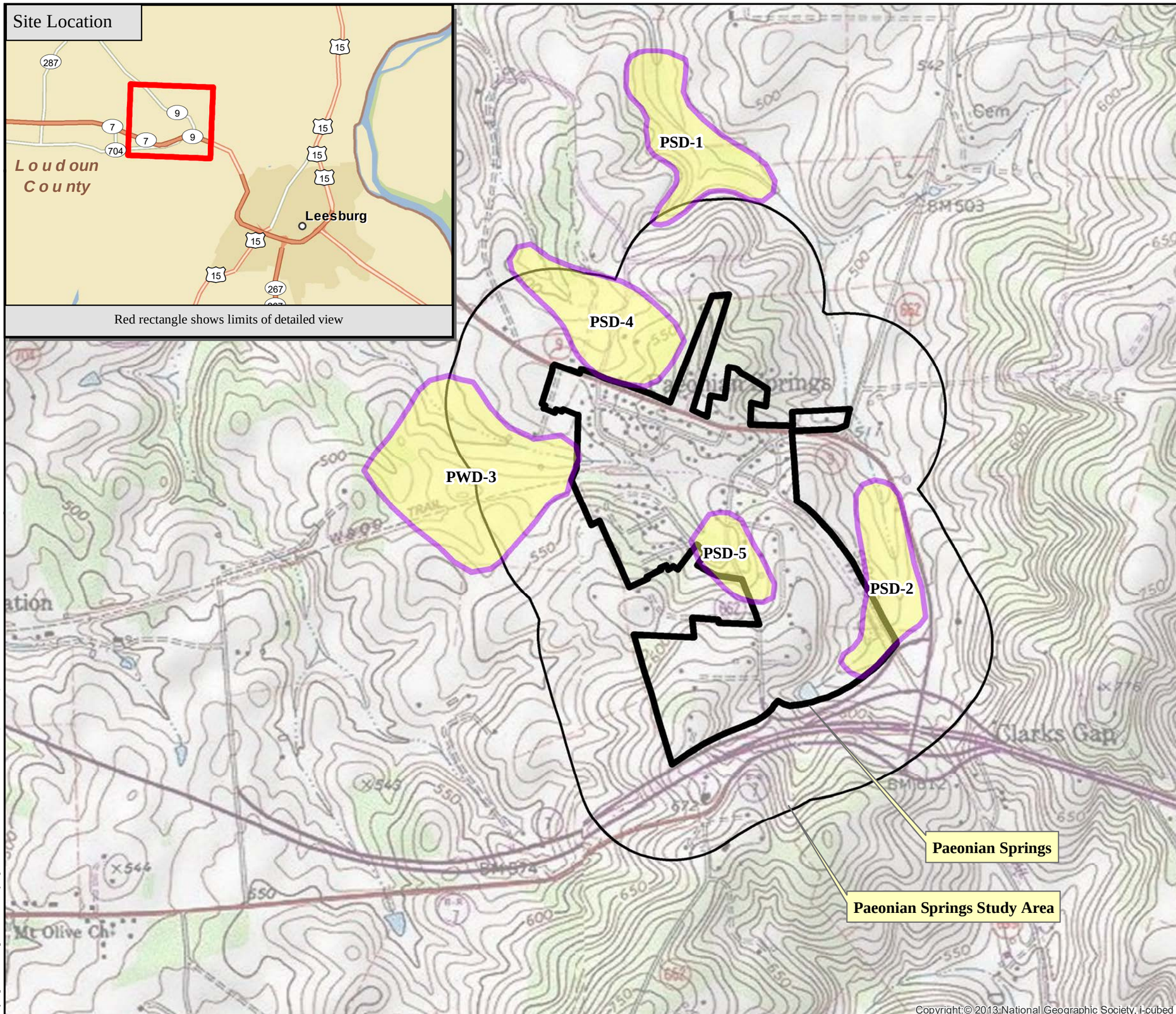
Wise; D. U., 1982, Linesmanship and the Practice of Linear Geo-art, Geol. Soc. Amer. Bull; 9; 886-888.

# FIGURE

# FIGURE 1

Topographic Setting of the
Paeonian Springs Project Study Area
Loudoun County, Virginia

Preliminary Hydrogeologic Assessment




## Legend

- Paeonian Springs
- 1000-Foot Buffer

**Potential Groundwater Development Zones**

- **PSD-1**

N

Scale is 1:12,000
1 inch = 1,000 feet

0 125 250 500 Meters

0 500 1,000 2,000 Feet

**FIGURE 1**

**Emery & Garrett Groundwater Investigations, A Division of GZA**

*Paeonian Springs\Ph1\Working\GIS\Paeonian Springs.mxd Last saved: 10/3/2018 3:22:16 PM by Mark.Wingsted*

# APPENDIX A

# ENVIRONMENTAL DATA RESOURCES, INC. (EDR) REPORT

**Paeonian Springs**
Charles Town Pike
Paeonian Springs, VA 20129

Inquiry Number: 5407673.2s
August 28, 2018

# The EDR Radius Map™ Report

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## GEOCHECK ADDENDUM

**GeoCheck - Not Requested**

***Thank you for your business.***
Please contact EDR at 1-800-352-0050
with any questions or comments.


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# EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-13), the ASTM Standard Practice for Environmental Site Assessments for Forestland or Rural Property (E 2247-16), the ASTM Standard Practice for Limited Environmental Due Diligence: Transaction Screen Process (E 1528-14) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

**TARGET PROPERTY INFORMATION**

**ADDRESS**

CHARLES TOWN PIKE
PAEONIAN SPRINGS, VA 20129

**COORDINATES**

| | |
|---|---|
| Latitude (North): | 39.1463000 - 39˚ 8' 46.68'' |
| Longitude (West): | 77.6196000 - 77˚ 37' 10.56'' |
| Universal Tranverse Mercator: | Zone 18 |
| UTM X (Meters): | 273610.1 |
| UTM Y (Meters): | 4336072.0 |
| Elevation: | 545 ft. above sea level |

**USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY**

| | |
|---|---|
| Target Property Map: | 5948992 WATERFORD, VA |
| Version Date: | 2013 |
| Northwest Map: | 5948986 PURCELLVILLE, VA |
| Version Date: | 2013 |

**AERIAL PHOTOGRAPHY IN THIS REPORT**

| | |
|---|---|
| Portions of Photo from: | 20140816, 20140826 |
| Source: | USDA |

## MAPPED SITES SUMMARY

Target Property Address:
CHARLES TOWN PIKE
PAEONIAN SPRINGS, VA 20129

Click on Map ID to see full detail.

| MAP ID | SITE NAME | ADDRESS | DATABASE ACRONYMS | RELATIVE ELEVATION | DIST (ft. & mi.) DIRECTION |
|---|---|---|---|---|---|
| 1 | | 40602 CHARLESTOWN PI | ERNS | Lower | 1444, 0.273, NE |
| 2 | COOK GLADYS PROPERTY | 16910 OLIVER RD | LTANKS | Lower | 1557, 0.295, NW |
| 3 | BAKER KENNETH RESIDE | 39872 CATOCTIN RIDGE | LTANKS | Higher | 1590, 0.301, NW |
| A4 | WATERFORD SHELL | 40636 CHARLES TOWN P | UST, Financial Assurance | Lower | 1667, 0.316, NE |
| A5 | WATERFORD TEXACO | 40636 CHARLES TOWN P | SPILLS | Lower | 1667, 0.316, NE |
| A6 | QUARLES/WATERFORD TE | 40636 CHARLESTOWN PI | LUST | Lower | 1667, 0.316, NE |
| A7 | QUARLES - WATERFORD | 40636 CHARLES TOWN P | LTANKS | Lower | 1667, 0.316, NE |
| A8 | PIERCES GARAGE | 40636 CHARLES TOWN P | EDR Hist Auto | Lower | 1667, 0.316, NE |
| A9 | QUARLES/WATERFORD TE | 40636 CHARLESTOWN PI | RGA LUST | Lower | 1667, 0.316, NE |
| B10 | SPINKS, JOANNE RESID | 16785 HILL HAVEN LAN | RGA LUST | Higher | 2096, 0.397, North |
| B11 | SPINKS JOANNE RESIDE | 16785 HILL HAVEN LN | LUST, LTANKS | Higher | 2096, 0.397, North |
| 12 | WARNER VELDA RESIDEN | 39920 MEADOWLARK DR | LTANKS | Higher | 2213, 0.419, South |
| 13 | DERUSSO REVOCABLE TR | 17327 CANBY RD | LTANKS | Higher | 3192, 0.605, South |
| 14 | FARKAS ROBERT A JR A | 16552 CLARKES GAP RD | LTANKS | Lower | 4823, 0.913, NNE |

# EXECUTIVE SUMMARY

## TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

## DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

## STANDARD ENVIRONMENTAL RECORDS

### *Federal NPL site list*

NPL ..... National Priority List
Proposed NPL ..... Proposed National Priority List Sites
NPL LIENS ..... Federal Superfund Liens

### *Federal Delisted NPL site list*

Delisted NPL ..... National Priority List Deletions

### *Federal CERCLIS list*

FEDERAL FACILITY ..... Federal Facility Site Information listing
SEMS ..... Superfund Enterprise Management System

### *Federal CERCLIS NFRAP site list*

SEMS-ARCHIVE ..... Superfund Enterprise Management System Archive

### *Federal RCRA CORRACTS facilities list*

CORRACTS ..... Corrective Action Report

### *Federal RCRA non-CORRACTS TSD facilities list*

RCRA-TSDF ..... RCRA - Treatment, Storage and Disposal

### *Federal RCRA generators list*

RCRA-LQG ..... RCRA - Large Quantity Generators
RCRA-SQG ..... RCRA - Small Quantity Generators
RCRA-CESQG ..... RCRA - Conditionally Exempt Small Quantity Generator

### *Federal institutional controls / engineering controls registries*

LUCIS ..... Land Use Control Information System
US ENG CONTROLS ..... Engineering Controls Sites List

# EXECUTIVE SUMMARY

US INST CONTROL..... Sites with Institutional Controls

***State- and tribal - equivalent CERCLIS***

SHWS..... This state does not maintain a SHWS list. See the Federal CERCLIS list and Federal NPL list.

***State and tribal landfill and/or solid waste disposal site lists***

SWF/LF..... Solid Waste Management Facilities

***State and tribal leaking storage tank lists***

INDIAN LUST..... Leaking Underground Storage Tanks on Indian Land

***State and tribal registered storage tank lists***

FEMA UST..... Underground Storage Tank Listing
AST..... Registered Petroleum Storage Tanks
INDIAN UST..... Underground Storage Tanks on Indian Land

***State and tribal institutional control / engineering control registries***

ENG CONTROLS..... Engineering Controls Sites Listing
INST CONTROL..... Voluntary Remediation Program Database

***State and tribal voluntary cleanup sites***

VCP..... Voluntary Remediation Program
INDIAN VCP..... Voluntary Cleanup Priority Listing

***State and tribal Brownfields sites***

BROWNFIELDS..... Brownfields Site Specific Assessments

**ADDITIONAL ENVIRONMENTAL RECORDS**

***Local Brownfield lists***

US BROWNFIELDS..... A Listing of Brownfields Sites

***Local Lists of Landfill / Solid Waste Disposal Sites***

INDIAN ODI..... Report on the Status of Open Dumps on Indian Lands
DEBRIS REGION 9..... Torres Martinez Reservation Illegal Dump Site Locations
ODI..... Open Dump Inventory
IHS OPEN DUMPS..... Open Dumps on Indian Land

***Local Lists of Hazardous waste / Contaminated Sites***

US HIST CDL..... Delisted National Clandestine Laboratory Register
US CDL..... National Clandestine Laboratory Register

***Local Land Records***

LIENS 2..... CERCLA Lien Information

# EXECUTIVE SUMMARY

***Records of Emergency Release Reports***

| | |
|---|---|
| HMIRS | Hazardous Materials Information Reporting System |
| SPILLS 90 | SPILLS 90 data from FirstSearch |

***Other Ascertainable Records***

| | |
|---|---|
| RCRA NonGen / NLR | RCRA - Non Generators / No Longer Regulated |
| FUDS | Formerly Used Defense Sites |
| DOD | Department of Defense Sites |
| SCRD DRYCLEANERS | State Coalition for Remediation of Drycleaners Listing |
| US FIN ASSUR | Financial Assurance Information |
| EPA WATCH LIST | EPA WATCH LIST |
| 2020 COR ACTION | 2020 Corrective Action Program List |
| TSCA | Toxic Substances Control Act |
| TRIS | Toxic Chemical Release Inventory System |
| SSTS | Section 7 Tracking Systems |
| ROD | Records Of Decision |
| RMP | Risk Management Plans |
| RAATS | RCRA Administrative Action Tracking System |
| PRP | Potentially Responsible Parties |
| PADS | PCB Activity Database System |
| ICIS | Integrated Compliance Information System |
| FTTS | FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act) |
| MLTS | Material Licensing Tracking System |
| COAL ASH DOE | Steam-Electric Plant Operation Data |
| COAL ASH EPA | Coal Combustion Residues Surface Impoundments List |
| PCB TRANSFORMER | PCB Transformer Registration Database |
| RADINFO | Radiation Information Database |
| HIST FTTS | FIFRA/TSCA Tracking System Administrative Case Listing |
| DOT OPS | Incident and Accident Data |
| CONSENT | Superfund (CERCLA) Consent Decrees |
| INDIAN RESERV | Indian Reservations |
| FUSRAP | Formerly Utilized Sites Remedial Action Program |
| UMTRA | Uranium Mill Tailings Sites |
| LEAD SMELTERS | Lead Smelter Sites |
| US AIRS | Aerometric Information Retrieval System Facility Subsystem |
| US MINES | Mines Master Index File |
| ABANDONED MINES | Abandoned Mines |
| FINDS | Facility Index System/Facility Registry System |
| UXO | Unexploded Ordnance Sites |
| ECHO | Enforcement & Compliance History Information |
| DOCKET HWC | Hazardous Waste Compliance Docket Listing |
| FUELS PROGRAM | EPA Fuels Program Registered Listing |
| AIRS | Permitted Airs Facility List |
| NPDES | Comprehensive Environmental Data System |
| COAL ASH | Coal Ash Disposal Sites |
| DRYCLEANERS | Drycleaner List |
| ENF | Enforcement Actions Data |
| TIER 2 | Tier 2 Information Listing |
| UIC | Underground Injection Control Wells |

**EDR HIGH RISK HISTORICAL RECORDS**

***EDR Exclusive Records***

| | |
|---|---|
| EDR MGP | EDR Proprietary Manufactured Gas Plants |

# EXECUTIVE SUMMARY

EDR Hist Cleaner..... EDR Exclusive Historical Cleaners

**EDR RECOVERED GOVERNMENT ARCHIVES**

***Exclusive Recovered Govt. Archives***

RGA LF..... Recovered Government Archive Solid Waste Facilities List

**SURROUNDING SITES: SEARCH RESULTS**

Surrounding sites were identified in the following databases.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

**STANDARD ENVIRONMENTAL RECORDS**

***Federal ERNS list***

ERNS: The Emergency Response Notification System records and stores information on reported releases of oil and hazardous substances. The source of this database is the U.S. EPA.

A review of the ERNS list, as provided by EDR, and dated 03/19/2018 has revealed that there is 1 ERNS site within approximately 1 mile of the target property.

| Lower Elevation | Address | Direction / Distance | Map ID | Page |
|---|---|---|---|---|
| Not reported<br>NRC Report #: 758874 | 40602 CHARLESTOWN PI | NE 1/4 - 1/2 (0.273 mi.) | 1 | 8 |

***State and tribal leaking storage tank lists***

LUST: The Leaking Underground Storage Tank Database.

A review of the LUST list, as provided by EDR, has revealed that there are 2 LUST sites within approximately 1 mile of the target property.

| Equal/Higher Elevation | Address | Direction / Distance | Map ID | Page |
|---|---|---|---|---|
| ***SPINKS JOANNE RESIDE***<br>Database: LUST REG NO, Date of Government Version: 05/18/2004<br>Facility Status: Closed<br>Pollution Complaint #: 01-3002<br>Closed Date: 4/30/2001 | ***16785 HILL HAVEN LN*** | ***N 1/4 - 1/2 (0.397 mi.)*** | ***B11*** | ***24*** |

Facility ID: 0

| Lower Elevation | Address | Direction / Distance | Map ID | Page |
|---|---|---|---|---|
| QUARLES/WATERFORD TE<br>Database: LUST REG NO, Date of Government Version: 05/18/2004<br>Facility Status: Closed<br>Facility Status: Open<br>Pollution Complaint #: 88-0955<br>Pollution Complaint #: 93-0376<br>Closed Date: 6/22/1998<br>Facility ID: 3014137 | 40636 CHARLESTOWN PI | NE 1/4 - 1/2 (0.316 mi.) | A6 | 22 |

LTANKS: The Leaking Tanks Database contains current Leaking petroleum tanks. The data comes from the Department of Environmental Quality.

A review of the LTANKS list, as provided by EDR, and dated 04/05/2018 has revealed that there are 7 LTANKS sites within approximately 1 mile of the target property.

| Equal/Higher Elevation | Address | Direction / Distance | Map ID | Page |
|---|---|---|---|---|
| BAKER KENNETH RESIDE<br>Facility Status: Closed<br>CEDS Facility Id: 200000223382<br>Pollution Complaint #: 20063181 | 39872 CATOCTIN RIDGE | NW 1/4 - 1/2 (0.301 mi.) | 3 | 8 |
| ***SPINKS JOANNE RESIDE***<br>Facility Status: Closed<br>CEDS Facility Id: 200000195797<br>Pollution Complaint #: 20013002 | ***16785 HILL HAVEN LN*** | ***N 1/4 - 1/2 (0.397 mi.)*** | ***B11*** | ***24*** |
| WARNER VELDA RESIDEN<br>Facility Status: Closed<br>CEDS Facility Id: 200000222598<br>Pollution Complaint #: 20063115 | 39920 MEADOWLARK DR | S 1/4 - 1/2 (0.419 mi.) | 12 | 25 |
| DERUSSO REVOCABLE TR<br>Facility Status: Closed<br>CEDS Facility Id: 200000881913<br>Pollution Complaint #: 20163137 | 17327 CANBY RD | S 1/2 - 1 (0.605 mi.) | 13 | 26 |

| Lower Elevation | Address | Direction / Distance | Map ID | Page |
|---|---|---|---|---|
| COOK GLADYS PROPERTY<br>Facility Status: Closed<br>CEDS Facility Id: 200000849323<br>Pollution Complaint #: 20083292 | 16910 OLIVER RD | NW 1/4 - 1/2 (0.295 mi.) | 2 | 8 |
| QUARLES - WATERFORD<br>Facility Status: Closed<br>CEDS Facility Id: 200000193747<br>Pollution Complaint #: 19930376<br>Pollution Complaint #: 19880955 | 40636 CHARLES TOWN P | NE 1/4 - 1/2 (0.316 mi.) | A7 | 23 |
| FARKAS ROBERT A JR A<br>Facility Status: Closed<br>CEDS Facility Id: 200000859180 | 16552 CLARKES GAP RD | NNE 1/2 - 1 (0.913 mi.) | 14 | 26 |

Pollution Complaint #: 20133142

***State and tribal registered storage tank lists***

UST: The Underground Storage Tank database contains registered USTs. USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA). The data come from the Department of Environmental Quality's Underground Storage Tank Data Notification Information.

A review of the UST list, as provided by EDR, and dated 05/01/2018 has revealed that there is 1 UST site within approximately 1 mile of the target property.

| Lower Elevation | Address | Direction / Distance | Map ID | Page |
|---|---|---|---|---|
| ***WATERFORD SHELL*** | ***40636 CHARLES TOWN P*** | ***NE 1/4 - 1/2 (0.316 mi.)*** | ***A4*** | ***9*** |
| Tank Status: CURR IN USE | | | | |
| Tank Status: REM FROM GRD | | | | |
| Facility Id: 3014137 | | | | |
| CEDS Facility ID: 200000193747 | | | | |

**ADDITIONAL ENVIRONMENTAL RECORDS**

***Records of Emergency Release Reports***

SPILLS: The Department of Environmental Quality's POLLUTION RESPONSE PROGRAM, known as PREP, provides for responses to air, water, and waste pollution incidents in order to protect human health and the environment. PREP staff often work to assist local emergency responders, other state agencies, federal agencies, and responsible parties, as may be needed, to manage pollution incidents. Oil spills, fish kills, and hazardous materials spills are examples of incidents that may involve the DEQ's PREP Program.

A review of the SPILLS list, as provided by EDR, has revealed that there is 1 SPILLS site within approximately 1 mile of the target property.

| Lower Elevation | Address | Direction / Distance | Map ID | Page |
|---|---|---|---|---|
| WATERFORD TEXACO | 40636 CHARLES TOWN P | NE 1/4 - 1/2 (0.316 mi.) | A5 | 19 |
| Database: SPILLS NO, Date of Government Version: 09/23/2009 | | | | |
| Database: SPILLS, Date of Government Version: 05/01/2018 | | | | |
| IR Number: 2005-N-0880 | | | | |
| Incident Response IR #: 2005-N-0880 | | | | |
| Date Closed: 5/16/2005 | | | | |

***Other Ascertainable Records***

Financial Assurance: A listing of financial assurance information for underground storage tank facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

A review of the Financial Assurance list, as provided by EDR, has revealed that there is 1 Financial

Assurance site within approximately 1 mile of the target property.

| Lower Elevation | Address | Direction / Distance | Map ID | Page |
|---|---|---|---|---|
| ***WATERFORD SHELL*** | ***40636 CHARLES TOWN P*** | ***NE 1/4 - 1/2 (0.316 mi.)*** | ***A4*** | ***9*** |

Database: Financial Assurance 1, Date of Government Version: 07/26/2018
Facility ID: 3014137
ROF Own Id: 38058

## EDR HIGH RISK HISTORICAL RECORDS

### *EDR Exclusive Records*

EDR Hist Auto: EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

A review of the EDR Hist Auto list, as provided by EDR, has revealed that there is 1 EDR Hist Auto site within approximately 1 mile of the target property.

| Lower Elevation | Address | Direction / Distance | Map ID | Page |
|---|---|---|---|---|
| PIERCES GARAGE | 40636 CHARLES TOWN P | NE 1/4 - 1/2 (0.316 mi.) | A8 | 24 |

## EDR RECOVERED GOVERNMENT ARCHIVES

### *Exclusive Recovered Govt. Archives*

RGA LUST: The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Environmental Quality in Virgina and at the Regional VA Levels.

A review of the RGA LUST list, as provided by EDR, has revealed that there are 2 RGA LUST sites within approximately 1 mile of the target property.

| Equal/Higher Elevation | Address | Direction / Distance | Map ID | Page |
|---|---|---|---|---|
| SPINKS, JOANNE RESID | 16785 HILL HAVEN LAN | N 1/4 - 1/2 (0.397 mi.) | B10 | 24 |

| Lower Elevation | Address | Direction / Distance | Map ID | Page |
|---|---|---|---|---|
| QUARLES/WATERFORD TE | 40636 CHARLESTOWN PI | NE 1/4 - 1/2 (0.316 mi.) | A9 | 24 |

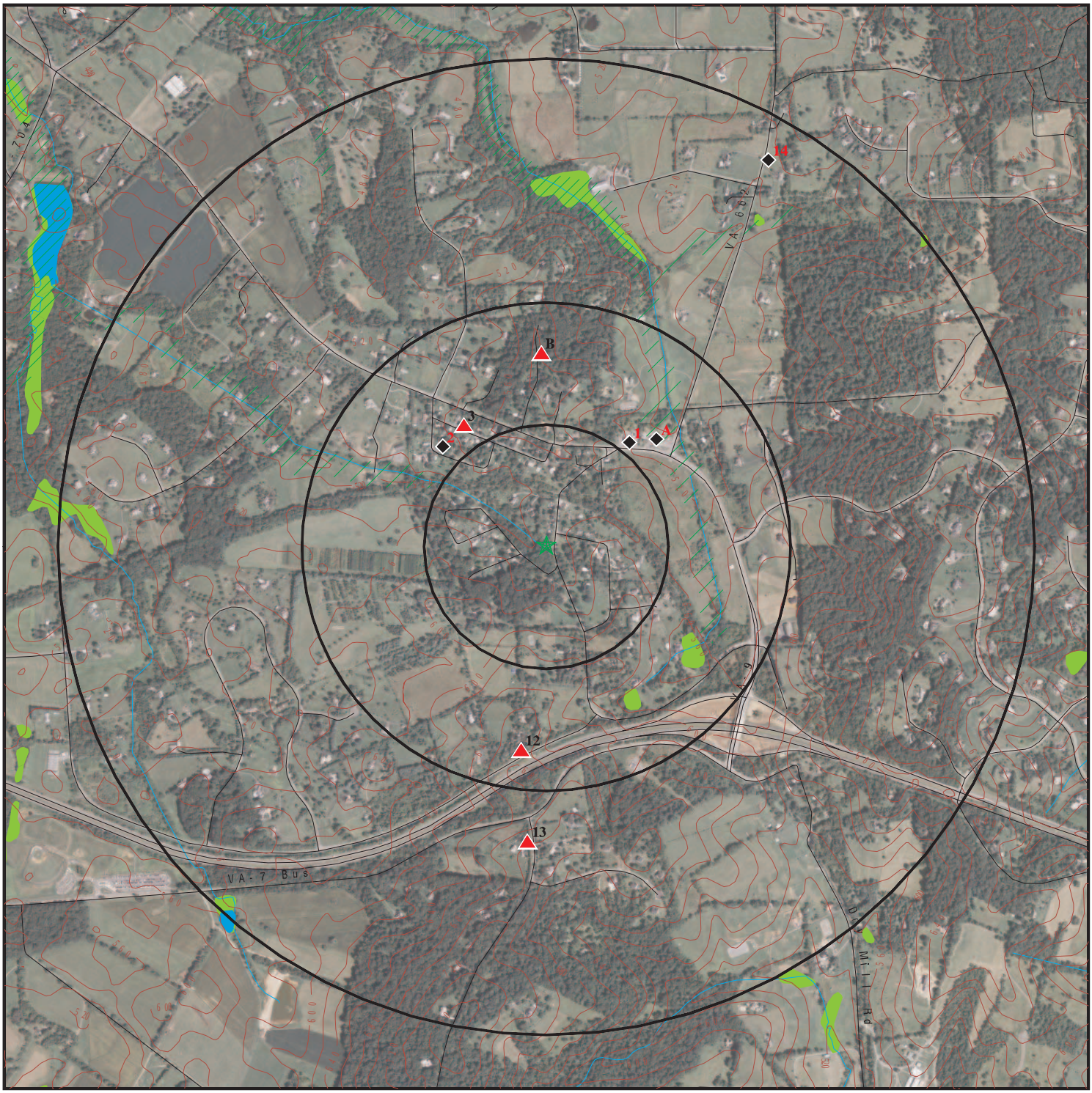
Facility ID: 3014137

# EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped. Count: 3 records.

| Site Name | Database(s) |
|---|---|
| BUCKARDT WELL | LUST, LTANKS |
| GOLDEN SPRINGS SECTION 2 SUBDIVISI | LUST |
| GOLDEN SPRINGS SECTION 2 SUBDIVISI | LTANKS |

# OVERVIEW MAP - 5407673.2S




- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites

0 1/4 1/2 1 Miles

- Indian Reservations BIA
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory
- Upgradient Area

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

| | |
|---|---|
| SITE NAME: Paeonian Springs<br>ADDRESS: Charles Town Pike<br>Paeonian Springs VA 20129<br>LAT/LONG: 39.1463 / 77.6196 | CLIENT: Emery & Garrett Groundwater<br>CONTACT: Mark Wingsted<br>INQUIRY #: 5407673.2s<br>DATE: August 28, 2018 1:37 pm |

