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One Burke

Village Infrastructure and Visioning and Economic Development Meeting

December 16, 2021

Online via Zoom and in-person at Burke Community Center

On December 14, 2021 at 5:00pm, a meeting was held via Zoom video conference to discuss the Burke Water and Wastewater Study. The following individuals attended:

Individual	Representing
Todd Vendituoli	One Burke
Linda Lotti	One Burke
Dan Flanagan	One Burke
Cathie Wheeler	One Burke
Patricia Aron	Burke property owner
Laura Malieswski	Burke Chamber of Commerce
Mike Harris	Town of Burke
Lynnette Claudon	State of Vermont
Andrea Day	Dufresne Group
Amy Macrellis	Stone Environmental

Andrea Day has prepared the following summary of notes taken at the meeting. Please notify her if you have any corrections or additions to these minutes. Tasks to be completed as a result of this meeting are underlined.

I. The minutes from the November 16, 2021 meeting were approved.

II. Meeting forum moving forward

a. Recommend until COVID case counts come down, move back to online meetings only. There was agreement among the group with this recommendation.

I. **Water & Wastewater Study**

a. On-site Investigations update.

i. West Burke

1. The results of the test Pits at the 3rd site (future Town Garage site) were reviewed with Amy Macrellis from Stone Environmental. Memo attached.

    a. An area of 1.5 acres was initially identified. After reviewing setbacks, this area was reduced to 0.5 acres available for wastewater disposal. There is currently a gravel access road on the northeast side of this area, if this road remains, the available area would be reduced to 0.25 acres. Mike Harris indicated that a new access would be constructed, and this road would likely not need to remain.

    b. Setbacks that limit the available space include well shields, surface water, and steep slopes.

    c. The preliminary hydraulic analysis shows that this site has enough capacity to serve the project area due to the sandy and gravelly soils. Given this, the site will not be limited by hydraulics but by how much space is available to fit a disposal system.

    d. Organic loading will also need to be considered to ensure effective treatment of wastewater.

    e. There is an existing wastewater disposal system at the site that will likely be abandoned, however the Town is planning to use the existing water supply well to serve the new Town garage.

2. The process for evaluation of the other two sites (School Street and Cole) will follow the same process as the Town Garage site. It is somewhat iterative as the site capacity is evaluated for both space and hydraulics.

3. Well locations in the areas of the School Street and Cole sites will be determined in the coming weeks and will be critical to determine the area available for wastewater capacity. A letter to property owners was sent out this week to notify them that someone may need to enter their property to locate their well but if they would rather not have someone enter their

property, they can call DG to provide the well location.

4. When looking at the wastewater system sizing, the primary consideration should be the current wastewater flow, while keeping in mind potential future needs and planning for those needs but not overbuilding the system for future estimated disposal. The design flow that the system will be designed to treat will be conservative so the actual flows reaching the system will likely be less than the design flow, providing some built-in extra capacity.

5. Methods for getting the wastewater to the disposal system will also be part of the evaluation.

ii. East Burke FONSI update

1. 7 of 9 potential test pits located outside area identified as potentially archaeologically sensitive

2. Coordinating with UVM CAP to verify can move forward without risk to potentially archaeologically sensitive sites

b. Next steps

i. Determine how much wastewater each site can treat.

ii. Develop cost estimates.

iii. Develop alternatives (i.e. public water, public wastewater or combination of both)

iv. Present information to the public for West Burke in Spring 2022.

v. Field investigations for East Burke in Spring 2022 with alternative information ready for presentation in Summer 2022.

II. **Other items**

- One Burke
  - Board updates
    - Starting back up with regular meetings in January

        - Tammy, Des and Alyssa stepping down from Board. Todd has joined the board and there are a couple other potential new board members.
        - The non-profit status is still being considered.
    - Town garage site update
        - Priority list application submitted for partial funding of garage site purchase. To be determined if timing will work out to make funds available.

III. **Next meeting**

a. January 18, 2022 at 5pm via zoom

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MEMO

December 8, 2021

To: Andrea Day, P.E., Dufresne Group

From: Amy Macrellis

Stone Project No. 20211256 (19-122)
Subject: West Burke, Gingue Property (Potential Town Garage Site) Soil Investigation & Capacity Analysis

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On May 17, 2021, a site visit was completed at the Gingue site, a working gravel pit located just east of the Cole site at 3772 US Route 5, as documented in the Stone Environmental (Stone) technical memo *East and West Burke, Soils and Site Investigations Update* dated May 21, 2021. At that time, the site was determined to be potentially worthy of test pit evaluations, pending owner permission and environmental review clearance. The site is being considered as a potential location for a new Town Garage.

