Electronic Delivery
September 27, 2023

Massachusetts Department of Environmental Protection
Northeast Regional Office
150 Presidential Way
Woburn, MA 01801

Sherborn Zoning Board of Appeals
Sherborn Town Hall
19 Washington Street
Sherborn, MA 01770

Re: Preliminary Determination of Applicability
Farm Road Homes Project
55-65 Farm Road
Sherborn, MA

To whom it may concern:

Mary and I are direct abutters and located hydraulically downgradient to the above-listed project proposed by Fenix Partners Farm Road, LLC (Fenix). We are in receipt of the Massachusetts Department of Environmental Protection's (MassDEP's) August 14, 2023 *Preliminary Approval of Request* addressed to Fenix. We offer this letter to express our numerous concerns about this project – with emphasis on the availability of clean drinking water for us and our neighbors along Farm Road, Great Rock Road, and the future owners of the properties within the Farm Road Homes Project development. We have several other concerns, but will limit our discussion here to those matters related to one of the most important and critical aspects of this project – water supply quantity and quality.

Basic Overview of Project Area

Several residents along Farm Road and Great Rock Road, including us, have recently undertaken substantial projects at our properties to upgrade or repair failing septic systems in a manner compliant with Town Bylaws and Title V requirements. At 49 Farm Road, our well and our septic leachfield are located directly downgradient of the 53-55-65 Farm Road properties. Also located on our property along the border with the 53-55-65 Farm Road parcel are a spring, a brook, perennial streams, intermittent streams, and the associated wetland habitats. This portion of Sherborn is considered to be a Nitrogen-Sensitive Area.

All groundwater, surface water, stormwater, and associated run-offs generally flow from east to west along the Farm Road corridor. The private wells that serve 49 Farm Road, 53 Farm Road, 55 Farm Road, and other nearby residences are all situated west and downgradient of the development proposed by Fenix. Furthermore, the natural resource areas listed above are also situated west and downgradient of this proposed Farm Road Homes development.
In addition, the MassDEP-approved Zone II and other Interim Wellhead Protection Areas (IWPAs) for the Town of Sherborn municipal wells situated in the Town Center area which service several local buildings including Town Hall, Police & Fire buildings, the Community

Center, the Public Library, Woodhaven, and the Pine Hill Elementary School are also located west and downgradient of this development within the same well-defined watershed area.

It is a generally understood that water within this subdrainage basin flows "downhill" from the east to the west directly towards our property, our private well at 49 Farm Road, the private wells at 53 and 55 Farm Road, other private wells along Farm and Great Road Roads, the Zone II, the IWPAs, the wetlands, the brook, the intermittent and perennial streams, the springs, and the associated wetland habitats.

Concerns about Quantity and Quality of Potable Water

Fenix's application for a preliminary determination was submitted to MassDEP before the Comprehensive Permit was submitted to the Town and omitted information and studies previously submitted to several Town Boards and Committees in public meetings when the developer was pursuing different development schemes.

We are disturbed, but not surprised, by Fenix's lack of transparency and presentation to MassDEP of only the information they considered to be favorable and supportive of the desired goal – to avoid having to provide clean potable water to the future inhabitants of the Farm Road Homes development in the manner prescribed by 310 CMR 22.00.

The threshold for establishing a Public Water Supply was firmly set at 25 individuals per day by the Legislature when they promulgated 310 CMR 22.00. Although 310 CMR 22.00 does "*reserve the right*" for MassDEP to observe a less-stringent threshold that this value, the intent appears to be clear that any such action would to be treated as an ***exception*** to the rule and therefore should not be considered a privilege "by right".

The Farm Road Homes development contains 76 bedrooms – and if 2 persons per bedroom is the industry standard for civil designing and permitting purposes, this would result in the need to permit and plan for an estimated 152 residences relying on those same 7 wells. This ratio is **more than six times** the threshold established by the Legislature in 310 CMR 22.00 and should not be allowed to proceed without the appropriate regulatory oversight to ensure that the scientific and financial aspects of this project are appropriately vetted and addressed to the degree where future inhabitants of the development and their neighbors will continue to have continuous access to clean, potable water for use in bathing, cooking, cleaning, and drinking for the foreseeable future.

Given the fragility of this resource, and its susceptibility to known and predictable threats from existing and emerging contaminants (e.g., nitrates, arsenic, manganese, lead, PFAS, radon, etc.), we believe a more objective study of the quality and quantity of potable water is warranted. Providing housing inventory without providing similar due process to ensure that potable water exists for its occupants is a reckless, short-sighted, and unintelligent proposition. Surely these future owners, if it were somehow possible to query them, would prefer to rely on a water supply system that has been permitted and approved through the MassDEP permitting process to ensure they clean and potable water above a system cobbled together from a series of unmonitored private water supply wells which appears to hinge on the willingness of multiple condominium unit owners to pay for, maintain, and periodically service and test.

Discussion of Proposed Private Water Supply

By the numbers, the plans forwarded to the MassDEP for their review indicate seven (7) individual wells are proposed to supply all the water for the Farm Road Homes development. Here are those numbers when taken together for this project:

- **Number of Wells:** Seven wells drilled to supply the 76 bedroom units of the development which averages out to almost 11 bedrooms per well. The applicant has provided the Department with a complex agreement that has not been executed or agreed to by any of the future property owners who would ultimately be bound by said agreement to monitor and maintain their individual wells systems in perpetuity. Therefore, this means that there would have to be a total of seven (7) similar individual agreements for this project as a whole to function in a united, functional manner without any financial assurance mechanism being set in place to ensure and enforce compliance with such agreements.

- **Groundwater Consumption:** The applicant utilized 200 gallons per day per person – a value below the Town recommended 220 gallons per day per bedroom – to calculate consumption rates of between 1,800 and 2,100 gallons per day per well with a cumulative projected rate of 15,200 gallons per day for the entire development. By comparison – a five bedroom home situated in this area zoned for 1-acre development only requires 1,100 gallons per day under Title V.

- **Protection of Private Water Supply Zone 1 Areas:** The "Zone 1 Equivalent" areas are calculated individually but all overlap as shown on the attached plan, which means that the ideal goal for Zone 1 equivalency for this suite of wells should be 495,875 square feet, but the layout and design results in only a cumulative protected area of 256,640 square feet – barely 51% of the goal.

- **Suitability of Zone 1 Areas:** The "Zone 1 Equivalent" areas are not large enough to accommodate the necessary recharge to the underlying bedrock. As Sherborn receives approximately 49 inches of rain each year, a generous, upper-bound bedrock recharge estimate of 50% would only result in an annual recharge of approximately 3.8 million gallons - far below the more than 6.1 million gallons of demand this project creates.

- **Control over Zone 1 Areas:** These plans depict that only approximately 70% of the 51% of the Zone 1 area 'goal' is actually under the control of the applicant – which means that a mere 36% of the 'goal' Zone 1 area is actually under to control of Fenix.

- **Incompatible Property Use within the Zone 1 Areas:** The undersized overlapping Zone 1 areas also **overlap with** an easement granted in the deed to allow the former owner access for pedestrian and equine traffic from a parking area at Farm Road to the Town Forest as shown on the development plans. This easement represents about 5% of the Zone 1 area equivalency goals and is physically located immediately proximate (within 10 feet) of the actual planned well heads.

- **Protection of Drinking Water Source Areas:** The "Drinking Water Source" areas are similarly calculated on an individual well-specific basis, but they also overlap as shown

on the attached plan, which means that the ideal goal for Drinking Water Source area for this suite of wells should be 4,414,248 square feet, but the layout and design results in only a cumulative protected area of 1,155,895 square feet – barely 26% of the goal.

- **Control over Drinking Water Source Areas:** These plans depict that less than 50% of the Drinking Water Source area 'goal' actually falls under the control of the applicant – which means that more than 50% of the 'goal' Drinking Water Source area is actually under to control of the applicant.

- **Incompatible Property Use within the Drinking Water Source Areas:** The undersized overlapping Drinking Water Source areas also are co-located with the same easement previously described, but also contain nearly all the stormwater features of the projected development, as well as more than 75% of the leachfield area of the combined sanitary septic waste leachfield area. This is a serious concern as the 6.1 million gallon annual demand on the bedrock aquifer will most certainly result in influencing groundwater flow within bedrock from previously untapped reserves/locations – such as from areas where stormwater/septic systems currently exist in close proximity to the project site.

Discussion of Ancillary Facts

As previously noted, MassDEP has issued a letter of preliminary approval for treating the proposed project – and reading the text of the approval clearly shows that MassDEP is treating this only as a **Preliminary** determination, withholding any Final Determination until Fenix applies for such with additional information.

As neighbors who also rely on the groundwater as our only source of potable water, we are concerned that Fenix has not considered or disclosed the expert reports and testimony provided to numerous Town Boards and Committees related to the risk to public health posed by nitrogen loading from the proposed septic systems.

Beginning in June 2021 and continuing through today, numerous public hearings have been held related to the development of these parcels by Fenix. One (1) line of permitting was with the Town of Sherborn Conservation Commission which issued an Order of Conditions for the 65 Farm Road property *under the auspices of installation of three (3) individual drinking water supply wells for three (3) single family residences.* It was clearly stated that such approvals were only being granted for the development of single family residences, and not for larger developments.

There was discussion about the likelihood of mounding of groundwater within the wetland areas situated along the downgradient property line, and the fact that the previous efforts to map the extent of areas subject to protection under the Wetland Protection Act may not have adequately demarcated certain areas subject to flooding. Additional mapping of these resource areas should be required of Fenix to ensure that the septic and stormwater features are appropriately sited for this project *prior to* moving forward with any approval of the contemplated private water supply wells.

The public meetings also included hearings with the Board of Health *under the auspices of seeking approval for foundations and septics for single family residences* on the current 53 and 65 Farm Road parcels. During the Board of Health meeting, a well-regarded expert we hired – Scott Horsley – provided testimony and maps depicting how various iterations of the proposed septic system(s) at 53 and 55 Farm Road would result in nitrogen concentrations above the 10 milligrams per kilogram beyond the limits of said property(ies). Reproductions of his reports and correspondences are attached here as Attachment A and clearly indicate that the proposed combined septic depicted on Fenix's plans will result in nitrogen loading such that 10 milligrams per liter (mg/l) nitrates will be impacting the wetlands at the downgradient property line situated west of the leachfields.

The seriousness of some of these observations were also raised when the development of one (1) new private water supply well at 53 Farm Road (created by ANR in 2021 and owned by Fenix until sold to a new builder in May 2023) was observed to require weeks of pumping and treatment and multiple tests to qualify as a potable private water supply. No further confirmatory testing is known to have occurred from this well, but it is immediately upgradient to our water supply well and therefore may be indicative of unforeseeable future problems headed towards our own water supply and those of our neighbors.

The requirements for appropriate stormwater controls also have been similarly avoided by Fenix in their preliminary design. As with the Title V requirements, when the actual design requirements are finalized, it is likely that several other features of the development will need to be modified and/or changed to allow for the proper set of controls to be put in place for such a large development. At the present time, Fenix appears to be relying on connecting stormwater features to a stormwater structure that was permitted, designed, and installed at the 53 Farm Road property *under the auspices of a waiver from the stormwater requirements* contingent on the 53 Farm Road project being permitted as a single-family home.

In light of the many issues raised about the viability of any water supply being considered for the Farm Road Homes development, consideration should also be placed on the potential financial implications of avoiding development of a proper Public Water Supply as part of this project. The are financial obligations and requirements for entities that supply water for public consumption, and there are unfortunate examples of situations where poor planning and controls have obliged municipal entities to essentially step in after-the-fact to contribute or control/repair systems at the taxpayer's expense. A duly designed Financial Assurance Mechanism (FAM) would help to protect the future owner(s) of homes within this development from unforeseeable costs related to maintenance, treatment, and or repairs to their water supply system.

The applicant's reliance on a forward-looking agreement that has as-of-yet to be agreed to by future homeowners seems to place a rather unnecessary burden squarely on the new owner-occupants of this development. A similar arrangement and structure have already been implemented at another development in the Town of Sherborn where this particular applicant was involved, and evidence of the problems associated with this burden were provided to the Zoning Board of Appeals in written testimony dated September 11, 2023 (reproduction included as Attachment B).

Disposition of Similar Projects

Sherborn - a community with no real public water or sewer infrastructure – has been targeted as a unique location ripe for development within the context of MGL Chapter 40B. As of late, this rural community with limited infrastructure and volunteer board members has been taxed with an onslaught of proposed developments using this "40B" process as a means to pursue clustered development under the auspices of increasing affordable housing stock in the Commonwealth of Massachusetts. It is worth noting that the status was conceived of and enacted by the legislature prior to the Wetlands Protection, Act, the Clean Water Act, the Clean Air Act, and other similar environmental regulations.

Sherborn has made strides in progressing towards the 10% "goal" of affordable housing stock – including a LHI plan approved by the Town that would achieve the 10% SHI. The Farm Road Homes project being contemplated and sitting before the Zoning Board of Appeals includes 32 homes, 8 affordable and 24 market rate units, and would only move the SHI by a mere 0.45%. At this rate it would take decades of similar projects to ultimately achieve the desired goal.

It seems that the intent of the Legislature in enacting 40B was to encourage municipal entities to make measurable progress towards affordable housing goals – not to encourage developers to exploit state laws by seeking waivers to local environmental bylaws and paralyzing municipal agencies. Yet in this instance, Fenix has done exactly that – they have been emboldened to exploit the outdated metrics of the MGL Chapter 40B process without discern for those environmental or public health impacts that have since been the subject of subsequent federal and state Legislative action under 310 CMR 22.00, 33 USC Section 1251, 310 CMR 10.00, etcetera.

The Farm Road Homes development is nearby a similar project previously proposed for the Town Center – commonly referred to as the 31 North Main/41 Hunting Lane development. The bedrock characterization, hydrology, and surficial geology of this project led independent experts to file the five (5) review letters attached here as Attachment C. The common thread amongst these reviews is a common desire to have the ZBA exercise caution and restraint in the approval of any water supply/septic systems for a project of this scale given the unique hydrogeologic properties present in Sherborn.

Such conditions are thoroughly detailed and opined upon by the Town of Sherborn's Groundwater Protection Committee (GPC) in their *Revised GPC Comments for ZBA on the Proposed 40B Farm Road* Homes letter dated 9/18/2023 (included as Attachment D). This correspondence also voices significant concerns over the physical aspects of this parcel – especially in light of the history of flooding and current concerns related to changes in the frequency and significance of precipitation events relative to historic norms. For this reason, incremental orthographic evidence of flooding events is included here as Attachment E.

The unique properties of this portion of Sherborn have been characterized as a watercourse in several Town municipal meetings. This watercourse exists along the Farm Road corridor – serving as a source of the daylighting groundwater in the springs and wetland habitats, feeding those intermittent and perennial streams, recharging the Interim and MassDEP-approved Zone IIs for Town Center, and serving as the headwaters to Sewall Brook. This watercourse remains an intrinsic, valuable, and irreplaceable resource for those residents and employees of the Town of Sherborn. Foregoing anything but the most strenuous protection of this watercourse is a

slippery slope that will lead to its corruption and demise – conditions it will likely never recover from. A presentation on the geology and hydrogeology of the Farm Road watercourse is included as Attachment F.

Conclusions and Recommendations

There are many reasons a clustered series of private water supply wells does not make sense for this development, including the risk to public health, the financial risk of exempting the development from Public Water Supply requirements, the risk of "fouling" other wells, the risk of over-taxing the resource areas, and other potential negative impacts to the resource areas subject to protection under the Wetland Protection Act.

All of these important facts demonstrate that the contemplated design does not comply with the basic industry standards and accepted practice of protecting groundwater for consumption by the individuals who will be moving into these homes. If such limited protections are going to serve as a basis for these homeowners, then there should be – at a minimum - some incremental means to ensure that once the project is developed that these residents are afforded the same rights to quality and quantity of groundwater as all other Sherborn residents. It is a basic right and should be treated as such.