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# DETAIL MAP - 5407673.2S

- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites

0 1/16 1/8 1/4 Miles

- Indian Reservations BIA
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

| | | | |
|---|---|---|---|
| SITE NAME: | Paeonian Springs | CLIENT: | Emery & Garrett Groundwater |
| ADDRESS: | Charles Town Pike<br>Paeonian Springs VA 20129 | CONTACT: | Mark Wingsted |
| | | INQUIRY #: | 5407673.2s |
| LAT/LONG: | 39.1463 / 77.6196 | DATE: | August 28, 2018 1:38 pm |

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# MAP FINDINGS SUMMARY

| Database | Search Distance (Miles) | Target Property | < 1/8 | 1/8 - 1/4 | 1/4 - 1/2 | 1/2 - 1 | > 1 | Total Plotted |
|---|---|---|---|---|---|---|---|---|
| **STANDARD ENVIRONMENTAL RECORDS** | | | | | | | | |
| ***Federal NPL site list*** | | | | | | | | |
| NPL | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| Proposed NPL | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| NPL LIENS | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| ***Federal Delisted NPL site list*** | | | | | | | | |
| Delisted NPL | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| ***Federal CERCLIS list*** | | | | | | | | |
| FEDERAL FACILITY | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| SEMS | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| ***Federal CERCLIS NFRAP site list*** | | | | | | | | |
| SEMS-ARCHIVE | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| ***Federal RCRA CORRACTS facilities list*** | | | | | | | | |
| CORRACTS | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| ***Federal RCRA non-CORRACTS TSD facilities list*** | | | | | | | | |
| RCRA-TSDF | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| ***Federal RCRA generators list*** | | | | | | | | |
| RCRA-LQG | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| RCRA-SQG | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| RCRA-CESQG | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| ***Federal institutional controls / engineering controls registries*** | | | | | | | | |
| LUCIS | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| US ENG CONTROLS | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| US INST CONTROL | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| ***Federal ERNS list*** | | | | | | | | |
| ERNS | 1.000 | | 0 | 0 | 1 | 0 | NR | 1 |
| ***State- and tribal - equivalent CERCLIS*** | | | | | | | | |
| SHWS | N/A | | N/A | N/A | N/A | N/A | N/A | N/A |
| ***State and tribal landfill and/or solid waste disposal site lists*** | | | | | | | | |
| SWF/LF | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| ***State and tribal leaking storage tank lists*** | | | | | | | | |
| LUST | 1.000 | | 0 | 0 | 2 | 0 | NR | 2 |
| INDIAN LUST | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| LTANKS | 1.000 | | 0 | 0 | 5 | 2 | NR | 7 |
| ***State and tribal registered storage tank lists*** | | | | | | | | |
| FEMA UST | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |

# MAP FINDINGS SUMMARY

| Database | Search Distance (Miles) | Target Property | < 1/8 | 1/8 - 1/4 | 1/4 - 1/2 | 1/2 - 1 | > 1 | Total Plotted |
|---|---|---|---|---|---|---|---|---|
| UST | 1.000 | | 0 | 0 | 1 | 0 | NR | 1 |
| AST | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| INDIAN UST | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| ***State and tribal institutional control / engineering control registries*** | | | | | | | | |
| ENG CONTROLS | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| INST CONTROL | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| ***State and tribal voluntary cleanup sites*** | | | | | | | | |
| VCP | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| INDIAN VCP | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| ***State and tribal Brownfields sites*** | | | | | | | | |
| BROWNFIELDS | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| **ADDITIONAL ENVIRONMENTAL RECORDS** | | | | | | | | |
| ***Local Brownfield lists*** | | | | | | | | |
| US BROWNFIELDS | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| ***Local Lists of Landfill / Solid Waste Disposal Sites*** | | | | | | | | |
| INDIAN ODI | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| DEBRIS REGION 9 | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| ODI | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| IHS OPEN DUMPS | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| ***Local Lists of Hazardous waste / Contaminated Sites*** | | | | | | | | |
| US HIST CDL | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| US CDL | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| ***Local Land Records*** | | | | | | | | |
| LIENS 2 | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| ***Records of Emergency Release Reports*** | | | | | | | | |
| HMIRS | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| SPILLS | 1.000 | | 0 | 0 | 1 | 0 | NR | 1 |
| SPILLS 90 | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| ***Other Ascertainable Records*** | | | | | | | | |
| RCRA NonGen / NLR | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| FUDS | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| DOD | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| SCRD DRYCLEANERS | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| US FIN ASSUR | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| EPA WATCH LIST | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| 2020 COR ACTION | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| TSCA | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |

# MAP FINDINGS SUMMARY

| Database | Search Distance (Miles) | Target Property | < 1/8 | 1/8 - 1/4 | 1/4 - 1/2 | 1/2 - 1 | > 1 | Total Plotted |
|---|---|---|---|---|---|---|---|---|
| TRIS | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| SSTS | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| ROD | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| RMP | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| RAATS | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| PRP | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| PADS | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| ICIS | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| FTTS | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| MLTS | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| COAL ASH DOE | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| COAL ASH EPA | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| PCB TRANSFORMER | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| RADINFO | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| HIST FTTS | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| DOT OPS | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| CONSENT | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| INDIAN RESERV | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| FUSRAP | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| UMTRA | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| LEAD SMELTERS | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| US AIRS | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| US MINES | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| ABANDONED MINES | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| FINDS | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| UXO | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| ECHO | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| DOCKET HWC | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| FUELS PROGRAM | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| AIRS | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| NPDES | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| COAL ASH | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| DRYCLEANERS | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| ENF | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| Financial Assurance | 1.000 | | 0 | 0 | 1 | 0 | NR | 1 |
| TIER 2 | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| UIC | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| **EDR HIGH RISK HISTORICAL RECORDS** | | | | | | | | |
| ***EDR Exclusive Records*** | | | | | | | | |
| EDR MGP | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| EDR Hist Auto | 1.000 | | 0 | 0 | 1 | 0 | NR | 1 |
| EDR Hist Cleaner | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |
| **EDR RECOVERED GOVERNMENT ARCHIVES** | | | | | | | | |
| ***Exclusive Recovered Govt. Archives*** | | | | | | | | |
| RGA LF | 1.000 | | 0 | 0 | 0 | 0 | NR | 0 |

# MAP FINDINGS SUMMARY

| Database | Search Distance (Miles) | Target Property | < 1/8 | 1/8 - 1/4 | 1/4 - 1/2 | 1/2 - 1 | > 1 | Total Plotted |
|---|---|---|---|---|---|---|---|---|
| RGA LUST | 1.000 | | 0 | 0 | 2 | 0 | NR | 2 |
| - Totals -- | | 0 | 0 | 0 | 14 | 2 | 0 | 16 |

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

N/A = This State does not maintain a SHWS list. See the Federal CERCLIS list.

**1**
**NE**
**1/4-1/2**
**0.273 mi.**
**1444 ft.**

**40602 CHARLESTOWN PIKE**
**PAEONING, VA 20129**

**ERNS** **2005758874**
**N/A**

**Relative:**
**Lower**

**Actual:**
**517 ft.**

Click this hyperlink while viewing on your computer to access additional ERNS detail in the EDR Site Report.

---

**2**
**NW**
**1/4-1/2**
**0.295 mi.**
**1557 ft.**

**COOK GLADYS PROPERTY**
**16910 OLIVER RD**
**PAEONIAN SPRINGS, VA 20129**

**LTANKS** **S109526189**
**N/A**

**Relative:**
**Lower**

**Actual:**
**535 ft.**

LTANKS:

| | |
|---|---|
| Region: | NRO |
| CEDS Facility Id: | 200000849323 |
| **Case Status:** | **Closed** |
| Pollution Complaint #: | 20083292 |
| Reported: | 05/20/2008 |
| Case Closed Date: | 12/04/2009 |
| Program: | RP Lead |
| Federally Regulated UST (Y/N): | N |
| Regulated Petroleum UST (1): | N |
| Excluded UST (1): | N |
| Deferred UST (1): | N |
| Partially Deferred UST (1): | N |
| Exempt 1 UST (2): | N |
| Exempt 2 Heating Oil UST (2): | N |
| Small Heating Oil AST (2): | N |
| Regulated AST (3): | N |
| Unregulated AST (3): | Y |
| Other Y/N: | N |
| Unknown Y/N: | N |
| Other Description: | Not reported |
| Heating Oil Category: | Not reported |

---

**3**
**NW**
**1/4-1/2**
**0.301 mi.**
**1590 ft.**

**BAKER KENNETH RESIDENCE**
**39872 CATOCTIN RIDGE ST**
**PAEONIAN SPRINGS, VA 20129**

**LTANKS** **S107870236**
**N/A**

**Relative:**
**Higher**

**Actual:**
**546 ft.**

LTANKS:

| | |
|---|---|
| Region: | NRO |
| CEDS Facility Id: | 200000223382 |
| **Case Status:** | **Closed** |
| Pollution Complaint #: | 20063181 |
| Reported: | 02/21/2006 |
| Case Closed Date: | 03/13/2007 |
| Program: | RP Lead |
| Federally Regulated UST (Y/N): | N |
| Regulated Petroleum UST (1): | N |
| Excluded UST (1): | N |
| Deferred UST (1): | N |
| Partially Deferred UST (1): | N |
| Exempt 1 UST (2): | N |
| Exempt 2 Heating Oil UST (2): | Y |

**BAKER KENNETH RESIDENCE (Continued)** **S107870236**

| | |
|---|---|
| Small Heating Oil AST (2): | N |
| Regulated AST (3): | N |
| Unregulated AST (3): | N |
| Other Y/N: | N |
| Unknown Y/N: | N |
| Other Description: | Not reported |
| Heating Oil Category: | Category 2 |

---

**A4** **WATERFORD SHELL** **UST** **U003680621**
**NE** **40636 CHARLES TOWN PIKE** **Financial Assurance** **N/A**
**1/4-1/2** **PAEONIAN SPRINGS, VA 20129**
**0.316 mi.**
**1667 ft.** **Site 1 of 6 in cluster A**

**Relative:**
**Lower**

**Actual:**
**507 ft.**

Facility:

| | |
|---|---|
| Facility Id: | 3014137 |
| Facility Type: | GAS STATION |
| CEDS Facility ID: | 200000193747 |

Owner:

| | |
|---|---|
| Owner Id: | 38058 |
| Owner Name: | Quarles Petroleum Incorporated |
| Owner Address: | 1701 Fall Hill Ave Ste 200 |
| Owner Address2: | Not reported |
| Owner City, State, Zip: | Fredericksburg, VA 22401 |
| Owner Type: | COMMERCIAL |
| Number of Active AST: | 0 |
| Number of Active UST: | 3 |
| Number of Inactive AST: | 0 |
| Number of Inactive UST: | 5 |

UST:

| | |
|---|---|
| Facility ID: | 3014137 |
| Federally Regulated: | Yes |
| Tank Number: | 1 |
| Tank Capacity: | 10000 |
| Tank Contents: | GASOLINE |
| **Tank Status:** | **CURR IN USE** |
| Tank Type: | UST |

Tank Material:

| | |
|---|---|
| Install Date: | 6/1/1995 |
| Tank Materials: Bare Steel | No |
| Tank Materials: Cath Protect Steel | No |
| Tank Materials: Epoxy Steel | No |
| Tank Materials: Fiberglass | No |
| Tank Materials: Concrete | No |
| Tank Materials: Composite | Yes |
| Tank Materials: Double Walled | No |
| Tank Materials: Lined Interior | No |
| Tank Materials: Excav Liner | No |
| Tank Materials: Insulated Tank Jacket | No |
| Tank Materials: Repaired | No |
| Tank Materials: Unknown | No |
| Tank Materials: Other | No |
| Tank Materials: Other Note | Not reported |

**WATERFORD SHELL (Continued)** **U003680621**

Release Detection:

| | |
|---|---|
| Tank Release Detection: Leak Deferred | No |
| Tank Release Detection: Manual Gauge | No |
| Tank Release Detection: Auto Gauge | Yes |
| Tank Release Detection:Tank Tightness | No |
| Tank Release Detection: Vapor Monitor | No |
| Tank Release Detection: Inventory | No |
| Tank Release Detection: Stat Invent Recon | No |
| Tank Release Detection: Spill Install | Yes |
| Tank Release Detection: Overfill Install | Yes |
| Tank Release Detection: Groundwater | No |
| Tank Release Detection: Int Sec Containment | No |
| Tank Release Detection: Int Double Walled | No |
| Tank Release Detection: Other Method | No |
| Tank Release Detection: Other Note | Not reported |
| Pipe Release Detection: Leak Deferred | Not reported |
| Pipe Release Detection: Autoleak | Not reported |
| Pipe Release Detection: Line Tightness | Yes |
| Pipe Release Detection: Stat Invent Recon | No |
| Pipe Release Detection: Groundwater | No |
| Pipe Release Detection: Int Sec Containment | No |
| Pipe Release Det: Interior Double Walled | No |
| Pipe Release Detection: Other Method | No |
| Pipe Release Detection: Other Note | Not reported |
| Pipe Type: | NO VALVE: SUCTION |
| Pipe Materials: Bare Steel | No |
| Pipe Materials: Galvanized Steel | No |
| Pipe Materials: Copper | No |
| Pipe Materials: Fiberglass | No |
| Pipe Materials: Cath Protect | No |
| Pipe Materials: Double Walled | Yes |
| Pipe Materials: Sec Containment | No |
| Pipe Materials: Repaired | No |
| Pipe Materials: Unknown | No |
| Pipe Materials: Other | No |
| Pipe Materials: Other Note | Not reported |
| Facility ID: | 3014137 |
| Federally Regulated: | Yes |
| Tank Number: | 2 |
| Tank Capacity: | 8000 |
| Tank Contents: | GASOLINE |
| **Tank Status:** | **CURR IN USE** |
| Tank Type: | UST |

Tank Material:

| | |
|---|---|
| Install Date: | 6/1/1995 |
| Tank Materials: Bare Steel | No |
| Tank Materials: Cath Protect Steel | No |
| Tank Materials: Epoxy Steel | No |
| Tank Materials: Fiberglass | No |
| Tank Materials: Concrete | No |
| Tank Materials: Composite | Yes |
| Tank Materials: Double Walled | No |

**WATERFORD SHELL (Continued)** **U003680621**

| | |
|---|---|
| Tank Materials: Lined Interior | No |
| Tank Materials: Excav Liner | No |
| Tank Materials: Insulated Tank Jacket | No |
| Tank Materials: Repaired | No |
| Tank Materials: Unknown | No |
| Tank Materials: Other | No |
| Tank Materials: Other Note | Not reported |

Release Detection:

| | |
|---|---|
| Tank Release Detection: Leak Deferred | No |
| Tank Release Detection: Manual Gauge | No |
| Tank Release Detection: Auto Gauge | Yes |
| Tank Release Detection:Tank Tightness | No |
| Tank Release Detection: Vapor Monitor | No |
| Tank Release Detection: Inventory | No |
| Tank Release Detection: Stat Invent Recon | No |
| Tank Release Detection: Spill Install | Yes |
| Tank Release Detection: Overfill Install | Yes |
| Tank Release Detection: Groundwater | No |
| Tank Release Detection: Int Sec Containment | No |
| Tank Release Detection: Int Double Walled | No |
| Tank Release Detection: Other Method | No |
| Tank Release Detection: Other Note | Not reported |
| Pipe Release Detection: Leak Deferred | Not reported |
| Pipe Release Detection: Autoleak | Not reported |
| Pipe Release Detection: Line Tightness | Yes |
| Pipe Release Detection: Stat Invent Recon | No |
| Pipe Release Detection: Groundwater | No |
| Pipe Release Detection: Int Sec Containment | No |
| Pipe Release Det: Interior Double Walled | No |
| Pipe Release Detection: Other Method | No |
| Pipe Release Detection: Other Note | Not reported |

| | |
|---|---|
| Pipe Type: | PRESSURE |
| Pipe Materials: Bare Steel | No |
| Pipe Materials: Galvanized Steel | No |
| Pipe Materials: Copper | No |
| Pipe Materials: Fiberglass | No |
| Pipe Materials: Cath Protect | No |
| Pipe Materials: Double Walled | Yes |
| Pipe Materials: Sec Containment | No |
| Pipe Materials: Repaired | No |
| Pipe Materials: Unknown | No |
| Pipe Materials: Other | No |
| Pipe Materials: Other Note | Not reported |

| | |
|---|---|
| Facility ID: | 3014137 |
| Federally Regulated: | Yes |

| | |
|---|---|
| Tank Number: | 3 |
| Tank Capacity: | 4000 |
| Tank Contents: | DIESEL |
| **Tank Status:** | **CURR IN USE** |
| Tank Type: | UST |

Tank Material:

**WATERFORD SHELL (Continued)** **U003680621**

| | |
|---|---|
| Install Date: | 6/1/1995 |
| Tank Materials: Bare Steel | No |
| Tank Materials: Cath Protect Steel | No |
| Tank Materials: Epoxy Steel | No |
| Tank Materials: Fiberglass | No |
| Tank Materials: Concrete | No |
| Tank Materials: Composite | Yes |
| Tank Materials: Double Walled | No |
| Tank Materials: Lined Interior | No |
| Tank Materials: Excav Liner | No |
| Tank Materials: Insulated Tank Jacket | No |
| Tank Materials: Repaired | No |
| Tank Materials: Unknown | No |
| Tank Materials: Other | No |
| Tank Materials: Other Note | Not reported |

Release Detection:

| | |
|---|---|
| Tank Release Detection: Leak Deferred | No |
| Tank Release Detection: Manual Gauge | No |
| Tank Release Detection: Auto Gauge | Yes |
| Tank Release Detection:Tank Tightness | Yes |
| Tank Release Detection: Vapor Monitor | No |
| Tank Release Detection: Inventory | Yes |
| Tank Release Detection: Stat Invent Recon | No |
| Tank Release Detection: Spill Install | Yes |
| Tank Release Detection: Overfill Install | Yes |
| Tank Release Detection: Groundwater | Yes |
| Tank Release Detection: Int Sec Containment | No |
| Tank Release Detection: Int Double Walled | No |
| Tank Release Detection: Other Method | No |
| Tank Release Detection: Other Note | Not reported |
| Pipe Release Detection: Leak Deferred | Not reported |
| Pipe Release Detection: Autoleak | Not reported |
| Pipe Release Detection: Line Tightness | No |
| Pipe Release Detection: Stat Invent Recon | No |
| Pipe Release Detection: Groundwater | No |
| Pipe Release Detection: Int Sec Containment | No |
| Pipe Release Det: Interior Double Walled | No |
| Pipe Release Detection: Other Method | Yes |
| Pipe Release Detection: Other Note | Safe Suction |

| | |
|---|---|
| Pipe Type: | PRESSURE |
| Pipe Materials: Bare Steel | No |
| Pipe Materials: Galvanized Steel | No |
| Pipe Materials: Copper | No |
| Pipe Materials: Fiberglass | No |
| Pipe Materials: Cath Protect | No |
| Pipe Materials: Double Walled | Yes |
| Pipe Materials: Sec Containment | No |
| Pipe Materials: Repaired | No |
| Pipe Materials: Unknown | No |
| Pipe Materials: Other | No |
| Pipe Materials: Other Note | Not reported |

| | |
|---|---|
| Facility ID: | 3014137 |
| Federally Regulated: | Yes |

**WATERFORD SHELL (Continued)** **U003680621**

| | |
|---|---|
| Tank Number: | R1 |
| Tank Capacity: | 4000 |
| Tank Contents: | GASOLINE |
| **Tank Status:** | **REM FROM GRD** |
| Tank Type: | UST |

Tank Material:

| | |
|---|---|
| Install Date: | 7/7/1985 |
| Tank Materials: Bare Steel | Yes |
| Tank Materials: Cath Protect Steel | No |
| Tank Materials: Epoxy Steel | No |
| Tank Materials: Fiberglass | No |
| Tank Materials: Concrete | No |
| Tank Materials: Composite | No |
| Tank Materials: Double Walled | No |
| Tank Materials: Lined Interior | No |
| Tank Materials: Excav Liner | No |
| Tank Materials: Insulated Tank Jacket | No |
| Tank Materials: Repaired | No |
| Tank Materials: Unknown | No |
| Tank Materials: Other | No |
| Tank Materials: Other Note | Not reported |

Release Detection:

| | |
|---|---|
| Tank Release Detection: Leak Deferred | No |
| Tank Release Detection: Manual Gauge | No |
| Tank Release Detection: Auto Gauge | No |
| Tank Release Detection:Tank Tightness | No |
| Tank Release Detection: Vapor Monitor | No |
| Tank Release Detection: Inventory | No |
| Tank Release Detection: Stat Invent Recon | No |
| Tank Release Detection: Spill Install | No |
| Tank Release Detection: Overfill Install | No |
| Tank Release Detection: Groundwater | No |
| Tank Release Detection: Int Sec Containment | No |
| Tank Release Detection: Int Double Walled | No |
| Tank Release Detection: Other Method | No |
| Tank Release Detection: Other Note | Not reported |
| Pipe Release Detection: Leak Deferred | Not reported |
| Pipe Release Detection: Autoleak | Not reported |
| Pipe Release Detection: Line Tightness | No |
| Pipe Release Detection: Stat Invent Recon | No |
| Pipe Release Detection: Groundwater | No |
| Pipe Release Detection: Int Sec Containment | No |
| Pipe Release Det: Interior Double Walled | No |
| Pipe Release Detection: Other Method | No |
| Pipe Release Detection: Other Note | Not reported |

| | |
|---|---|
| Pipe Type: | VALVE: SUCTION |
| Pipe Materials: Bare Steel | No |
| Pipe Materials: Galvanized Steel | Yes |
| Pipe Materials: Copper | No |
| Pipe Materials: Fiberglass | No |
| Pipe Materials: Cath Protect | No |
| Pipe Materials: Double Walled | No |
| Pipe Materials: Sec Containment | No |
| Pipe Materials: Repaired | No |

**WATERFORD SHELL (Continued)** **U003680621**

| | |
|---|---|
| Pipe Materials: Unknown | No |
| Pipe Materials: Other | No |
| Pipe Materials: Other Note | Not reported |
| | |
| Facility ID: | 3014137 |
| Federally Regulated: | Yes |
| | |
| Tank Number: | R2 |
| Tank Capacity: | 4000 |
| Tank Contents: | GASOLINE |
| **Tank Status:** | **REM FROM GRD** |
| Tank Type: | UST |

Tank Material:

| | |
|---|---|
| Install Date: | 7/7/1972 |
| Tank Materials: Bare Steel | Yes |
| Tank Materials: Cath Protect Steel | No |
| Tank Materials: Epoxy Steel | No |
| Tank Materials: Fiberglass | No |
| Tank Materials: Concrete | No |
| Tank Materials: Composite | No |
| Tank Materials: Double Walled | No |
| Tank Materials: Lined Interior | No |
| Tank Materials: Excav Liner | No |
| Tank Materials: Insulated Tank Jacket | No |
| Tank Materials: Repaired | No |
| Tank Materials: Unknown | No |
| Tank Materials: Other | No |
| Tank Materials: Other Note | Not reported |

Release Detection:

| | |
|---|---|
| Tank Release Detection: Leak Deferred | No |
| Tank Release Detection: Manual Gauge | No |
| Tank Release Detection: Auto Gauge | No |
| Tank Release Detection:Tank Tightness | No |
| Tank Release Detection: Vapor Monitor | No |
| Tank Release Detection: Inventory | No |
| Tank Release Detection: Stat Invent Recon | No |
| Tank Release Detection: Spill Install | No |
| Tank Release Detection: Overfill Install | No |
| Tank Release Detection: Groundwater | No |
| Tank Release Detection: Int Sec Containment | No |
| Tank Release Detection: Int Double Walled | No |
| Tank Release Detection: Other Method | No |
| Tank Release Detection: Other Note | Not reported |
| Pipe Release Detection: Leak Deferred | Not reported |
| Pipe Release Detection: Autoleak | Not reported |
| Pipe Release Detection: Line Tightness | No |
| Pipe Release Detection: Stat Invent Recon | No |
| Pipe Release Detection: Groundwater | No |
| Pipe Release Detection: Int Sec Containment | No |
| Pipe Release Det: Interior Double Walled | No |
| Pipe Release Detection: Other Method | No |
| Pipe Release Detection: Other Note | Not reported |
| | |
| Pipe Type: | VALVE: SUCTION |

**WATERFORD SHELL (Continued)** **U003680621**

| | |
|---|---|
| Pipe Materials: Bare Steel | No |
| Pipe Materials: Galvanized Steel | Yes |
| Pipe Materials: Copper | No |
| Pipe Materials: Fiberglass | No |
| Pipe Materials: Cath Protect | No |
| Pipe Materials: Double Walled | No |
| Pipe Materials: Sec Containment | No |
| Pipe Materials: Repaired | No |
| Pipe Materials: Unknown | No |
| Pipe Materials: Other | No |
| Pipe Materials: Other Note | Not reported |

| | |
|---|---|
| Facility ID: | 3014137 |
| Federally Regulated: | Yes |
| Tank Number: | R3 |
| Tank Capacity: | 4000 |
| Tank Contents: | GASOLINE |
| **Tank Status:** | **REM FROM GRD** |
| Tank Type: | UST |

Tank Material:

| | |
|---|---|
| Install Date: | 7/7/1972 |
| Tank Materials: Bare Steel | Yes |
| Tank Materials: Cath Protect Steel | No |
| Tank Materials: Epoxy Steel | No |
| Tank Materials: Fiberglass | No |
| Tank Materials: Concrete | No |
| Tank Materials: Composite | No |
| Tank Materials: Double Walled | No |
| Tank Materials: Lined Interior | No |
| Tank Materials: Excav Liner | No |
| Tank Materials: Insulated Tank Jacket | No |
| Tank Materials: Repaired | No |
| Tank Materials: Unknown | No |
| Tank Materials: Other | No |
| Tank Materials: Other Note | Not reported |

Release Detection:

| | |
|---|---|
| Tank Release Detection: Leak Deferred | No |
| Tank Release Detection: Manual Gauge | No |
| Tank Release Detection: Auto Gauge | No |
| Tank Release Detection:Tank Tightness | No |
| Tank Release Detection: Vapor Monitor | No |
| Tank Release Detection: Inventory | No |
| Tank Release Detection: Stat Invent Recon | No |
| Tank Release Detection: Spill Install | No |
| Tank Release Detection: Overfill Install | No |
| Tank Release Detection: Groundwater | No |
| Tank Release Detection: Int Sec Containment | No |
| Tank Release Detection: Int Double Walled | No |
| Tank Release Detection: Other Method | No |
| Tank Release Detection: Other Note | Not reported |
| Pipe Release Detection: Leak Deferred | Not reported |
| Pipe Release Detection: Autoleak | Not reported |
| Pipe Release Detection: Line Tightness | No |