Following receipt of owner permission and of confirmation that the site is not considered archaeologically sensitive (on October 27, 2021), a test pit soils investigation was conducted by Amy Macrellis of Stone on November 3, 2021 using an excavator supplied by the Town of Burke. Mary Clark (Vermont DEC, Drinking Water and Groundwater Protection Division) and Mike Harris (Town Administrator) were also present during portions of the investigation. Four test pits were advanced; test pit locations are shown on Figure 1 and Appendix A contains test pit logs.

The NRCS Soil Survey for Caledonia County identifies the site as being underlain by Monadnock fine sandy loam (very stony) (soil survey map unit 75E, Figure 1). This is roughly consistent with test pit observations, though only the C horizon material remains as the result of historic gravel pit operations. The site is identified in surficial geologic mapping as an esker running parallel to the West Branch of the Passumpsic River, located east of the site. A kame terrace is located immediately west of the esker, running roughly parallel with US Route 5. The surficial geologic mapping is consistent with the site's landscape position near the northern extent of Glacial Lake Hitchcock. No bedrock was encountered in the test pits (Appendix A).

Test pit TP-1, at the northern end of the area of interest, revealed coarse sand to gravelly very coarse sand with no limiting features to 9.0 feet below ground surface (bgs), or about 887.7 feet elevation. Test pit TP-2 contained similar material but with a higher percentage of rock fragments (65% cobbles and gravel combined). Though no redoximorphic features were encountered at TP-3, saturated soils were found at 114 inches bgs or 872.0 feet elevation. The seep is at a higher elevation than the river corridor and riparian wetland/beaver dam to the east of the site (elevation approximately 864 feet). Perched indications of seasonal high groundwater were also encountered at TP-4, where redoximorphic features were present in a surficial lens of friable to firm sandy gravel at 6-24 inches bgs, underlain by gravelly coarse to very coarse sand as observed in other test pits to 144 inches bgs or 876.9 feet elevation.

Following advancement and assessment of the test pits, the previously identified disposal field area limits were adjusted to account for test pit and other site observations, including potable water supplies, groundwater seeps, and steep slopes or top-of-bank conditions (Figure 1). The upper/northern area, where TP-1 and TP-2 are located, is the most suitable location for a potential municipal wastewater system. Given seeps encountered during the May 2021 site visit, and the presence of standing water noted in historic orthophotos, the lower bench where TP-3 and TP-4 are located is not advised as a potential municipal leachfield site.

Isolation distances were determined using the *Vermont Environmental Protection Rules Chapter 1, Wastewater System and Potable Water Supply Rules*, effective April 12, 2019. After accounting for isolation distances from steep slopes, seeps, property boundaries, and the existing drilled well, a maximum of ~0.47 acres is available for siting a municipal disposal field highlighted in pink (Figure 1). This estimate assumes that the existing work road area could be restored / used for a leachfield. If the road will remain, the available area is reduced to the land area on the west side of the road, or about 0.26 acres.

Within this area, soil conditions evaluated indicate soil characteristics of sand or coarser and single grain structure (WSPWSR § 1-911(c)(1)(A) and Table 9-3) and wastewater loading rate of 1.50 gallons/square foot/day applies. Given the very coarse and gravelly soil textures encountered in TP-2, the additional design requirements for in-ground trenches specified in § 1-919(b) may apply, such that the maximum application rate is limited to 1.0 gallons/square foot/day.