By comparison, should the applicant pursue this development while relying on a Public Groundwater Supply (as opposed to a private), their obligations relative to site control and use would be easier to achieve. Again – the math indicates a Zone I radius for a 15,200 gallon per day well would only have to be approximately 275 feet. The corresponding Zone I would only have to be 92% of the size of the area being proposed as a "Zone 1 Equivalent" area by Fenix while at the same time addressing many of the concerns stated in this letter related to compliance with 310 CMR 22.00**.**

We therefore recommend and request the following:

i> ZBA request the applicant's engineers and consultants provide Nitrogen loading and mounding analyses for the proposed septic systems prior to waiving any local Bylaws that protect groundwater quality.

ii> MassDEP reconsiders and reverses their Preliminary Approval of Fenix's desire to rely on a Private Water Supply to ensure that new residents have access to a clean and reliable source of potable water.

iii> ZBA request the applicant's engineers and consultants provide details on their stormwater collection and management systems, including how they intend to allow for continued recharge and storage of stormwaters within the Pond which supplies the watercourse and nearby resource areas with clean water.

iv> ZBA condition any approval issued for the Farm Road Homes project to reflect concerns about the financial and physical viability of <u>any</u> water supply servicing this project – including the use of performance bods, escrow accounts, etc. to make sure new residents are afforded adequate protections against design or engineering shortcomings.

Thank you very much for your attention in these matters. We appreciate having this opportunity to table the numerous concerns of many residents of the Farm Road and Great Rock Road neighborhood, and look forward to hearing our concerns addressed in your future meetings and deliberations on this project.

Most respectfully,

Brian D. Moore
Mary O. Moore
49 Farm Road
Sherborn, MA 01770

Attachment A

Expert Report of Scott Horsley

Scott Horsley
Water Resources Consultant
39 Chestnut Street • Boston, MA 02108 • 508-364-7818

September 27, 2022

VIA EMAIL

Mr. Brian Moore
49 Farm Road
Sherborn, MA

Re: 55 and 65 Farm Road, Sherborn, MA

Dear Brian:

At your request I have conducted a water quality impact and nitrogen loading analysis associated with the proposed development at 55 and 65 Farm Road, Sherborn, MA. The proposed project is located adjacent to your property and is hydrologically upgradient from you. I understand that you have a private drinking water supply well on your property.

The Sherborn Health Regulations require a detailed review of water quality impacts. Section 10.3 states that, "all distances shall be increased where required by conditions peculiar to a location or by other Town Regulations or By-Laws". The Health Regulations also require an "Environmental Health Impact Report" for all developments that exceed 2000 gallons/day.

I have applied the nitrogen loading method as outlined in MADEP's "Guidelines for Title 5 Aggregation of Flows and Nitrogen Loading 310 CMR 15.216". These guidelines stipulate that for proposed wastewater flows exceeding 2000 gallons per day adjacent to areas served by private drinking water wells that nitrate-nitrogen concentrations must be maintained below 10 mg/liter.

To determine groundwater flow directions on the subject property I plotted groundwater elevations provided by the applicant's consultant, Creative Land Development. A series of test pits shown on the site plans provide estimated seasonal high groundwater (ESHGW) elevations. Utilizing this data I constructed water table maps showing groundwater flow in a westerly direction towards your property.

Based upon these groundwater flow directions I delineated two Areas of Impact (AOI). These include the AOI for lots 1, 2, 3, and 4 (see figure 1) and another AOI for the 40B Conceptual Overlay Plan prepared by Creative Land Development dated April 26, 2022 (see figure 2).

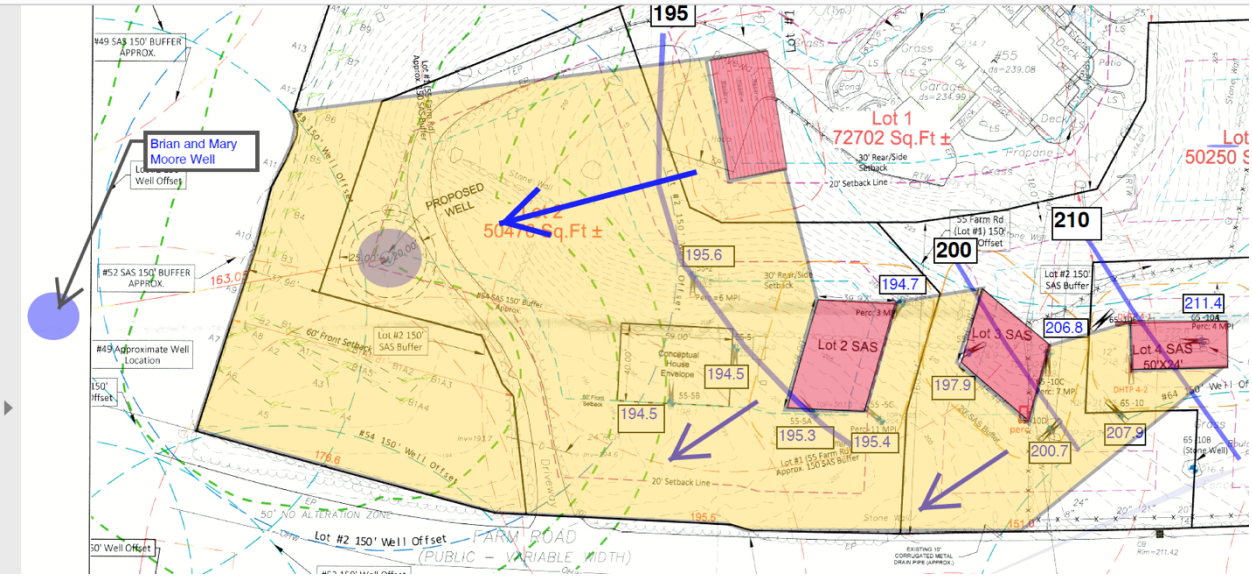

Figure 1 - Area of Impact - Lots 1 - 4

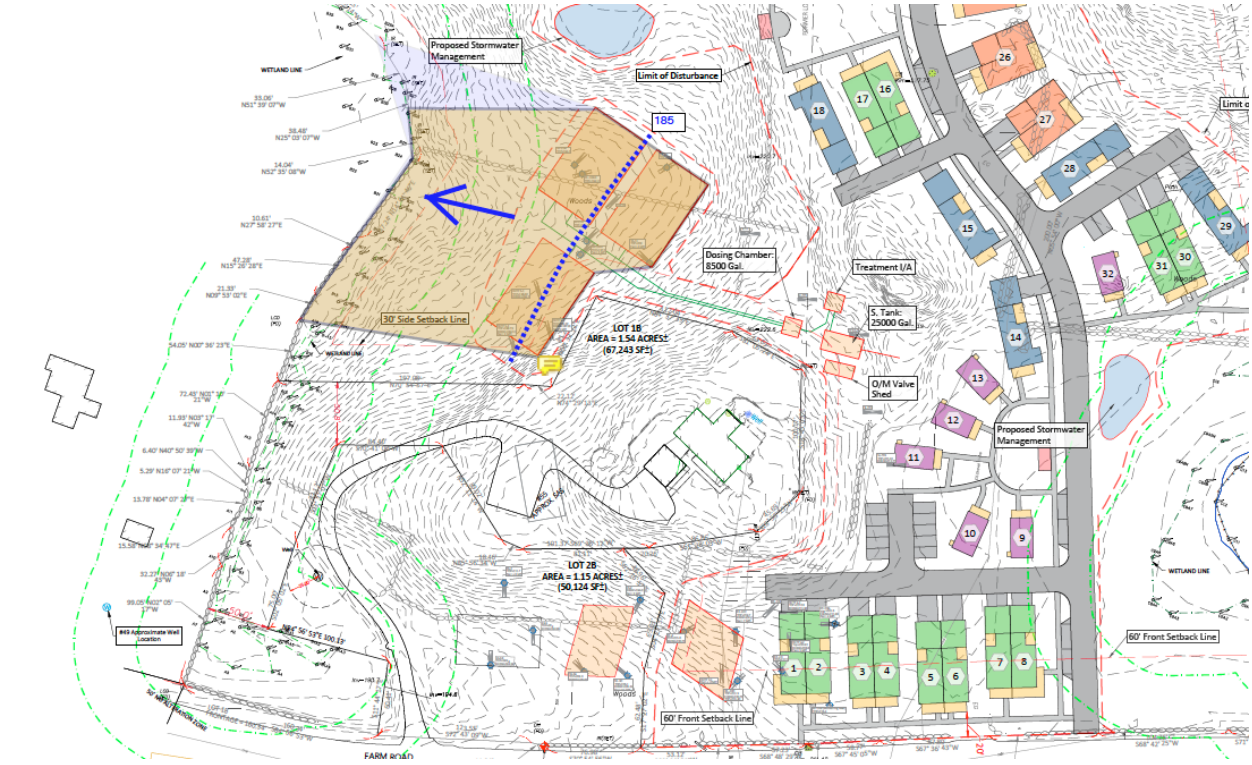

Figure 2 - Area of Impact - Conceptual 40B Plan

I then calculated the resulting nitrogen concentrations at the downgradient property boundary with your parcel (see Table 1). This analysis indicates that the proposed

wastewater discharges will result in nitrate-nitrogen concentrations in excess of the drinking water standard of 10 mg/liter at the property boundary and on your land. This analysis is conservative in that it does not account for fertilizer applications and stormwater runoff losses.

Table 1 - Nitrogen Loading Calculations

	Lots 1 - 4		Conceptual 40B Project	
recharge rate	10	inches/year	10	inches/year
recharge	49920	CF/year	34167	CF/year
	374400	gals/year	256250	gals/year
	1417104	liters/year	969906	liters/year
Title 5 flow	2200	gals/day	8360	gals/day
	3039355	liters/year	11549549	liters/year
Total flow	4456459	liters/year	12519455	liters/year
Wastewater	35	mg/liter	19	mg/liter
	106377425	mg/year	219441431	mg/year
	106.4	kg/year	219.4	kg/year
Concentration	23.9	mg/liter	17.5	mg/liter

Please call me with any questions that you might have.

Sincerely,

Scott W. Horsley
Water Resources Consultant

Attachment B

Written Testimony related to Complexities of Multiple-Owner Water Supply Systems

Dear Members of the Zoning Board of Appeals,

I attended the Zoom hearing held on August 6th. Part of the discussion was water distribution and monitoring for the Farm Rd. 40 B project.

Bob Murchison was the developer for Abbey Rd.. That development has in place the same well share format that Mr. Murchison is proposing for his development on Farm Rd..

In Abbey Road's case, six units share the responsibility for a well, its quality, use and maintenance. Having lived at Abbey Road, I can go into more details, but suffice to say, this is a very complex arrangement that puts a burden on the homeowner. While appropriate for Abbey Road, I have concerns for it being successful for a larger 40B community.

I recently looked at the "Report on water Quality" for Woodhaven. It is extremely comprehensive and makes a good case for a public water supply for the community being developed on Farm Rd..
I encourage Board members to review the report. We all know water quality is paramount to living a good healthy life and I think the safe guard of a public water supply is what this community deserves.

Thank you for your attention,

Sara L Wragge

Sara Wragge

Woodhaven Elderly Housing

2022

PWS ID: #3269002

REPORT ON WATER QUALITY

This report is a snapshot of the quality of the drinking water that we provided last year. The statistics in this report are based on testing done throughout 2022 and prior years. We hope you will find it helpful to know the sources of your water and the process by which safe drinking water is delivered to your home.

Where Do We Get Our Water?

Woodhaven Elderly Housing is located in Sherborn, MA and is currently served by two bedrock wells, one for each of the buildings. A third well is flushed routinely and is available for emergency usage. All of the wells are within 100 feet of the building it serves. Each well is more than 400 feet deep and the most productive of the wells delivers up to six gallons per minute. The town has passed a water protection bylaw restricting activities within 400 feet of each of the wells that may threaten the water purity.

Water Treatment

In an effort to maintain and improve the quality of water delivered to you, we continually test, monitor, and research ways to treat your water supply.

In 2012 significant modifications were made to the treatment system. The existing softening system, used to treat for hardness, were upgraded to further assist in the removal of iron and manganese. A new sediment filter was installed directly downstream of the wells and prior to the water softening system. This filter removes particles from the raw water to improve the effectiveness of the water softeners. A second smaller sediment filter was installed prior to the ultraviolet system to increase the efficiency of the disinfection process.

The water quality of our system is constantly monitored by our certified operator and reviewed by MassDEP to provide safe drinking water and to determine if any additional treatment is required. At this time all testing has been at or below standards and Iron and manganese removal is better than 99.99%

Maintaining Water Quality

Woodhaven Elderly Housing continuously strives to produce the highest quality water possible to meet or surpass every water quality standard. We monitor both our sources and distribution system very closely. The standards we operate under were enacted by the U.S. Congress as the Safe Drinking Water Act in 1974 and were amended in 1986 and 1996.

In order to ensure tap water is safe to drink, the MassDEP and EPA prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. Food and Drug Administration (FDA) and Massachusetts Department of Public Health regulations establish limits for contaminants in bottled water that must provide the same protection for public health.

SHOULD SOME PEOPLE TAKE SPECIAL PRECAUTIONS?

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons, such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (800)426-4791.

Woodhaven Elderly Housing

The water system at Woodhaven Elderly Housing is operated and maintained by WhiteWater, Inc. If you have any questions about this report, please contact WhiteWater at 1-888-377-7678.

Additional copies of this report are available upon request and at www.whitewateronline.com

WhiteWater
WATER & WASTEWATER SOLUTIONS

DISTRIBUTION SYSTEM WATER QUALITY

This report summarizes only those items detected during sampling - not all contaminants that are monitored.

Microbial Results	Highest # Positive in a Month	Total # Positive	MCL	MCLG	Violation	Possible Source of Contamination
Total Coliform	0	-	1	0	No	Naturally present in the environment

Total Coliform: Coliforms are bacteria that are naturally present in the environment and are used as an indicator that other potentially harmful bacteria may be present. Your water source is tested monthly and has been found to be free of these contaminants.

Lead & Copper	Date(s) Collected	90th Percentile of Sample	Action Level	MCLG	# of Sites sampled	# of Sites Above Action Level	Exceeds Action Level?	Possible Source of Contamination
Lead (ppb)	2022	11	15	0	5	0	No	Corrosion of household plumbing systems
Copper (ppm)		0.7475	1.3	1.3		0	No	Corrosion of household plumbing systems

TESTING FOR LEAD

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. **Woodhaven Elderly Housing** is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http://www.epa.gov/safewater/lead.

Key to Tables

- ppm – Parts per million, corresponds to one penny in $10,000
- ppb – Parts per billion, corresponds to one penny in $10,000,000
- pCi/L – Picocuries per liter (a measure of radioactivity)
- ND – Not detected
- n/a - not applicable
- RAA –Running annual average
- TT—Treatment technique

SOURCE WATER CHARACTERISTICS

The sources of drinking water in the United States (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals, and in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

- Microbial contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.
- Inorganic contaminants, such as salts and metals, which can be naturally occurring or result from urban storm water runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.
- Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban storm water runoff, and residential uses.
- Organic chemical contaminants, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production. These contaminants can also come from gasoline storage, urban storm water runoff, and septic systems.
- Radioactive contaminants, which can be naturally occurring or be the result of oil and gas production and mining activities.

SUMMARY OF FINISHED WATER CHARACTERISTICS

Regulated Contaminants	Date(s) Collected	Highest Detect Value	Range Detected	MCL	MCLG	Violation	Possible Source of Contamination
Inorganic Contaminants							
Barium (ppm)	4/13/21	0.118	n/a	2	2	No	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits
Nitrate (ppm)	4/5/22	0.53	n/a	10	10	No	Runoff from fertilizer use; leaching from septic tanks; sewage; erosion of natural deposits
Perchlorate (ppb)	7/17/17	0.122	n/a	2	n/a	No	Rocket propellants, fireworks, munitions, flares, blasting agents
Radioactive Contaminants							
Radium 226 & 228 (pCi/L) (combined values)	2/15/17	0.70	n/a	5	0	No	Erosion of natural deposits

Regulated	Detect Result or Range	Highest Quarterly Average	MCL	Violation	Possible Sources	Health Effects
PFAS6 (ppt) 2022	7.14-10.7	9.44	20	No	Discharges and emissions from industrial and manufacturing sources associated with the production or use of these PFAS, including production of moisture and oil resistant coatings on fabrics and other materials. Additional sources include the use and disposal of products containing these PFAS, such as fire-fighting foams.	Some people who drink water containing these PFAS in excess of the MCL may experience certain adverse effects. These could include effects on the liver, blood, immune system, thyroid, and fetal development. These PFAS may also elevate the risk of certain cancers.