**WATERFORD SHELL (Continued)** **U003680621**

| | |
|---|---|
| Pipe Release Detection: Stat Invent Recon | No |
| Pipe Release Detection: Groundwater | No |
| Pipe Release Detection: Int Sec Containment | No |
| Pipe Release Det: Interior Double Walled | No |
| Pipe Release Detection: Other Method | No |
| Pipe Release Detection: Other Note | Not reported |
| | |
| Pipe Type: | VALVE: SUCTION |
| Pipe Materials: Bare Steel | No |
| Pipe Materials: Galvanized Steel | Yes |
| Pipe Materials: Copper | No |
| Pipe Materials: Fiberglass | No |
| Pipe Materials: Cath Protect | No |
| Pipe Materials: Double Walled | No |
| Pipe Materials: Sec Containment | No |
| Pipe Materials: Repaired | No |
| Pipe Materials: Unknown | No |
| Pipe Materials: Other | No |
| Pipe Materials: Other Note | Not reported |
| | |
| Facility ID: | 3014137 |
| Federally Regulated: | Yes |
| | |
| Tank Number: | R4 |
| Tank Capacity: | 4000 |
| Tank Contents: | DIESEL |
| **Tank Status:** | **REM FROM GRD** |
| Tank Type: | UST |
| Tank Material: | |
| Install Date: | 7/7/1972 |
| Tank Materials: Bare Steel | Yes |
| Tank Materials: Cath Protect Steel | No |
| Tank Materials: Epoxy Steel | No |
| Tank Materials: Fiberglass | No |
| Tank Materials: Concrete | No |
| Tank Materials: Composite | No |
| Tank Materials: Double Walled | No |
| Tank Materials: Lined Interior | No |
| Tank Materials: Excav Liner | No |
| Tank Materials: Insulated Tank Jacket | No |
| Tank Materials: Repaired | No |
| Tank Materials: Unknown | No |
| Tank Materials: Other | No |
| Tank Materials: Other Note | Not reported |
| | |
| Release Detection: | |
| Tank Release Detection: Leak Deferred | No |
| Tank Release Detection: Manual Gauge | No |
| Tank Release Detection: Auto Gauge | No |
| Tank Release Detection:Tank Tightness | No |
| Tank Release Detection: Vapor Monitor | No |
| Tank Release Detection: Inventory | No |
| Tank Release Detection: Stat Invent Recon | No |
| Tank Release Detection: Spill Install | No |
| Tank Release Detection: Overfill Install | No |

**WATERFORD SHELL (Continued)** **U003680621**

| | |
|---|---|
| Tank Release Detection: Groundwater | No |
| Tank Release Detection: Int Sec Containment | No |
| Tank Release Detection: Int Double Walled | No |
| Tank Release Detection: Other Method | No |
| Tank Release Detection: Other Note | Not reported |
| Pipe Release Detection: Leak Deferred | Not reported |
| Pipe Release Detection: Autoleak | Not reported |
| Pipe Release Detection: Line Tightness | No |
| Pipe Release Detection: Stat Invent Recon | No |
| Pipe Release Detection: Groundwater | No |
| Pipe Release Detection: Int Sec Containment | No |
| Pipe Release Det: Interior Double Walled | No |
| Pipe Release Detection: Other Method | No |
| Pipe Release Detection: Other Note | Not reported |
| Pipe Type: | VALVE: SUCTION |
| Pipe Materials: Bare Steel | No |
| Pipe Materials: Galvanized Steel | Yes |
| Pipe Materials: Copper | No |
| Pipe Materials: Fiberglass | No |
| Pipe Materials: Cath Protect | No |
| Pipe Materials: Double Walled | No |
| Pipe Materials: Sec Containment | No |
| Pipe Materials: Repaired | No |
| Pipe Materials: Unknown | No |
| Pipe Materials: Other | No |
| Pipe Materials: Other Note | Not reported |
| Facility ID: | 3014137 |
| Federally Regulated: | Yes |
| Tank Number: | R5 |
| Tank Capacity: | 3000 |
| Tank Contents: | GASOLINE |
| **Tank Status:** | **REM FROM GRD** |
| Tank Type: | UST |

Tank Material:

| | |
|---|---|
| Install Date: | 7/7/1972 |
| Tank Materials: Bare Steel | Yes |
| Tank Materials: Cath Protect Steel | No |
| Tank Materials: Epoxy Steel | No |
| Tank Materials: Fiberglass | No |
| Tank Materials: Concrete | No |
| Tank Materials: Composite | No |
| Tank Materials: Double Walled | No |
| Tank Materials: Lined Interior | No |
| Tank Materials: Excav Liner | No |
| Tank Materials: Insulated Tank Jacket | No |
| Tank Materials: Repaired | No |
| Tank Materials: Unknown | No |
| Tank Materials: Other | No |
| Tank Materials: Other Note | Not reported |

Release Detection:

| | |
|---|---|
| Tank Release Detection: Leak Deferred | No |

**WATERFORD SHELL (Continued)** **U003680621**

| | |
|---|---|
| Tank Release Detection: Manual Gauge | No |
| Tank Release Detection: Auto Gauge | No |
| Tank Release Detection:Tank Tightness | No |
| Tank Release Detection: Vapor Monitor | No |
| Tank Release Detection: Inventory | No |
| Tank Release Detection: Stat Invent Recon | No |
| Tank Release Detection: Spill Install | No |
| Tank Release Detection: Overfill Install | No |
| Tank Release Detection: Groundwater | No |
| Tank Release Detection: Int Sec Containment | No |
| Tank Release Detection: Int Double Walled | No |
| Tank Release Detection: Other Method | No |
| Tank Release Detection: Other Note | Not reported |
| Pipe Release Detection: Leak Deferred | Not reported |
| Pipe Release Detection: Autoleak | Not reported |
| Pipe Release Detection: Line Tightness | No |
| Pipe Release Detection: Stat Invent Recon | No |
| Pipe Release Detection: Groundwater | No |
| Pipe Release Detection: Int Sec Containment | No |
| Pipe Release Det: Interior Double Walled | No |
| Pipe Release Detection: Other Method | No |
| Pipe Release Detection: Other Note | Not reported |
| Pipe Type: | VALVE: SUCTION |
| Pipe Materials: Bare Steel | No |
| Pipe Materials: Galvanized Steel | Yes |
| Pipe Materials: Copper | No |
| Pipe Materials: Fiberglass | No |
| Pipe Materials: Cath Protect | No |
| Pipe Materials: Double Walled | No |
| Pipe Materials: Sec Containment | No |
| Pipe Materials: Repaired | No |
| Pipe Materials: Unknown | No |
| Pipe Materials: Other | No |
| Pipe Materials: Other Note | Not reported |

VA Financial Assurance 1:

| | |
|---|---|
| Facility ID: | 3014137 |
| Owner Name: | Quarles Petroleum Incorporated |
| ROF Own Id: | 38058 |
| Tank Type: | UST |
| Mechanism: | Financial Test |
| Gallonage: | Not reported |
| Per Occurence: | 50000 |
| Third Party: | 150000 |
| Annual Aggregate: | 200000 |
| In Compliance: | Not reported |
| Total Capacity: | 10000 |
| CEDS Facility Name: | Piercys Garage Incorporated |
| Tank Status: | CURR IN USE |
| Active Federally Regualted UST: | Y |

| | |
|---|---|
| Facility ID: | 3014137 |
| Owner Name: | Quarles Petroleum Incorporated |
| ROF Own Id: | 38058 |
| Tank Type: | UST |

**WATERFORD SHELL (Continued)** **U003680621**

| | |
|---|---|
| Mechanism: | Financial Test |
| Gallonage: | Not reported |
| Per Occurence: | 50000 |
| Third Party: | 150000 |
| Annual Aggregate: | 200000 |
| In Compliance: | Not reported |
| Total Capacity: | 8000 |
| CEDS Facility Name: | Piercys Garage Incorporated |
| Tank Status: | CURR IN USE |
| Active Federally Regualted UST: | Y |

| | |
|---|---|
| Facility ID: | 3014137 |
| Owner Name: | Quarles Petroleum Incorporated |
| ROF Own Id: | 38058 |
| Tank Type: | UST |
| Mechanism: | Financial Test |
| Gallonage: | Not reported |
| Per Occurence: | 50000 |
| Third Party: | 150000 |
| Annual Aggregate: | 200000 |
| In Compliance: | Not reported |
| Total Capacity: | 4000 |
| CEDS Facility Name: | Piercys Garage Incorporated |
| Tank Status: | CURR IN USE |
| Active Federally Regualted UST: | Y |

---

**A5** **WATERFORD TEXACO** **SPILLS** **S108325978**
**NE** **40636 CHARLES TOWN PIKE** **N/A**
**1/4-1/2** **PAEONIAN SPRINGS, VA**
**0.316 mi.**
**1667 ft.** **Site 2 of 6 in cluster A**

**Relative:**
**Lower**

**Actual:**
**507 ft.**

SPILLS:

| | |
|---|---|
| Fips City/County: | Loudoun County |
| Status: | Not reported |
| Reference Id: | Not reported |
| IR Number: | 2005-N-0880 |
| Associated IR: | Not reported |
| Incident Date: | Not reported |
| Call Received Date: | 05/16/2005 |
| Closure Comments: | See Site Summary for details |
| Threat To: | Not reported |
| Terrorism (Y/N): | NO |
| Characterize Incident: | Not reported |
| Incident Type: | Water |
| Incident Subtype: | Water |
| Materials: | Chemicals (Antifreeze)(-1 - -1 Unknown) |
| Effect To Receptor: | Not reported |
| Water Body: | Not reported |
| Low Quantity To Water: | Not reported |
| High Quantity To Water: | Not reported |
| Quantity Units: | Not reported |
| Other Receptors: | "Land, Potable Water" |
| RP Company: | Piercys Garage |
| RP Name: | Not reported |
| Property Owner: | Not reported |
| Property Company: | Not reported |
| Duration Of Event (Hrs): | Not reported |

**WATERFORD TEXACO (Continued)** **S108325978**

| | |
|---|---|
| Impacts: | Not reported |
| Other Impacts: | Not reported |
| Steps Taken: | Not reported |
| Steps Taken Description: | Not reported |
| System Components: | Not reported |
| Other System Components: | Not reported |
| Cause Of Event: | Not reported |
| Corrective Action Taken: | Not reported |
| Weather Status: | Not reported |
| Precipitation (Wet): | Not reported |
| Discharge Type: | Not reported |
| Discharge Volume: | Not reported |
| Unknown Discharge (Y/N): | NO |
| Site Name: | WATERFORD TEXACO |
| Closure Date: | 05/16/2005 |
| Orig. Call Incident Description: | "vehicle repair facility - improper auto fluid mgmt. dumping antifreeze into septic drain, surface spills of antifreeze and oil not cleaned up" |
| Original Call Material Description: | antifreeze |
| Original Call Location Description: | Waterford Texaco-40636 Charles Town Pike-Paeonian Springs-VA--Loudoun County |
| Incident Ongoing at time of Call: | Not reported |
| Agencies Notified (Y/N): | NO |
| Other Agencies: | Not reported |
| Permitted (Y/N): | NO |
| Call Reported By Company Name: | Anonymous |
| Call Property Owner Company Name: | Not reported |
| Call Property Owner Name: | Not reported |
| Site Summary: | Not reported |

SPILLS NO:

| | |
|---|---|
| Region: | NO |
| Id: | Not reported |
| Incident Summary: | Not reported |
| Date In: | 5/16/2005 |
| Date Closed: | 5/16/2005 |
| Pollution Type: | Not reported |
| Responsible Party: | Piercys Garage |
| **Facility Status:** | **Not reported** |
| Owner: | Not reported |
| Facility Contact: | Not reported |
| Facility Permitted: | 0 |
| Facility Telephone: | Not reported |
| Time In: | 12:39:00 PM |
| Reported By Name: | Anonymous |
| Reported By Telephone: | Not reported |
| Reported By Affiliation/Addr: | Not reported |
| Incident Response IR #: | 2005-N-0880 |
| Responsible Party Address: | Not reported |
| Responsible Party City: | Not reported |
| Responsible Party State: | Not reported |
| Responsible Party Zip: | Not reported |
| Responsible Party Contact: | Not reported |
| Responsible Party Telephone: | Not reported |
| Owner Name: | Not reported |
| Owner Address: | Not reported |
| Owner City: | Not reported |

**WATERFORD TEXACO (Continued)** **S108325978**

| | |
|---|---|
| Owner State: | Not reported |
| Owner Zip: | Not reported |
| Owner Contact: | Not reported |
| Owner Telephone: | Not reported |
| Incident Date: | Not reported |
| Incident Time: | Not reported |
| Petroleum: | 0 |
| Solid Waste: | 0 |
| Hazardous Waste: | 0 |
| Water: | -1 |
| Air: | 0 |
| Sewage: | 0 |
| Fish Kill: | 0 |
| Threat Wetlands: | 0 |
| Wetlands: | 0 |
| Material Released: | antifreeze |
| Possible Receptors: | land, potable water |
| Quantity Released: | Not reported |
| Unit Released: | Not reported |
| Quantity In Water: | Not reported |
| Receiving Waters: | Not reported |
| River Basin: | Not reported |
| Inspection Date: | Not reported |
| Call Date: | Not reported |
| Inspector: | Not reported |
| Response Due: | Not reported |
| Response Received Date: | Not reported |
| Visit Needed: | 0 |
| Open: | 0 |
| Air Referral Date: | Not reported |
| Air Reg/ Permit Number: | Not reported |
| Waste Referral Date: | Not reported |
| Epa Id Or Permit Number: | Not reported |
| Water Referral Date: | Not reported |
| Water Permit Number: | Not reported |
| Remediation Referral Date: | Not reported |
| Remediation Pc Number: | Not reported |
| Enforcement Referral Date: | Not reported |
| Nov Number: | Not reported |
| Pc Number: | Not reported |
| Receive By: | Not reported |
| Case Officer: | Not reported |
| Case Type: | Not reported |
| Street Address: | Not reported |
| Polllutant: | Not reported |
| Impact: | Not reported |
| Spill Time: | Not reported |
| Spill Date: | Not reported |
| Spill Volume: | Not reported |
| Measure: | Not reported |
| Volume In Water: | Not reported |
| Stream Name: | Not reported |
| Investigation Date: | Not reported |
| Closure Date: | Not reported |
| Lab Results: | Not reported |
| Target Date: | Not reported |
| Prep Number: | Not reported |

**WATERFORD TEXACO (Continued)** **S108325978**

| | |
|---|---|
| Report Date: | Not reported |
| Report Time: | Not reported |
| Pollutant Scr: | Not reported |
| Volume: | Not reported |
| Volume Esc: | Not reported |
| Future Recommendations: | Not reported |
| Stream Code: | Not reported |
| Visit Date: | Not reported |
| Lab Date: | Not reported |
| File Close Date: | Not reported |
| Prep Copy: | Not reported |
| City: | Not reported |
| Incident Summary: | vehicle repair facility - improper auto fluid mgmt. dumping antifreeze into septic drain, surface spills of antifreeze and oil not cleaned up |
| Reported: | Not reported |
| Results: | Not reported |
| Inspection Comments: | Not reported |
| Remarks: | Not reported |

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**A6**
**NE**
**1/4-1/2**
**0.316 mi.**
**1667 ft.**

**QUARLES/WATERFORD TEXACO** **LUST** **S103457769**
**40636 CHARLESTOWN PIKE** **N/A**
**LOUDOUN, VA 20129**

**Site 3 of 6 in cluster A**

**Relative:**
**Lower**

**Actual:**
**507 ft.**

LUST REG NO:

| | |
|---|---|
| Region: | NO |
| Facility ID: | 3014137 |
| **Status:** | **Closed** |
| Tank Size: | 0 |
| Product: | Not reported |
| Release Date: | 05/16/1988 |
| Closed Date: | 6/22/1998 |
| Case Type: | Article 9 |
| Case Officer: | Randy Chapman |
| Pollution Complaint #: | 88-0955 |
| Permit Number: | 0 |
| Priority: | - |

| | |
|---|---|
| Region: | NO |
| Facility ID: | 3014137 |
| **Status:** | **Open** |
| Tank Size: | 0 |
| Product: | gasoline |
| Release Date: | 08/21/1992 |
| Closed Date: | Not reported |
| Case Type: | Article 9 |
| Case Officer: | Randy Chapman |
| Pollution Complaint #: | 93-0376 |
| Permit Number: | 836054 |
| Priority: | - |

**A7 NE 1/4-1/2 0.316 mi. 1667 ft.** | **QUARLES - WATERFORD TEXACO**
**40636 CHARLES TOWN PIKE**
**PAEONIAN SPRINGS, VA 20129**

**Site 4 of 6 in cluster A**

**LTANKS** | **S104897060**
**N/A**

**Relative: Lower**

**Actual: 507 ft.**

LTANKS:

| | |
|---|---|
| Region: | NRO |
| CEDS Facility Id: | 200000193747 |
| **Case Status:** | **Closed** |
| Pollution Complaint #: | 19930376 |
| Reported: | 08/21/1992 |
| Case Closed Date: | 09/03/2003 |
| Program: | RP Lead |
| Federally Regulated UST (Y/N): | Y |
| Regulated Petroleum UST (1): | Y |
| Excluded UST (1): | N |
| Deferred UST (1): | N |
| Partially Deferred UST (1): | N |
| Exempt 1 UST (2): | N |
| Exempt 2 Heating Oil UST (2): | N |
| Small Heating Oil AST (2): | N |
| Regulated AST (3): | N |
| Unregulated AST (3): | N |
| Other Y/N: | N |
| Unknown Y/N: | N |
| Other Description: | Not reported |
| Heating Oil Category: | Not reported |

| | |
|---|---|
| Region: | NRO |
| CEDS Facility Id: | 200000193747 |
| **Case Status:** | **Closed** |
| Pollution Complaint #: | 19880955 |
| Reported: | 05/16/1988 |
| Case Closed Date: | 06/22/1998 |
| Program: | RP Lead |
| Federally Regulated UST (Y/N): | Y |
| Regulated Petroleum UST (1): | Y |
| Excluded UST (1): | N |
| Deferred UST (1): | N |
| Partially Deferred UST (1): | N |
| Exempt 1 UST (2): | N |
| Exempt 2 Heating Oil UST (2): | N |
| Small Heating Oil AST (2): | N |
| Regulated AST (3): | N |
| Unregulated AST (3): | N |
| Other Y/N: | N |
| Unknown Y/N: | N |
| Other Description: | Not reported |
| Heating Oil Category: | Not reported |

**A8 NE 1/4-1/2 0.316 mi. 1667 ft.** — **PIERCES GARAGE**, **40636 CHARLES TOWN PIKE**, **PAEONIAN SPRINGS, VA 20129** — **EDR Hist Auto** — **1020820858** / **N/A**

**Site 5 of 6 in cluster A**

**Relative: Lower**
**Actual: 507 ft.**

EDR Hist Auto

| Year: | Name: | Type: |
|---|---|---|
| 2006 | PIERCES GARAGE | Gasoline Service Stations, NEC |
| 2007 | PIERCES GARAGE | Gasoline Service Stations, NEC |
| 2008 | PIERCES GARAGE | Gasoline Service Stations, NEC |
| 2009 | PIERCES GARAGE | Gasoline Service Stations, NEC |
| 2010 | PIERCES GARAGE | Gasoline Service Stations, NEC |
| 2011 | PIERCES GARAGE | Gasoline Service Stations, NEC |
| 2012 | PIERCES GARAGE | Gasoline Service Stations, NEC |
| 2013 | PIERCES GARAGE | Gasoline Service Stations, NEC |
| 2014 | PIERCES GARAGE | Gasoline Service Stations, NEC |

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**A9 NE 1/4-1/2 0.316 mi. 1667 ft.** — **QUARLES/WATERFORD TEXACO**, **40636 CHARLESTOWN PIKE**, **PAEONIAN SPRINGS, VA** — **RGA LUST** — **S115983167** / **N/A**

**Site 6 of 6 in cluster A**

**Relative: Lower**
**Actual: 507 ft.**

RGA LUST:

| | | |
|---|---|---|
| 2001 | QUARLES/WATERFORD TEXACO | 40636 CHARLESTOWN PIKE |

---

**B10 North 1/4-1/2 0.397 mi. 2096 ft.** — **SPINKS, JOANNE RESIDENCE**, **16785 HILL HAVEN LANE**, **HAMILTON, VA** — **RGA LUST** — **S115987934** / **N/A**

**Site 1 of 2 in cluster B**

**Relative: Higher**
**Actual: 580 ft.**

RGA LUST:

| | | |
|---|---|---|
| 2001 | SPINKS, JOANNE RESIDENCE | 16785 HILL HAVEN LANE |

---

**B11 North 1/4-1/2 0.397 mi. 2096 ft.** — **SPINKS JOANNE RESIDENCE**, **16785 HILL HAVEN LN**, **HAMILTON, VA 20158** — **LUST**, **LTANKS** — **S105502378** / **N/A**

**Site 2 of 2 in cluster B**

**Relative: Higher**
**Actual: 580 ft.**

LUST REG NO:

| | |
|---|---|
| Region: | NO |
| Facility ID: | 0 |
| **Status:** | **Closed** |
| Tank Size: | Not reported |
| Product: | Not reported |
| Release Date: | 07/05/2000 |
| Closed Date: | 4/30/2001 |
| Case Type: | Alternate Water Supply |
| Case Officer: | Mark L. Miller |

**SPINKS JOANNE RESIDENCE (Continued)** **S105502378**

Pollution Complaint #: 01-3002
Permit Number: Not reported
Priority: Not reported

LTANKS:

| | |
|---|---|
| Region: | NRO |
| CEDS Facility Id: | 200000195797 |
| **Case Status:** | **Closed** |
| Pollution Complaint #: | 20013002 |
| Reported: | 07/05/2000 |
| Case Closed Date: | 04/30/2001 |
| Program: | State Lead |
| Federally Regulated UST (Y/N): | N |
| Regulated Petroleum UST (1): | N |
| Excluded UST (1): | N |
| Deferred UST (1): | N |
| Partially Deferred UST (1): | N |
| Exempt 1 UST (2): | N |
| Exempt 2 Heating Oil UST (2): | N |
| Small Heating Oil AST (2): | N |
| Regulated AST (3): | N |
| Unregulated AST (3): | N |
| Other Y/N: | N |
| Unknown Y/N: | Y |
| Other Description: | Not reported |
| Heating Oil Category: | Not reported |

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**12**
**South**
**1/4-1/2**
**0.419 mi.**
**2213 ft.**

**WARNER VELDA RESIDENCE** **LTANKS** **S107472136**
**39920 MEADOWLARK DR** **N/A**
**PAEONIAN SPRINGS, VA 20129**

**Relative:**
**Higher**

**Actual:**
**673 ft.**

LTANKS:

| | |
|---|---|
| Region: | NRO |
| CEDS Facility Id: | 200000222598 |
| **Case Status:** | **Closed** |
| Pollution Complaint #: | 20063115 |
| Reported: | 11/21/2005 |
| Case Closed Date: | 04/22/2009 |
| Program: | RP Lead |
| Federally Regulated UST (Y/N): | N |
| Regulated Petroleum UST (1): | N |
| Excluded UST (1): | N |
| Deferred UST (1): | N |
| Partially Deferred UST (1): | N |
| Exempt 1 UST (2): | N |
| Exempt 2 Heating Oil UST (2): | Y |
| Small Heating Oil AST (2): | N |
| Regulated AST (3): | N |
| Unregulated AST (3): | N |
| Other Y/N: | N |
| Unknown Y/N: | N |
| Other Description: | Not reported |
| Heating Oil Category: | Category 3 |

**13**
**South**
**1/2-1**
**0.605 mi.**
**3192 ft.**

**DERUSSO REVOCABLE TRUST PROPERTY**
**17327 CANBY RD**
**LEESBURG, VA 20175**

**LTANKS** **S118456891**
**N/A**

**Relative:**
**Higher**

**Actual:**
**694 ft.**

LTANKS:

| | |
|---|---|
| Region: | NRO |
| CEDS Facility Id: | 200000881913 |
| **Case Status:** | **Closed** |
| Pollution Complaint #: | 20163137 |
| Reported: | 01/07/2016 |
| Case Closed Date: | 04/15/2016 |
| Program: | RP Lead |
| Federally Regulated UST (Y/N): | N |
| Regulated Petroleum UST (1): | N |
| Excluded UST (1): | N |
| Deferred UST (1): | N |
| Partially Deferred UST (1): | N |
| Exempt 1 UST (2): | N |
| Exempt 2 Heating Oil UST (2): | Y |
| Small Heating Oil AST (2): | N |
| Regulated AST (3): | N |
| Unregulated AST (3): | N |
| Other Y/N: | N |
| Unknown Y/N: | N |
| Other Description: | Not reported |
| Heating Oil Category: | Category 3 |

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**14**
**NNE**
**1/2-1**
**0.913 mi.**
**4823 ft.**

**FARKAS ROBERT A JR AND LINDA J RESIDENCE**
**16552 CLARKES GAP RD**
**PEAONIAN SPRINGS, VA 20129**

**LTANKS** **S113412072**
**N/A**

**Relative:**
**Lower**

**Actual:**
**529 ft.**

LTANKS:

| | |
|---|---|
| Region: | NRO |
| CEDS Facility Id: | 200000859180 |
| **Case Status:** | **Closed** |
| Pollution Complaint #: | 20133142 |
| Reported: | 03/13/2013 |
| Case Closed Date: | 04/22/2013 |
| Program: | RP Lead |
| Federally Regulated UST (Y/N): | N |
| Regulated Petroleum UST (1): | N |
| Excluded UST (1): | N |
| Deferred UST (1): | N |
| Partially Deferred UST (1): | N |
| Exempt 1 UST (2): | N |
| Exempt 2 Heating Oil UST (2): | Y |
| Small Heating Oil AST (2): | N |
| Regulated AST (3): | N |
| Unregulated AST (3): | N |
| Other Y/N: | N |
| Unknown Y/N: | N |
| Other Description: | Not reported |
| Heating Oil Category: | Category 1 |

Count: 3 records.

ORPHAN SUMMARY

| City | EDR ID | Site Name | Site Address | Zip | Database(s) |
|---|---|---|---|---|---|
| LOUDOUN | S104406707 | BUCKARDT WELL | 17000 BLOCK SIMPSON CIRCLE | 20129 | LUST, LTANKS |
| LOUDOUN | S104957220 | GOLDEN SPRINGS SECTION 2 SUBDIVISI | GOLDEN SPRINGS COURT | 20158 | LUST |
| PAEONIAN SPRINGS | S104897434 | GOLDEN SPRINGS SECTION 2 SUBDIVISI | GOLDEN SPRINGS CT | 20158 | LTANKS |

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

**Number of Days to Update:** Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

## STANDARD ENVIRONMENTAL RECORDS

### *Federal NPL site list*

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 05/13/2018
Date Data Arrived at EDR: 05/30/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 23

Source: EPA
Telephone: N/A
Last EDR Contact: 08/09/2018
Next Scheduled EDR Contact: 10/15/2018
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 6
Telephone: 214-655-6659

EPA Region 3
Telephone 215-814-5418

EPA Region 7
Telephone: 913-551-7247

EPA Region 4
Telephone 404-562-8033

EPA Region 8
Telephone: 303-312-6774

EPA Region 5
Telephone 312-886-6686

EPA Region 9
Telephone: 415-947-4246

EPA Region 10
Telephone 206-553-8665

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 05/13/2018
Date Data Arrived at EDR: 05/30/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 23

Source: EPA
Telephone: N/A
Last EDR Contact: 08/09/2018
Next Scheduled EDR Contact: 10/15/2018
Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

***Federal Delisted NPL site list***

Delisted NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 05/13/2018
Date Data Arrived at EDR: 05/30/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 23

Source: EPA
Telephone: N/A
Last EDR Contact: 08/09/2018
Next Scheduled EDR Contact: 10/15/2018
Data Release Frequency: Quarterly

***Federal CERCLIS list***

FEDERAL FACILITY: Federal Facility Site Information listing

A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 11/07/2016
Date Data Arrived at EDR: 01/05/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 92

Source: Environmental Protection Agency
Telephone: 703-603-8704
Last EDR Contact: 07/06/2018
Next Scheduled EDR Contact: 10/15/2018
Data Release Frequency: Varies

SEMS: Superfund Enterprise Management System

SEMS (Superfund Enterprise Management System) tracks hazardous waste sites, potentially hazardous waste sites, and remedial activities performed in support of EPA's Superfund Program across the United States. The list was formerly know as CERCLIS, renamed to SEMS by the EPA in 2015. The list contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This dataset also contains sites which are either proposed to or on the National Priorities List (NPL) and the sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 05/18/2018
Date Data Arrived at EDR: 05/30/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 23

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 08/09/2018
Next Scheduled EDR Contact: 10/29/2018
Data Release Frequency: Quarterly

***Federal CERCLIS NFRAP site list***

SEMS-ARCHIVE: Superfund Enterprise Management System Archive

SEMS-ARCHIVE (Superfund Enterprise Management System Archive) tracks sites that have no further interest under the Federal Superfund Program based on available information. The list was formerly known as the CERCLIS-NFRAP, renamed to SEMS ARCHIVE by the EPA in 2015. EPA may perform a minimal level of assessment work at a site while it is archived if site conditions change and/or new information becomes available. Archived sites have been removed and archived from the inventory of SEMS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list the site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. The decision does not necessarily mean that there is no hazard associated with a given site; it only means that. based upon available information, the location is not judged to be potential NPL site.