Gingue Site Wastewater Capacity Estimate

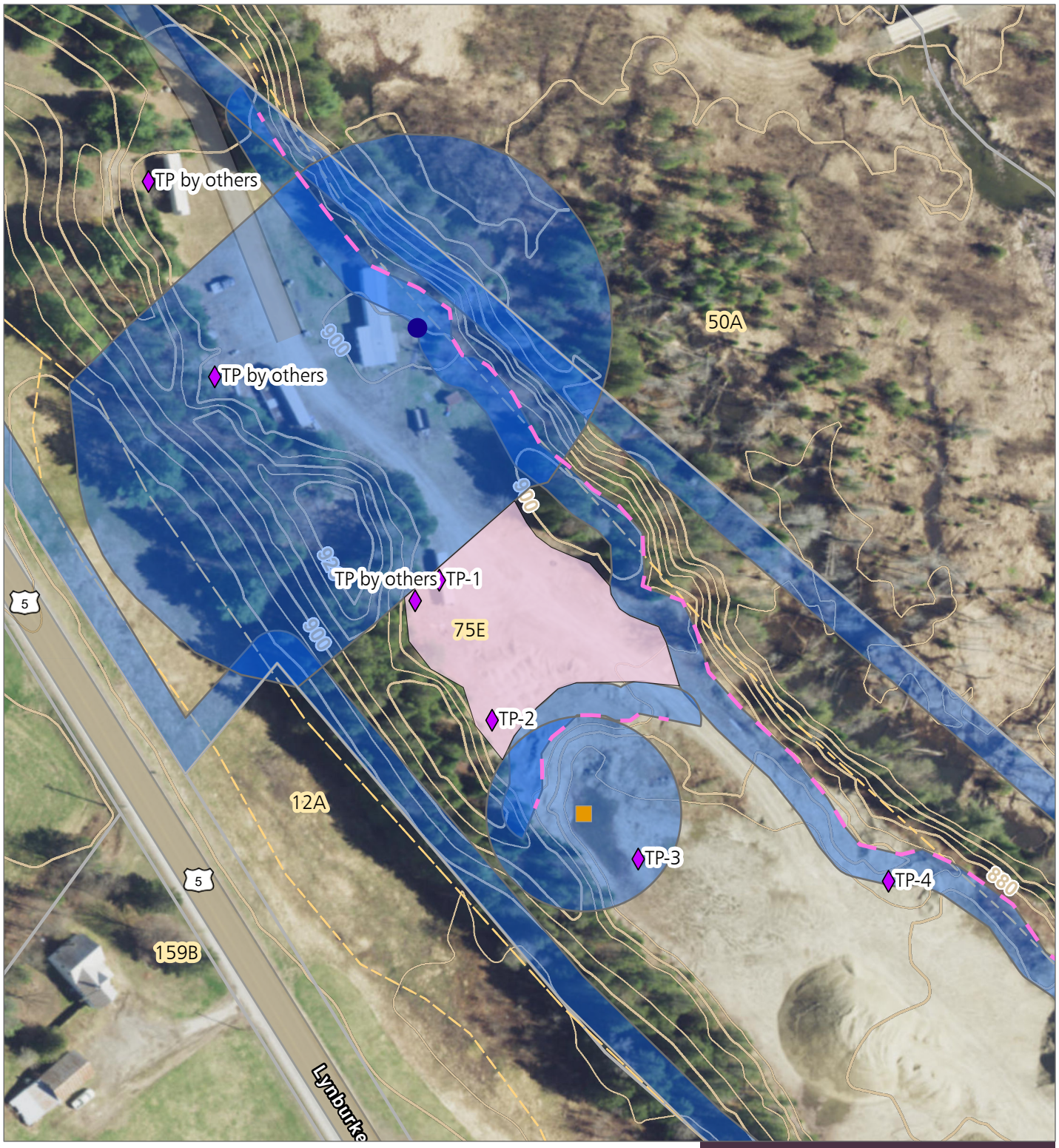
In order to estimate the hydraulic capacity of this potential infiltration site, we used a conservative method called Darcy's Law. This formula is represented as Q = KiA where

Q = design flow (gallons/day) (gpd)
K = hydraulic conductivity (ft. /day)
i = hydraulic gradient (slope of water table)
A = transmitting soil cross-sectional area (square feet) = D x L where
D = transmitting soil thickness (depth to impeding layer or water table, minus the required separation depth, minus the system depth) (feet)
L = length of the disposal system in the estimated direction of groundwater flow (feet)

We used this formula to develop a hydraulic capacity scenario given the assumptions described below. Full calculations are included in Table 1.