Unregulated Contaminants	Date(s) Collected	Result or Range Detected	Average	SMCL	ORSG	Possible Source of Contamination
Inorganic Contaminants						
Sodium (ppm)	4/13/21	54	n/a	-	20	Natural sources; runoff from use as salt on roadways; by-product of treatment process
Sulfate (ppm)	7/6/16	20	n/a	250	-	Natural sources

Sodium is a naturally-occurring common element found in soil and water. It is necessary for the normal functioning of regulating fluids in human systems. Some people, however, have difficulty regulating fluid volume as a result of several diseases, including congestive heart failure and hypertension. The guideline of 20 mg/L for sodium represents a level in water that physicians and sodium sensitive individuals should be aware of in cases where sodium exposures are being carefully controlled. For additional information, contact your health care provider, your local board of health or the Massachusetts Department of Public Health, Bureau of Environmental Health Assessment at 617-624-5757.

SOME TERMS DEFINED

Action Level (AL): *The concentration of a contaminant which, if exceeded, triggers a treatment or other requirement which a water system must follow.*

Maximum Contaminant Level Goal (MCLG): *The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLG's allow for a margin of safety*

Maximum Contaminant Level (MCL): *The highest level of a contaminant that is allowed in drinking water. MCL's are set as close to the MCLG's as feasible using the best available treatment technology.*

Secondary Maximum Contaminant Level (SMCL): *These standards are developed to protect the aesthetic qualities of drinking water and are not health based.*

Massachusetts Office of Research and Standards Guideline (ORSG): *This is the concentration of a chemical in drinking water, at or below which, adverse, non-cancer health effects are likely to occur after chronic (lifetime) exposure. If exceeded, it serves as an indicator of the potential need for further action.*

Total Coliform: *A bacteria that indicates other potentially harmful bacteria may be present.*

Unregulated Contaminants: *Unregulated contaminants are those for which EPA has not established drinking water standards. The purpose of unregulated contaminant monitoring is to assist EPA in determining their occurrence in drinking water and whether future regulation is warranted.*

90th Percentile: *Out of every 10 homes, 9 were at or below this level.*

Source Water Protection

The MassDEP has prepared a Source Water Assessment Program (SWAP) Report for the water supply source serving the Woodhaven Elderly Housing. The report assesses the susceptibility of public water supplies to contamination and makes recommendations.

This report is available from the MassDEP website: http://www.mass.gov/eea/docs/dep/water/drinking/swap/nero/3269002.pdf.

A susceptibility ranking of **moderate** was assigned to all wells in our system by the MassDEP and they meet all US Environmental Protection Agency (EPA) and MassDEP drinking water quality standards.

Be assured that the Woodhaven Elderly Housing in concert with its certified operator, WhiteWater, Inc., is addressing the concerns as stated in the SWAP Report and welcomes your input to our planning. If you have any questions, please contact WhiteWater, Inc., at 1-888 377-7678.

Opportunities to Participate

Any matters that concern your drinking water supply or issues you would like to see addressed can be presented to the Sherborn Elder Housing Committee at their regularly scheduled Meeting on the third Thursday of the month. You may also contact Claire McClennan at Alan Slawsby & Associates (781) 237-6498. If your concerns need immediate attention feel free to contact our current Certified Operator, WhiteWater, Inc. at 1-888-377-7678.

FOR YOUR INFORMATION

In order to ensure that tap water is safe to drink, the Department of Environmental Protection (MassDEP) and U.S. Environmental Protection Agency (EPA) prescribe regulations that limit the amount of certain contaminants in water provided to public water systems. The Food and Drug Administration (FDA) and Massachusetts Department of Public Health (DPH) regulations establish limits for contaminants in bottled water that must provide the same protection for public health. All drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline (800-426-4791).

Where to go for more information ....

Massachusetts Department of Environmental Protection (MassDEP)
http://www.mass.gov/eea/agencies/massdep/water/drinking/

Woodhaven Elderly Housing
c/o Alan Slawsby & Associates, Inc.
40 Grove St., Suite 350
Wellesley, MA 02482

Cross Connection Control & Prevention

The outside watering tap and garden hose tend to be the most common sources of cross connections

What is a cross connection?

A cross connection occurs whenever a potable drinking water line is directly or indirectly linked to a piece of equipment or piping containing non-potable water.

Why should I be concerned about cross connections?

An unprotected or inadequately protected cross connection in your home or work place could contaminate the drinking water not only in your building, but in neighboring businesses and homes. Severe illnesses– even death– have been caused by cross connection contamination events that could have been prevented. Unprotected and inadequately protected cross connections have been known to cause outbreaks of hepatitis A, gastroenteritis, Legionnaire's disease, chemical poisoning, body lesions (from exposure through showering), damage to plumbing fixtures and explosions.

How can a cross connection contamination occur?

Non-potable water or chemicals used in equipment or a plumbing system can end up in the drinking waterline as a result of backpressure or backsiphonage. Backpressure occurs when the pressure in the equipment such as a boiler or air conditioning unit is greater than the pressure in the drinking water line.

Backsiphonage occurs when the pressure in the drinking water line drops due to fairly routine occurrences such as water main breaks, nearby fires, unusually heavy water demand. Contaminants are then sucked out and into the drinking water line.

What can I do to make sure my water supply is protected from cross connections?

At home:

- Contact your local water supplier to find out what he/she is doing to prevent cross connection contamination incidents.
- Survey your home to make sure you are not unknowingly creating a cross connection
- Do not attach any pesticide, chemical, or any other non-potable liquid applicators to your water line
- Install hose bibb vacuum breakers (HBVB) on all outside faucets. The HBVB isolates garden hose applications, protecting your drinking water supply from contaminants that could be drawn into your home through the hose.

At work:

- Contact your supervisor and/or maintenance personnel and find out if all cross connections within your workplace are protected.
- Find out when/if all backflow preventers have been tested.
- Ask you facility to provide you with information on its cross connection program.

In general:

- Find out all you can about cross connection control from DEP, your local water department, or a plumbing inspector.

For further information about our Cross Connection Control and Backflow Prevention Program please contact WhiteWater at

Phone: 888-377-7678
Fax: 508-248-2895
Email: mthompson@rhwhite.com

Backsiphonage may occur due to a water main break or other low-pressure incident such as a fire.

Attachment C

Expert Reports detailing
Geologic and Hydrogeologic Challenges of
Large Scale Developments in Sherborn

Creative
LAND & WATER
Engineering, LLC

www.claweng.com
P.O Box 584
Southborough, MA 01722

clawe@claweng.com
(774) 454-0266 (cell)
(508) 281-1694 (office)

April 23, 2021

Richard Novak, Chair
Zoning Board of Appeals
Town of Sherborn

Re: 40B Applications: 41 North Main Street and 31 Hunting Lane ("Pine Residences" & "Apple Hill Estates")

Dear Mr. Chairman:

At the request of the Hunting Lane Neighbors Group, Creative Land and Water Engineering, LLC conducted a review of the referenced projects. We have focused on the water related issues. We have the following comments:

Documents Reviewed

All documents posted on the Town website under Land Development-Pine Residences, 41 North Main (update 10/8/2020) and 31 Hunting Lane (Apple Hill Estates), through April 9, 2021.

Relevant Facts and Recommendations

Water:

Relevant facts:

The project site is located on a total of 36.06 acres of land including 8 acres of land dedicated to water supply wells. The land is located in the watershed to an intermittent stream, namely Indian Brook, which becomes a perennial river further downstream. The applicable watershed contains mostly tight glacial till and hollis-rock-outcrop. Well drained high permeable soil area is less than 8% of the watershed. See Figure 3 for soil distribution in the watershed. The project site counts for about 17% of the total watershed. See Figures 1 and 2 for watershed area with overlay of the project site.

In the watershed, there are about 50 units of residential housing and downtown small commercial buildings. It is estimated to serve 200-250 people. There are eight (8) public water supply wells and over forty (40) private water supply wells. Due to the poor soil condition and overburdened aquifer, a majority of the wells, if not all, should be deep bedrock wells similar to the proposed wells on the applicant's property. The proposed project will require a dramatic increase in water withdrawal from the deep bedrock aquifer, which is low yield and has small water storage capacity.

The project proposes to construct 87 new units of homes plus one existing single-family house. It has a total of 192 bedrooms and a total Title 5 flow of 21,120 gpd. It might service 384 people. The housing units will be more than doubled in the watershed (over 150% increase) while in only 17% of the total area of the watershed. The total flow of water withdrawal from deep groundwater and disposed to shallow, overburdened soil will be about 5 times of the amount of water that would be permitted for a conventional project.

The proposed wells are located in a relative lower area than the existing wells. The wells are in mafic rocks (Silurian and ordovician volcanic and granitic rocks), which is a very low yield aquifer and has a very limited water storage.

The proposed wells are located about 40 ft from the downgradient wetland.

Recommendations:

- Require a comprehensive water budget analysis to support the proposed water need in the watershed
- Require a sound aquifer modeling and testing and monitoring for the long-term impact of the huge increase in water withdrawal from the deep bedrock aquifer
- Require a six month (in summer and early fall) pumping testing of the proposed wells on the site to assure adequate supply for the projects
- Require long term testing of the proposed wells as well as all abutters' wells during the driest season to assure that abutters will not suffer any shortages of water supply
- Require an environmental impact study on the potential impacts on the wetland areas, including the perennial stream, adjacent to the project and appropriate mitigation if required
- Require a bond in the amount enough to provide adequate fund to remedy damage to abutting owners
- Require background water quality testing and long term impact water quality testing including but not limited to VOCs, bacteria, metals, N, P, emerging chemicals, and PFAs

Wastewater:

Relevant Facts:

The proposed project will withdraw water from deep bedrock and dispose of it on higher ground and in an extremely limited area 2-3 times of a Title 5 system application rate per square foot and total flow equivalent of 48 homes of 4-brm houses. The area has a high groundwater condition as tested and the added 21,120 gallons per day flow (7.7 million gallons per year) will cause significant groundwater mounding. The mounded area is surrounded by poorly drained soils or shallow ledge.

There are many regulated and unregulated emerging chemicals, such as pharmaceuticals and personal care products (PPCPs) and per- and polyfluoroalkyl substances (PFAS), some of which are carcinogenic, that will likely be present in the wastewater discharge.

There is a potential vernal pool upgradient from the projects but very near the proposed leaching field and there may be other potential vernal pools on the site. State law requires a vernal pool to be more than 100 feet from soil absorption system area and 50 feett from septic tanks.

Recommendations:

- Require extensive soil and aquifer testing in order to determine if the groundwater mounding would cause sewage break out resulting in failure of septic systems and contamination of abutters' well water. It is important to understand and simulate, based on accurate onsite data, the impact of the ground water mounding on the system itself and on the abutting properties due to this surmounted water discharge in the overburdened shallow aquifer upgradient of many houses serviced by well water and septic. The impact should be simulated by proper groundwater modeling (e.g., Modflow) to consider both stormwater and wastewater discharge areas and supported with adequate and accurate soil and aquifer testing data.
- Any comprehensive permit should be conditioned so as to monitor and mitigate the impact of regulated and unregulated chemicals on abutters' wells
- Require investigation and protection of vernal pools on the project site
- The extending of the mounding to the abutting land and its impact on their septic system and drinking water wells should be modeled and monitored for negative impact.
- The Board shall consider a proper condition so the groundwater mounding impact can be monitored and mitigated if found impacting public health and safety.

Stormwater:

Relevant Facts:

Apple Hill Estates - 31 Hunting Lane

The site consists of 16.93 acres of land in the building area. land and therefore the project will increase impervious area by 243% as shown below:

31 Hunting lane	Impervious area, sq. ft	Imp. Area, ac	Change
Existing impervious area	37,942	0.87	
Proposed impervious area	130,141	2.99	
Change in impervious area	92199	2.12	243%

Due to the high groundwater and to avoid groundwater mounding impact analysis, the design engineer proposes to use filled infiltration to meet the ground water recharge requirement.

The neighborhood has reported high groundwater and surface water and basement flooding.

Pine Residences – 41 N. Main Street

The site consists of 7.2 acres of land as shown on Sherborn Assessor's map 11 as lots 41 and 43.; the projectwill increase impervious area by 201% as shown below:

41 N. Main St	Impervious area, sq. ft	Imp. Area, ac	Change
Existing impervious area	35797	0.82	
Proposed impervious area	107682	2.47	
Change in impervious area	71885	1.65	201%

Recommendations:

- See Recommendation #1 under Wastewater above. Extensive testing is needed in order to measure groundwater mounding due to stormwater runoff by reason of the dramatic increase in impervious area and the likely poor infiltration rate and high groundwater condition
- Require the modeling of the impact between stormwater basins and infiltration areas and the wastewater disposal area to make sure the two systems can be properly function and not to cause negative impact on the abutting properties.

Conclusions

The applicant has provided very limited or no data and analysis to the ZBA on many of the concerning issues described above and so the recommendations above are necessarily preliminary and subject to change as more data is obtained. Nevertheless, projects of this sort in such a sensitive area with competing needs for water quantity and water quality, which is a serious public health and safety issue, should, at a minimum, require some additional analysis and testing as suggested above, which is commensurate with the scale of the project.

It is our professional opinion, based on our review of all of the available information and our extensive experience in the Town of Sherborn, that the recommended testing will likely support our conclusion that these projects are much larger than the environment can support (5 times larger than a conventional project that would be supported by the size of the land). These projects will cause serious public safety and health issues as well as serious detrimental environmental impacts on wetlands, other protected environmental resources and on the residences and small commercial buildings in the watershed including the abutters if not designed and implemented based solid in field testing data and information regarding water quality and quantity related issues.

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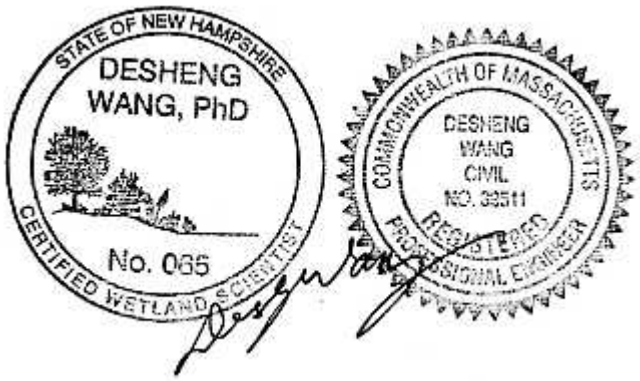
Please forward this letter to the Town's peer reviewer and other Town officials as appropriate. We would be happy to discuss this letter with you at any time.