Date of Government Version: 05/18/2018
Date Data Arrived at EDR: 05/30/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 23

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 08/09/2018
Next Scheduled EDR Contact: 10/29/2018
Data Release Frequency: Quarterly

***Federal RCRA CORRACTS facilities list***

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 03/01/2018
Date Data Arrived at EDR: 03/28/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 86

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 06/28/2018
Next Scheduled EDR Contact: 10/08/2018
Data Release Frequency: Quarterly

***Federal RCRA non-CORRACTS TSD facilities list***

RCRA-TSDF: RCRA - Treatment, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 03/01/2018
Date Data Arrived at EDR: 03/28/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 86

Source: Environmental Protection Agency
Telephone: 800-438-2474
Last EDR Contact: 06/28/2018
Next Scheduled EDR Contact: 10/08/2018
Data Release Frequency: Quarterly

***Federal RCRA generators list***

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 03/01/2018
Date Data Arrived at EDR: 03/28/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 86

Source: Environmental Protection Agency
Telephone: 800-438-2474
Last EDR Contact: 06/28/2018
Next Scheduled EDR Contact: 10/08/2018
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 03/01/2018
Date Data Arrived at EDR: 03/28/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 86

Source: Environmental Protection Agency
Telephone: 800-438-2474
Last EDR Contact: 06/28/2018
Next Scheduled EDR Contact: 10/08/2018
Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 03/01/2018
Date Data Arrived at EDR: 03/28/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 86

Source: Environmental Protection Agency
Telephone: 800-438-2474
Last EDR Contact: 06/28/2018
Next Scheduled EDR Contact: 10/08/2018
Data Release Frequency: Quarterly

***Federal institutional controls / engineering controls registries***

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 05/14/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 07/16/2018
Next Scheduled EDR Contact: 11/26/2018
Data Release Frequency: Varies

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 02/13/2018
Date Data Arrived at EDR: 02/27/2018
Date Made Active in Reports: 05/11/2018
Number of Days to Update: 73

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 05/29/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 02/13/2018
Date Data Arrived at EDR: 02/27/2018
Date Made Active in Reports: 05/11/2018
Number of Days to Update: 73

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 05/29/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: Varies

***Federal ERNS list***

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 03/19/2018
Date Data Arrived at EDR: 03/27/2018
Date Made Active in Reports: 06/08/2018
Number of Days to Update: 73

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 06/27/2018
Next Scheduled EDR Contact: 10/08/2018
Data Release Frequency: Quarterly

***State- and tribal - equivalent CERCLIS***

SHWS: This state does not maintain a SHWS list. See the Federal CERCLIS list and Federal NPL list.

State Hazardous Waste Sites. State hazardous waste site records are the states' equivalent to CERCLIS. These sites may or may not already be listed on the federal CERCLIS list. Priority sites planned for cleanup using state funds (state equivalent of Superfund) are identified along with sites where cleanup will be paid for by potentially responsible parties. Available information varies by state.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: Department of Environmental Quality
Telephone: 804-698-4236
Last EDR Contact: 06/13/2018
Next Scheduled EDR Contact: 10/01/2018
Data Release Frequency: N/A

***State and tribal landfill and/or solid waste disposal site lists***

SWF/LF: Solid Waste Management Facilities

Solid Waste Facilities/Landfill Sites. SWF/LF type records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 06/04/2018
Date Data Arrived at EDR: 06/06/2018
Date Made Active in Reports: 07/06/2018
Number of Days to Update: 30

Source: Department of Environmental Quality
Telephone: 804-698-4238
Last EDR Contact: 06/04/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Semi-Annually

***State and tribal leaking storage tank lists***

LUST REG WC: Leaking Underground Storage Tank List

Leaking underground storage tank site locations. Includes: counties of Alleghany, Bedford, Botetourt, Craig, Floyd, Franklin, Giles, Henry, Montgomery, Patrick, Pulaski, Roanoke; cities of Bedford, Clifton Forge, Covington, Martinsville, Radford, Roanoke, Salem.

Date of Government Version: 06/04/2015
Date Data Arrived at EDR: 06/05/2015
Date Made Active in Reports: 07/07/2015
Number of Days to Update: 32

Source: Department of Environmental Quality West Central Regional Office
Telephone: 540-562-6700
Last EDR Contact: 08/29/2016
Next Scheduled EDR Contact: 12/12/2016
Data Release Frequency: No Update Planned

LUST REG NO: Leaking Underground Storage Tank Tracking Database

Leaking underground storage tank site locations. Includes: counties of Arlington, Caroline, Culpeper, Fairfax, Fauquier, King George, Loudoun, Louisa, Madison, Orange, Prince William, Rappahannock, Spotsylvania, Stafford; cities of Alexandria, Fairfax, Falls Church, Fredericksburg, Manassas, Manassas Park.

Date of Government Version: 05/18/2004
Date Data Arrived at EDR: 05/22/2004
Date Made Active in Reports: 07/09/2004
Number of Days to Update: 48

Source: Department of Environmental Quality Northern Regional Office
Telephone: 703-583-3800
Last EDR Contact: 09/06/2011
Next Scheduled EDR Contact: 12/19/2011
Data Release Frequency: No Update Planned

LUST REG PD: Leaking Underground Storage Tank Sites
Leaking underground storage tank site locaitons. Includes: counties of Amelia, Brunswick, Charles City, Chesterfield, Dinwiddie, Essex, Gloucester, Goochland, Greensville, Hanover, Henrico, King and Queen, King William, Lancaster, Mathews, Middlesex, New Kent, Northumberland, Powhatan, Prince George, Richmond, Surry, Sussex, Westmoreland; cities of Colonial Heights, Emporia, Hopewell, Petersburg.

Date of Government Version: 12/02/2014
Date Data Arrived at EDR: 12/04/2014
Date Made Active in Reports: 01/16/2015
Number of Days to Update: 43

Source: Department of Environmental Quality Piedmont Regional Office
Telephone: 804-527-5020
Last EDR Contact: 08/29/2016
Next Scheduled EDR Contact: 12/12/2016
Data Release Frequency: Quarterly

LUST REG SC: Leaking Underground Storage Tanks
Leaking underground storage tank site locations. Includes: counties of Amherst, Appomattox, Buckingham, Campbell, Charlotte, Cumberland, Halifax, Lunenburg, Mecklenburg, Nottoway, Pittsylvania, Prince Deward; cities of Danville, Lynchburg.

Date of Government Version: 09/06/2013
Date Data Arrived at EDR: 09/06/2013
Date Made Active in Reports: 09/17/2013
Number of Days to Update: 11

Source: Department of Environmental Quality, South Central Region
Telephone: 434-582-5120
Last EDR Contact: 08/29/2016
Next Scheduled EDR Contact: 12/12/2016
Data Release Frequency: Semi-Annually

LUST REG SW: Leaking Underground Storage Tank Database
Leaking underground storage tank site locations. Includes: counties of Bland, Buchanan, Carroll, Dickenson, Grayson, Lee, Russell, Scott, Smyth, Tazewell, Washington, Wise, Wythe; cities of Bristol, Galax, Norton.

Date of Government Version: 07/15/2013
Date Data Arrived at EDR: 07/18/2013
Date Made Active in Reports: 09/16/2013
Number of Days to Update: 60

Source: Department of Environmental Quality Southwest Regional Office
Telephone: 276-676-4800
Last EDR Contact: 10/11/2016
Next Scheduled EDR Contact: 01/23/2017
Data Release Frequency: No Update Planned

LUST REG TD: Leaking Underground Storage Tank Sites
Leaking underground storage tank site locations. Includes: counties of Accomack, Isle of Wight, James City, Northampton, Southampton, York; cities of Chesapeake, Franklin, Hampton, Newport News, Norfolk, Poquoson, Portsmouth, Suffolk, Virginia Beach, Williamsburg.

Date of Government Version: 06/30/2013
Date Data Arrived at EDR: 07/05/2013
Date Made Active in Reports: 09/16/2013
Number of Days to Update: 73

Source: Department of Environmental Quality Tidewater Regional Office
Telephone: trofoia@deq.vir
Last EDR Contact: 09/26/2016
Next Scheduled EDR Contact: 01/09/2017
Data Release Frequency: Quarterly

LUST REG VA: Leaking Underground Storage Tank List
Leaking underground storage tank site locations. Includes: counties of Albemarle, Augusta, Bath, Clarke, Fluvanna, Frederick, Greene, Highland, Nelson, Page, Rockbridge, Rockingham, Shenandoah, Warren; cities of Buena Vista, Charlottesville, Harrisonburg, Lexington, Staunton, Waynesboro, Winchester.

Date of Government Version: 12/06/2011
Date Data Arrived at EDR: 12/08/2011
Date Made Active in Reports: 01/16/2012
Number of Days to Update: 39

Source: Department of Environmental Quality Valley Regional Office
Telephone: 540-574-7800
Last EDR Contact: 08/29/2016
Next Scheduled EDR Contact: 12/12/2016
Data Release Frequency: No Update Planned

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 04/10/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 04/25/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 04/24/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 04/01/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 05/08/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 04/13/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 04/12/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN LUST R5: Leaking Underground Storage Tanks on Indian Land
Leaking underground storage tanks located on Indian Land in Michigan, Minnesota and Wisconsin.

Date of Government Version: 04/12/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA, Region 5
Telephone: 312-886-7439
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

LTANKS: Leaking Petroleum Storage Tanks
Includes releases of petroleum from underground storage tanks and aboveground storage tanks.

Date of Government Version: 04/05/2018
Date Data Arrived at EDR: 06/07/2018
Date Made Active in Reports: 07/06/2018
Number of Days to Update: 29

Source: Department of Environmental Quality
Telephone: 804-698-4010
Last EDR Contact: 06/07/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: Quarterly

***State and tribal registered storage tank lists***

FEMA UST: Underground Storage Tank Listing
A listing of all FEMA owned underground storage tanks.

Date of Government Version: 05/15/2017
Date Data Arrived at EDR: 05/30/2017
Date Made Active in Reports: 10/13/2017
Number of Days to Update: 136

Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 07/11/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: Varies

UST: Registered Petroleum Storage Tanks
Registered Underground Storage Tanks. UST's are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.

Date of Government Version: 05/01/2018
Date Data Arrived at EDR: 06/07/2018
Date Made Active in Reports: 07/06/2018
Number of Days to Update: 29

Source: Department of Environmental Quality
Telephone: 804-698-4010
Last EDR Contact: 06/07/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: Quarterly

AST: Registered Petroleum Storage Tanks
Registered Aboveground Storage Tanks.

Date of Government Version: 05/01/2018
Date Data Arrived at EDR: 06/07/2018
Date Made Active in Reports: 07/06/2018
Number of Days to Update: 29

Source: Department of Environmental Quality
Telephone: 804-698-4010
Last EDR Contact: 06/07/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: Quarterly

INDIAN UST R7: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 04/24/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN UST R8: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 04/25/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN UST R9: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 04/10/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN UST R1: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 04/13/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 04/01/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN UST R5: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 04/12/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 05/08/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

INDIAN UST R10: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 04/12/2018
Date Data Arrived at EDR: 05/18/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 63

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

***State and tribal institutional control / engineering control registries***

ENG CONTROLS: Engineering Controls Sites Listing
A listing of sites with Engineering Controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 06/20/2018
Date Data Arrived at EDR: 06/26/2018
Date Made Active in Reports: 08/10/2018
Number of Days to Update: 45
Source: Department of Environmental Quality
Telephone: 804-698-4228
Last EDR Contact: 06/20/2018
Next Scheduled EDR Contact: 10/08/2018
Data Release Frequency: Quarterly

INST CONTROL: Voluntary Remediation Program Database
Sites included in the Voluntary Remediation Program database that have deed restrictions.

Date of Government Version: 06/20/2018
Date Data Arrived at EDR: 06/26/2018
Date Made Active in Reports: 08/10/2018
Number of Days to Update: 45
Source: Department of Environmental Quality
Telephone: 804-698-4228
Last EDR Contact: 06/20/2018
Next Scheduled EDR Contact: 10/08/2018
Data Release Frequency: Quarterly

***State and tribal voluntary cleanup sites***

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng
A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27
Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 04/20/2009
Next Scheduled EDR Contact: 07/20/2009
Data Release Frequency: Varies

INDIAN VCP R1: Voluntary Cleanup Priority Listing
A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 07/27/2015
Date Data Arrived at EDR: 09/29/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 142
Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 06/22/2018
Next Scheduled EDR Contact: 10/08/2018
Data Release Frequency: Varies

VRP: Voluntary Remediation Program
The Voluntary Cleanup Program encourages owners of elected contaminated sites to take the initiative and conduct voluntary cleanups that meet state environmental standards.

Date of Government Version: 06/20/2018
Date Data Arrived at EDR: 06/26/2018
Date Made Active in Reports: 08/10/2018
Number of Days to Update: 45
Source: Department of Environmental Quality
Telephone: 804-698-4228
Last EDR Contact: 06/20/2018
Next Scheduled EDR Contact: 10/08/2018
Data Release Frequency: Quarterly

***State and tribal Brownfields sites***

BROWNFIELDS: Brownfields Site Specific Assessments
To qualify for Brownfields Assessment, the site must meet the Federal definition of a Brownfields and should have contaminant issues that need to be addressed and a redevelopment plan supported by the local government and community. Virginia's Department of Environmental Quality performs brownfields assessments under a cooperative agreement with the U.S. Environmental Protection Agency at no cost to communities, property owners or, prospective purchasers. The assessment is an evaluation of environmental impacts caused by previous site uses similar to a Phase II Environmental Assessment.

Date of Government Version: 07/24/2018
Date Data Arrived at EDR: 07/26/2018
Date Made Active in Reports: 08/15/2018
Number of Days to Update: 20

Source: Department of Environmental Quality
Telephone: 804-698-4207
Last EDR Contact: 07/26/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Quarterly

**ADDITIONAL ENVIRONMENTAL RECORDS**

***Local Brownfield lists***

US BROWNFIELDS: A Listing of Brownfields Sites
Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

Date of Government Version: 03/19/2018
Date Data Arrived at EDR: 03/21/2018
Date Made Active in Reports: 06/08/2018
Number of Days to Update: 79

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 06/20/2018
Next Scheduled EDR Contact: 10/01/2018
Data Release Frequency: Semi-Annually

***Local Lists of Landfill / Solid Waste Disposal Sites***

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands
Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 07/30/2018
Next Scheduled EDR Contact: 11/12/2018
Data Release Frequency: Varies

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations
A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 137

Source: EPA, Region 9
Telephone: 415-947-4219
Last EDR Contact: 07/17/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: No Update Planned

ODI: Open Dump Inventory
An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

IHS OPEN DUMPS: Open Dumps on Indian Land
A listing of all open dumps located on Indian Land in the United States.

Date of Government Version: 04/01/2014
Date Data Arrived at EDR: 08/06/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 176

Source: Department of Health & Human Serivces, Indian Health Service
Telephone: 301-443-1452
Last EDR Contact: 08/03/2018
Next Scheduled EDR Contact: 11/12/2018
Data Release Frequency: Varies

***Local Lists of Hazardous waste / Contaminated Sites***

US HIST CDL: National Clandestine Laboratory Register

A listing of clandestine drug lab locations that have been removed from the DEAs National Clandestine Laboratory Register.

Date of Government Version: 02/22/2018
Date Data Arrived at EDR: 03/01/2018
Date Made Active in Reports: 05/11/2018
Number of Days to Update: 71

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 05/30/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: No Update Planned

US CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 02/22/2018
Date Data Arrived at EDR: 03/01/2018
Date Made Active in Reports: 05/11/2018
Number of Days to Update: 71

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 05/30/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: Quarterly

***Local Land Records***

LIENS 2: CERCLA Lien Information

A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 05/13/2018
Date Data Arrived at EDR: 05/30/2018
Date Made Active in Reports: 06/29/2018
Number of Days to Update: 30

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 08/09/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Semi-Annually

***Records of Emergency Release Reports***

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 03/26/2018
Date Data Arrived at EDR: 03/27/2018
Date Made Active in Reports: 06/08/2018
Number of Days to Update: 73

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 03/27/2018
Next Scheduled EDR Contact: 07/09/2018
Data Release Frequency: Quarterly

SPILLS: Prep/Spills Database Listing

The Department of Environmental Quality's POLLUTION RESPONSE PROGRAM, known as PREP, provides for responses to air, water, and waste pollution incidents in order to protect human health and the environment. PREP staff often work to assist local emergency responders, other state agencies, federal agencies, and responsible parties, as may be needed, to manage pollution incidents. Oil spills, fish kills, and hazardous materials spills are examples of incidents that may involve the DEQ's PREP Program.

Date of Government Version: 05/01/2018
Date Data Arrived at EDR: 06/07/2018
Date Made Active in Reports: 07/06/2018
Number of Days to Update: 29

Source: Department of Environmental Quality
Telephone: 804-698-4287
Last EDR Contact: 06/07/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: Quarterly

SPILLS WC: Prep Database

The Department of Environmental Quality's POLLUTION RESPONSE PROGRAM, known as PREP, provides for responses to air, water, and waste pollution incidents in order to protect human health and the environment.

Date of Government Version: 09/21/2009
Date Data Arrived at EDR: 09/29/2009
Date Made Active in Reports: 10/30/2009
Number of Days to Update: 31

Source: Department of Environmental Quality, West Central Region
Telephone: 540-562-6700
Last EDR Contact: 09/06/2011
Next Scheduled EDR Contact: 12/19/2011
Data Release Frequency: No Update Planned

SPILLS VA: PREP Database

The Department of Environmental Quality's POLLUTION RESPONSE PROGRAM, known as PREP, provides for responses to air, water, and waste pollution incidents in order to protect human health and the environment.

Date of Government Version: 08/08/2012
Date Data Arrived at EDR: 08/09/2012
Date Made Active in Reports: 10/05/2012
Number of Days to Update: 57

Source: Department of Environmental Quality, Valley Regional Office
Telephone: 540-574-7800
Last EDR Contact: 05/06/2013
Next Scheduled EDR Contact: 08/19/2013
Data Release Frequency: Quarterly

SPILLS TD: PREP Database

The Department of Environmental Quality's POLLUTION RESPONSE PROGRAM, known as PREP, provides for responses to air, water, and waste pollution incidents in order to protect human health and the environment.

Date of Government Version: 09/17/2009
Date Data Arrived at EDR: 09/23/2009
Date Made Active in Reports: 10/06/2009
Number of Days to Update: 13

Source: Department of Environmental Quality, Tidewater Region
Telephone: trofoia@deq.vir
Last EDR Contact: 09/06/2011
Next Scheduled EDR Contact: 12/19/2011
Data Release Frequency: Quarterly

SPILLS SW: Reportable Spills

The Department of Environmental Quality's POLLUTION RESPONSE PROGRAM, known as PREP, provides for responses to air, water, and waste pollution incidents in order to protect human health and the environment.

Date of Government Version: 01/21/2010
Date Data Arrived at EDR: 01/22/2010
Date Made Active in Reports: 02/16/2010
Number of Days to Update: 25

Source: Department of Environmental Quality, Southwest Region
Telephone: 276-676-4839
Last EDR Contact: 07/13/2012
Next Scheduled EDR Contact: 10/29/2012
Data Release Frequency: No Update Planned

SPILLS PD: PREP Database

The Department of Environmental Quality's POLLUTION RESPONSE PROGRAM, known as PREP, provides for responses to air, water, and waste pollution incidents in order to protect human health and the environment.

Date of Government Version: 10/20/2009
Date Data Arrived at EDR: 10/29/2009
Date Made Active in Reports: 12/03/2009
Number of Days to Update: 35

Source: Department of Environmental Quality, Piedmont Region
Telephone: 804-527-5020
Last EDR Contact: 02/06/2012
Next Scheduled EDR Contact: 05/21/2012
Data Release Frequency: Quarterly

SPILLS NO: PREP Database

The Department of Environmental Quality's POLLUTION RESPONSE PROGRAM, known as PREP, provides for responses to air, water, and waste pollution incidents in order to protect human health and the environment.

Date of Government Version: 09/23/2009
Date Data Arrived at EDR: 09/29/2009
Date Made Active in Reports: 10/30/2009
Number of Days to Update: 31

Source: Department of Environmental Quality, Northern Region
Telephone: 703-583-3864
Last EDR Contact: 09/06/2011
Next Scheduled EDR Contact: 12/19/2011
Data Release Frequency: No Update Planned

SPILLS PC: Pollution Complaint Database

Pollution Complaints Database. The pollution reports contained in the PC database include the initial release reporting of Leaking Underground Storage Tanks and all other releases of petroleum to the environment as well as releases to state waters. The database is current through 12/1/93. Since that time, all spill and pollution reporting information has been collected and tracked through the DEQ regional offices.

Date of Government Version: 06/01/1996
Date Data Arrived at EDR: 10/22/1996
Date Made Active in Reports: 11/21/1996
Number of Days to Update: 30

Source: Department of Environmental Quality
Telephone: 804-698-4287
Last EDR Contact: 03/08/2010
Next Scheduled EDR Contact: 06/21/2010
Data Release Frequency: No Update Planned

SPILLS BRL: Prep/Spills Database Listing

A listing of spills locations located in the Blue Ridge Regional area, Lynchburg.

Date of Government Version: 09/18/2009
Date Data Arrived at EDR: 09/18/2009
Date Made Active in Reports: 10/06/2009
Number of Days to Update: 18

Source: DEQ, Blue Ridge Regional Office
Telephone: 434-582-6218
Last EDR Contact: 11/28/2011
Next Scheduled EDR Contact: 03/12/2012
Data Release Frequency: Varies

SPILLS 90: SPILLS90 data from FirstSearch

Spills 90 includes those spill and release records available exclusively from FirstSearch databases. Typically, they may include chemical, oil and/or hazardous substance spills recorded after 1990. Duplicate records that are already included in EDR incident and release records are not included in Spills 90.

Date of Government Version: 09/01/2012
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 02/15/2013
Number of Days to Update: 43

Source: FirstSearch
Telephone: N/A
Last EDR Contact: 01/03/2013
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

***Other Ascertainable Records***

RCRA NonGen / NLR: RCRA - Non Generators / No Longer Regulated

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 03/01/2018
Date Data Arrived at EDR: 03/28/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 86

Source: Environmental Protection Agency
Telephone: 800-438-2474
Last EDR Contact: 06/28/2018
Next Scheduled EDR Contact: 10/08/2018
Data Release Frequency: Quarterly

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 01/31/2015
Date Data Arrived at EDR: 07/08/2015
Date Made Active in Reports: 10/13/2015
Number of Days to Update: 97

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 08/24/2018
Next Scheduled EDR Contact: 12/03/2018
Data Release Frequency: Varies

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 888-275-8747
Last EDR Contact: 07/11/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: Semi-Annually

FEDLAND: Federal and Indian Lands

Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 02/06/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 339

Source: U.S. Geological Survey
Telephone: 888-275-8747
Last EDR Contact: 07/13/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: N/A

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 01/01/2017
Date Data Arrived at EDR: 02/03/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 63

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 08/17/2018
Next Scheduled EDR Contact: 11/26/2018
Data Release Frequency: Varies

US FIN ASSUR: Financial Assurance Information

All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.

Date of Government Version: 03/01/2018
Date Data Arrived at EDR: 03/27/2018
Date Made Active in Reports: 06/22/2018
Number of Days to Update: 87

Source: Environmental Protection Agency
Telephone: 202-566-1917
Last EDR Contact: 06/27/2018
Next Scheduled EDR Contact: 10/08/2018
Data Release Frequency: Quarterly

EPA WATCH LIST: EPA WATCH LIST

EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

Date of Government Version: 08/30/2013
Date Data Arrived at EDR: 03/21/2014
Date Made Active in Reports: 06/17/2014
Number of Days to Update: 88

Source: Environmental Protection Agency
Telephone: 617-520-3000
Last EDR Contact: 08/03/2018
Next Scheduled EDR Contact: 11/19/2018
Data Release Frequency: Quarterly

2020 COR ACTION: 2020 Corrective Action Program List

The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

Date of Government Version: 09/30/2017
Date Data Arrived at EDR: 05/08/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 73

Source: Environmental Protection Agency
Telephone: 703-308-4044
Last EDR Contact: 08/10/2018
Next Scheduled EDR Contact: 11/19/2018
Data Release Frequency: Varies

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 06/21/2017
Date Made Active in Reports: 01/05/2018
Number of Days to Update: 198

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 06/22/2018
Next Scheduled EDR Contact: 10/01/2018
Data Release Frequency: Every 4 Years

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 01/10/2018
Date Made Active in Reports: 01/12/2018
Number of Days to Update: 2

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 08/24/2018
Next Scheduled EDR Contact: 12/03/2018
Data Release Frequency: Annually

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 12/10/2010
Date Made Active in Reports: 02/25/2011
Number of Days to Update: 77

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Annually

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 05/13/2018
Date Data Arrived at EDR: 05/30/2018
Date Made Active in Reports: 06/29/2018
Number of Days to Update: 30

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 08/09/2018
Next Scheduled EDR Contact: 10/15/2018
Data Release Frequency: Annually

RMP: Risk Management Plans

When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 11/02/2017
Date Data Arrived at EDR: 11/17/2017
Date Made Active in Reports: 12/08/2017
Number of Days to Update: 21

Source: Environmental Protection Agency
Telephone: 202-564-8600
Last EDR Contact: 07/20/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

PRP: Potentially Responsible Parties

A listing of verified Potentially Responsible Parties

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 10/17/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 3

Source: EPA
Telephone: 202-564-6023
Last EDR Contact: 08/09/2018
Next Scheduled EDR Contact: 11/19/2018
Data Release Frequency: Quarterly

PADS: PCB Activity Database System

PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 06/01/2017
Date Data Arrived at EDR: 06/09/2017
Date Made Active in Reports: 10/13/2017
Number of Days to Update: 126

Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 07/13/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System

The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 11/18/2016
Date Data Arrived at EDR: 11/23/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 79

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 07/09/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: Quarterly

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 08/18/2017
Next Scheduled EDR Contact: 12/04/2017
Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 08/18/2017
Next Scheduled EDR Contact: 12/04/2017
Data Release Frequency: Quarterly

MLTS: Material Licensing Tracking System
MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 08/30/2016
Date Data Arrived at EDR: 09/08/2016
Date Made Active in Reports: 10/21/2016
Number of Days to Update: 43

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 07/23/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Quarterly

COAL ASH DOE: Steam-Electric Plant Operation Data
A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 08/07/2009
Date Made Active in Reports: 10/22/2009
Number of Days to Update: 76

Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 06/07/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Varies

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List
A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 07/01/2014
Date Data Arrived at EDR: 09/10/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 06/04/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Varies

PCB TRANSFORMER: PCB Transformer Registration Database
The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 05/24/2017
Date Data Arrived at EDR: 11/30/2017
Date Made Active in Reports: 12/15/2017
Number of Days to Update: 15

Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 07/27/2018
Next Scheduled EDR Contact: 11/05/2018
Data Release Frequency: Varies

RADINFO: Radiation Information Database
The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 04/03/2018
Date Data Arrived at EDR: 04/05/2018
Date Made Active in Reports: 06/29/2018
Number of Days to Update: 85

Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 07/05/2018
Next Scheduled EDR Contact: 10/15/2018
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing

A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing

A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

DOT OPS: Incident and Accident Data

Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 07/31/2012
Date Data Arrived at EDR: 08/07/2012
Date Made Active in Reports: 09/18/2012
Number of Days to Update: 42

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 08/09/2018
Next Scheduled EDR Contact: 11/12/2018
Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 03/31/2018
Date Data Arrived at EDR: 04/16/2018
Date Made Active in Reports: 06/29/2018
Number of Days to Update: 74

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 07/09/2018
Next Scheduled EDR Contact: 10/01/2018
Data Release Frequency: Varies

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2015
Date Data Arrived at EDR: 02/22/2017
Date Made Active in Reports: 09/28/2017
Number of Days to Update: 218

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 08/24/2018
Next Scheduled EDR Contact: 12/03/2018
Data Release Frequency: Biennially

INDIAN RESERV: Indian Reservations

This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 07/14/2015
Date Made Active in Reports: 01/10/2017
Number of Days to Update: 546

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 07/11/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: Semi-Annually

FUSRAP: Formerly Utilized Sites Remedial Action Program

DOE established the Formerly Utilized Sites Remedial Action Program (FUSRAP) in 1974 to remediate sites where radioactive contamination remained from Manhattan Project and early U.S. Atomic Energy Commission (AEC) operations.