1. Hydraulic conductivity (K) = 75 feet per day, estimated for the soil horizon that would receive renovated effluent at TP-1 and TP-2. Vermont DEC guidance regarding K values for the sand to coarse sand soil textures encountered gives a range of 50-100 feet/day.
2. Hydraulic gradient (i) = 9.1%, estimated from the LiDAR data, groundwater seep observed in May 2021, and elevation of the beaver pond and wetland at the eastern edge of the site. Groundwater mounding beneath the disposal field will slightly increase the hydraulic gradient, but we did not include an allowance for this increased slope in the capacity analysis.
3. The average limiting depth to an impeding layer or seasonal high water table was calculated assuming that the groundwater seep encountered in May 2021 represents a conservative limiting condition for the potential disposal field area identified immediately upslope and north of the seep, at 15.5 feet below ground surface.
4. Leachfield design was assumed to be for in-ground absorption trenches with the bottom of the trench a maximum of 24 inches (2.0 feet) below the ground surface.
5. For in-ground trenches being loaded with septic tank effluent, the required separation distance to seasonal high groundwater is 3.0 feet.
6. Average system length in the estimated direction of groundwater flow (across slope, perpendicular to contours from west to east) is 140 feet.

The hydraulic capacity available for wastewater disposal in this area is on the order of 75,000 gallons per day (Table 1). Preliminary adsorption area layouts followed by a mounding analysis are required to refine these estimates. However, the small land area available to site adsorption trenches or other wastewater dispersal options will be a larger limiting condition than the hydraulic capacity of the site.



LEGEND

- Test pit location
- Groundwater seep
- Drilled well
- Estimated infiltration area
- Isolation Distances
- VT NRCS Soil Survey Units
- Parcel boundary (VCGI)

N 0 80 Feet

Figure 1. 3772 Lynburke Road (Gingue Property) Test Pits and Field Observations, West Burke

One Burke Village Infrastructure Preliminary Engineering

Prepared for the Town of Burke and Dufresne Group

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Path: O:\PROJ-19\WRM\19-122 VTDEC NBRC Burke Engineering\GIS\Intermediate\Burke_Capacity.aprx Figure 1 3772 Lynburke Rd
Site Map Exported: 12/8/2021 7:30 AM by AmyM

Table 1: Darcy's Law Capacity Analysis, Gingue Site, Depth to Saturated Soils

Project Title: One Burke Village Infrastructure, Preliminary Engineering
Stone Project No.: 19-122 / 20211256
Date: December 8, 2021
Prepared by: Amy Macrellis

Darcy's Law Calculations: Q = KiA
Q = design flow (gallons / day)
K = Hydraulic conductivity (feet / day)
i = Hydraulic gradient (slope of water table, unitless)
A = transmitting soil cross-sectional area (D) times length of disposal system (L) in square feet, where
D = depth to impeding layer or water table, minus required vertical separation, minus system depth

Assumptions:

1. Hydraulic conductivity (K) = 75 feet/day (low-mid-range Freeze and Cherry Table 2-2 and Fetter Table 4.6 for well-sorted sands and glacial outwash; mid-range of VT DEC guidance)
2. Water table slope (i) estimated from LIDAR and from site and test pit observations, use location and elevation of groundwater seep as observed May 2021 and distance to/elevation of wetland edge. Slope = 16.83 ft/185 ft = 9.1%
3. Depth to limiting feature or bottom of pit - use average of TP-1 and TP-2 surface elevations to May 2021 groundwater seep elevation. 896.3 ft -880.8 feet = 15.5 feet
4. Design is for adsorption trenches with the bottom of the trenches 2.0 ft below the ground surface
5. Required separation distance to seasonal high groundwater is 3.0 feet for septic tank effluent
6. System length (L) across slope (perpendicular to contours) = 140 feet (average length across the disposal field area identified in Figure 1)

Calculations:

K =	75	ft/day	
i =	0.091		
L =	140	ft.	
D =	10.50	ft.	=15.5 ft. -2.0 ft. - 3.0 ft.

Q = 75 ft/day x 0.091 x (140 ft x 10.5 ft) x 7.48 gal/ft^3
Q = 75,000 gallons/day

Town of Burke, Vermont Wastewater and Water Preliminary Engineering
Gingue Property, 3772 Lynburke Rd (Potential Town Garage Site) – Test Pit Logs

Soils investigation conducted by Amy Macrellis of Stone Environmental, Inc. on November 3, 2021. Backhoe supplied and operated by Town of Burke personnel. Others present during portions of the investigation included Mike Harris (Town of Burke Town Administrator) and Mary Clark (Vermont DEC).