CREATIVE LAND & WATER ENGINEERING, LLC

BY:



Desheng Wang, Ph.D., P.E., CWS
Sr. Hydraulic Engineer and Certified Wetland Scientist

cc: Zoning Board of Appeals
Daryl Beardsley, Sherborn Board of Health
Neil Kessler, Sherborn Conservation Commission
Brian Moore, Sherborn Groundwater Protection Committee
Jeanne Guthrie
Craig D. Mills
Paul Bochicchio

Summary of the Project sites and vicinity watershed

31 Hunting lane

Tax Parcel: 11-0-3C (16.93 ac), 11-0-02 (4.88 ac), 11-0-3B (8 ac, well)						
	Most of	land of 11-0-03C is in M.G.L. c. 61B (open space and recreation)				
Area:	29.81	acres	support sewage flow:	3570.94	gpd	
	8	acres	for well yied (21.81 acres are used for development)			
Designed for:	28	units	Sewage flow:	9240	gpd	
			Drinking water flow:	9240	gpd	
Masshousing approval			4/30/2020	two years		
			28	units	7 units	affordable
			84	brms	168 people	
			12 Dulexes, one triplex, one existing single-family house			

41 N. Main Street

Tax Parcel: 11-0-41						
Zoning:	RA					
Area:	6.25	acres	support sewage flow:	748.69	gpd	
Designed for:	60	units of apts	Sewage flow	11880	gpd	
			Drinking water flow:	11880	gpd	
Offsite area	4.88	acres	to support water and wastewater need			
Masshousing approval			4/30/2020	two years		
			60	units	15 units	affordable
			108	brms	216 people	
			12 one-brm,36 two-brm, 8 three-brm			

Total			Land area:	36.06	acres	17% total wshd
			Total home units:	88	units	
			Total bedrooms:	192	brms	384 people
			Title 5 support flow (W+S)	4319.63	gpd	
			Design flow	21120	gpd	7708800 gpy
				4.89	times of allowed	

Well	2	on Parcel 8 ac 11-0-3B	
Zone I	250	ft	
IWHP	880	ft	
To wetland	42	ft, approx.	
To 23 Hunting	250	ft	
Watershed	Indian Brook	pernential river	Drawndown impact
	9360023	sf	215 acres
Public water supply	8		
Existing homes/small business	50	units	In watershed

Bedrock	Mafic rock	Silurian and ordovician volcanic and granitic rocks
Aquifer	very low yield	
	Soils:	

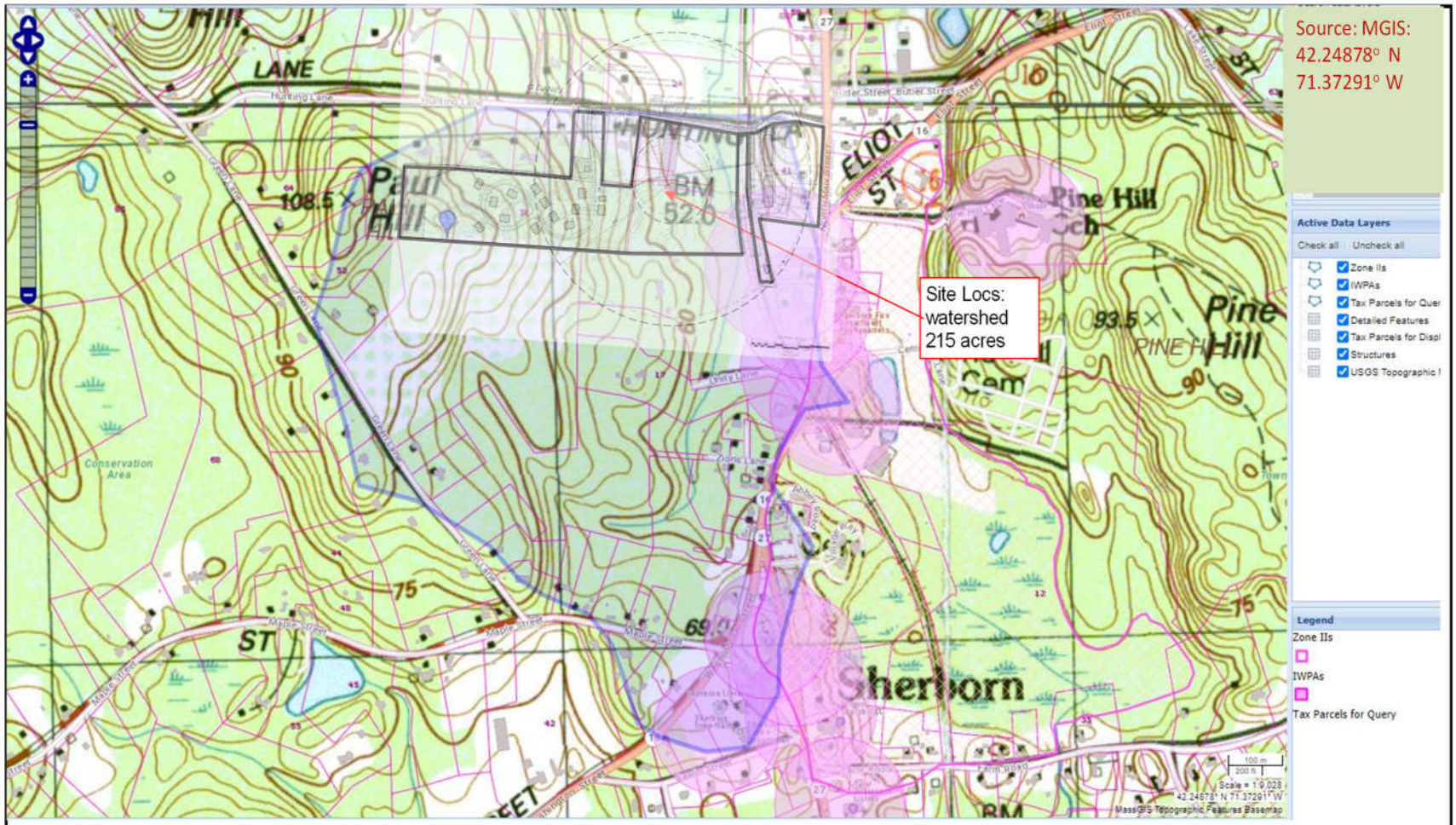


Figure 1.

USGS Site Locus and watershed plan
31 Hunting Lane and 41 N Main Street, Sherborn, MA

By: Desheng Wang, Ph.D., P.E.
Creative Land & Water Engineering, LLC
P.O. Box 584
Southborough, MA 01772
508-281-1694 www.CLAWENG.com

Figure 2. Enlarged USGS Site Locus & Project site overlay
31 Hunting Lane and 41 N Main Street, Sherborn, MA

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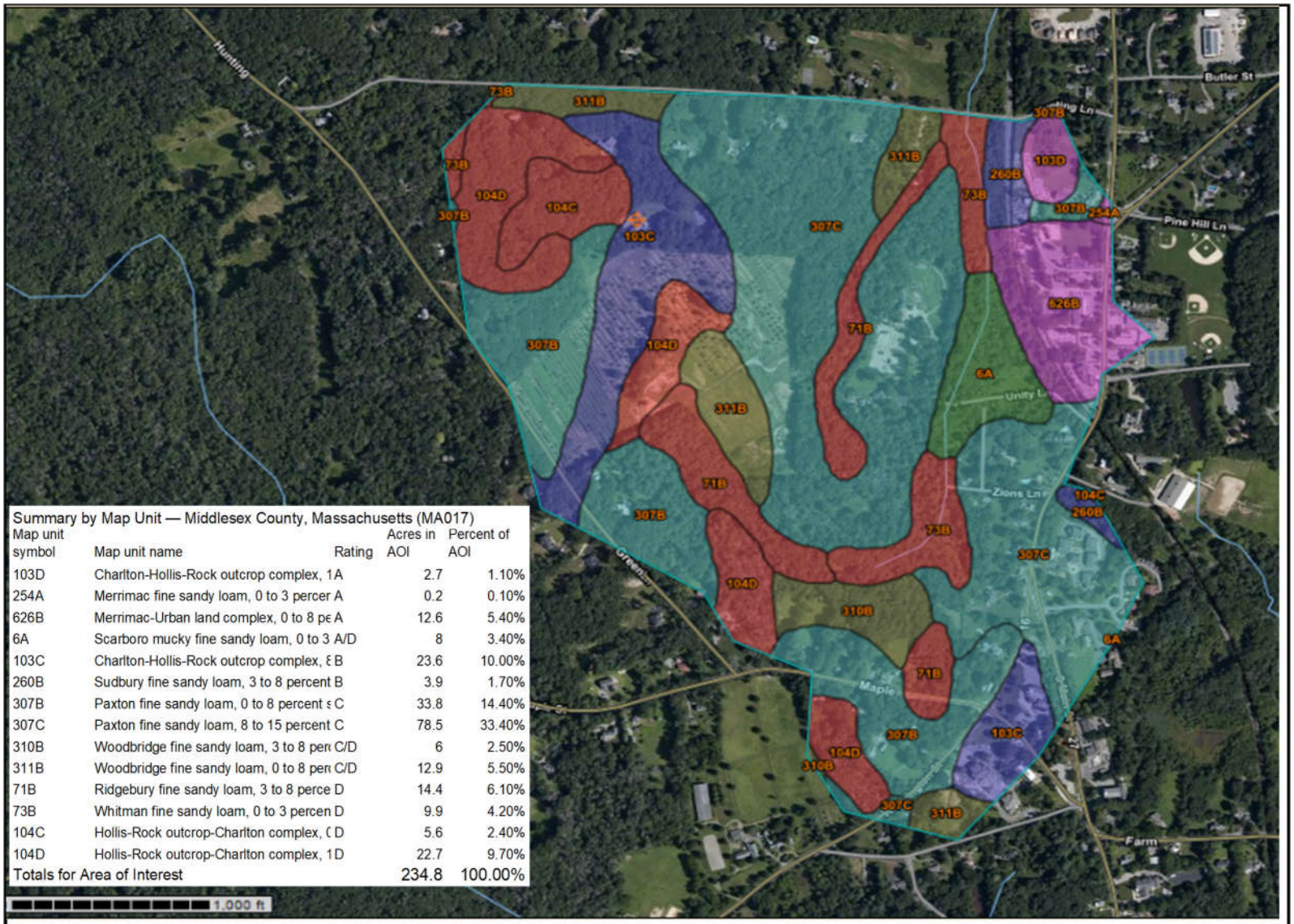

Summary by Map Unit — Middlesex County, Massachusetts (MA017)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
103D	Charlton-Hollis-Rock outcrop complex, 1	A	2.7	1.10%
254A	Merrimac fine sandy loam, 0 to 3 percer	A	0.2	0.10%
626B	Merrimac-Urban land complex, 0 to 8 pe	A	12.6	5.40%
6A	Scarboro mucky fine sandy loam, 0 to 3	A/D	8	3.40%
103C	Charlton-Hollis-Rock outcrop complex, 8	B	23.6	10.00%
260B	Sudbury fine sandy loam, 3 to 8 percent	B	3.9	1.70%
307B	Paxton fine sandy loam, 0 to 8 percent s	C	33.8	14.40%
307C	Paxton fine sandy loam, 8 to 15 percent	C	78.5	33.40%
310B	Woodbridge fine sandy loam, 3 to 8 per	C/D	6	2.50%
311B	Woodbridge fine sandy loam, 0 to 8 per	C/D	12.9	5.50%
71B	Ridgebury fine sandy loam, 3 to 8 perce	D	14.4	6.10%
73B	Whitman fine sandy loam, 0 to 3 percen	D	9.9	4.20%
104C	Hollis-Rock outcrop-Charlton complex, (	D	5.6	2.40%
104D	Hollis-Rock outcrop-Charlton complex, 1	D	22.7	9.70%
Totals for Area of Interest			234.8	100.00%

Figure 3. NRCS Soil Map
31 Hunting Lane and 41 N Main Street,
Sherborn, MA

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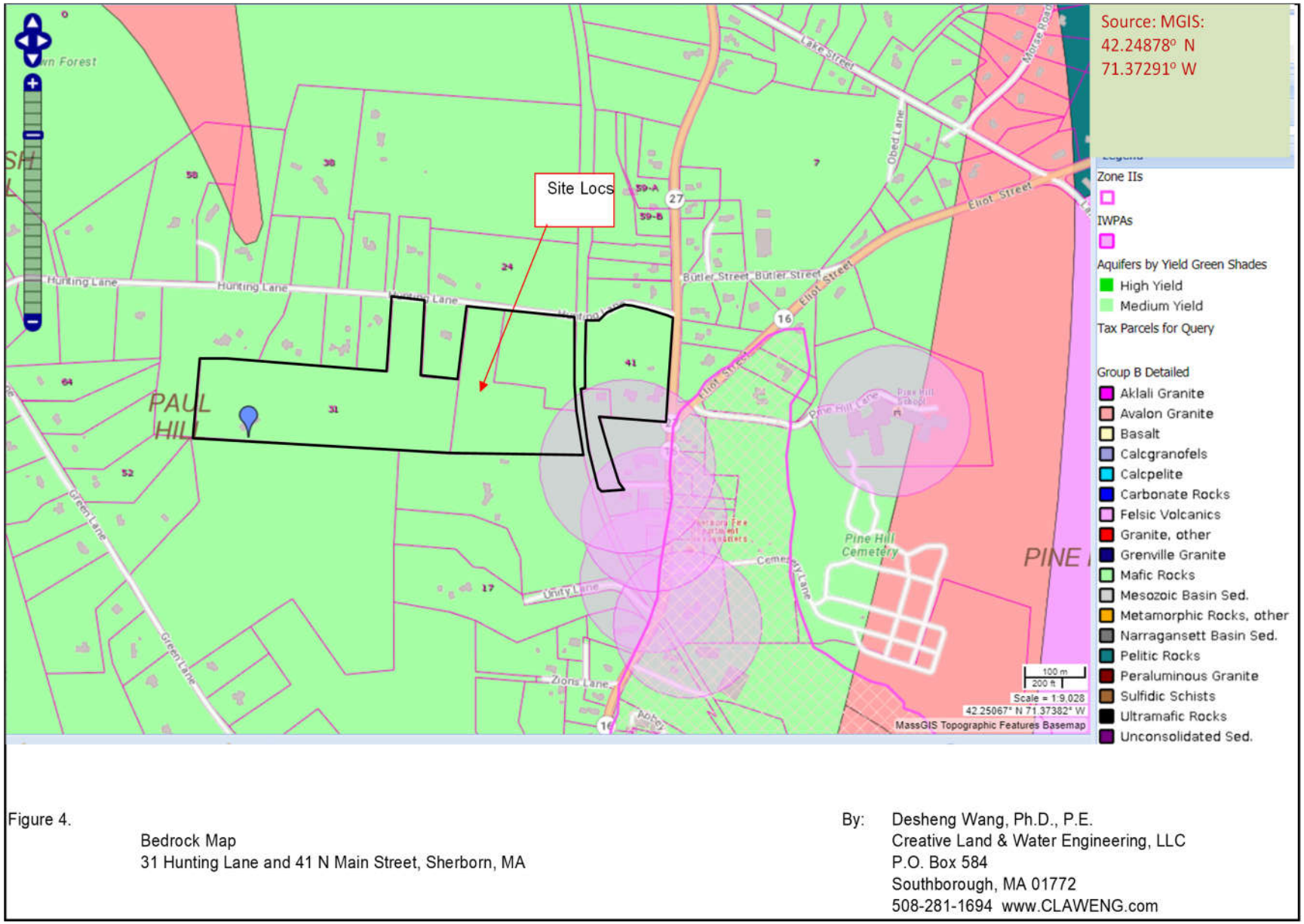

Figure 4.

Bedrock Map
31 Hunting Lane and 41 N Main Street, Sherborn, MA

By: Desheng Wang, Ph.D., P.E.
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(508) 281-1694 (office)

May 6, 2021

To:

Richard Novak, Chair
Zoning Board of Appeals
Town of Sherborn

cc: Daryl Beardsley, Sherborn Board of Health
Neil Kessler, Sherborn Conservation Commission
Jeanne Guthrie
Brian Moore, Sherborn Groundwater Protection Committee
Craig D. Mills
Paul Bochicchio

Re: 40B Applications: 41 North Main Street and 31 Hunting Lane ("Pine Residences" & "Apple Hill Estates")

Dear Mr. Chairman and Board members:

Upon the request of the Hunting Lane Neighbors Group, on April 29, 2021, Creative Land and Water Engineering, LLC (CLAWE) conducted a site visit to the neighborhood around the proposed the project site at 31 Hunting Lane and curbside view of the project property. Here are some of our observations and potential impact:

1. There is a bordering vegetated wetland (BVW) in the front yard of 41 Hunting lane. The owner, Mr. Paul Bochicchio indicated that the wetland receives water from 31 Hunting Lane and above. The topographic map from MGIS appears support this observation.
2. The abutters also pointed to me the water impoundment that is behind 51 Hunting Lane. Mr. Mark Callahan has lived there for 30 years and each year he saw the water impoundment lasting for several months into July. Given a relative dry spring, this pool has been lasted for more than a couple of months. In this case, the area of impoundment will qualify as a wetland per wetland hydrology as it is flooded more than 7 days during growing season. The pool appears large enough to support vernal pool habitat and should be evaluated by a wildlife biologist during breeding season.
3. The potential wetland appears have a hydraulic connection to the wetland in front of 41 Hunting lane. It will qualify the wetland as a BVW and jurisdictional under the wetland protection act.
4. Given the long-time impoundment and the hydraulic connection, there is a serious concern that the proposed large quantity of wastewater disposal in the same area and the impact on the abutting wells and septic systems will be very imminent. It should need much more required hydrogeological study and ground water flow analysis of the observed evidence.
5. We strongly recommend that the Board should have a third party peer review hydrogeologist and wetland and wildlife biologist review these issues to make sure that such large quality of water added to

the impoundment area will not cause serious impact on outstanding resource and drinking water wells and septic systems.