Date of Government Version: 12/23/2016
Date Data Arrived at EDR: 12/27/2016
Date Made Active in Reports: 02/17/2017
Number of Days to Update: 52

Source: Department of Energy
Telephone: 202-586-3559
Last EDR Contact: 08/01/2018
Next Scheduled EDR Contact: 11/19/2018
Data Release Frequency: Varies

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 06/23/2017
Date Data Arrived at EDR: 10/11/2017
Date Made Active in Reports: 11/03/2017
Number of Days to Update: 23

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 08/20/2018
Next Scheduled EDR Contact: 12/03/2018
Data Release Frequency: Varies

LEAD SMELTER 1: Lead Smelter Sites

A listing of former lead smelter site locations.

Date of Government Version: 05/13/2018
Date Data Arrived at EDR: 05/30/2018
Date Made Active in Reports: 06/29/2018
Number of Days to Update: 30

Source: Environmental Protection Agency
Telephone: 703-603-8787
Last EDR Contact: 08/09/2018
Next Scheduled EDR Contact: 10/15/2018
Data Release Frequency: Varies

LEAD SMELTER 2: Lead Smelter Sites

A list of several hundred sites in the U.S. where secondary lead smelting was done from 1931and 1964. These sites may pose a threat to public health through ingestion or inhalation of contaminated soil or dust

Date of Government Version: 04/05/2001
Date Data Arrived at EDR: 10/27/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 36

Source: American Journal of Public Health
Telephone: 703-305-6451
Last EDR Contact: 12/02/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS)

The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 09/26/2017
Next Scheduled EDR Contact: 01/08/2018
Data Release Frequency: Annually

US AIRS MINOR: Air Facility System Data
A listing of minor source facilities.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 09/26/2017
Next Scheduled EDR Contact: 01/08/2018
Data Release Frequency: Annually

US MINES: Mines Master Index File
Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 05/03/2018
Date Data Arrived at EDR: 05/31/2018
Date Made Active in Reports: 06/29/2018
Number of Days to Update: 29

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 05/31/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: Semi-Annually

US MINES 2: Ferrous and Nonferrous Metal Mines Database Listing
This map layer includes ferrous (ferrous metal mines are facilities that extract ferrous metals, such as iron ore or molybdenum) and nonferrous (Nonferrous metal mines are facilities that extract nonferrous metals, such as gold, silver, copper, zinc, and lead) metal mines in the United States.

Date of Government Version: 12/05/2005
Date Data Arrived at EDR: 02/29/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 49

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 05/30/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: Varies

US MINES 3: Active Mines & Mineral Plants Database Listing
Active Mines and Mineral Processing Plant operations for commodities monitored by the Minerals Information Team of the USGS.

Date of Government Version: 04/14/2011
Date Data Arrived at EDR: 06/08/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 97

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 05/30/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: Varies

ABANDONED MINES: Abandoned Mines
An inventory of land and water impacted by past mining (primarily coal mining) is maintained by OSMRE to provide information needed to implement the Surface Mining Control and Reclamation Act of 1977 (SMCRA). The inventory contains information on the location, type, and extent of AML impacts, as well as, information on the cost associated with the reclamation of those problems. The inventory is based upon field surveys by State, Tribal, and OSMRE program officials. It is dynamic to the extent that it is modified as new problems are identified and existing problems are reclaimed.

Date of Government Version: 03/08/2018
Date Data Arrived at EDR: 03/13/2018
Date Made Active in Reports: 06/08/2018
Number of Days to Update: 87

Source: Department of Interior
Telephone: 202-208-2609
Last EDR Contact: 06/20/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Quarterly

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 02/21/2018
Date Data Arrived at EDR: 02/23/2018
Date Made Active in Reports: 03/23/2018
Number of Days to Update: 28

Source: EPA
Telephone: (215) 814-5000
Last EDR Contact: 06/06/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Quarterly

ECHO: Enforcement & Compliance History Information

ECHO provides integrated compliance and enforcement information for about 800,000 regulated facilities nationwide.

Date of Government Version: 02/25/2018
Date Data Arrived at EDR: 03/17/2018
Date Made Active in Reports: 06/08/2018
Number of Days to Update: 83

Source: Environmental Protection Agency
Telephone: 202-564-2280
Last EDR Contact: 06/06/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Quarterly

UXO: Unexploded Ordnance Sites

A listing of unexploded ordnance site locations

Date of Government Version: 09/30/2016
Date Data Arrived at EDR: 10/31/2017
Date Made Active in Reports: 01/12/2018
Number of Days to Update: 73

Source: Department of Defense
Telephone: 703-704-1564
Last EDR Contact: 07/13/2018
Next Scheduled EDR Contact: 10/29/2018
Data Release Frequency: Varies

DOCKET HWC: Hazardous Waste Compliance Docket Listing

A complete list of the Federal Agency Hazardous Waste Compliance Docket Facilities.

Date of Government Version: 01/04/2018
Date Data Arrived at EDR: 01/19/2018
Date Made Active in Reports: 04/13/2018
Number of Days to Update: 84

Source: Environmental Protection Agency
Telephone: 202-564-0527
Last EDR Contact: 06/01/2018
Next Scheduled EDR Contact: 09/10/2018
Data Release Frequency: Varies

FUELS PROGRAM: EPA Fuels Program Registered Listing

This listing includes facilities that are registered under the Part 80 (Code of Federal Regulations) EPA Fuels Programs. All companies now are required to submit new and updated registrations.

Date of Government Version: 02/20/2018
Date Data Arrived at EDR: 02/21/2018
Date Made Active in Reports: 03/23/2018
Number of Days to Update: 30

Source: EPA
Telephone: 800-385-6164
Last EDR Contact: 08/22/2018
Next Scheduled EDR Contact: 12/03/2018
Data Release Frequency: Quarterly

AIRS: Permitted Airs Facility List

A listing of permitted Airs facilities.

Date of Government Version: 06/18/2018
Date Data Arrived at EDR: 06/21/2018
Date Made Active in Reports: 08/14/2018
Number of Days to Update: 54

Source: Department of Environmental Quality
Telephone: 804-698-4000
Last EDR Contact: 06/15/2018
Next Scheduled EDR Contact: 10/01/2018
Data Release Frequency: Annually

# GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

CEDS: Comprehensive Environmental Data System
Virginia Water Protection Permits, Virginia Pollution Discharge System (point discharge) permits and Virginia Pollution Abatement (no point discharge) permits.

Date of Government Version: 06/11/2018
Date Data Arrived at EDR: 06/14/2018
Date Made Active in Reports: 07/06/2018
Number of Days to Update: 22

Source: Department of Environmental Quality
Telephone: 804-698-4077
Last EDR Contact: 06/04/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Quarterly

COAL ASH: Coal Ash Disposal Sites
A listing of facilities with coal ash impoundments.

Date of Government Version: 07/29/2009
Date Data Arrived at EDR: 07/31/2009
Date Made Active in Reports: 08/21/2009
Number of Days to Update: 21

Source: Department of Environmental Protection
Telephone: 804-698-4285
Last EDR Contact: 06/04/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Varies

DRYCLEANERS: Drycleaner List
A listing of registered drycleaners.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 10/19/2017
Date Made Active in Reports: 12/01/2017
Number of Days to Update: 43

Source: Department of Environmental Quality
Telephone: 804-698-4407
Last EDR Contact: 07/06/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: Varies

ENFORCEMENT: Enforcement Actions Data
A listing of enforcement actions.

Date of Government Version: 06/01/2018
Date Data Arrived at EDR: 06/06/2018
Date Made Active in Reports: 07/05/2018
Number of Days to Update: 29

Source: Department of Environmental Quality
Telephone: 804-698-4031
Last EDR Contact: 06/04/2018
Next Scheduled EDR Contact: 09/17/2018
Data Release Frequency: Quarterly

Financial Assurance 1: Financial Assurance Information Listing
A listing of financial assurance information for underground storage tank facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 07/26/2018
Date Data Arrived at EDR: 07/31/2018
Date Made Active in Reports: 08/15/2018
Number of Days to Update: 15

Source: Department of Environmental Quality
Telephone: 804-698-4205
Last EDR Contact: 07/26/2018
Next Scheduled EDR Contact: 11/12/2018
Data Release Frequency: Varies

Financial Assurance 2: Financial Assurance Information listing
Solid waste financial assurance information.

Date of Government Version: 07/30/2018
Date Data Arrived at EDR: 08/02/2018
Date Made Active in Reports: 08/15/2018
Number of Days to Update: 13

Source: Department of Environmental Quality
Telephone: 804-698-4123
Last EDR Contact: 07/26/2018
Next Scheduled EDR Contact: 11/12/2018
Data Release Frequency: Varies

TIER 2: Tier 2 Information Listing
A listing of facilities which store or manufacture hazardous materials and submit a chemical inventory report.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 01/20/2017
Date Made Active in Reports: 02/14/2017
Number of Days to Update: 25

Source: Department of Environmental Quality
Telephone: 804-698-4159
Last EDR Contact: 06/15/2018
Next Scheduled EDR Contact: 10/01/2018
Data Release Frequency: Annually

UIC: Underground Injection Control Wells
A listing of underground injection controls wells.

Date of Government Version: 07/31/2018
Date Data Arrived at EDR: 08/02/2018
Date Made Active in Reports: 08/15/2018
Number of Days to Update: 13

Source: Department of Mines, Minerals and Energy
Telephone: 276-415-9700
Last EDR Contact: 08/02/2018
Next Scheduled EDR Contact: 11/12/2018
Data Release Frequency: Quarterly

**EDR HIGH RISK HISTORICAL RECORDS**

***EDR Exclusive Records***

EDR MGP: EDR Proprietary Manufactured Gas Plants
The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

EDR Hist Auto: EDR Exclusive Historical Auto Stations
EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR Hist Cleaner: EDR Exclusive Historical Cleaners
EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

**EDR RECOVERED GOVERNMENT ARCHIVES**

***Exclusive Recovered Govt. Archives***

RGA LF: Recovered Government Archive Solid Waste Facilities List
The EDR Recovered Government Archive Landfill database provides a list of landfills derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Environmental Quality in Virgina.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/20/2014
Number of Days to Update: 203

Source: Department of Environmental Quality
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LUST: Recovered Government Archive Leaking Underground Storage Tank
The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Environmental Quality in Virgina and at the Regional VA Levels.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/15/2014
Number of Days to Update: 198

Source: Department of Environmental Quality
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

**OTHER DATABASE(S)**

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data
Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 01/03/2018
Date Data Arrived at EDR: 02/14/2018
Date Made Active in Reports: 03/22/2018
Number of Days to Update: 36

Source: Department of Energy & Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 08/09/2018
Next Scheduled EDR Contact: 11/26/2018
Data Release Frequency: No Update Planned

NJ MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2017
Date Data Arrived at EDR: 07/13/2018
Date Made Active in Reports: 08/01/2018
Number of Days to Update: 19

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 07/13/2018
Next Scheduled EDR Contact: 10/22/2018
Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data
Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 04/30/2018
Date Data Arrived at EDR: 05/03/2018
Date Made Active in Reports: 06/07/2018
Number of Days to Update: 35

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 08/01/2018
Next Scheduled EDR Contact: 11/12/2018
Data Release Frequency: Quarterly

PA MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 07/25/2017
Date Made Active in Reports: 09/25/2017
Number of Days to Update: 62

Source: Department of Environmental Protection
Telephone: 717-783-8990
Last EDR Contact: 07/12/2018
Next Scheduled EDR Contact: 10/29/2018
Data Release Frequency: Annually

RI MANIFEST: Manifest information
Hazardous waste manifest information

Date of Government Version: 12/31/2017
Date Data Arrived at EDR: 02/23/2018
Date Made Active in Reports: 04/09/2018
Number of Days to Update: 45

Source: Department of Environmental Management
Telephone: 401-222-2797
Last EDR Contact: 08/21/2018
Next Scheduled EDR Contact: 12/03/2018
Data Release Frequency: Annually

WI MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2017
Date Data Arrived at EDR: 06/15/2018
Date Made Active in Reports: 07/09/2018
Number of Days to Update: 24

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 06/11/2018
Next Scheduled EDR Contact: 09/24/2018
Data Release Frequency: Annually

Oil/Gas Pipelines
Source: PennWell Corporation
Petroleum Bundle (Crude Oil, Refined Products, Petrochemicals, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)) N = Natural Gas Bundle (Natural Gas, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)). This map includes information copyrighted by PennWell Corporation. This information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of PennWell.

Electric Power Transmission Line Data
Source: PennWell Corporation
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Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Daycare Centers: Licensed Facilities
Source: Department of Social Services
Telephone: 804-692-1900

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

**STREET AND ADDRESS INFORMATION**

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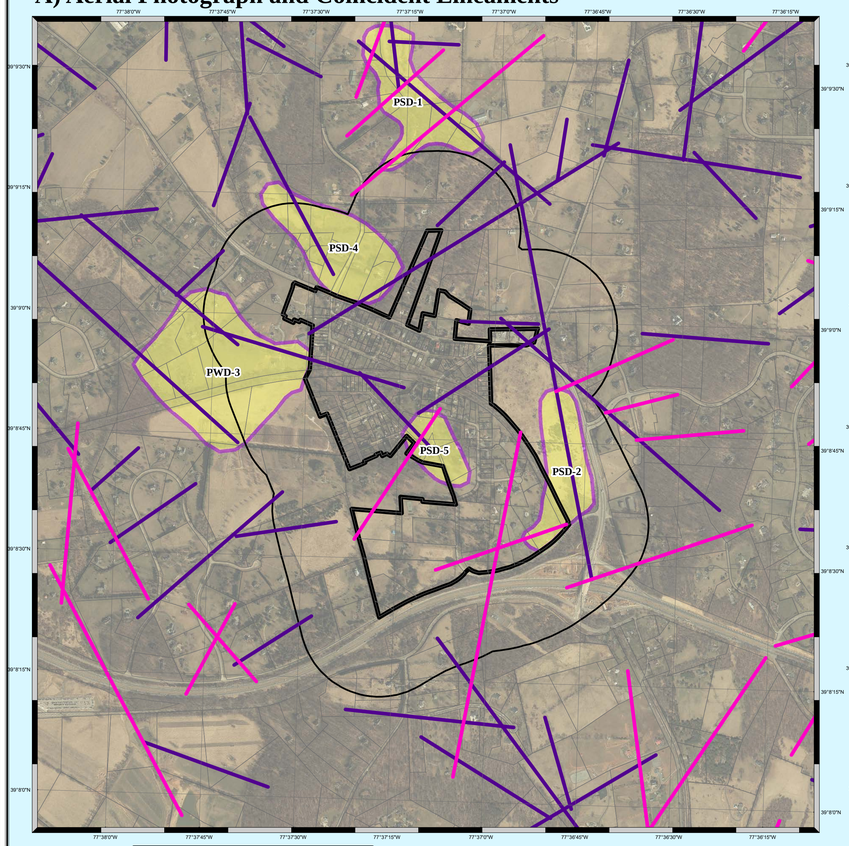
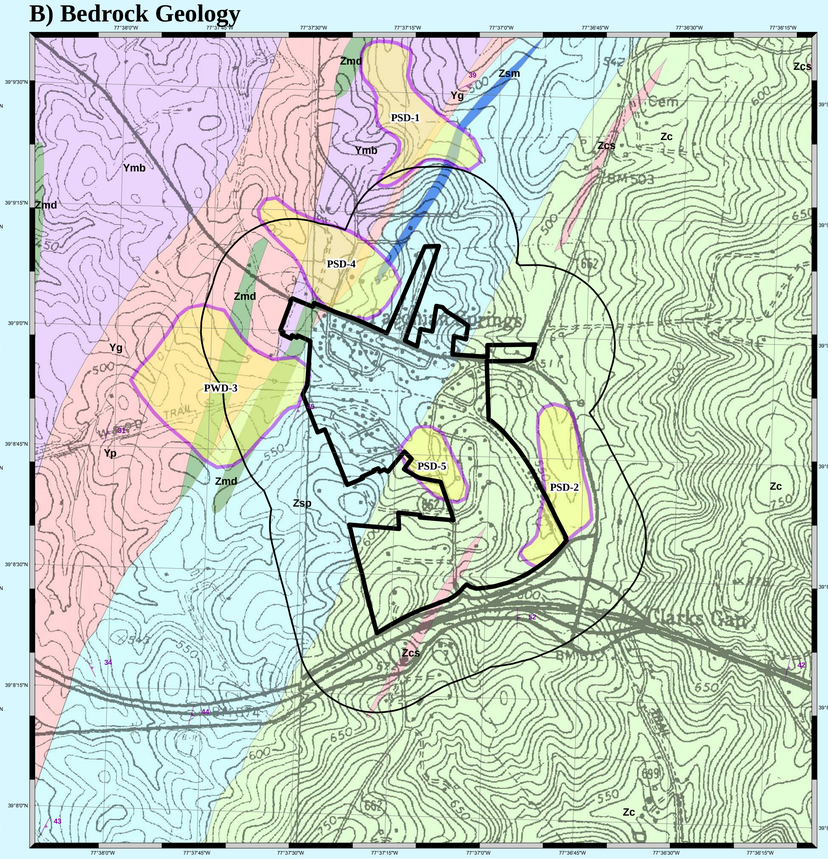
# PLATE

# PLATE 1 — RESULTS of the HYDROGEOLOGIC INVESTIGATION FOR PAEONIAN SPRINGS, LOUDOUN COUNTY, VIRGINIA

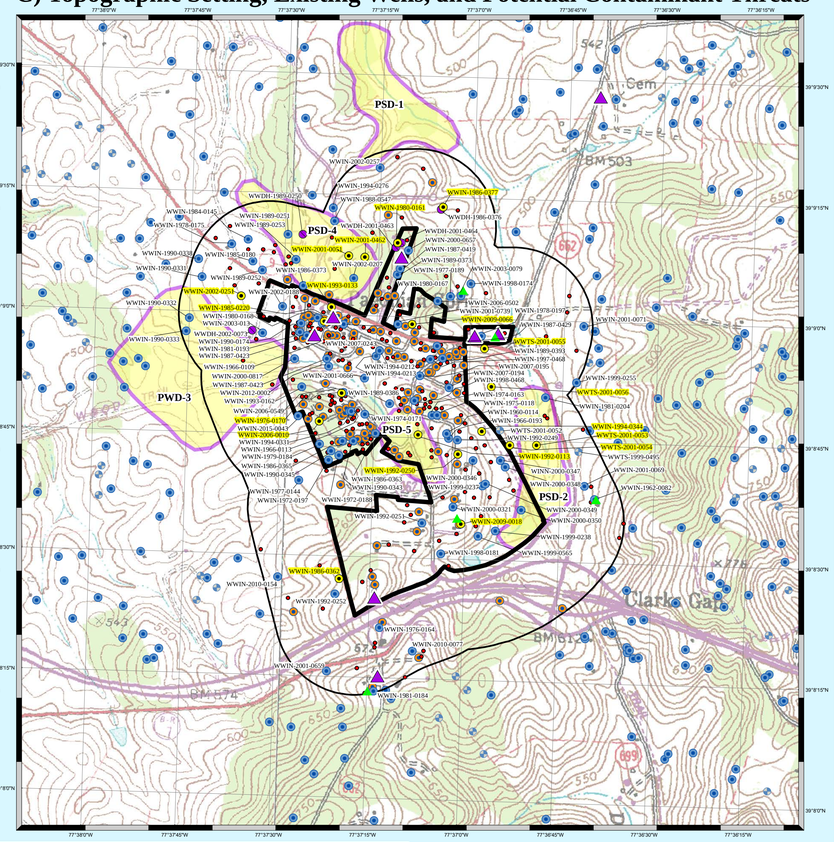
## A) Aerial Photograph and Coincident Lineaments




## B) Bedrock Geology




## C) Topographic Setting, Existing Wells, and Potential Contaminant Threats




## Legend - View A

**Fracture-Supported Coincident Lineaments**

Observed on more than three scales of imagery AND co-parallels nearby fracture family or bedding trends.

**Coincident Lineaments**

Observed on more than three scales of imagery. (trend is posted in degrees east of north)

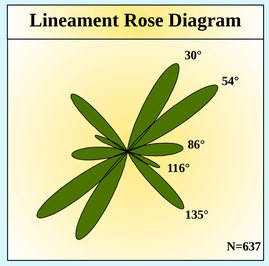
Paeonian Springs

1000-Foot Buffer

**Potential Groundwater Development Zones**

PSD-1

## Lineament Rose Diagram




## Legend - View B

1000-Foot Buffer

Paeonian Springs

Structural Data

**Bedrock Units**

- Ymb — Biotitic Marshall metagranite
- Zsm — Leucocratic metagranite
- Zsm — Marble
- Zc — Catoctin Formation
- Zmd — Metadiabase dike
- Zsc — Metasiltstone, metasandstone
- Yp — Paragneiss Metagranite
- Zsp — Swift Run Formation

## LINEAMENT PLATFORMS EVALUATED

| Scale | Image Id (Name / Roll / Frame) | Image Type | Number of Observational Trials | Total Number of Lineaments Observed |
|---|---|---|---|---|
| 1:10,000 | Color Infrared Aerial Photograph | Photograph | 2 | 430 |
| 1:12,000 | Light Detction and Ranging (LIDAR) | Digital Elevation Model Computer Images | 2 | 224 |
| 1:18,000 | USGS Topographic Map | Topographic Map | 2 | 218 |
| 1:24,000 | 3m Digital Elevation Model | Digital Elevation Model Computer Images | 2 | 283 |
| | | TOTALS: | 8 | 1155 |

0 700 1,400 2,800 Feet

0 165 330 660 Meters

1:9,600

1 inch = 800 feet

USGS Topographic quadrangle map base, UTM Zone 18N, NAD 27, meters. Topographic contours interval: 10 feet.

**Well Data from Loudon County GIS Database - only those wells with data tabulated in table**

| WellSite ID | Yield (gpm) | Depth to Bedrock (feet) | Casing Depth (feet) | Well Depth (feet) |
|---|---|---|---|---|
| WWDH-1986-0376 | 0 | n/a | n/a | 515 |
| WWDH-1989-0250 | 0 | 20 | n/a | 345 |
| WWDH-2001-0463 | 0 | n/a | n/a | 98 |
| WWDH-2001-0464 | n/a | n/a | n/a | 100 |
| WWDH-2002-0073 | n/a | 15 | n/a | 820 |
| WWIN-1960-0114 | n/a | n/a | n/a | 160 |
| WWIN-1962-0082 | n/a | n/a | n/a | 160 |
| WWIN-1966-0109 | n/a | n/a | n/a | 73 |
| WWIN-1966-0113 | n/a | n/a | n/a | 72 |
| WWIN-1966-0193 | n/a | n/a | 48 | 300 |
| WWIN-1972-0188 | n/a | n/a | 60 | 125 |
| WWIN-1972-0197 | n/a | n/a | 74 | 125 |
| WWIN-1974-0163 | n/a | n/a | 65 | 160 |
| WWIN-1974-0171 | 15 | n/a | 70 | 100 |
| WWIN-1975-0118 | n/a | n/a | 55 | 140 |
| WWIN-1976-0164 | n/a | n/a | 20 | 530 |
| WWIN-1976-0170 | 25 | 30 | 50 | 75 |
| WWIN-1977-0144 | n/a | 72 | 75 | 125 |
| WWIN-1977-0189 | 6 | 63 | 75 | 325 |
| WWIN-1978-0175 | n/a | n/a | 23 | 360 |
| WWIN-1978-0197 | n/a | 50 | 65 | 90 |
| WWIN-1979-0184 | 15 | 62 | 70 | 150 |
| WWIN-1980-0161 | 30 | 106 | 110 | 150 |
| WWIN-1980-0167 | 7 | n/a | 15 | 250 |
| WWIN-1980-0168 | n/a | 15 | 71 | 125 |
| WWIN-1981-0184 | n/a | n/a | 35 | 300 |
| WWIN-1981-0193 | 12 | n/a | 85 | 125 |
| WWIN-1981-0204 | 2 | 26 | 32 | 405 |
| WWIN-1984-0145 | 2 | 14 | 68 | 350 |
| WWIN-1985-0180 | 3 | 41 | 60 | 500 |
| WWIN-1985-0220 | 50 | 57 | 70 | 160 |
| WWIN-1986-0362 | 20 | n/a | 21 | 300 |
| WWIN-1986-0363 | n/a | n/a | 51 | 120 |
| WWIN-1986-0365 | 10 | 35 | 51 | 147 |
| WWIN-1986-0373 | n/a | n/a | 60 | 350 |
| WWIN-1986-0377 | 25 | 70 | 84 | 95 |
| WWIN-1987-0419 | n/a | 95 | 107 | 500 |
| WWIN-1987-0423 | n/a | 55 | 100 | 200 |
| WWIN-1987-0429 | n/a | 45 | 75 | 445 |

| WellSite ID | Yield (gpm) | Depth to Bedrock (feet) | Casing Depth (feet) | Well Depth (feet) |
|---|---|---|---|---|
| WWIN-1988-0547 | 1 | 22 | 32 | 470 |
| WWIN-1989-0251 | n/a | 35 | 63 | 405 |
| WWIN-1989-0252 | 15 | 45 | 63 | 145 |
| WWIN-1989-0253 | n/a | 40 | 102 | 405 |
| WWIN-1989-0373 | 3 | 40 | 78 | 405 |
| WWIN-1989-0386 | 2 | 5 | 62 | 500 |
| WWIN-1989-0393 | 2 | 43 | 54 | 270 |
| WWIN-1990-0174 | 10 | 72 | 84 | 280 |
| WWIN-1990-0331 | 18 | 25 | 63 | 220 |
| WWIN-1990-0332 | 3 | 5 | 63 | 400 |
| WWIN-1990-0333 | 3 | 15 | 63 | 350 |
| WWIN-1990-0338 | 2 | 26 | 63 | 500 |
| WWIN-1990-0343 | 8 | 30 | 80 | 265 |
| WWIN-1992-0113 | 75 | 20 | 143 | 160 |
| WWIN-1992-0249 | 8 | 28 | 62 | 300 |
| WWIN-1992-0250 | 25 | 58 | 72 | 300 |
| WWIN-1992-0251 | 1 | 20 | 71 | 400 |
| WWIN-1992-0252 | 3 | 35 | 59 | 690 |
| WWIN-1993-0133 | 40 | 40 | 118 | 140 |
| WWIN-1993-0162 | 2 | 40 | 80 | 125 |
| WWIN-1994-0212 | n/a | n/a | n/a | 63 |
| WWIN-1994-0213 | 1 | 30 | 61 | 300 |
| WWIN-1994-0276 | 2 | 50 | 62 | 470 |
| WWIN-1994-0331 | 15 | 60 | 73 | 100 |
| WWIN-1994-0344 | 25 | 15 | 63 | 245 |
| WWIN-1997-0468 | 1 | 40 | 110 | 400 |
| WWIN-1998-0174 | 10 | 60 | 83 | 350 |
| WWIN-1998-0181 | 5 | 54 | 79 | 425 |
| WWIN-1998-0468 | 8 | 39 | 100 | 300 |
| WWIN-1999-0237 | 18 | 20 | 83 | 220 |
| WWIN-1999-0238 | 3 | n/a | 75 | 700 |
| WWIN-1999-0255 | 4 | 18 | 75 | 680 |
| WWIN-1999-0565 | 3 | 25 | 73 | 460 |
| WWIN-2000-0321 | 10 | 10 | 78 | 280 |
| WWIN-2000-0345 | 1 | 60 | 81 | 625 |
| WWIN-2000-0346 | 14 | 25 | 70 | 480 |
| WWIN-2000-0347 | 10 | 40 | 85 | 280 |
| WWIN-2000-0348 | 10 | 40 | 85 | 300 |
| WWIN-2000-0349 | 5 | 35 | 80 | 380 |

| WellSite ID | Yield (gpm) | Bedrock (feet) | Depth (feet) | Well Depth (feet) |
|---|---|---|---|---|
| WWIN-2000-0350 | 8 | 25 | 60 | 420 |
| WWIN-2000-0657 | 1 | 90 | 150 | 600 |
| WWIN-2000-0817 | 5 | 15 | 141 | 300 |
| WWIN-2001-0051 | 23 | 30 | 63 | 200 |
| WWIN-2001-0069 | 10 | 20 | 72 | 1000 |
| WWIN-2001-0071 | 3 | 20 | 75 | 400 |
| WWIN-2001-0462 | 20 | 50 | 74 | 200 |
| WWIN-2001-0659 | 5 | 29 | 80 | 650 |
| WWIN-2001-0666 | 5 | 10 | 68 | 500 |
| WWIN-2001-0739 | 9 | 15 | 80 | 240 |
| WWIN-2002-0188 | 15 | 15 | 68 | 220 |
| WWIN-2002-0207 | 3 | 15 | 84 | 700 |
| WWIN-2002-0251 | 25 | 40 | 62 | 220 |
| WWIN-2002-0257 | 10 | 21 | 75 | 300 |
| WWIN-2003-0013 | 7 | 20 | 109 | 420 |
| WWIN-2003-0079 | 1 | 65 | 93 | 600 |
| WWIN-2006-0010 | 25 | 25 | 96 | 140 |
| WWIN-2006-0502 | 3 | 20 | 75 | 800 |
| WWIN-2006-0549 | 5 | 40 | 69 | 500 |
| WWIN-2007-0194 | 3 | 30 | 78 | 480 |
| WWIN-2007-0195 | 3 | 35 | 78 | 500 |
| WWIN-2007-0243 | 1 | 50 | 138 | 600 |
| WWIN-2009-0018 | 20 | 28 | 84 | 300 |
| WWIN-2009-0066 | 30 | 48 | 63 | 145 |
| WWIN-2010-0077 | 6 | 20 | 63 | 400 |
| WWIN-2010-0154 | 3 | 45 | 60 | 500 |
| WWIN-2012-0002 | 10 | 13 | 63 | 400 |
| WWIN-2015-0043 | 15 | n/a | n/a | 500 |
| WWTS-1999-0495 | 4 | 10 | 70 | 450 |
| WWTS-2001-0052 | 15 | 23 | 63 | 420 |
| WWTS-2001-0053 | 20 | 9 | 84 | 420 |
| WWTS-2001-0054 | 20 | 26 | 84 | 420 |
| WWTS-2001-0055 | 20 | 19 | 84 | 320 |
| WWTS-2001-0056 | 20 | 16 | 82 | 380 |
| **Maximum =** | **75** | **106** | **150** | **1000** |
| **Minimum =** | **0** | **5** | **15** | **63** |
| **Average =** | **11** | **35** | **73** | **338** |