Test pits were located using GPS prior to excavation; locations were previously reported in the May 21, 2021 Stone Environmental technical memo *East and West Burke, Soils and Site Investigations Update*. A total of four test pits were excavated and logged as described below. Ground surface elevations reported below are derived from data supplied by the Vermont LiDAR Program, see https://anrmaps.vermont.gov/websites/ANRApps/getElevation.html.

Test Pit TP-1 (44.63559, -71.97562; ground elevation 896.67 feet)

0" – 7"	Brown (7.5YR 4/3) gravelly loamy sand to coarse sand, single grain structure, loose consistence, moist.
7" – 20"	Dark olive brown (2.5Y 3/3) gravelly very coarse sand, single grain structure, loose consistence, moist. ~20% gravel, 5% cobbles.
20" - 64"	Light olive brown (2.5Y 5/3) very coarse sand, single grain structure, loose consistence, moist. ~5% gravel on east side of pit to 64". ~30% gravel and 10% cobble on west side of pit; Fe staining in stones on west side of pit only at 36-44".
64" – 108"	Over-dug pit but did not enter. Material similar to that encountered at 20-64"; decreasing gravel content with increasing depth.

No bedrock or seasonal high groundwater indicators to depth.

Test Pit TP-2 (44.63529, -71.97547; ground elevation 895.94 feet)

0" – 11"	Dark brown (7.5YR 3/3) loamy gravelly coarse sand, single grain structure, loose consistence, moist.
11" – 65"	Olive brown (2.5Y 4/3) very coarse sandy gravel, single grain structure, loose consistence, moist. 40% gravel, 25% cobble. Over-dug pit below 65" but did not enter.
77" – 120"	Olive brown (2.5Y 4/3) coarse sand, single grain structure, loose consistence, moist. Abrupt boundary with coarser material above. Gravel content increasing slightly with depth to ~5% at 10'/120".

No bedrock or seasonal high groundwater indicators to depth.

Test Pit TP-3 (44.63499, -71.97504; ground elevation 880.96 feet)

East side of pit:

0" – 4"	Gray (2.5Y 5/1) loamy sand, single grain structure, loose consistence, moist.
4" – 12"	Light olive brown (2.5Y 5/4) coarse sand, single grain structure, loose consistence, moist.
12" – 76"	Light olive brown (2.5Y 5/3) coarse sand, single grain structure, loose consistence, moist. Few bands of Fe staining at 48-60".

West side of pit:

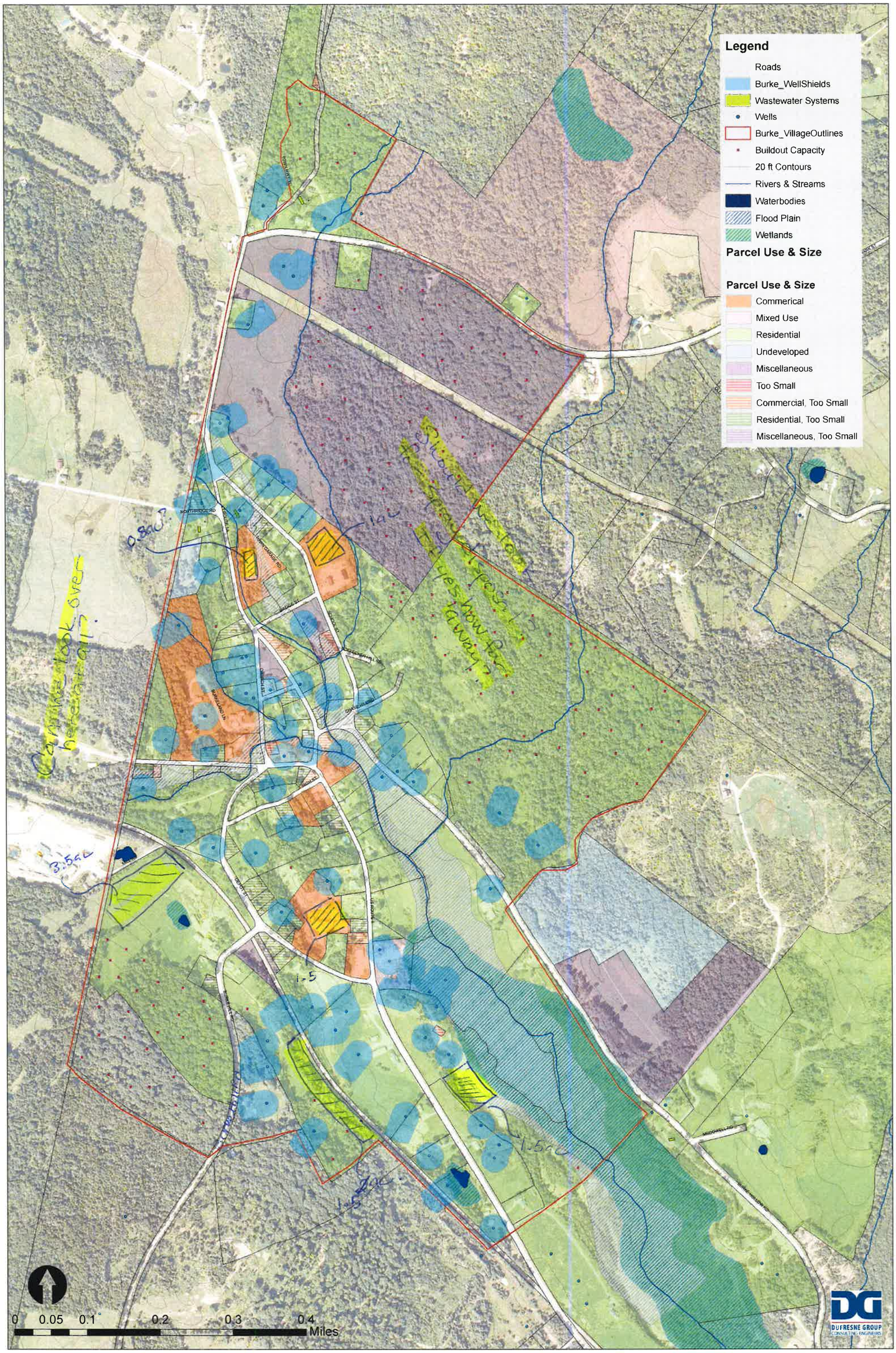
0" – 12"	Gray (2.5Y 5/1) loamy sand, single grain structure, loose consistence, moist.
12" – 76"	Very dark brown (7.5YR 2.5/3) coarse sandy gravel, single grain structure, friable consistence, moist. ~40% gravel, 20% cobbles. Very common Fe staining; heavy Mn staining at 12-24". Heavily weathered stones.

Over-dug pit but did not enter. Similar material as above to 114"/9.5'. Groundwater seep encountered at 9.5'.

Test Pit TP-4 (44.63495, -71.97430; ground elevation 888.86 feet)

0" – 6"	Dark brown (7.5YR 3/2) gravelly loamy sand, friable consistence, moist.
6" – 24"	Brown (7.5YR 4/2) sandy gravel, single grain structure, friable to firm consistence, moist. Few, medium, faint redoximorphic features possible throughout. Heavy Fe staining; highly weathered cobbles present with gray minerology similar to redoximorphic features. This is a perched lens that pinches out to the east and west sides of the pit. Bright, 1" band of Fe staining at the bottom of the horizon.
24" - 120"	Light brownish gray (2.5Y 6/2) gravelly coarse to very coarse sand, single grain structure, loose consistence, moist. ~20% gravel. Over-dug pit below 80" but did not enter.
120" – 132"	Light brownish gray (2.5Y 6.2) gravelly coarse to very coarse sand, as above but ~5-10% gravel.
132" – 144"	Light brownish gray (2.5Y 6/2) gravelly coarse to very coarse sand, as above but ~30% gravel, few cobbles.

No bedrock or seasonal high groundwater indicators to depth.


Legend
Roads
Burke_WellShields
Wastewater Systems
Wells
Burke_VillageOutlines
Buildout Capacity
20 ft Contours
Rivers & Streams
Waterbodies
Flood Plain
Wetlands
Parcel Use & Size
Parcel Use & Size
Commerical
Mixed Use
Residential
Undeveloped
Miscellaneous
Too Small
Commercial, Too Small
Residential, Too Small
Miscellaneous, Too Small
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Miles
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