Photo: The impoundment of water in the proposed leaching area at 31 Hunting lane view from west at 51 Hunting Lane on April 29, 2021

Proposed Well Draw Down and Water Quality

We have reviewed the available PWS well logs and pumping and water quality testing data, here is our preliminary observation and concerns:

1. Both wells are deep (820 ft) bed rock wells in granite, which will have to depend on fractures for water storage as we pointed out in our previous review comments.
2. The watershed has very limited overburden aquifer to recharge the PWS wells as the well log showed. Though the PWS initial static water level is below the ground surface, there are not water table elevation data and the nearby wetland elevations to determine if the PWS wells share the same water level or is connected to each other in nearby distance. It cannot be determined with the submitted data as where the PWS water source may be connected for recharge, which will be important data to find out in order to determine the long-term supply and impact on abutting wells and wetland resources. Given the PWS

wells are withdrawing water from fractures and may connected to wetland further away, it is indeterministic test to conclude that no impact using inadequate data point with short time pumping and little space coverage in the wetland and watershed to claim that the Order of Condition #54 has been met.

3. There is a detection of toluene, a volatile organic compounds (VOCs), in both well water, which is a indication of source of pollutants in the aquifer. It is a serious public health concern that long-term drawing large quantity of water from the spot may mobilize higher concertation of other more toxic VOCs to the drinking water. What is the plan and remedy of the potential increase in pollution? When and how will the applicant find out where is the potential pollution sources?
4. There are more than 200 ft draw down in well 1 and 280 ft drawn down in well 2 for just 8 hour pumping time. It is not clear what is the depth of the well pump was set at for the pumping. There is a serious concern about the long-term supply and storage to support the needed water supply from the limited pumping time and huge draw down.
5. We did not observe a monitoring well map in the applicant data file submitted. We did not observe the same time series of the water table variation in the monitoring wells. Therefore, it can not be used to make any further comments on the impact.

NOBIS Preliminary Review

We share most of Dr. Jim Vernon's concern in his preliminary hydrogeological review. The impact of leaching field and the long-term sustainable water source are two serious concerns on public health and safety and lacking adequate pumping, testing, and monitoring data.

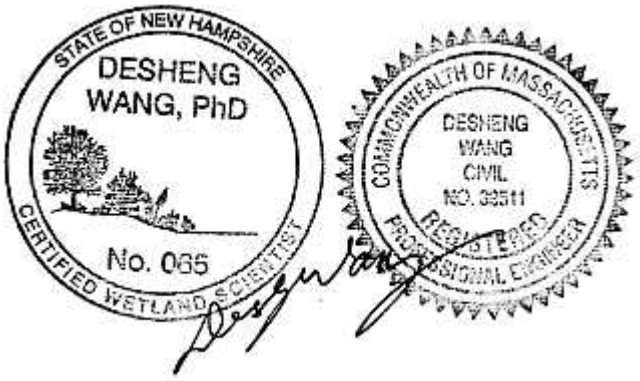
Applicant Response to our Initial Comments

We have received the applicant's responses to our initial comments. While the applicant mostly quoted the DEP testing procedure, they have not specifically addressed the specific site condition as how to tailor DEP's procedure to address the site-specific conditions and provide assurance for the abutting neighbors for their wells and septic function in the future.

As information have been keeping rolling out, we reserve the right to review them and provide updated review comments on them when we had the chance to review.

If you have any questions, please feel free to contact us.

Sincerely,
Creative Land & Water Engineering, LLC
By



Desheng Wang, Ph.D., P.E., CWS
Sr. Hydraulic Engineer and
Certified Wetland Scientist

Summary of the Project sites and vicinity watershed

31 Hunting lane

Tax Parcel: 11-0-3C (16.93 ac), 11-0-02 (4.88 ac), 11-0-3B (8 ac, well)
Most of land of 11-0-03C is in M.G.L. c. 61B (open space and recreation)

Area:	29.81	acres	support sewage flow:	3570.94	gpd	
	8	acres	for well yied (21.81 acres are used for development)			
Designed for:	28	units	Sewage flow:	9240	gpd	
			Drinking water flow:	9240	gpd	
Masshousing approval			4/30/2020	two years		
			28	units	7 units	affordable
			84	brms	168 people	
			12 Dulexes, one triplex, one existing single-family house			

41 N. Main Street

Tax Parcel: 11-0-41
Zoning: RA

Area:	6.25	acres	support sewage flow:	748.69	gpd	
Designed for:	60	units of apts	Sewage flow	11880	gpd	
			Drinking water flow:	11880	gpd	
Offsite area	4.88	acres	to support water and wastewater need			
Masshousing approval			4/30/2020	two years		
			60	units	15 units	affordable
			108	brms	216 people	
			12 one-brm,36 two-brm, 8 three-brm			

Total	Land area:	36.06	acres	17% total wshd
	Total home units:	88	units	
	Total bedrooms:	192	brms	384 people
	Title 5 support flow (W+S)	4319.63	gpd	
	Design flow	21120	gpd	
		4.89	times of allowed	

Well	2	on Parcel 8 ac 11-0-3B	
Zone I	250	ft	
IWHP	880	ft	
To wetland	42	ft, approx.	
To 23 Hunting	250	ft	

Watershed	Indian Brook	pernential river	Drawndown impact
	9360023	sf	215 acres
Public water supply	8		
Existing homes/small business	50	units	In watershed

Bedrock	Mafic rock	Silurian and ordovician volcanic and granitic rocks
Aquifer	very low yield	
	Soils:	

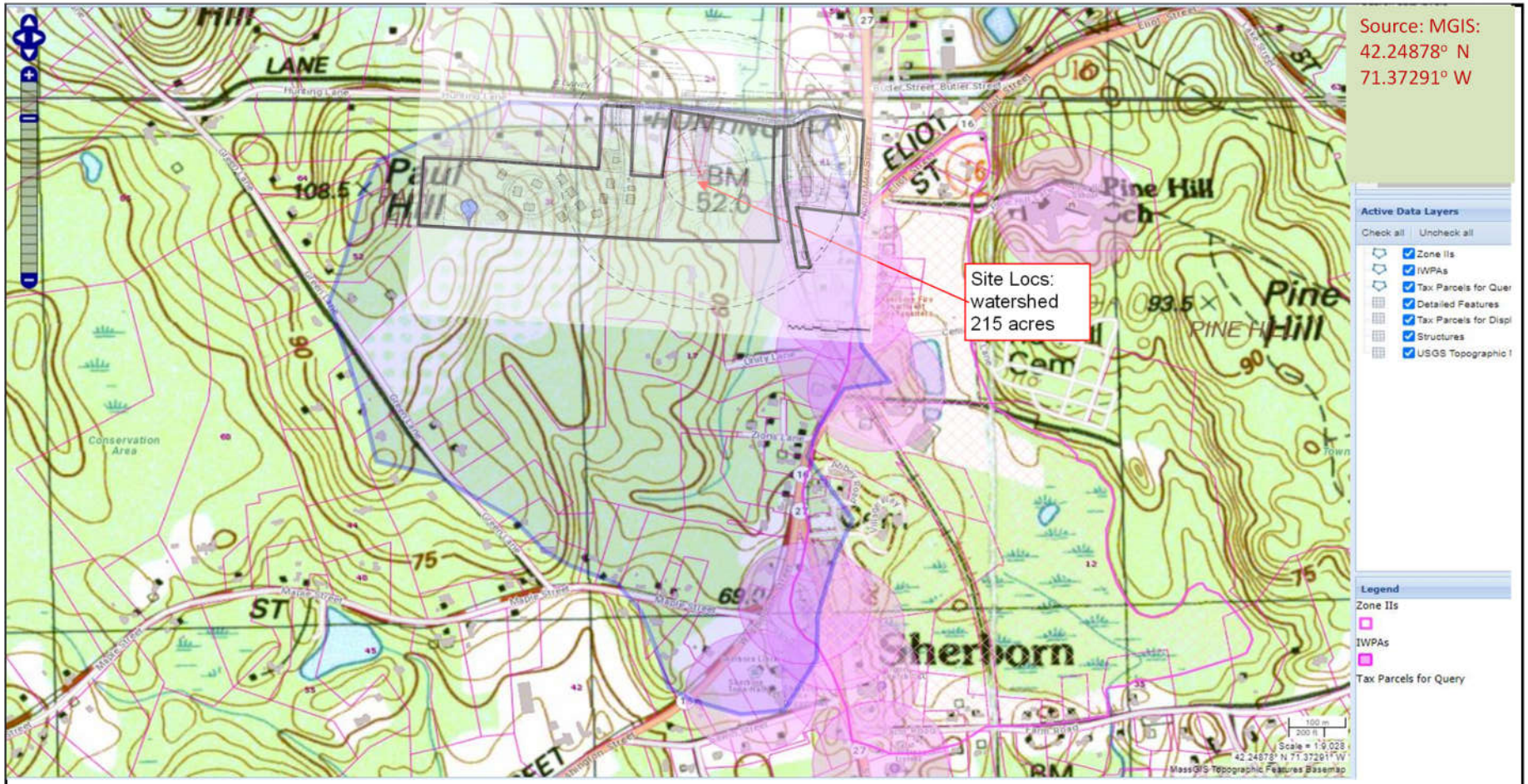


Figure 1.

USGS Site Locus and watershed plan
31 Hunting Lane and 41 N Main Street, Sherborn, MA

By: Desheng Wang, Ph.D., P.E.
Creative Land & Water Engineering, LLC
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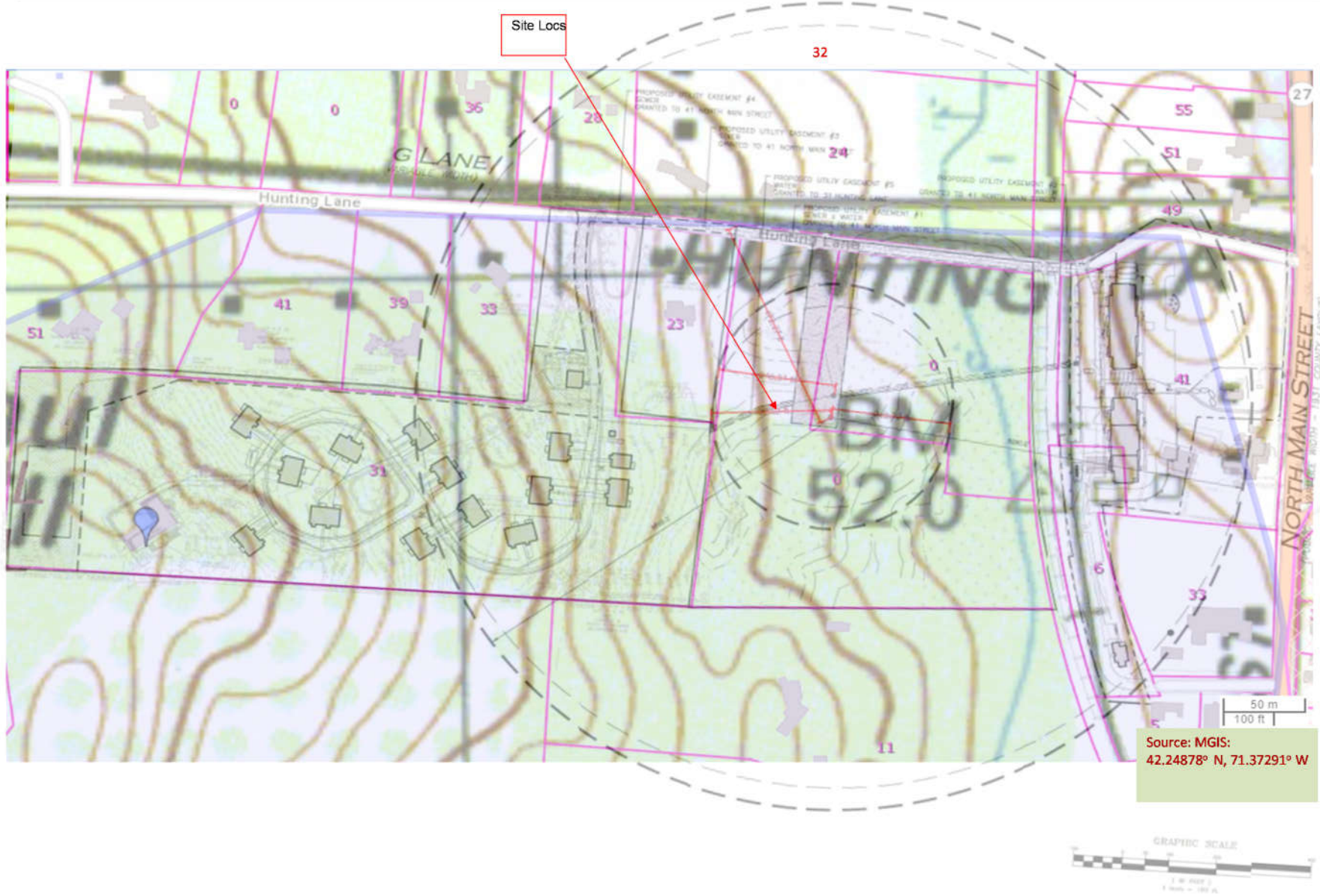

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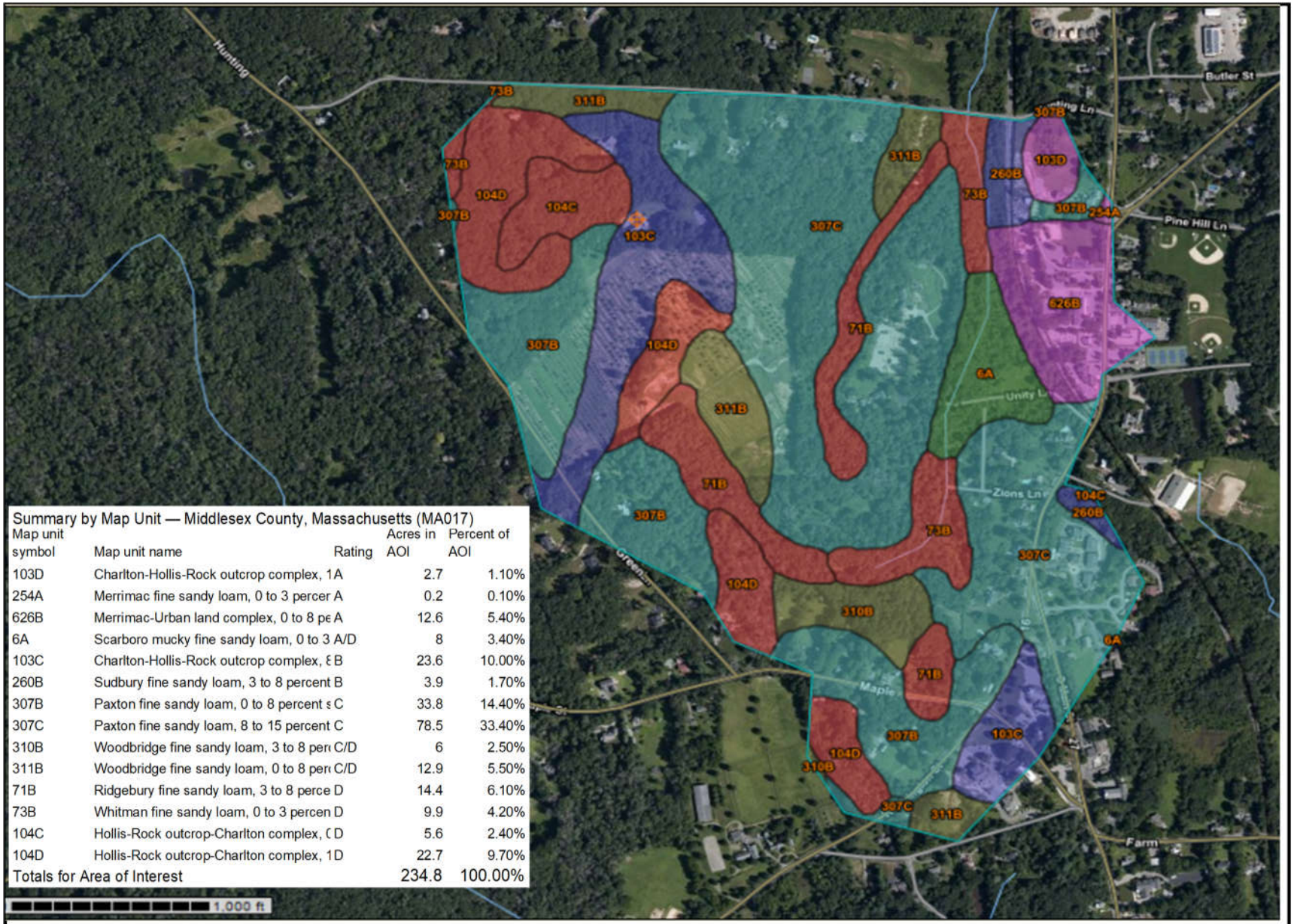