**Wells with no data available excluded from table**

***Wells yielding 20 gpm or more are highlighted in yellow.**

## Legend - View C

- Chemical Storage Tank
- Potential Contaminant Threat Identified by EDR
- Wells that yield at least 20 gpm
- Septic Systems
- Dry Hole Well -no data available
- Individual Water Well -no data available
- Test Well -no data available
- Individual Water Well
- Test Well

**PLATE 1**

**HYDROGEOLOGIC INVESTIGATION RESULTS for Paeonian Springs, Loudoun County, Virginia**

# BEDROCK GEOLOGY, LINEAMENTS, EXISTING WELLS, and POTENTIAL THREATS to GROUNDWATER QUALITY


**Emery & Garrett Groundwater Investigations, A Division of GZA**

Groundwater Exploration, Development, and Protection

Northeast Mid Atlantic South Atlantic



October 2018 V:\Sit\Paeonian Springs\PA1\Working\GIS\Paeonian_Plate.mxd (last modified:10/3/2018) 33.0083070

**EMERY & GARRETT GROUNDWATER INVESTIGATIONS, A DIVISION OF GZA**
**56 Main Street | P.O. Box 1578 | Meredith, New Hampshire 03253**
**www.eggi.com**

# Appendix C

Mass Drainfield Feasibility Study

*MARSH & LEGGE LAND SURVEYORS, P.L.C.*
*560 North Loudoun Street, Winchester, VA 22601 ■ 540-667-0468 ■ Fax: 540-667-0469 ■ E-mail: office@marshandlegge.com*

**PAEONIAN SPRINGS COMMUNITY**
**LOUDOUN COUNTY, VIRGINIA**

**MASS DRAINFIELD FEASIBILITY STUDY**

The capacity for the Paeonian Springs community drainfield was determined to be 42,165 gallons per day by Dewberry and Loudoun Water. Size requirements for the mass drainfield are approximately 158,119 square feet of dispersal area (percolation rate of 75 minutes per inch). A 100% reserve drainfield is also required with 158,119 square feet (approximately 7.5 acres total). The proposed dispersal method with TL-2 effluent secondary treatment levels is drip irrigation with an installation depth of approximately 18 to 20 inches.

Fencing may be required around the proposed drainfield, proposed reserve drainfield, and other onsite system components.

Nitrogen dilution buffer areas will be required around the proposed drainfield sites of approximately 16 acres (Dewberry calculations).

Equation1: Rain water infiltration = 74 x 22 x $\underline{16}$ = 26,048 gallons per day per acre year

Equation 2: [42,165 GPD/(26,048 + 42,165)] x 8 mg/L = 4.9 mg/L

The dilution buffer area is a requirement in the regulations to protect ground water from exceeding nitrate concentration levels considered to be safe. No installation of the mass drainfield system or land disturbance occurs in the buffer area. No structures can be built on the dilution area for the life of the drainfield. Ground water monitoring wells may be required for this project as determined by the Virginia Department of Health's discretion. The monitoring wells would be used for testing to ensure that ground water is not adversely impacted by the drainfield system.

Proposed mass drainfield and reserve drainfield sites must be located at a minimum of 100 feet from existing wells.

This information is preliminary and may change with a detailed soil evaluation and site analysis.

There are ten (10) parcels included in the feasibility study. Composite maps were developed using available Loudoun County GIS information. The "best" soils for potential drainfield sites were determined using the Virginia Department of Health's Sewage Handling and Disposal Regulations and Chapter 1066 of the Loudoun County Code.

Feasibility study results for each parcel are as follows:

**PARCEL 1 [PIN 383404530000]**

Size requirements for the mass drainfield dispersal area are approximately 158,119 square feet for the drainfield and 158,119 square feet for the reserve drainfield (about 7.5 acres total). The percolation rate is estimated to be 75 minutes per inch. Proposed dispersal method is drip irrigation with an installation depth of approximately 18 to 20 inches.

Nitrogen dilution buffer areas of approximately 16 acres will be required around the drainfield sites (Dewberry calculations).

The "best" suitable soils found in the study area for drainfield sites are found in Soil Map Units 23B, 55B and 55C. Soils of the Purcellville series (23B) are deep and well drained. They formed in residuum derived from diorite, biotite schist and greenstone schist in the Blue Ridge Uplands. They comprise approximately 27 acres of this property. Soils of the Glenelg (55B, 55C) are very deep and well drained. They formed in residuum weathered from micaceous schist on uplands of the Blue Ridge and the Northern Piedmont. They comprise approximately nine (9) acres of this property. Inclusions of soils shallower to rock may occur in these mapping units.

Soils of the Purcellville-Tankerville complex (20B, 20C) and the Myersville-Catoctin complex (43B, 43C) are moderately suitable for this project. Soils of the Tankerville and Catoctin series are moderately deep (depth of rock ranges from 20 to 40 inches) and may not meet the mass drainfield requirements. They may comprise as much as 50 percent or more of

the soil mapping unit. Soils of the Myersville series are deep and well drained that formed in residuum from basic crystalline rocks in the Blue Ridge and adjacent Piedmont Uplands. Inclusions of soils shallower to rock may occur in these mapping units.

Soils of the Purcellville-Swampoodle complex (22B) are moderately suitable for this project. Soils of the Swampoodle series are very deep and moderately well drained that formed in local colluvium over residuum from basic crystalline rocks in the Blue Ridge Lowlands. They have a seasonal water table in the upper argillic horizon (around 16 inches). Inclusions of soils shallower to the seasonal water table may occur in these mapping units.

There appears to be suitable soils and landscapes on this property to site the mass drainfield, reserve drainfield and nitrogen dilution buffer area. There are existing houses, drainfields and wells on this property.

This information is preliminary and may change with a detailed soil evaluation and site analysis.

**PARCEL 2 [PIN 382282803000]**

Size requirements for the mass drainfield dispersal area are approximately 158,119 square feet for the drainfield and 158,119 square feet for the reserve drainfield (about 7.5 acres total). The percolation rate is estimated to be 75 minutes per inch. Proposed dispersal method is drip irrigation with an installation depth of approximately 18 to 20 inches.

Nitrogen dilution buffer areas of approximately 16 acres will be required around the drainfield sites (Dewberry calculations).

The "best" suitable soils found in the study area for drainfield sites are found in Soil Map Unit 23B. Soils of the Purcellville series (23B) are deep and well drained. They formed in residuum derived from diorite, biotite schist and greenstone schist in the Blue Ridge Uplands. Inclusions of soils shallower to rock may occur in these mapping units. They comprise approximately 23 acres of this property.

Soils of the Purcellville-Tankerville complex (20B, 20C) and the Purcellville-Swampoodle complex (22B) are moderately suitable for this project. Soils of the Tankerville series are moderately deep (depth of rock ranges from 20 to 40 inches) and may not meet the mass drainfield requirements. They may comprise as much as 50 percent or more of the soil mapping unit. Soils of the Swampoodle series are very deep and moderately well drained that formed in local colluvium over residuum from basic crystalline rocks in the Blue Ridge lowlands. They have a seasonal water table in the upper argillic horizon (around 16 inches). Inclusions of soils shallower to the seasonal water table may occur in these mapping units.

There does appear to be enough area of suitable soils and landscapes on this property to site the mass drainfield, reserve drainfield and nitrogen dilution buffer area.

This information is preliminary and may change with a detailed soil evaluation and site analysis.

**PARCEL 5 [PIN 310261450000]**

Size requirements for the mass drainfield dispersal area are approximately 158,119 square feet for the drainfield and 158,119 square feet for the reserve drainfield (about 7.5 acres total). The percolation rate is estimated to be 75 minutes per inch. Proposed dispersal method is drip irrigation with an installation depth of approximately 18 to 20 inches.

Nitrogen dilution buffer areas of approximately 16 acres will be required around the drainfield sites (Dewberry calculations).

The "best" suitable soils found in the study area for drainfield sites are found in Soil Map Unit 45C. Soils of the Fauquier series (45C) are very deep and well drained. They formed in residuum derived from greenstone and similar mafic rocks in the Blue Ridge Uplands. They comprise approximately three (3) acres of this property. Inclusions of soils shallower to rock may occur in these mapping units.

Soils of the Myersville-Catoctin complex (43B, 43C) are moderately suitable for this project. Soils of the Catoctin series are moderately deep (depth of rock ranges from 20 to 40

inches) and may not meet the mass drainfield requirements. They may comprise as much as 50 percent or more of the soil mapping unit. Soils of the Myersville series are deep and well drained that formed in residuum from basic crystalline rocks in the Blue Ridge and adjacent Piedmont Uplands. Inclusions of soils shallower to rock may occur in these mapping units.

Soils of the Catoctin series (40C) are moderately deep and may not meet the mass drainfield requirements. Inclusions of soils shallower to rock may also occur in these mapping units.

There does not appear to be enough area of suitable soils and landscapes on this property to site the mass drainfield, reserve drainfield and nitrogen dilution buffer area.

**PARCEL 8 [PIN 306193182000]**

Size requirements for the mass drainfield dispersal area are approximately 158,119 square feet for the drainfield and 158,119 square feet for the reserve drainfield (about 7.5 acres total). The percolation rate is estimated to be 75 minutes per inch. Proposed dispersal method is drip irrigation with an installation depth of approximately 18 to 20 inches.

Nitrogen dilution buffer areas of approximately 16 acres will be required around the drainfield sites (Dewberry calculations).

The "best" suitable soils found in the study area for drainfield sites are found in Soil Map Units 45B and 45C. Soils of the Fauquier series (45B, 45C) are very deep and well drained. They formed in residuum derived from greenstone and similar mafic rocks in the Blue Ridge Uplands. They comprise approximately seven (7) acres of this property. Inclusions of soils shallower to rock may occur in these mapping units.

Soils of the Myersville-Catoctin complex (43B, 43C) are moderately suitable for this project. Soils of the Catoctin series are moderately deep (depth of rock ranges from 20 to 40 inches) and may not meet the mass drainfield requirements. They may comprise as much as 50 percent or more of the soil mapping unit. Soils of the Myersville series are deep and well

drained that formed in residuum from basic crystalline rocks in the Blue Ridge and adjacent Piedmont Uplands. Inclusions of soils shallower to rock may occur in these mapping units.

Soils of the Catoctin series (40C) are moderately deep (depth of rock ranges from 20 to 40 inches) and may not meet the mass drainfield requirements. Inclusions of soils shallower to rock may also occur in these mapping units.

There does not appear to be enough area of suitable soils and landscapes on this property to site the mass drainfield, reserve drainfield and nitrogen dilution buffer area. Existing house, barns, driveway, drainfield and two wells also limit possible mass drainfield sites on this property.

This information is preliminary and may change with a detailed soil evaluation and site analysis.

**PARCEL 10 [PIN 383388802000]**

Size requirements for the mass drainfield dispersal area are approximately 158,119 square feet for the drainfield and 158,119 square feet for the reserve drainfield (about 7.5 acres total). The percolation rate is estimated to be 75 minutes per inch. Proposed dispersal method is drip irrigation with an installation depth of approximately 18 to 20 inches.

Nitrogen dilution buffer areas of approximately 16 acres will be required around the drainfield sites (Dewberry calculations).

The "best" suitable soils found in the study area for drainfield sites are found in Soil Map Units 23B, 55B and 55C. Soils of the Purcellville series (23B) are deep and well drained. They formed in residuum derived from diorite, biotite schist and greenstone schist in the Blue Ridge Uplands. They comprise approximately 70 acres of this property. Soils of the Glenelg (55B, 55C) are very deep and well drained. They formed in residuum weathered from micaceous schist on uplands of the Blue Ridge and the Northern Piedmont. They comprise approximately 50 acres of this property. Inclusions of soils shallower to rock may occur in these mapping units.

Soils of the Purcellville-Tankerville complex (20C) and the Myersville-Catoctin complex (43C) are moderately suitable for this project. Soils of the Tankerville and Catoctin series are moderately deep (depth of rock ranges from 20 to 40 inches) and may not meet the mass drainfield requirements. They may comprise as much as 50 percent or more of the soil mapping unit. Soils of the Myersville series are deep and well drained that formed in residuum from basic crystalline rocks in the Blue Ridge and adjacent Piedmont Uplands. Inclusions of soils shallower to rock may occur in these mapping units.

Soils of the Purcellville-Swampoodle complex (22B) are moderately suitable for this project. Soils of the Swampoodle series are very deep and moderately well drained that formed in local colluvium over residuum from basic crystalline rocks in the Blue Ridge Lowlands. They have a seasonal water table in the upper argillic horizon (around 16 inches) and may not meet the mass drainfield requirements. Inclusions of soils shallower to the seasonal water table may occur in these mapping units.

There appears to be suitable soils and landscapes on this property to site the mass drainfield, reserve drainfield and nitrogen dilution buffer area. There are existing houses, drainfields and wells on this property.

This information is preliminary and may change with a detailed soil evaluation and site analysis.

**PARCEL 12 [PIN 310463273000]**

Size requirements for the mass drainfield dispersal area are approximately 158,119 square feet for the drainfield and 158,119 square feet for the reserve drainfield (about 7.5 acres total). The percolation rate is estimated to be 75 minutes per inch. Proposed dispersal method is drip irrigation with an installation depth of approximately 18 to 20 inches.

Nitrogen dilution buffer areas of approximately 16 acres will be required around the drainfield sites (Dewberry calculations).

The "best" suitable soils found in the study area for drainfield sites are found in Soil Map Unit 45C. Soils of the Fauquier series (45C) are very deep and well drained. They formed in residuum derived from greenstone and similar mafic rocks in the Blue Ridge Uplands. They comprise approximately six (6) acres of this property. Inclusions of soils shallower to rock may occur in these mapping units.

Soils of the Myersville-Catoctin complex (43B, 43C) are moderately suitable for this project. Soils of the Catoctin series are moderately deep (depth of rock ranges from 20 to 40 inches) and may not meet the mass drainfield requirements. They may comprise as much as 50 percent or more of the soil mapping unit. Soils of the Myersville series are deep and well drained that formed in residuum from basic crystalline rocks in the Blue Ridge and adjacent Piedmont Uplands. Inclusions of soils shallower to rock may occur in these mapping units.

Soils of the Catoctin series (40C) are moderately deep and may not meet the mass drainfield requirements. Inclusions of soils shallower to rock may also occur in these mapping units.

There does not appear to be enough area of suitable soils and landscapes on this property to site the mass drainfield, reserve drainfield and nitrogen dilution buffer area unless the soils in mapping units 43B and 43C meet the mass drainfield requirements. They comprise approximately 20 acres on this property.

The "best" soils of the Fauquier series (45B, 45C) mapped on the property are near existing buildings, houses, riding ring, well and septic components.

This information is preliminary and may change with a detailed soil evaluation and site analysis.

## PARCEL 13 [PIN 304283694000]

Size requirements for the mass drainfield dispersal area are approximately 158,119 square feet for the drainfield and 158,119 square feet for the reserve drainfield (about 7.5 acres

total). The percolation rate is estimated to be 75 minutes per inch. Proposed dispersal method is drip irrigation with an installation depth of approximately 18 to 20 inches.

Nitrogen dilution buffer areas of approximately 16 acres will be required around the drainfield sites (Dewberry calculations).

The "best" suitable soils found in the study area for drainfield sites are found in Soil Map Units 23B, 55B and 55C. Soils of the Purcellville series (23B) are deep and well drained. They formed in residuum derived from diorite, biotite schist and greenstone schist in the Blue Ridge Uplands. They comprise approximately 42 acres of this property. Soils of the Glenelg (55B, 55C) are very deep and well drained. They formed in residuum weathered from micaceous schist on uplands of the Blue Ridge and the Northern Piedmont. They comprise approximately ten (10) acres of this property. Inclusions of soils shallower to rock may occur in these mapping units.

Soils of the Purcellville-Tankerville complex (20B, 20C) and the Myersville-Catoctin complex (43B, 43C) are moderately suitable for this project. Soils of the Tankerville and Catoctin series are moderately deep (depth of rock ranges from 20 to 40 inches) and may not meet the mass drainfield requirements. They may comprise as much as 50 percent or more of the soil mapping unit. Soils of the Myersville series are deep and well drained that formed in residuum from basic crystalline rocks in the Blue Ridge and adjacent Piedmont Uplands. Inclusions of soils shallower to rock may occur in these mapping units.

Soils of the Purcellville-Swampoodle complex (22B) are moderately suitable for this project. Soils of the Swampoodle series are very deep and moderately well drained that formed in local colluvium over residuum from basic crystalline rocks in the Blue Ridge Lowlands. They have a seasonal water table in the upper argillic horizon (around 16 inches) and may not meet the mass drainfield requirements. Inclusions of soils shallower to the seasonal water table may occur in these mapping units.

There appears to be suitable soils and landscapes on this property to site the mass drainfield, reserve drainfield and nitrogen dilution buffer area.

This information is preliminary and may change with a detailed soil evaluation and site analysis.

**PARCEL 16 [PIN 381207702000]**

Size requirements for the mass drainfield dispersal area are approximately 158,119 square feet for the drainfield and 158,119 square feet for the reserve drainfield (about 7.5 acres total). The percolation rate is estimated to be 75 minutes per inch. Proposed dispersal method is drip irrigation with an installation depth of approximately 18 to 20 inches.

Nitrogen dilution buffer areas of approximately 16 acres will be required around the drainfield sites (Dewberry calculations).

The "best" suitable soils found in the study area for drainfield sites are found in Soil Map Units 23B and 55B. Soils of the Purcellville series (23B) are deep and well drained. They formed in residuum derived from diorite, biotite schist and greenstone schist in the Blue Ridge Uplands. They comprise approximately 53 acres of this property. Soils of the Glenelg (55B) are very deep and well drained. They formed in residuum weathered from micaceous schist on uplands of the Blue Ridge and the Northern Piedmont. They comprise approximately two (2) acres of this property. Inclusions of soils shallower to rock may occur in these mapping units.

Soils of the Purcellville-Tankerville complex (20C) are moderately suitable for this project. Soils of the Tankerville series are moderately deep (depth of rock ranges from 20 to 40 inches) and may not meet the mass drainfield requirements. They may comprise as much as 50 percent or more of the soil mapping unit. They comprise approximately 33 acres of this property. Inclusions of soils shallower to rock may occur in these mapping units.

Soils of the Purcellville-Swampoodle complex (22B) are moderately suitable for this project. Soils of the Swampoodle series are very deep and moderately well drained that formed in local colluvium over residuum from basic crystalline rocks in the Blue Ridge Lowlands.

They have a seasonal water table in the upper argillic horizon (around 16 inches) and may not meet mass drainfield requirements. They comprise approximately six (6) acres of this property. Inclusions of soils shallower to the seasonal water table may occur in these mapping units.

There appears to be suitable soils and landscapes on this property to site the mass drainfield, reserve drainfield and nitrogen dilution buffer area.

This information is preliminary and may change with a detailed soil evaluation and site analysis.

**PARCEL 21 [PIN 305281781000]**

Size requirements for the mass drainfield dispersal area are approximately 158,119 square feet for the drainfield and 158,119 square feet for the reserve drainfield (about 7.5 acres total). The percolation rate is estimated to be 75 minutes per inch. Proposed dispersal method is drip irrigation with an installation depth of approximately 18 to 20 inches.

Nitrogen dilution buffer areas of approximately 16 acres will be required around the drainfield sites (Dewberry calculations).

The "best" suitable soils found in the study area for drainfield sites are found in Soil Map Units 55B and 55C. Soils of the Glenelg series (55B, 55C) are very deep and well drained. They formed in residuum weathered from micaceous schist in the Blue Ridge Uplands and the Northern Piedmont. They comprise approximately nine (9) acres of this property. Inclusions of soils shallower to rock may occur in these mapping units.

Soils of the Myersville-Catoctin complex (43C) are moderately suitable for this project. Soils of the Catoctin series are moderately deep (depth of rock ranges from 20 to 40 inches) and may not meet the mass drainfield requirements. They may comprise as much as 50 percent or more of the soil mapping unit. Soils of the Myersville series are deep and well drained that formed in residuum from basic crystalline rocks in the Blue Ridge and adjacent Piedmont Uplands. Inclusions of soils shallower to rock may occur in these mapping units.

There does not appear to be enough area of suitable soils and landscapes on this property to site the mass drainfield, reserve drainfield and nitrogen dilution buffer area unless the soils in mapping unit 43C meet the mass drainfield requirements. They comprise approximately nine (9) acres on this property.

The "best" soils of the Glenelg series (55B, 55C) mapped on the property are near existing buildings, houses, wells and septic components.

This information is preliminary and may change with a detailed soil evaluation and site analysis.

**PARCEL 22 [PIN 310174360000]**

Size requirements for the mass drainfield dispersal area are approximately 158,119 square feet for the drainfield and 158,119 square feet for the reserve drainfield (about 7.5 acres total). The percolation rate is estimated to be 75 minutes per inch. Proposed dispersal method is drip irrigation with an installation depth of approximately 18 to 20 inches.

Nitrogen dilution buffer areas of approximately 16 acres will be required around the drainfield sites (Dewberry calculations).

The "best" suitable soils found in the study area for drainfield sites are found in Soil Map Units 45B and 45C. Soils of the Fauquier series (45B,45C) are very deep and well drained. They formed in residuum derived from greenstone and similar mafic rocks in the Blue Ridge Uplands. They comprise approximately 22 acres of this property. Inclusions of soils shallower to rock may occur in these mapping units. Soils of the Glenelg series (55B) are also suitable for drainfield sites. They are very deep and well drained. Glenelg soils formed in residuum weathered from micaceous schist in the Blue Ridge Uplands and the Northern Piedmont. They comprise approximately three (3) acres of this property. Inclusions of soils shallower to rock may occur in these mapping units.

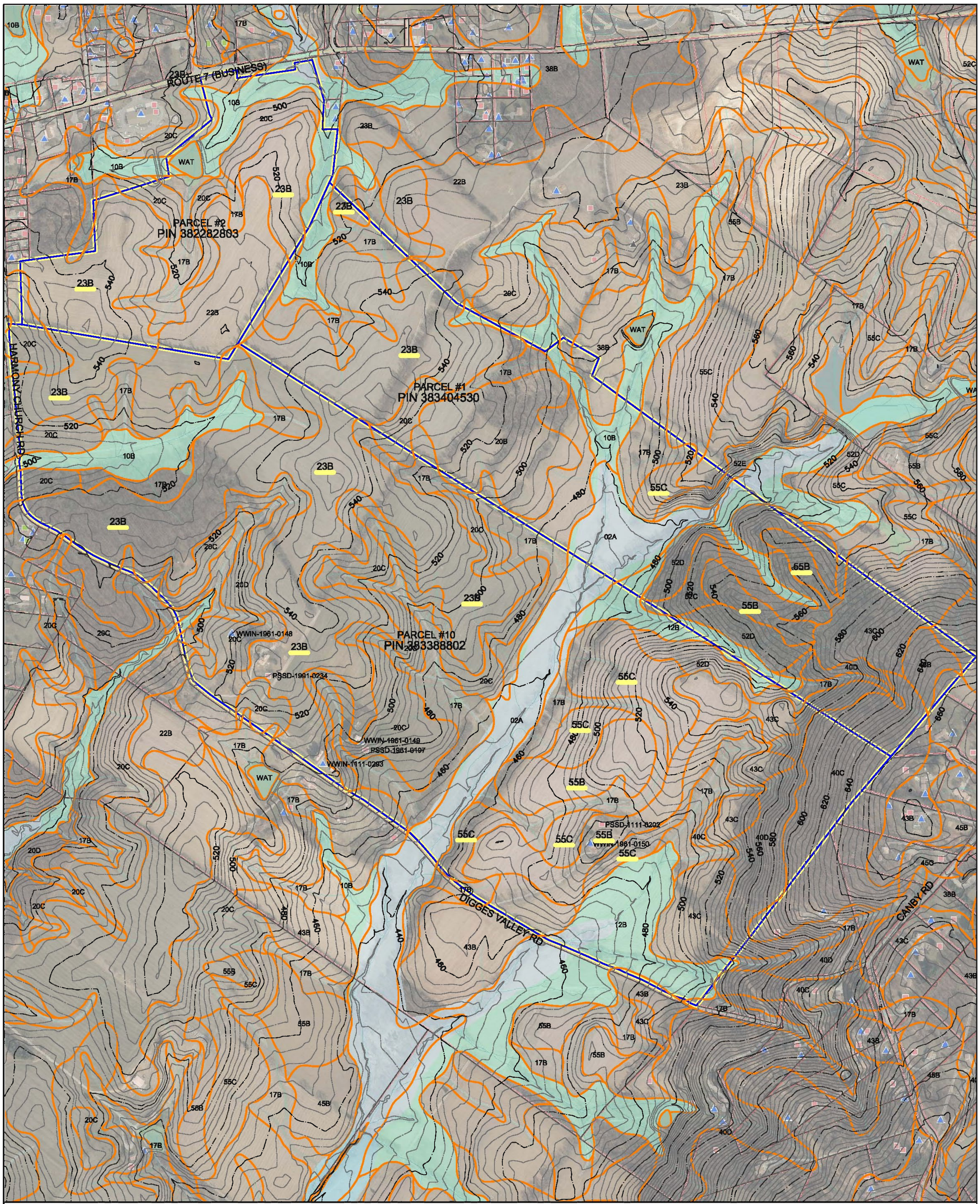
Soils of the Myersville-Catoctin complex (43B, 43C) are moderately suitable for this project. Soils of the Catoctin series are moderately deep (depth of rock ranges from 20 to 40

inches) and may not meet the mass drainfield requirements. They may comprise as much as 50 percent or more of the soil mapping unit. Soils of the Myersville series are deep and well drained that formed in residuum from basic crystalline rocks in the Blue Ridge and adjacent Piedmont Uplands. Inclusions of soils shallower to rock may occur in these mapping units.

Soils of the Catoctin series (40C) are moderately deep and may not meet the mass drainfield requirements. Inclusions of soils shallower to rock may also occur in these mapping units.

There appears to be suitable soils and landscapes on this property to site the mass drainfield, reserve drainfield and nitrogen dilution buffer area.

This information is preliminary and may change with a detailed soil evaluation and site analysis.




= SOIL DELINEATION LINE

SEE INCLUDED NCSS SOIL MAPS AND TABLES FOR SOIL NUMBER DESCRIPTIONS

= INDEX COUNTOUR (20 FT)

= INTERMEDIATE CONTOUR (4 FT)

DATA FROM LOUDOUN COUNTY, VA GIS
EXHIBIT DATE: JANUARY 2019

= FLOODPLAIN (MINOR)

= HYDRIC SOILS

= EXISTING DRAINFIELD

= EXISTING WELL

(DRAINFIELD AND WELL LABELS SHOWN ON SUBJECT PARCELS)

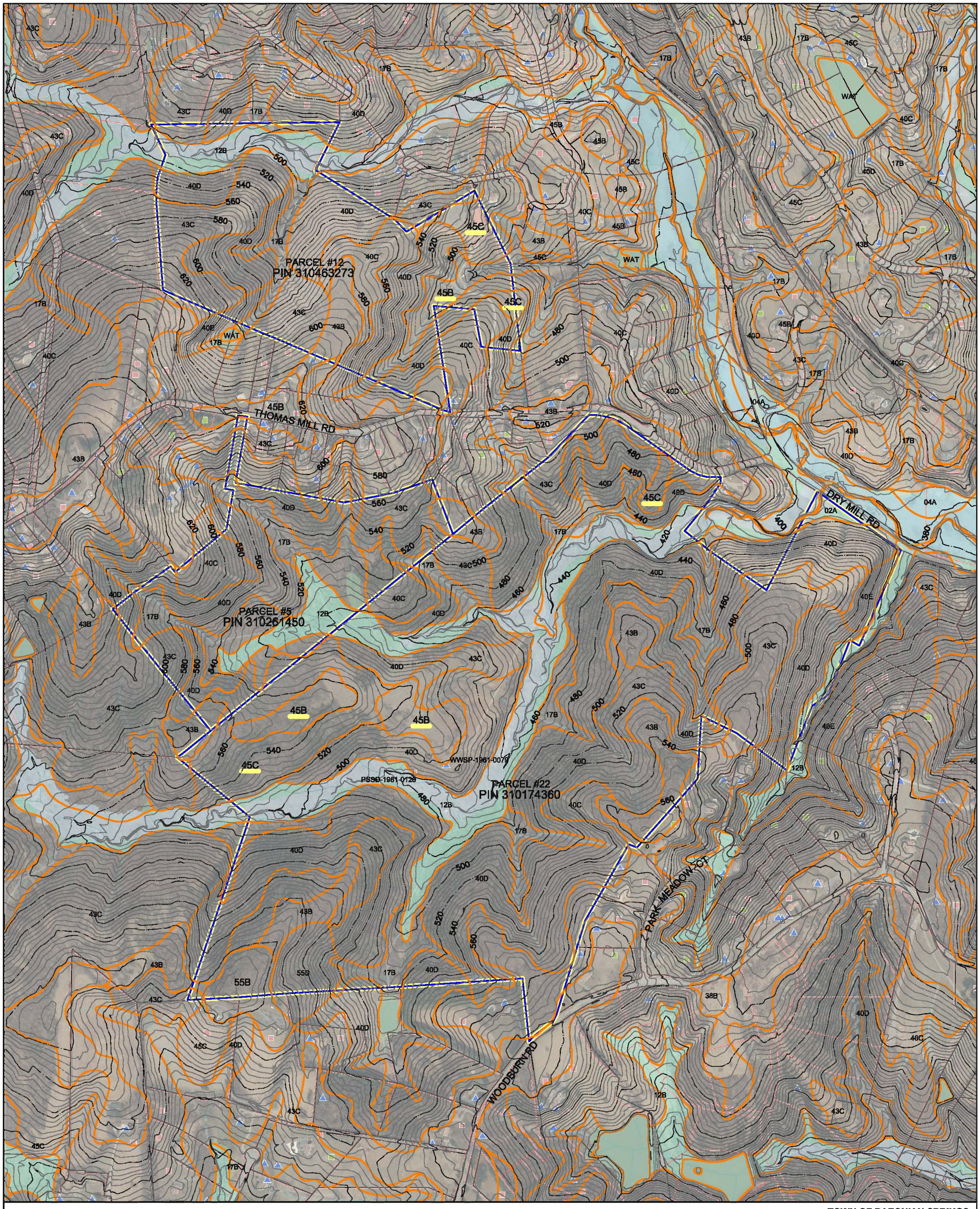
# MAP EXHIBIT A
# PARCELS 1, 2 AND 10
## SCALE: 1'=400'

0' 400' 800'

**TOWN OF PAEONIAN SPRINGS**
**POTENTIAL MASS DRAINFIELD STUDY (42,165 GPD)**
**MAP EXHIBIT A**
LOUDOUN COUNTY, VIRGINIA

**Marsh & Legge Land Surveyors, P.L.C.**
560 NORTH LOUDOUN STREET ~ WINCHESTER, VIRGINIA 22601
PHONE (540) 667-0468 ~ FAX (540) 667-0469
www.marshandlegge.com

ML ID 10896




= SOIL DELINEATION LINE

SEE INCLUDED NCSS SOIL MAPS AND TABLES FOR SOIL NUMBER DESCRIPTIONS

= INDEX COUNTOUR (20 FT)

= INTERMEDIATE CONTOUR (4 FT)

DATA FROM LOUDOUN COUNTY, VA GIS
EXHIBIT DATE: JANUARY 2019

= FLOODPLAIN (MINOR)

= HYDRIC SOILS

= EXISTING DRAINFIELD

= EXISTING WELL

(DRAINFIELD AND WELL LABELS SHOWN ON SUBJECT PARCELS)

# MAP EXHIBIT B
# PARCELS 5, 12 AND 22
SCALE: 1'=400'

0' 400' 800'

**TOWN OF PAEONIAN SPRINGS**
**POTENTIAL MASS DRAINFIELD STUDY (42,165 GPD)**
**MAP EXHIBIT B**
LOUDOUN COUNTY, VIRGINIA

**Marsh & Legge Land Surveyors, P.L.C.**
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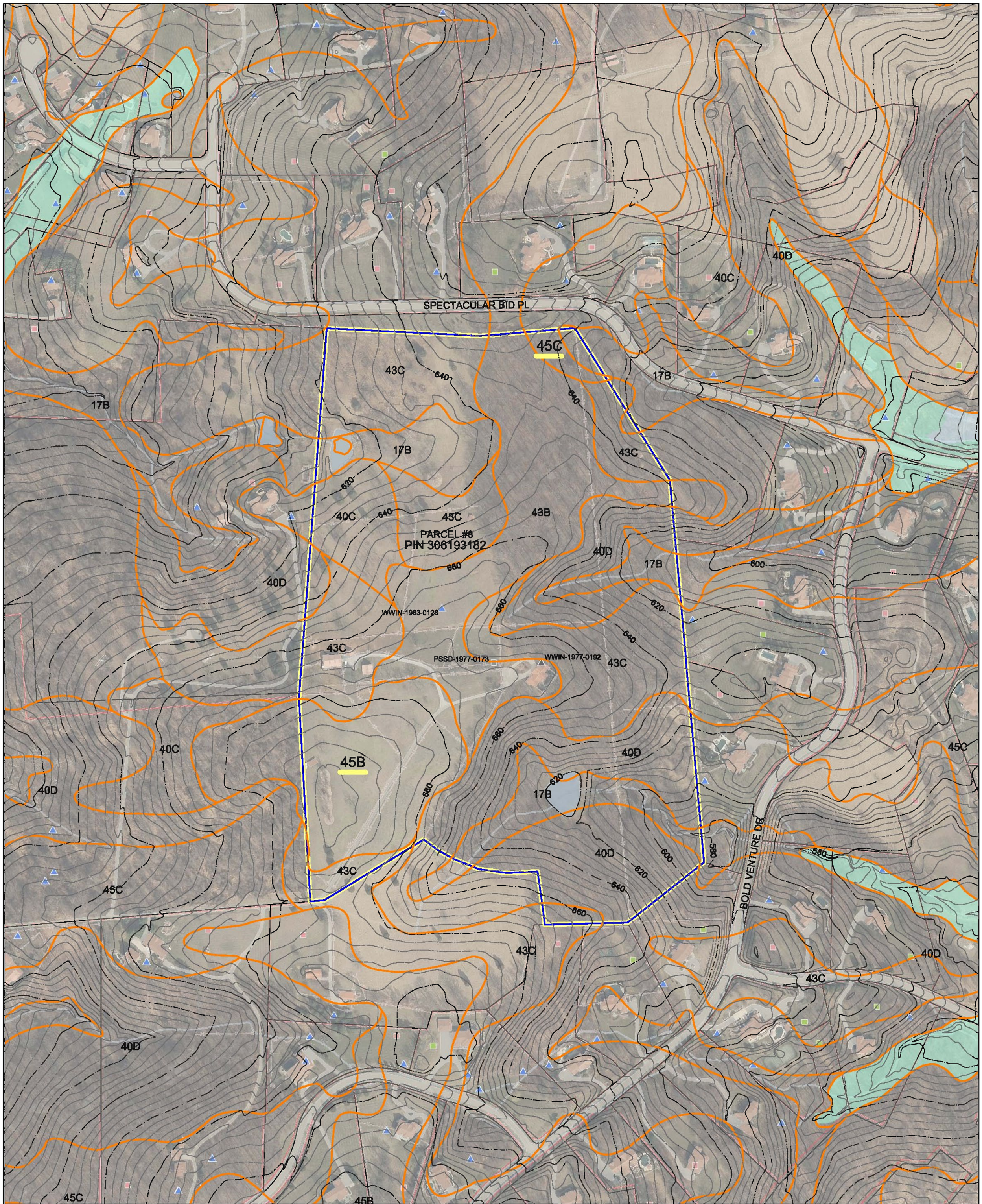
www.marshandlegge.com

ML ID 10895




= SOIL DELINEATION LINE

SEE INCLUDED NCSS SOIL MAPS AND TABLES FOR SOIL NUMBER DESCRIPTIONS

= INDEX COUNTOUR (20 FT)

= INTERMEDIATE CONTOUR (4 FT)

DATA FROM LOUDOUN COUNTY, VA GIS
EXHIBIT DATE: JANUARY 2019

= FLOODPLAIN (MINOR)

= HYDRIC SOILS

= EXISTING DRAINFIELD

= EXISTING WELL

(DRAINFIELD AND WELL LABELS SHOWN ON SUBJECT PARCELS)

# MAP EXHIBIT C
# PARCEL 8
## SCALE: 1'=200'

0' 200' 400'

**TOWN OF PAEONIAN SPRINGS**
**POTENTIAL MASS DRAINFIELD STUDY (42,165 GPD)**
**MAP EXHIBIT C**
LOUDOUN COUNTY, VIRGINIA

**Marsh & Legge Land Surveyors, P.L.C.**
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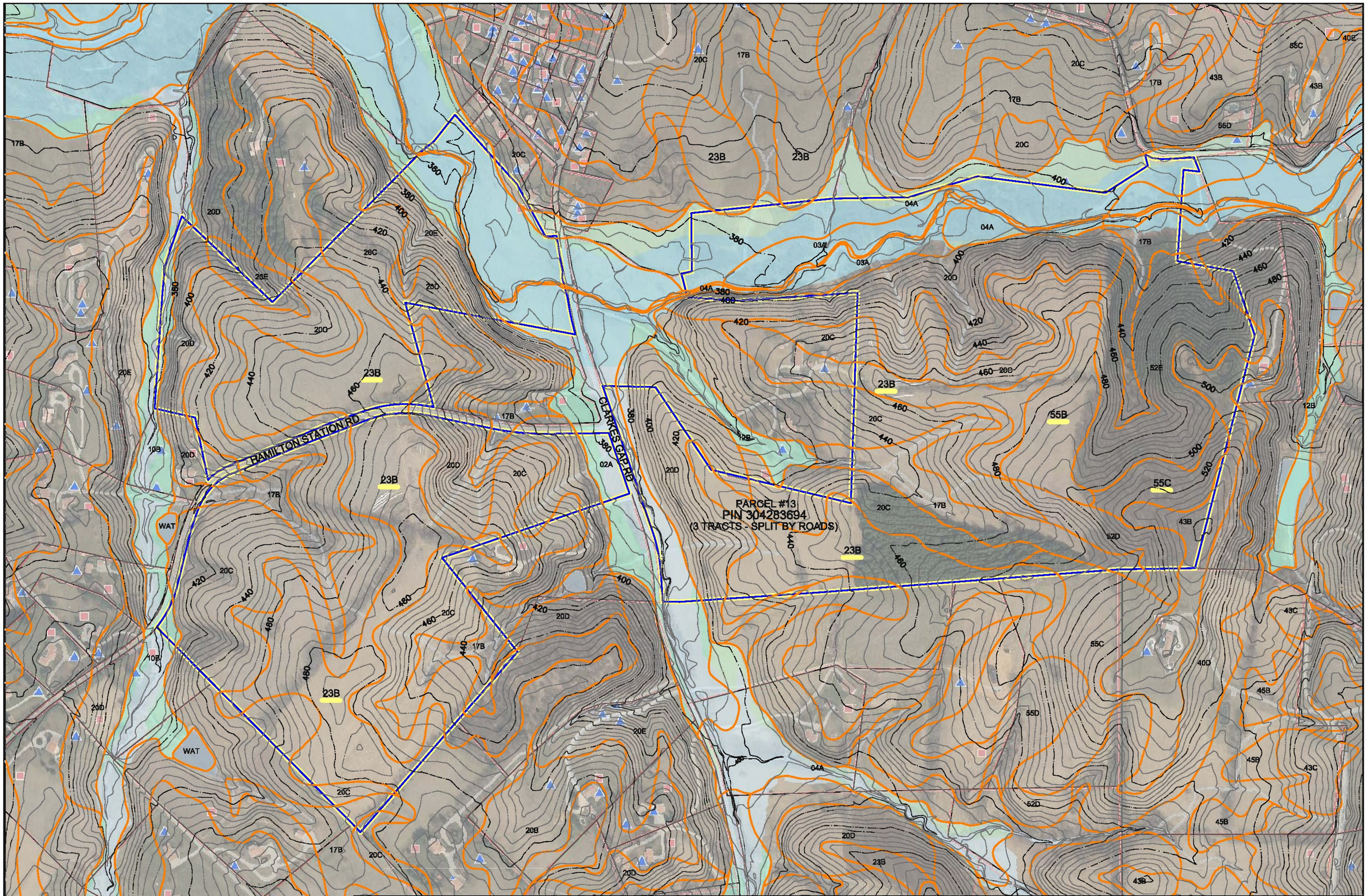
www.marshandlegge.com

ML ID 10895




= SOIL DELINEATION LINE
SEE INCLUDED NCSS SOIL MAPS AND TABLES FOR SOIL NUMBER DESCRIPTIONS

= INDEX COUNTOUR (20 FT)
= INTERMEDIATE CONTOUR (4 FT)

DATA FROM LOUDOUN COUNTY, VA GIS
EXHIBIT DATE: JANUARY 2019

= FLOODPLAIN (MINOR)
= HYDRIC SOILS
= EXISTING DRAINFIELD
= EXISTING WELL

(DRAINFIELD AND WELL LABELS SHOWN ON SUBJECT PARCELS)

MAP EXHIBIT D
PARCEL 13
SCALE: 1'=300'

0' 200' 400'

**TOWN OF PAEONIAN SPRINGS**
**POTENTIAL MASS DRAINFIELD STUDY (42,165 GPD)**
**MAP EXHIBIT D**
LOUDOUN COUNTY, VIRGINIA

**Marsh & Legge Land Surveyors, P.L.C.**
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PHONE (540) 667-0469 ~ FAX (540) 667-0469
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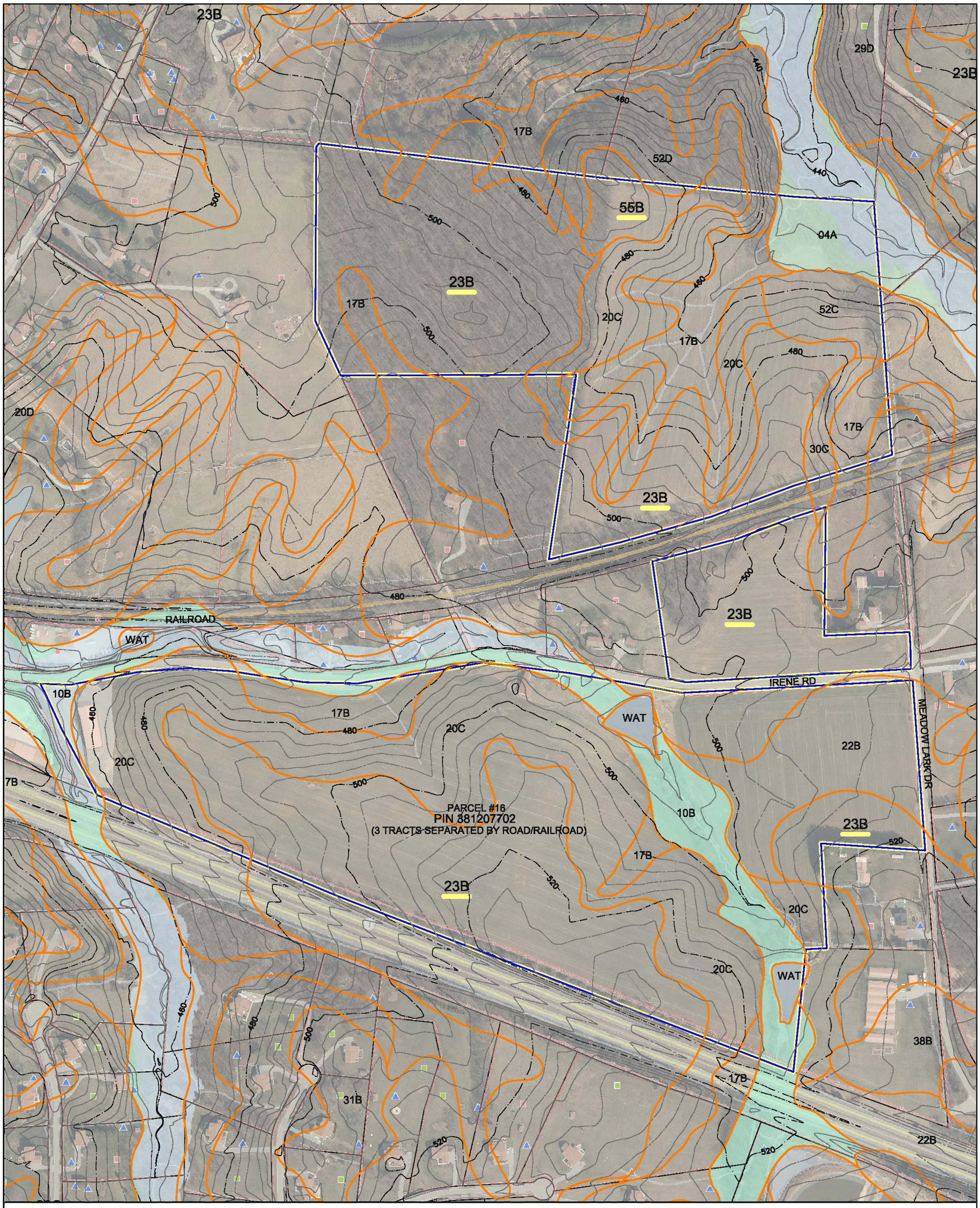
ML ID 10696




= SOIL DELINEATION LINE

SEE INCLUDED NCSS SOIL MAPS AND TABLES FOR SOIL NUMBER DESCRIPTIONS

= INDEX COUNTOUR (20 FT)

= INTERMEDIATE CONTOUR (4 FT)

DATA FROM LOUDOUN COUNTY, VA GIS
EXHIBIT DATE: JANUARY 2019

= FLOODPLAIN (MINOR)

= HYDRIC SOILS

= EXISTING DRAINFIELD

= EXISTING WELL

(DRAINFIELD AND WELL LABELS SHOWN ON SUBJECT PARCELS)

# MAP EXHIBIT E
# PARCEL 16
# SCALE: 1'=200'

0' 200' 400'

**TOWN OF PAEONIAN SPRINGS**
**POTENTIAL MASS DRAINFIELD STUDY (42,165 GPD)**
**MAP EXHIBIT E**
LOUDOUN COUNTY, VIRGINIA

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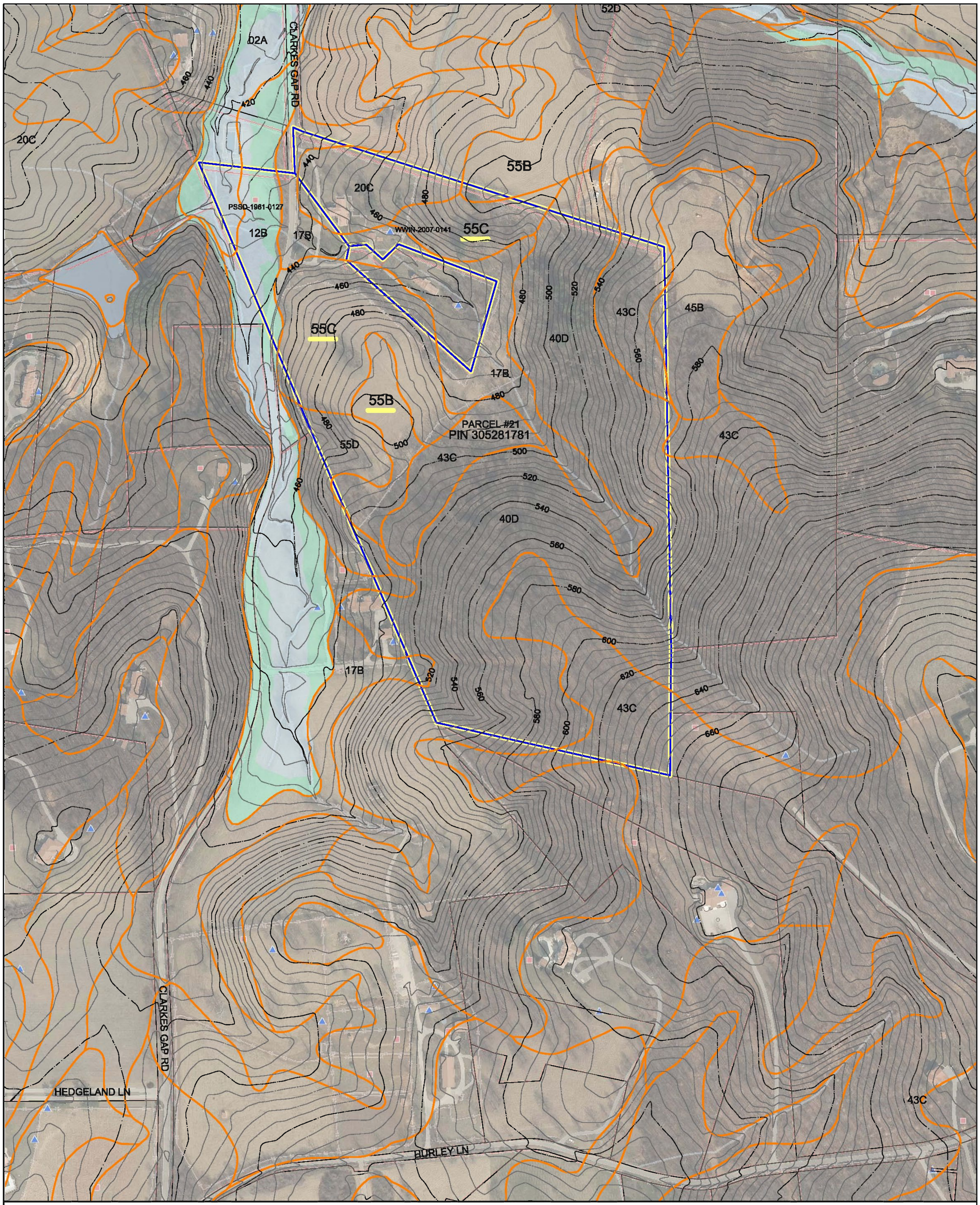
ML ID 10895




= SOIL DELINEATION LINE

SEE INCLUDED NCSS SOIL MAPS AND TABLES FOR SOIL NUMBER DESCRIPTIONS

= INDEX COUNTOUR (20 FT)

= INTERMEDIATE CONTOUR (4 FT)

DATA FROM LOUDOUN COUNTY, VA GIS
EXHIBIT DATE: JANUARY 2019

= FLOODPLAIN (MINOR)

= HYDRIC SOILS

= EXISTING DRAINFIELD

= EXISTING WELL

(DRAINFIELD AND WELL LABELS SHOWN ON SUBJECT PARCELS)

# MAP EXHIBIT F
# PARCEL 21
## SCALE: 1'=200'

0' 200' 400'

**TOWN OF PAEONIAN SPRINGS**
**POTENTIAL MASS DRAINFIELD STUDY (42,165 GPD)**
**MAP EXHIBIT F**
LOUDOUN COUNTY, VIRGINIA

**Marsh & Legge Land Surveyors, P.L.C.**
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PHONE (540) 667-0468 ~ FAX (540) 667-0469
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ML ID 10896

Soil Map—Loudoun County, Virginia
(Parcel #1)

Map Scale: 1:7,360 if printed on B landscape (17" x 11") sheet.