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6A	Scarboro mucky fine sandy loam, 0 to 3	A/D	8	3.40%
103C	Charlton-Hollis-Rock outcrop complex, 8	B	23.6	10.00%
260B	Sudbury fine sandy loam, 3 to 8 percent	B	3.9	1.70%
307B	Paxton fine sandy loam, 0 to 8 percent s	C	33.8	14.40%
307C	Paxton fine sandy loam, 8 to 15 percent	C	78.5	33.40%
310B	Woodbridge fine sandy loam, 3 to 8 per	C/D	6	2.50%
311B	Woodbridge fine sandy loam, 0 to 8 per	C/D	12.9	5.50%
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Totals for Area of Interest			234.8	100.00%

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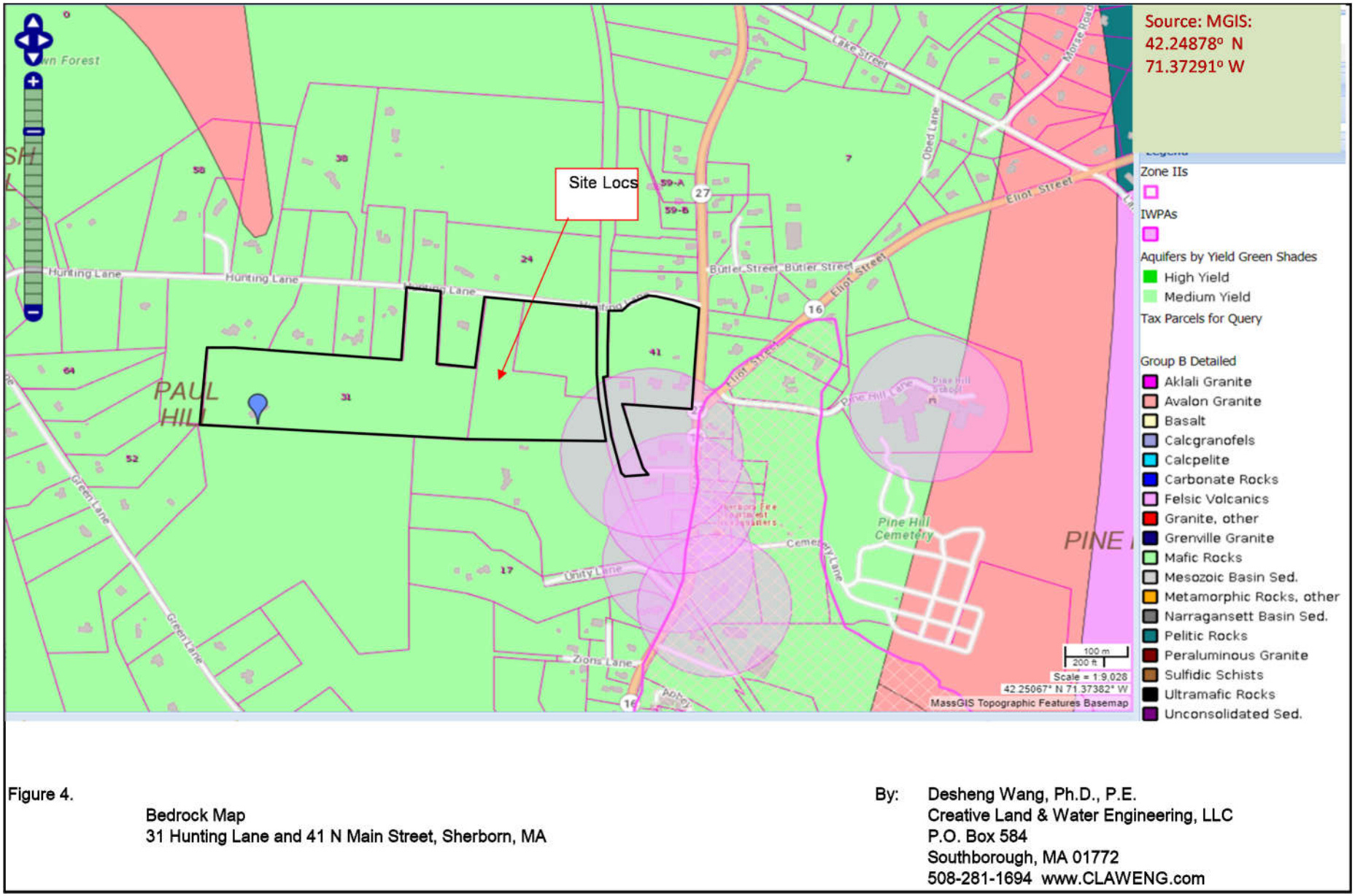

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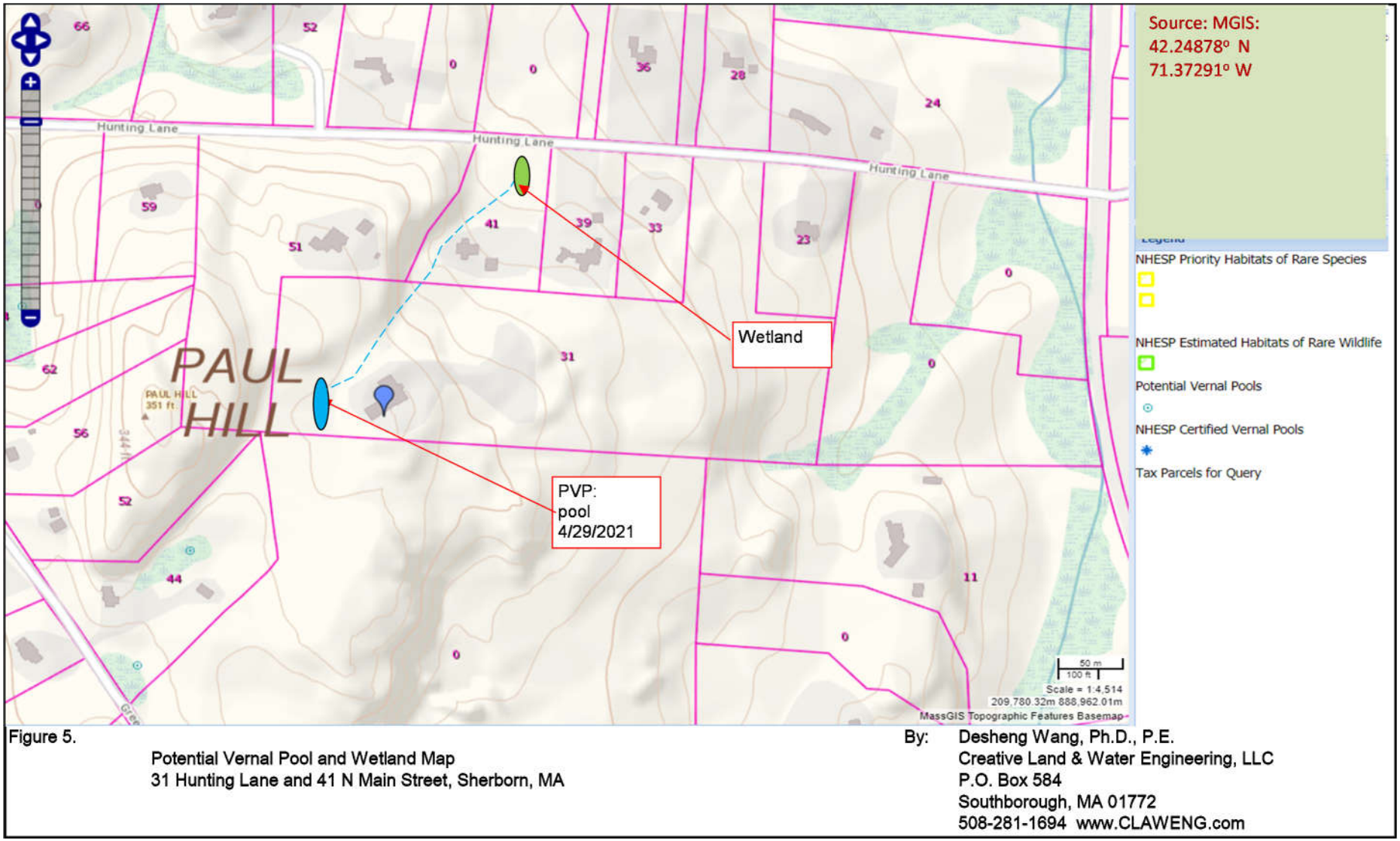

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(508) 281-1694 (office)

May 25, 2021

To:

Richard Novak, Chair
Zoning Board of Appeals
Town of Sherborn

cc: Daryl Beardsley, Sherborn Board of Health
Neil Kessler, Sherborn Conservation Commission
Jeanne Guthrie
Brian Moore, Sherborn Groundwater Protection Committee
Craig D. Mills
Paul Bochicchio

Re: 40B Applications: 41 North Main Street and 31 Hunting Lane ("Pine Residences" & "Apple Hill Estates")

Dear Mr. Chairman and Board members:

On behalf of the Hunting Lane Neighbors Group, I would like one more time to bring to your attention a couple of issues related to the referenced project.

1. **Environmental Law Compliance.** The Masshousing eligibility letter dated April 30, 2020, clearly stated that
"*Based on MassHousing's consideration of comments received from the Municipality, and its site and design review, the following issues should be addressed in your application to the local Zoning Bard of Appeals ("ZBA") for a Comprehensive Permit and fully explored in the public hearing process prior to submission of your application for Final Approval under the program:*
   - *Development of the Site will require compliance with all state and federal environmental laws, regulations and standards applicable to existing conditions and to the proposed use related to wetland protection, stormwater management, wastewater collection and treatment, hazardous waste safety, and public water supply. The Applicant* ***should expect that the Municipality will require evidence of such compliance prior to the issuance of a building permit for the Project.***

   ….."
   As we brought to your attention in our May 6, 2021 letter and by many abutters at the public hearing that a good size of water impoundment exits as witnessed by us at the project site overlapping partially with the proposed onsite wastewater treatment soil absorption area (leaching area). The abutters had also testified at the hearing that the water body occurs every year and last a few months into June. We provided the Board a letter of concern at the May 6, 2021 meeting that the area might be a vernal pool and may have a significant adverse impact on both upgradient and downgradient state regulated wetlands. The Board voted at the May 6, 2021 public hearing to hire a third-party peer review to check the area to determine whether the water impoundment area is a certifiable vernal pool or other resource area that is under the state and/or

federal environmental laws. We believe that the Board has the authority to deny the project for lacking adequate information if this issue **cannot** be "fully explored". The impact of the area with large wastewater disposal is significant and irreparable on potential protected resources and on the abutting properties' drinking water and wastewater treatment function. It is a significant public safety issue not to explore to the full extent.

Photo: The impoundment of water in the proposed leaching area at 31 Hunting lane view from west at 51 Hunting Lane on April 29, 2021

2. **Public Water Supply Concern**. As we detailed the reasons and echoed by the town peer review hydrogeologist, the bedrock wells that will be used to support such a large development in the downtown area with a relatively dense development condition depending on both onsite well and wastewater disposal is an unprecedented public safety risk on the existing residents and business. We have requested that the Board should consider a strong and solid safety mitigation measures condition in the approval for water supply impact on abutting properties so future damage can be mitigated with certainty. ***The following case may shed some light on why I recommend the above.***
   It happened in the past two years a long time used drinking water well ran from normal to dry in about a year in the same area of the project. The owners (Jo and Paul Sagar) of 51 North Main Street bought this house and moved in on June 22, 2017. They have a 350-ft bedrock well and was tested with 7 gpm yield at 2 hour pumping testing in April 2017 before they purchased the house by a well driller. The house has been there for decades. After they moved in, they had normal water supply until late summer when the well pump run out. They changed the well pump in October 2017. Since then, they had normal water supply from the well for their normal daily use until Spring 2019. They started to feel low water pressure and have to wait between two showers to get enough water. The situation deteriorated

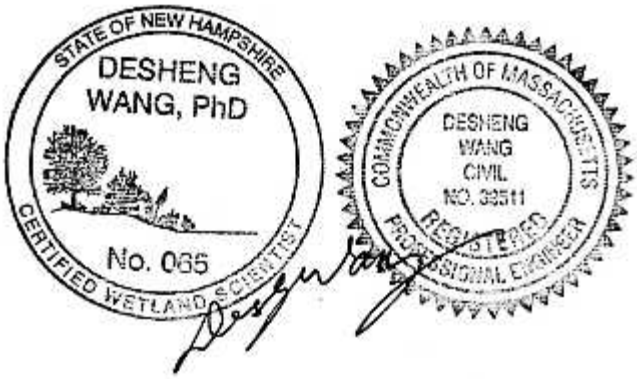
quickly in 2020 and they faced intermittent water supply and they had to call in a well driller to check it out. The driller checked the rate of the well, it dropped to 0.01 gpm. They had to drill a new well with a depth of 800 ft. At the same time, a 12-unit condo project was under construction at 59 N Main Street and according to the Sagar, the condo had 5-6 units sold and people moved in in 2019. There are two drinking water wells at 59 N Main to serve the 12 units of condos. The deep new well at 51 N Main is just a house lot away and in August 2020 was only tested with 1 gpm at the time of drilling and after hydrofracturing, the well barely made to 4 gpm. While many factors may be counted for a well yield when the well geometry and depth is fixed, it will fall into three major factors: 1) aquifer transmissivity, which affects the instant yield; 2) the aquifer storage, which impacts the long-term production of the well; 3) the recharge of the well head area, which is the ultimate sustainability of the well. As the well at 51 N Main ran dry in merely about 1 year without noticeable change of the pattern of water use as the owner can recall, the general recharge area in the well head zone assumed no change, the likely cause of the well run-dry would likely be additional water withdrawal by other wells from the shared aquifer, which has limited storage to sustain the increased use. Under a limited recharge condition and aquifer storage, the total long term sustainable water supply is fixed. If the water use exceeded this long-term sustainable supply, people will suffer water shortage and dry well condition. **Therefore, it is especially important for a large water use project to provide a thorough comprehensive investigation to show the approving authority that they can assure their own water supply is sustainable and at the same time they will not impact the people using the same water source negatively.** While this is easier to say then to do, some basic things can be done. The direct water pumping is one but how can we assure that the pumping is not and will not impact the other wells is not a quick short time testing. The overall water budget and water supply study will be needed to understand the situation holistically. While it is hard and unrealistic to ask an individual homeowner to do such a study when their use and land area ratio is low, a large-scale project in a relatively small land area, it should be a must to do. As we pointed out in our April 15, 2021 letter report, the under-review project at 41 N Main Street and 31 Hunting Lane is way larger than what has been constructed in the area, which will increase home units by about 150% more than doubled in the same watershed with a land area of about 17% of the watershed area. The likelihood of impact on abutting water supply is extremely high as we illustrated in the above ongoing case. If the project is to be approved, it is the Board's responsibility and power to require a "fully explored" study of the obviously concerning issues and construct prorated stringent conditions with reasonable to scale financial mechanism to replace existing abutting wells after fully explored investigation to show unlikely negative impact on existing homes and businesses. Therefore, the water wells proposed shall be conditioned to "fully explored" level to make sure there will be no impact on the abutting wells. We acknowledge and appreciate your effort facing this challenge situation to the Board. We hope and believe that you will have a great wisdom and many needed skills that you will live up to the challenge to protect entrusted public safety and interests by the town's residents.

3. **Long-term Sustainability in water supply and on-site wastewater disposal.** As we elaborated in our previous two reports and above, a long-term water budget analysis in the area will be a reasonable requirement and necessary to be fully explored in order to understand and assure that the public safety and adequate drinking water is warranted that can be done during the DEP standard water supply and wastewater treatment and disposal approval process. You do not want to have another resident to experience the same issue at 51 N Main Street.

Attached are some summary table and figures from my previous report for easy reference.

If you have any questions, please feel free to contact us.

Sincerely,
Creative Land & Water Engineering, LLC
By



Desheng Wang, Ph.D., P.E., CWS
Sr. Hydraulic Engineer and
Certified Wetland Scientist

Summary of the Project sites and vicinity watershed

31 Hunting lane

Tax Parcel: 11-0-3C (16.93 ac), 11-0-02 (4.88 ac), 11-0-3B (8 ac, well)
Most of land of 11-0-03C is in M.G.L. c. 61B (open space and recreation)

Area:	29.81	acres	support sewage flow:	3570.94	gpd	
	8	acres	for well yied (21.81 acres are used for development)			
Designed for:	28	units	Sewage flow:	9240	gpd	
			Drinking water flow:	9240	gpd	
Masshousing approval			4/30/2020	two years		
			28	units	7 units	affordable
			84	brms	168 people	
			12 Dulexes, one triplex, one existing single-family house			

41 N. Main Street

Tax Parcel: 11-0-41
Zoning: RA

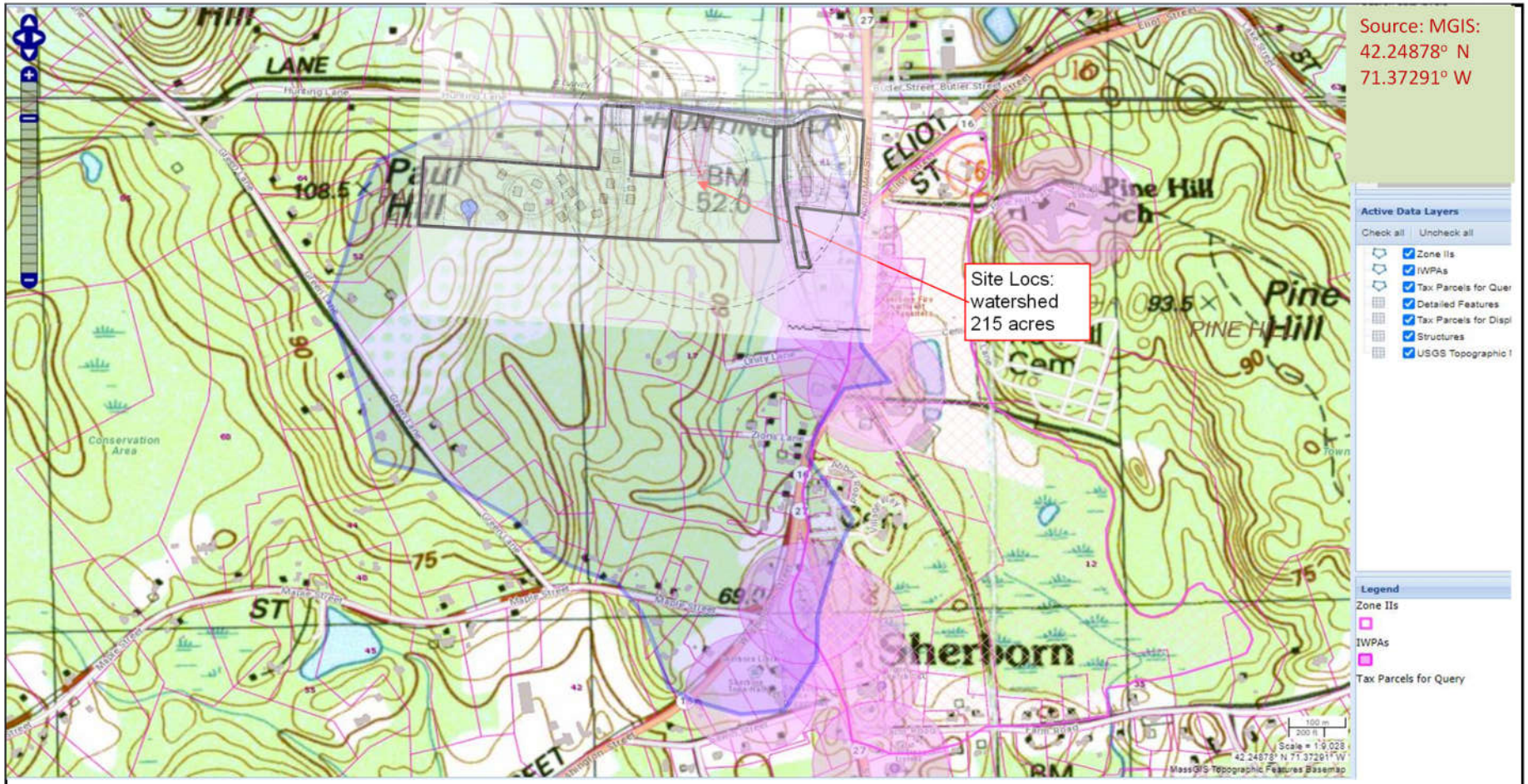
Area:	6.25	acres	support sewage flow:	748.69	gpd	
Designed for:	60	units of apts	Sewage flow	11880	gpd	
			Drinking water flow:	11880	gpd	
Offsite area	4.88	acres	to support water and wastewater need			
Masshousing approval			4/30/2020	two years		
			60	units	15 units	affordable
			108	brms	216 people	
			12 one-brm,36 two-brm, 8 three-brm			

Total	Land area:	36.06	acres	17% total wshd
	Total home units:	88	units	
	Total bedrooms:	192	brms	384 people
	Title 5 support flow (W+S)	4319.63	gpd	
	Design flow	21120	gpd	
		4.89	times of allowed	

Well	2	on Parcel 8 ac 11-0-3B	
Zone I	250	ft	
IWHP	880	ft	
To wetland	42	ft, approx.	
To 23 Hunting	250	ft	

Watershed	Indian Brook	pernential river	Drawndown impact
	9360023	sf	215 acres
Public water supply	8		
Existing homes/small business	50	units	In watershed

Bedrock	Mafic rock	Silurian and ordovician volcanic and granitic rocks
Aquifer	very low yield	
	Soils:	



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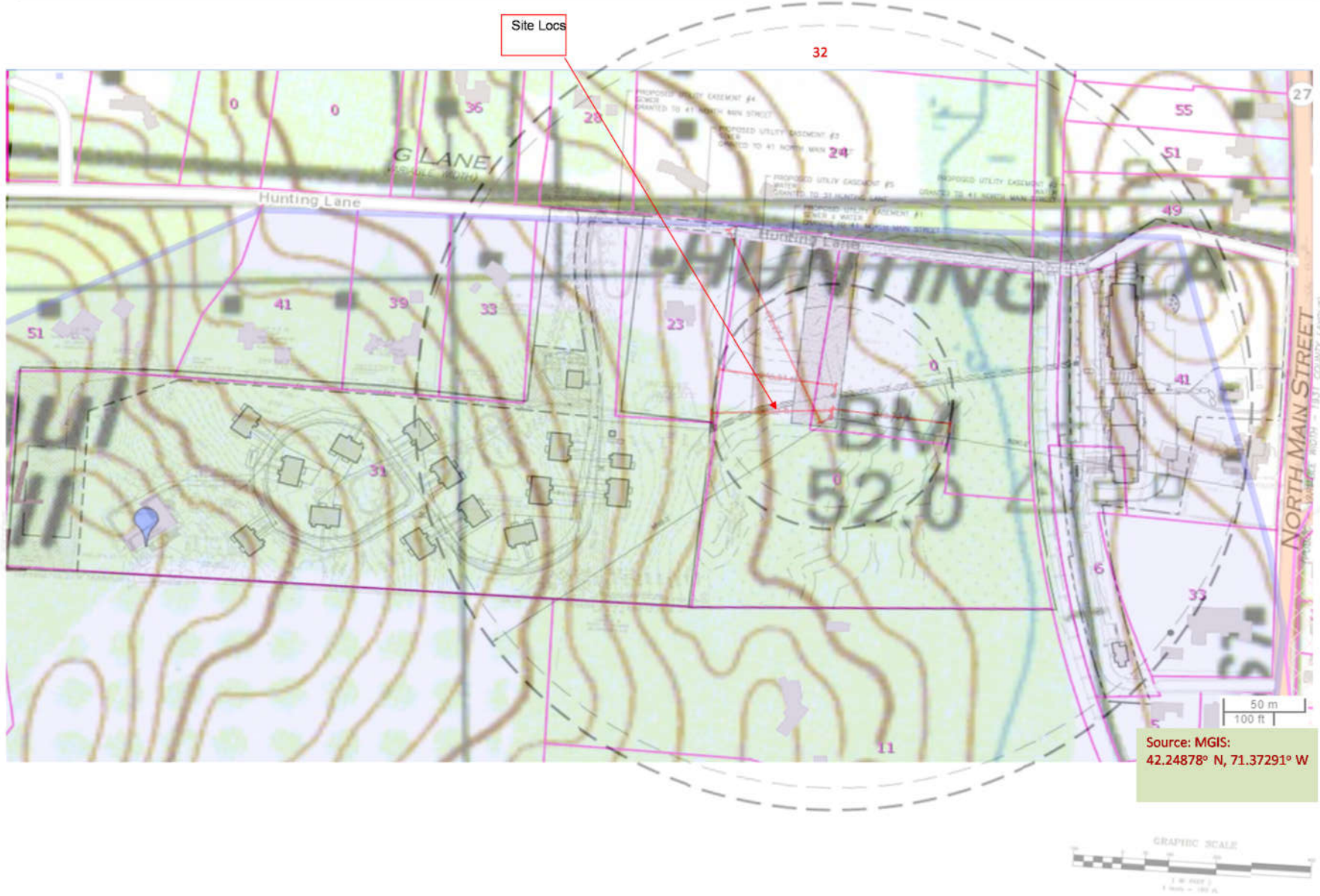

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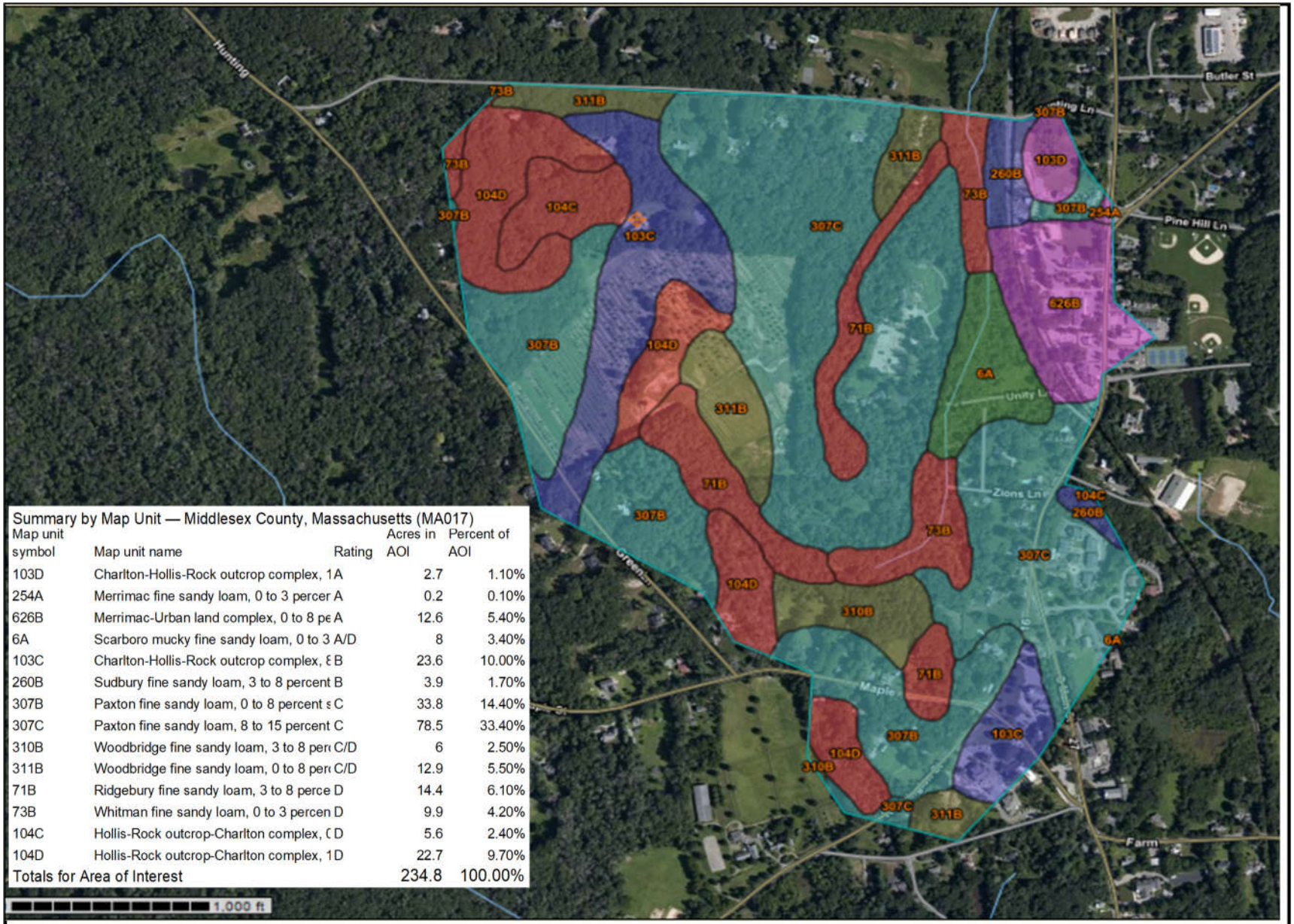