N

Meters
0 100 200 400 600

Feet
0 350 700 1400 2100

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

## 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 1:12,000.

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: Loudoun County, Virginia
Survey Area Data: Version 15, Aug 28, 2018

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

Date(s) aerial images were photographed: Apr 14, 2011—Nov 6, 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 |
|---|---|---|---|
| 2A | Codorus silt loam, 0 to 2 percent slopes, occasionally flooded | 8.7 | 6.2% |
| 10B | Mongle silt loam, 0 to 7 percent slopes, frequently flooded | 9.6 | 6.9% |
| 12B | Rohrersville cobbly silt loam, 0 to 7 percent slopes, occasionally flooded | 1.2 | 0.9% |
| 17B | Middleburg silt loam, 2 to 7 percent slopes | 19.9 | 14.2% |
| 20B | Purcellville and Tankerville soils, 2 to 7 percent slopes | 16.8 | 12.0% |
| 20C | Purcellville and Tankerville soils, 7 to 15 percent slopes | 2.8 | 2.0% |
| 22B | Purcellville-Swampoodle complex, 2 to 7 percent slopes | 2.2 | 1.6% |
| 23B | Purcellville silt loam, 2 to 7 percent slopes | 27.5 | 19.6% |
| 38B | Swampoodle silt loam, 2 to 7 percent slopes, occasionally ponded | 1.9 | 1.4% |
| 40C | Catoctin channery silt loam, 7 to 15 percent slopes | 5.5 | 3.9% |
| 40D | Catoctin channery silt loam, 15 to 25 percent slopes | 3.6 | 2.6% |
| 43B | Myersville-Catoctin complex, 2 to 7 percent slopes | 2.9 | 2.1% |
| 43C | Myersville-Catoctin complex, 7 to 15 percent slopes | 7.8 | 5.6% |
| 45B | Fauquier silt loam, 2 to 7 percent slopes | 0.6 | 0.4% |
| 52C | Cardiff channery silt loam, 7 to 15 percent slopes | 8.1 | 5.8% |
| 52D | Cardiff channery silt loam, 15 to 25 percent slopes | 10.1 | 7.2% |
| 52E | Cardiff channery silt loam, 25 to 45 percent slopes | 1.4 | 1.0% |
| 55B | Glenelg silt loam, 2 to 7 percent slopes | 6.6 | 4.7% |
| 55C | Glenelg silt loam, 7 to 15 percent slopes | 2.8 | 2.0% |
| **Totals for Area of Interest** | | **140.1** | **100.0%** |

Soil Map—Loudoun County, Virginia
(Parcel #2)

Map Scale: 1:3,790 if printed on B landscape (17" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

## 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 1:12,000.

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: Loudoun County, Virginia
Survey Area Data: Version 15, Aug 28, 2018

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

Date(s) aerial images were photographed: Sep 25, 2014—Mar 10, 2017

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 |
|---|---|---|---|
| 10B | Mongle silt loam, 0 to 7 percent slopes, frequently flooded | 8.5 | 14.1% |
| 17B | Middleburg silt loam, 2 to 7 percent slopes | 5.3 | 8.9% |
| 20C | Purcellville and Tankerville soils, 7 to 15 percent slopes | 10.0 | 16.6% |
| 22B | Purcellville-Swampoodle complex, 2 to 7 percent slopes | 13.1 | 21.8% |
| 23B | Purcellville silt loam, 2 to 7 percent slopes | 23.3 | 38.7% |
| **Totals for Area of Interest** | | **60.2** | **100.0%** |

Soil Map—Loudoun County, Virginia
(Parcel #5)

Map Scale: 1:4,000 if printed on B landscape (17" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

## 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 1:12,000.

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: Loudoun County, Virginia
Survey Area Data: Version 15, Aug 28, 2018

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

Date(s) aerial images were photographed: Sep 25, 2014—Mar 10, 2017

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 |
|---|---|---|---|
| 12B | Rohrersville cobbly silt loam, 0 to 7 percent slopes, occasionally flooded | 4.9 | 9.8% |
| 17B | Middleburg silt loam, 2 to 7 percent slopes | 12.3 | 24.7% |
| 40C | Catoctin channery silt loam, 7 to 15 percent slopes | 5.1 | 10.3% |
| 40D | Catoctin channery silt loam, 15 to 25 percent slopes | 15.4 | 30.8% |
| 43B | Myersville-Catoctin complex, 2 to 7 percent slopes | 1.1 | 2.3% |
| 43C | Myersville-Catoctin complex, 7 to 15 percent slopes | 7.7 | 15.3% |
| 45B | Fauquier silt loam, 2 to 7 percent slopes | 0.0 | 0.0% |
| 45C | Fauquier silt loam, 7 to 15 percent slopes | 3.3 | 6.7% |
| **Totals for Area of Interest** | | **49.9** | **100.0%** |

Soil Map—Loudoun County, Virginia
(Parcel #8)

Map Scale: 1:2,400 if printed on B portrait (11" x 17") sheet.

N

Meters: 0 35 70 140 210

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

## 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 1:12,000.

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: Loudoun County, Virginia
Survey Area Data: Version 15, Aug 28, 2018

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

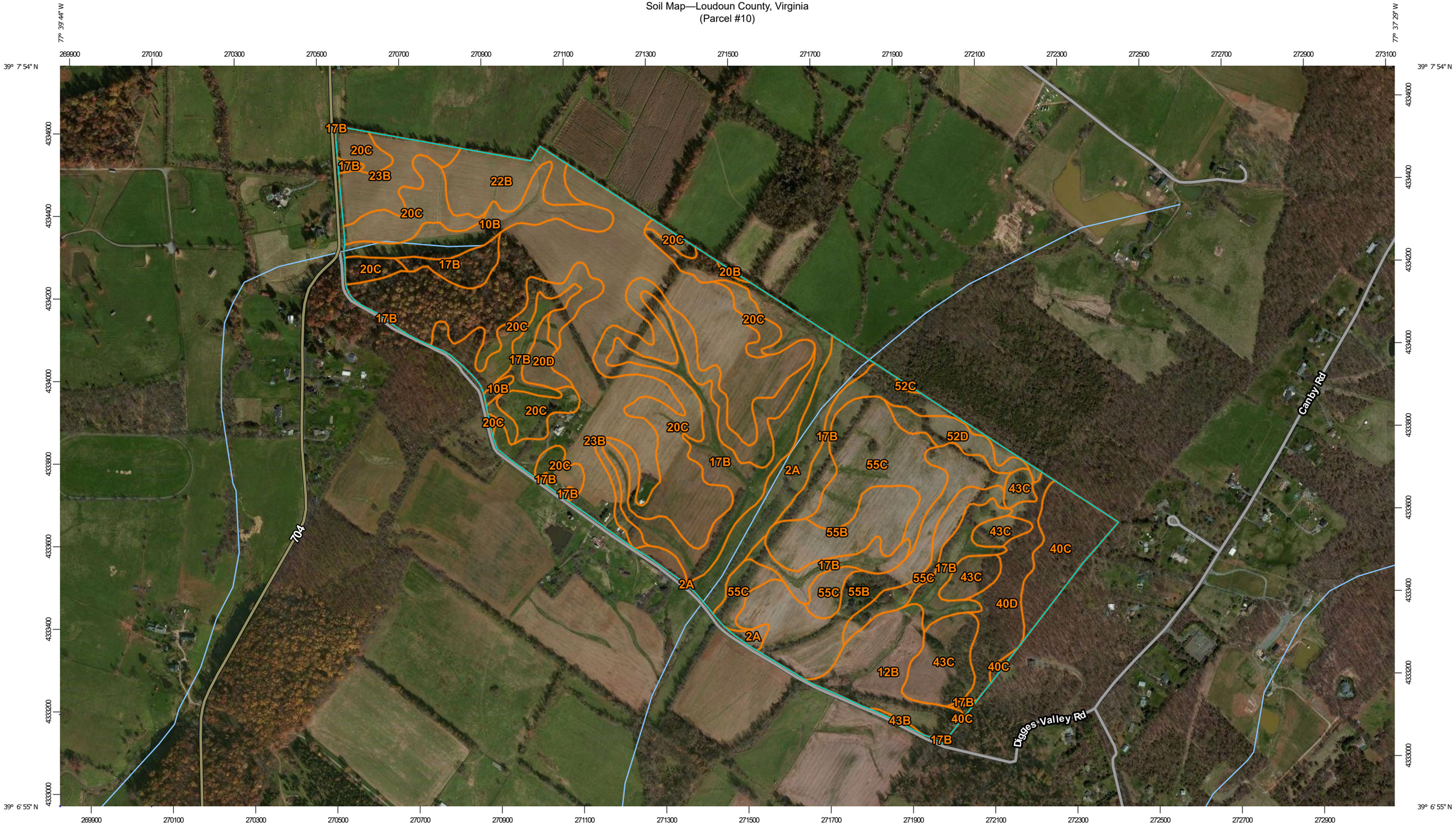
Date(s) aerial images were photographed: Sep 25, 2014—Mar 10, 2017

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 |
|---|---|---|---|
| 17B | Middleburg silt loam, 2 to 7 percent slopes | 6.5 | 11.2% |
| 40C | Catoctin channery silt loam, 7 to 15 percent slopes | 2.5 | 4.3% |
| 40D | Catoctin channery silt loam, 15 to 25 percent slopes | 13.6 | 23.5% |
| 43B | Myersville-Catoctin complex, 2 to 7 percent slopes | 11.1 | 19.1% |
| 43C | Myersville-Catoctin complex, 7 to 15 percent slopes | 17.3 | 29.8% |
| 45B | Fauquier silt loam, 2 to 7 percent slopes | 6.5 | 11.3% |
| 45C | Fauquier silt loam, 7 to 15 percent slopes | 0.5 | 0.8% |
| **Totals for Area of Interest** | | **57.9** | **100.0%** |

Soil Map—Loudoun County, Virginia
(Parcel #10)




Map Scale: 1:8,740 if printed on B landscape (17" x 11") sheet.

Meters: 0 100 200 400 600

Feet: 0 400 800 1600 2400

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

## 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 1:12,000.

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: Loudoun County, Virginia
Survey Area Data: Version 15, Aug 28, 2018

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

Date(s) aerial images were photographed: Apr 14, 2011—Nov 6, 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 |
|---|---|---|---|
| 2A | Codorus silt loam, 0 to 2 percent slopes, occasionally flooded | 13.1 | 4.2% |
| 10B | Mongle silt loam, 0 to 7 percent slopes, frequently flooded | 9.9 | 3.2% |
| 12B | Rohrersville cobbly silt loam, 0 to 7 percent slopes, occasionally flooded | 12.7 | 4.0% |
| 17B | Middleburg silt loam, 2 to 7 percent slopes | 48.7 | 15.6% |
| 20B | Purcellville and Tankerville soils, 2 to 7 percent slopes | 0.2 | 0.1% |
| 20C | Purcellville and Tankerville soils, 7 to 15 percent slopes | 54.3 | 17.3% |
| 20D | Purcellville and Tankerville soils, 15 to 25 percent slopes | 2.4 | 0.8% |
| 22B | Purcellville-Swampoodle complex, 2 to 7 percent slopes | 8.6 | 2.8% |
| 23B | Purcellville silt loam, 2 to 7 percent slopes | 73.7 | 23.6% |
| 40C | Catoctin channery silt loam, 7 to 15 percent slopes | 9.9 | 3.2% |
| 40D | Catoctin channery silt loam, 15 to 25 percent slopes | 9.8 | 3.1% |
| 43B | Myersville-Catoctin complex, 2 to 7 percent slopes | 0.2 | 0.1% |
| 43C | Myersville-Catoctin complex, 7 to 15 percent slopes | 13.2 | 4.2% |
| 52C | Cardiff channery silt loam, 7 to 15 percent slopes | 0.2 | 0.1% |
| 52D | Cardiff channery silt loam, 15 to 25 percent slopes | 4.0 | 1.3% |
| 55B | Glenelg silt loam, 2 to 7 percent slopes | 27.2 | 8.7% |
| 55C | Glenelg silt loam, 7 to 15 percent slopes | 24.7 | 7.9% |
| **Totals for Area of Interest** | | **312.9** | **100.0%** |

Soil Map—Loudoun County, Virginia
(Parcel #12)

Map Scale: 1:3,690 if printed on B landscape (17" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

## 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 1:12,000.

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: Loudoun County, Virginia
Survey Area Data: Version 15, Aug 28, 2018

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

Date(s) aerial images were photographed: Sep 25, 2014—Mar 10, 2017

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 |
|---|---|---|---|
| 12B | Rohrersville cobbly silt loam, 0 to 7 percent slopes, occasionally flooded | 6.0 | 8.3% |
| 17B | Middleburg silt loam, 2 to 7 percent slopes | 3.3 | 4.6% |
| 40C | Catoctin channery silt loam, 7 to 15 percent slopes | 7.8 | 10.8% |
| 40D | Catoctin channery silt loam, 15 to 25 percent slopes | 26.7 | 36.9% |
| 40E | Catoctin channery silt loam, 25 to 45 percent slopes | 0.8 | 1.1% |
| 43B | Myersville-Catoctin complex, 2 to 7 percent slopes | 3.3 | 4.5% |
| 43C | Myersville-Catoctin complex, 7 to 15 percent slopes | 17.2 | 23.8% |
| 45B | Fauquier silt loam, 2 to 7 percent slopes | 4.4 | 6.1% |
| 45C | Fauquier silt loam, 7 to 15 percent slopes | 2.8 | 3.8% |
| **Totals for Area of Interest** | | **72.5** | **100.0%** |

Soil Map—Loudoun County, Virginia
(Parcel #13)

Map Scale: 1:6,580 if printed on B landscape (17" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 300 600 1200 1800

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

## 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 1:12,000.

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: Loudoun County, Virginia
Survey Area Data: Version 15, Aug 28, 2018

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

Date(s) aerial images were photographed: Apr 14, 2011—Nov 6, 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 |
|---|---|---|---|
| 2A | Codorus silt loam, 0 to 2 percent slopes, occasionally flooded | 15.0 | 6.8% |
| 3A | Comus silt loam, 0 to 2 percent slopes, occasionally flooded | 6.8 | 3.1% |
| 4A | Hatboro loam, 0 to 2 percent slopes, frequently flooded | 11.9 | 5.4% |
| 10B | Mongle silt loam, 0 to 7 percent slopes, frequently flooded | 1.2 | 0.5% |
| 12B | Rohrersville cobbly silt loam, 0 to 7 percent slopes, occasionally flooded | 0.0 | 0.0% |
| 17B | Middleburg silt loam, 2 to 7 percent slopes | 16.8 | 7.6% |
| 20C | Purcellville and Tankerville soils, 7 to 15 percent slopes | 59.3 | 26.8% |
| 20D | Purcellville and Tankerville soils, 15 to 25 percent slopes | 33.1 | 14.9% |
| 20E | Tankerville and Purcellville soils, 25 to 45 percent slopes | 4.5 | 2.0% |
| 23B | Purcellville silt loam, 2 to 7 percent slopes | 42.1 | 19.0% |
| 40D | Catoctin channery silt loam, 15 to 25 percent slopes | 0.1 | 0.0% |
| 40E | Catoctin channery silt loam, 25 to 45 percent slopes | 0.4 | 0.2% |
| 43B | Myersville-Catoctin complex, 2 to 7 percent slopes | 3.6 | 1.6% |
| 52D | Cardiff channery silt loam, 15 to 25 percent slopes | 3.3 | 1.5% |
| 52E | Cardiff channery silt loam, 25 to 45 percent slopes | 13.5 | 6.1% |
| 55B | Glenelg silt loam, 2 to 7 percent slopes | 6.0 | 2.7% |
| 55C | Glenelg silt loam, 7 to 15 percent slopes | 4.0 | 1.8% |
| **Totals for Area of Interest** | | **221.5** | **100.0%** |

Soil Map—Loudoun County, Virginia
(Parcel #16)

Map Scale: 1:5,260 if printed on B portrait (11" x 17") sheet.

Meters: 0 50 100 200 300

Feet: 0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

## 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 1:12,000.

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: Loudoun County, Virginia
Survey Area Data: Version 15, Aug 28, 2018

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

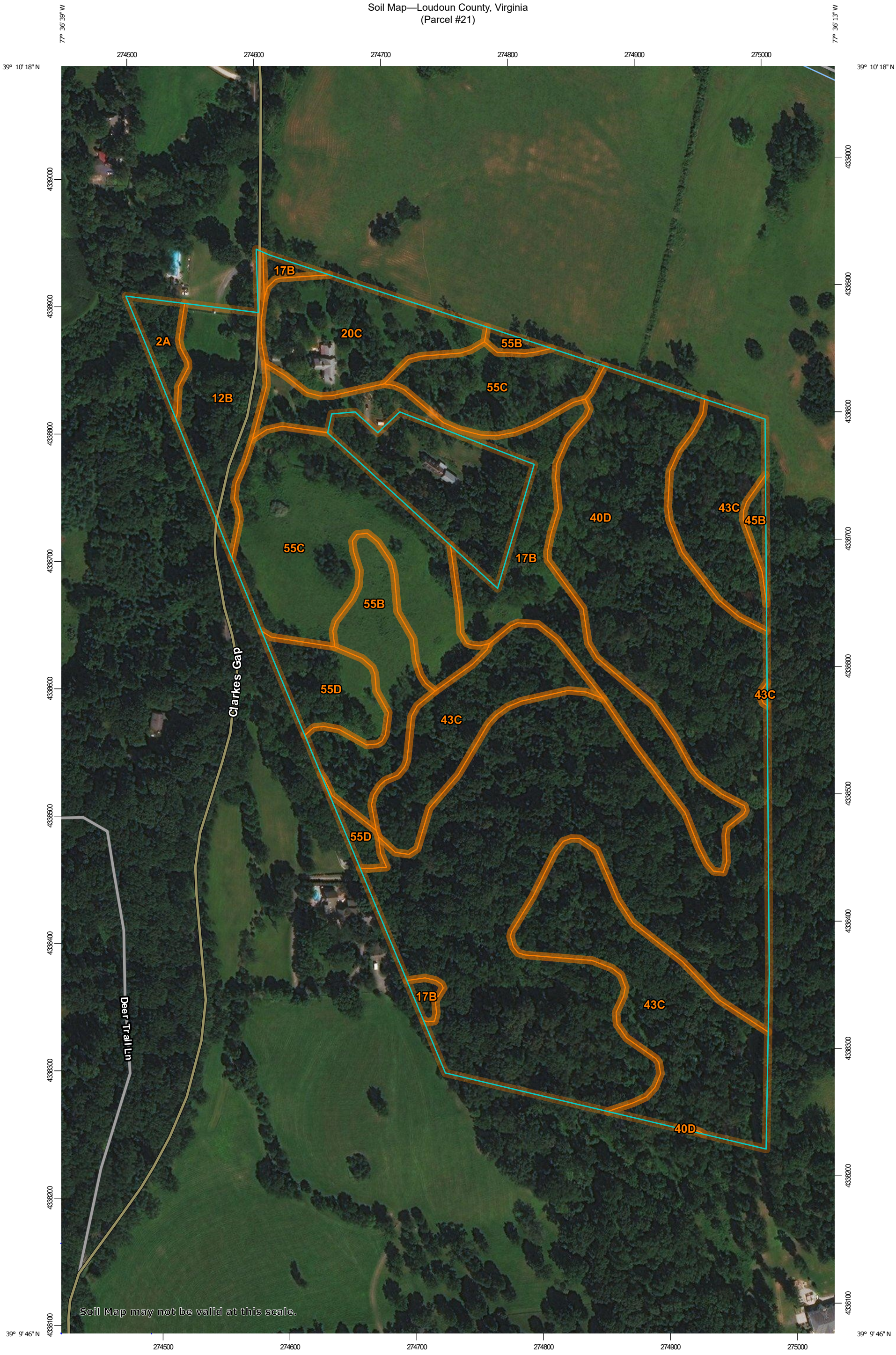
Date(s) aerial images were photographed: Apr 14, 2011—Nov 6, 2011

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 |
|---|---|---|---|
| 4A | Hatboro loam, 0 to 2 percent slopes, frequently flooded | 2.3 | 2.0% |
| 10B | Mongle silt loam, 0 to 7 percent slopes, frequently flooded | 6.4 | 5.6% |
| 17B | Middleburg silt loam, 2 to 7 percent slopes | 5.7 | 5.0% |
| 20C | Purcellville and Tankerville soils, 7 to 15 percent slopes | 33.8 | 29.7% |
| 22B | Purcellville-Swampoodle complex, 2 to 7 percent slopes | 6.5 | 5.7% |
| 23B | Purcellville silt loam, 2 to 7 percent slopes | 53.0 | 46.6% |
| 52C | Cardiff channery silt loam, 7 to 15 percent slopes | 3.3 | 2.9% |
| 52D | Cardiff channery silt loam, 15 to 25 percent slopes | 0.9 | 0.8% |
| 55B | Glenelg silt loam, 2 to 7 percent slopes | 1.9 | 1.7% |
| **Totals for Area of Interest** | | **113.7** | **100.0%** |

Soil Map—Loudoun County, Virginia
(Parcel #21)




Map Scale: 1:2,790 if printed on B portrait (11" x 17") sheet.

N

Meters: 0 40 80 160 240

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

## 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 1:12,000.

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: Loudoun County, Virginia
Survey Area Data: Version 15, Aug 28, 2018

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

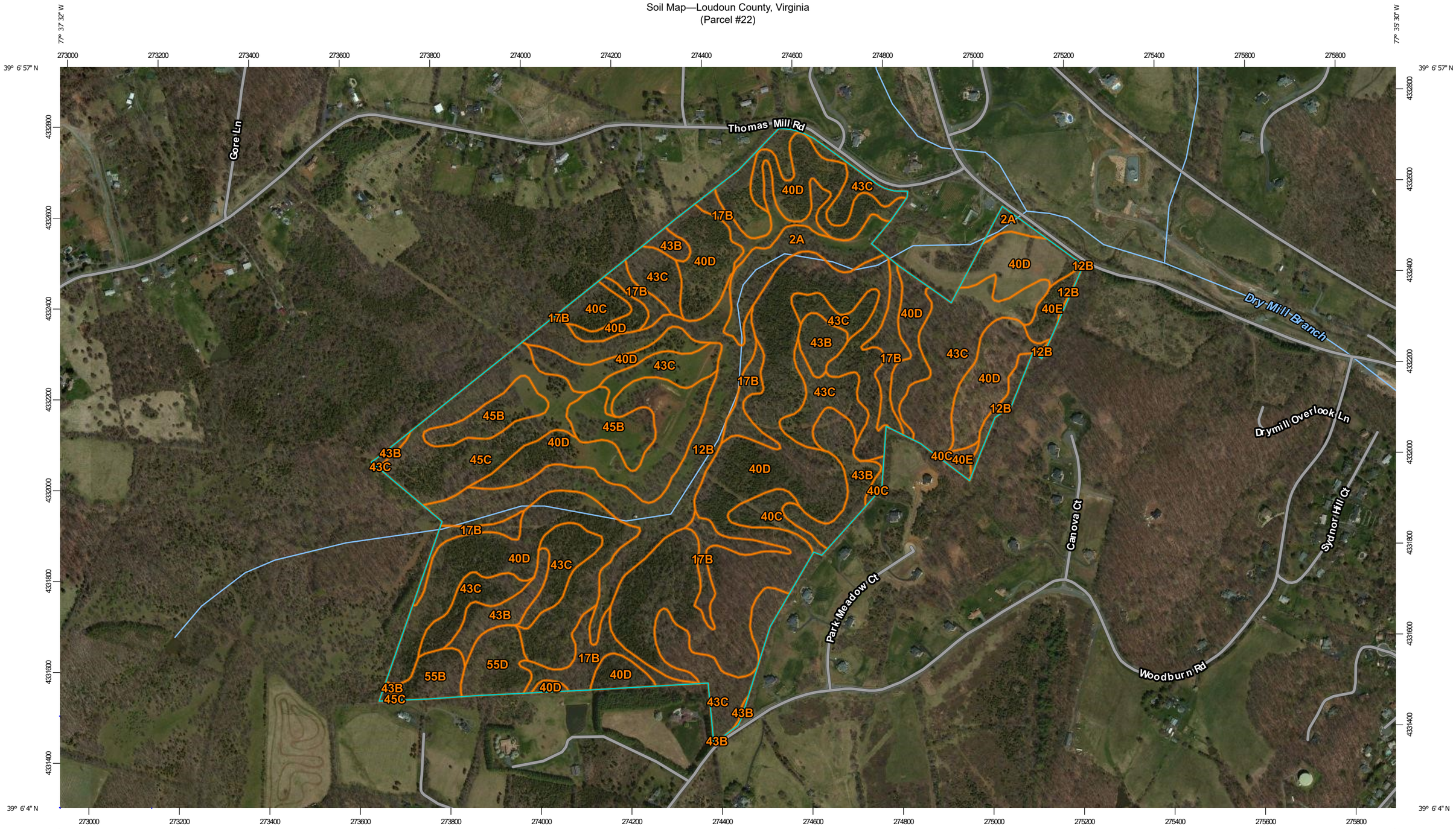
Date(s) aerial images were photographed: Sep 25, 2014—Mar 10, 2017

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 |
|---|---|---|---|
| 2A | Codorus silt loam, 0 to 2 percent slopes, occasionally flooded | 0.5 | 1.0% |
| 12B | Rohrersville cobbly silt loam, 0 to 7 percent slopes, occasionally flooded | 2.3 | 4.2% |
| 17B | Middleburg silt loam, 2 to 7 percent slopes | 4.9 | 9.1% |
| 20C | Purcellville and Tankerville soils, 7 to 15 percent slopes | 2.7 | 5.0% |
| 40D | Catoctin channery silt loam, 15 to 25 percent slopes | 22.2 | 41.4% |
| 43C | Myersville-Catoctin complex, 7 to 15 percent slopes | 9.7 | 18.0% |
| 45B | Fauquier silt loam, 2 to 7 percent slopes | 0.2 | 0.4% |
| 55B | Glenelg silt loam, 2 to 7 percent slopes | 2.4 | 4.4% |
| 55C | Glenelg silt loam, 7 to 15 percent slopes | 7.3 | 13.6% |
| 55D | Glenelg silt loam, 15 to 25 percent slopes | 1.5 | 2.8% |
| **Totals for Area of Interest** | | **53.6** | **100.0%** |

Soil Map—Loudoun County, Virginia
(Parcel #22)




Map Scale: 1:7,950 if printed on B landscape (17" x 11") sheet.

N

Meters
0 100 200 400 600

Feet
0 350 700 1400 2100

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

## 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 1:12,000.

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: Loudoun County, Virginia
Survey Area Data: Version 15, Aug 28, 2018

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

Date(s) aerial images were photographed: Data not available.

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 |
|---|---|---|---|
| 2A | Codorus silt loam, 0 to 2 percent slopes, occasionally flooded | 7.9 | 3.0% |
| 12B | Rohrersville cobbly silt loam, 0 to 7 percent slopes, occasionally flooded | 25.5 | 9.5% |
| 17B | Middleburg silt loam, 2 to 7 percent slopes | 19.3 | 7.2% |
| 40C | Catoctin channery silt loam, 7 to 15 percent slopes | 5.5 | 2.1% |
| 40D | Catoctin channery silt loam, 15 to 25 percent slopes | 118.0 | 44.0% |
| 40E | Catoctin channery silt loam, 25 to 45 percent slopes | 2.8 | 1.0% |
| 43B | Myersville-Catoctin complex, 2 to 7 percent slopes | 12.7 | 4.7% |
| 43C | Myersville-Catoctin complex, 7 to 15 percent slopes | 46.0 | 17.2% |
| 45B | Fauquier silt loam, 2 to 7 percent slopes | 8.7 | 3.2% |
| 45C | Fauquier silt loam, 7 to 15 percent slopes | 14.2 | 5.3% |
| 55B | Glenelg silt loam, 2 to 7 percent slopes | 3.1 | 1.2% |
| 55D | Glenelg silt loam, 15 to 25 percent slopes | 4.5 | 1.7% |
| **Totals for Area of Interest** | | **268.3** | **100.0%** |