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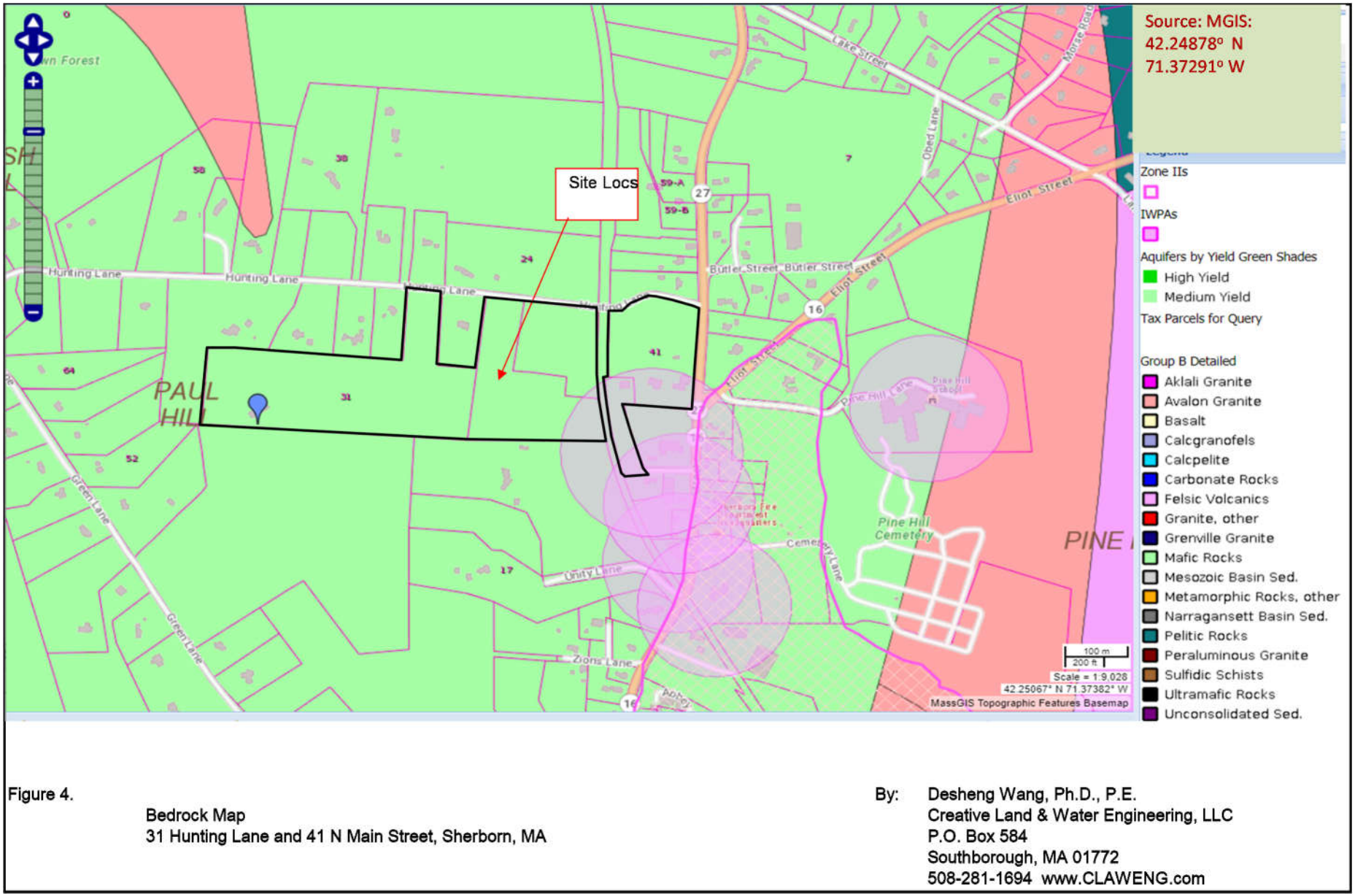

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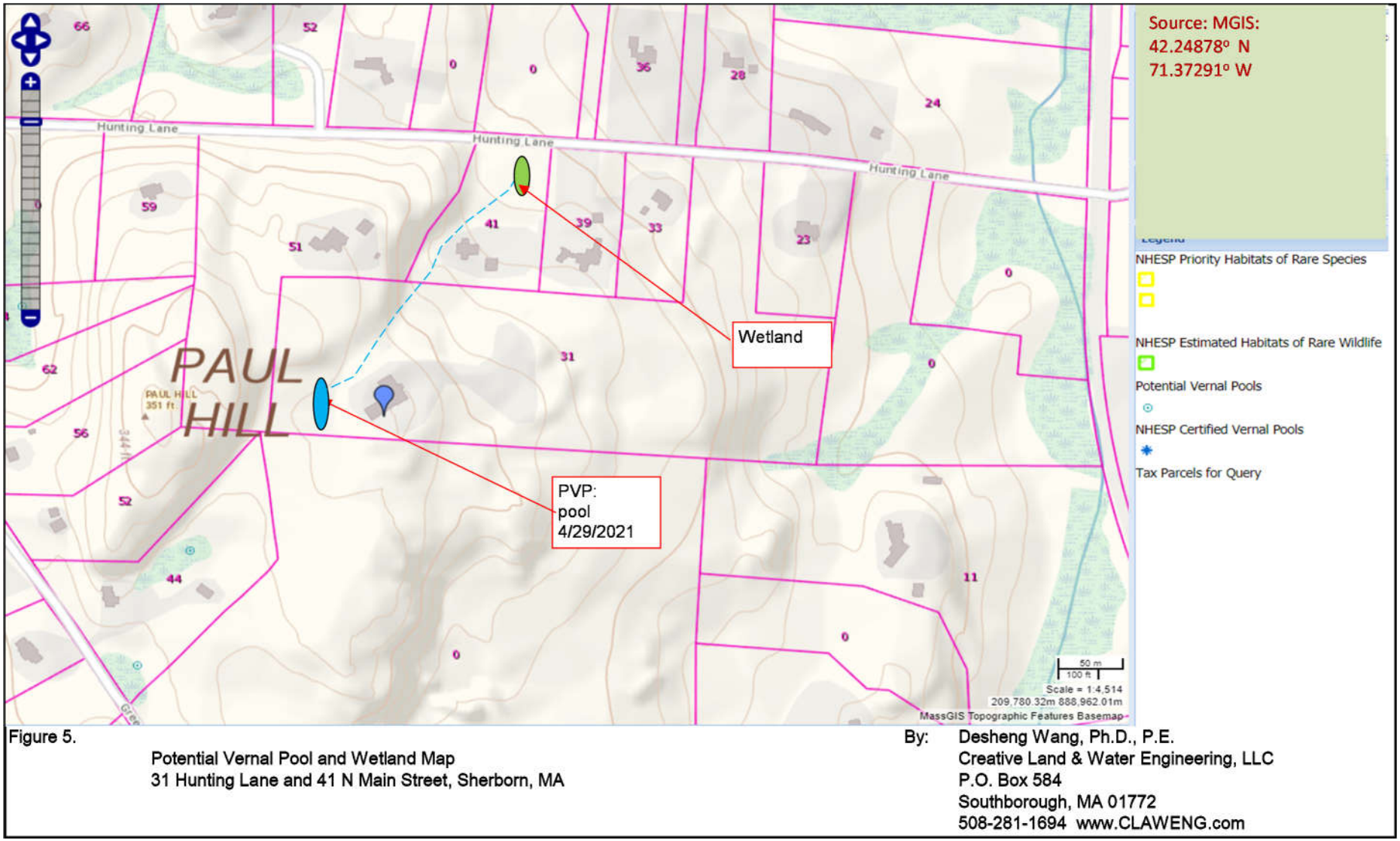

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Roger L. Demler
Engineering
169 Maple Street, Sherborn, Massachusetts 01770
508.653.2069 demler@msn.com

May 26, 2021

Sherborn Board of Appeals and files to:
Massachusetts Department of Environmental Protection

SUBJECT: 40B applications for 31 Hunting Lane and 41 North Main, Sherborn, MA.
Concerns about Sherborn's town center drinking water and wastewater

BACKGROUND:

Geology and slowly developing knowledge have resulted in safety and viability concerns for the water and wastewater capacities in the town center.

Geology has left Sherborn with a shallow overburden in most of the town. One of the two sites in town with a potential for a modest-capacity overburden well is now covered by a 40B development. The other potential for a preferred overburden well is a modest-capacity well that is fortunately on Town land about one mile from the center of town. All Sherborn wells have had to be drilled into bedrock where it is difficult to determine the source and capacity of the well and thus difficult to know how to protect the wells from contamination.

The shallow depth to bedrock in most of the town also restrains, otherwise desirable, wastewater onsite recharge for septic systems. Recent advances in alternative septic field equipment have helped with the practical repair and replacement of systems on individual lots. Large land areas are still desired to protect nearby wells.

Knowledge has slowly evolved in the understanding of the performance of wells and septic systems. Downtown Sherborn is an example of how wells and septic systems were permitted, by the state and the town, to be located too close together. The map below shows the 12 Public Water Supplies (PWS) Zone 1's in big red circles, over 40 private wells in blue circles, but few of the septic systems on every property. Only one PWS has a formal Zone 2 determination shown in slanted red. None of the PWS's could be permitted under current state regulations.

CONCERNS:

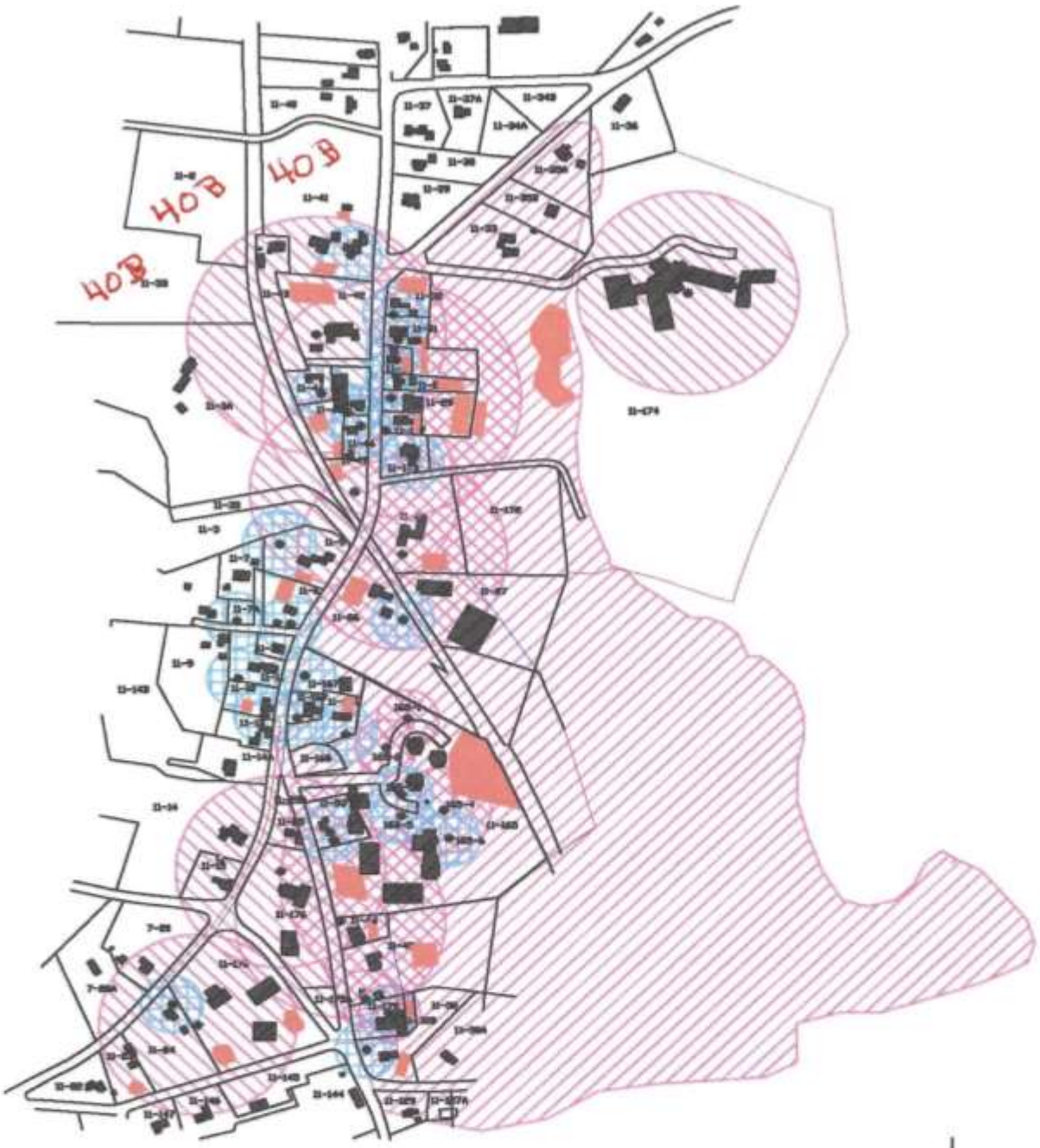
The two 40B sites intersect the PWS Zone 1 at the upper left of the map. The proposed PWS Zone 1 would overlap an existing Zone 1, a railroad, and a public road. The proposed sites are in the watershed for this already highly stressed area. Any failure of the 40B well or sewer systems would have an immediate impact on the neighbors either by loss of water capacity or water quality

The Town is actively trying to reduce the water stress here by considering either providing water from a remote well, and/or by adding a central sewer and treatment system. An overburden test well one mile from the town center appears to have the potential to supply enough water to the center but without much growth capacity. The 40B sites are at the head of the watershed for the Town's test well. A central wastewater system for the center appears to be feasible but would reduce only one of the risks to the centers water quality.

REQUEST:

Please exercise great care in the engineering, testing and evaluation of this critical project.

Roger Demler: Water Commission Chair, Town Center Water and Wastewater Options Committee Chair
Board of Appeals past Chair



Documented Septic Leaching Areas
DEP-Approved Zone II Protective Zone
DEP Regulated Wells Protective Zones
Other Private Well Protective Zones
Approximated Well Location (typ. bedrock)
Committee Study Area (arbitrary)
Town Center Water District
Parcel Boundary(ies)

Graphic Scale

N

PROJECTION OF RESOURCE AREAS SHERBORN TOWN CENTER

Presentation to Sherborn Water District Study Committee
Subject to references and limitations on record with Committee

May 26, 2021

Mr. Richard Novak, Chair
Zoning Board of Appeals
19 Washington Street
Sherborn, MA 01770

RE: 31 Hunting Lane/41 N Main Street
Sherborn, MA

Dear Mr. Novak and Board Members,

I am writing as a private citizen to express a few primary concerns I have regarding the proposed Pine Residences (41 N. Main St.) and Apple Hill Estates (31 Hunting Lane) development project. I am a Massachusetts Licensed Site Professional (LSP) of 23 years, and I am a member of Sherborn's Groundwater Protection Committee. I attended the Site Walk of 31 Hunting Lane on April 22, 2021. Having seen the property and having reviewed the geologic maps of the area, my concerns relate to impacts to drinking water quantity and quality of the downtown and Hunting Lane areas, including the proposed project.

Drinking Water Supply

1. The peer reviewer Jim Vernon from Nobis Group has concerns about the adequacy of the new drinking water supply wells installed for this project, particularly water supply well #2. There have been water shortages and wells running dry in our downtown area, including near this development. A well adjacent to the 40B at 59 North Main St (which is only half occupied at this point), had to be re-installed deeper, as I understand it to 800 feet, and there have been several other water supply/quantity issues and wells requiring replacement nearby on North Main St. and Hunting Lane over the years. Droughts have been increasing, and our area was in the category "critical drought" last summer and into the fall. There should be serious concerns about whether there is sufficient water supply to support this project with 87 new households, and how it will impact the surrounding residences and businesses, all of whom rely on groundwater as the only water supply.

Geology

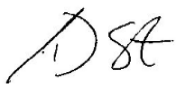
2. The proposed development property is bedrock controlled with numerous visible bedrock outcrops, overlain by a thin layer of glacial till which is a low permeability soil. Bedrock is shallow. Although the proponent plans horizontal drilling*, there will likely need to be bedrock blasting for building foundations and numerous trenches for underground utilities. Not only is blasting disruptive and can have consequences for abutters, but perchlorates are often used in this kind of blasting. MassDEP has identified that Perchlorates have contaminated several drinking water supplies in Massachusetts. Perchlorates are highly water soluble and can travel long distances in groundwater. Perchlorates affect the thyroid gland, and MassDEP has assigned a drinking water standard of 2 ppb for perchlorates, a very low concentration.

*Horizontal drilling also can have adverse effects on wetland areas and groundwater recharge. The drilling produces conduits in the ground, resulting in preferential flow pathways for precipitation and groundwater to flow away from the site, following the drilled trenches and piping, rather than recharging into the ground. This can change the local hydrology, drain wetlands, etc.

Infiltration Capacity of Septic Leach Field and Stormwater Management

3. Given the geology of the area (shallow bedrock and the low permeability thin overburden), and the shallow seasonal groundwater table (within two feet of the ground surface in some areas of the proposed septic leach field), there are concerns about the capacity of the soils at the property, including the proposed leach field and stormwater infiltration areas, to manage all the waste from 87 new households that are proposed at 41 N. Main St and 31 Hunting Lane and associated impervious surfaces. There are serious risks of impact to the drinking water quality of the existing nearby homes. The substantial mounding that could result at the sewerage infiltration area for all 87 new homes, and the nature of the thin glacial till overburden soils, can cause the discharged water to reach the existing water supply wells of the nearby residences via flow along the surface of the soil-bedrock interface and through bedrock fractures. It could also result in surficial break out as it flows downhill to the abutting properties. It is critical that the project does not degrade the drinking water quality of abutting and nearby properties.

Sincerely,



Andrea D. Stiller, LSP
205 Woodland Street
Sherborn, MA 01770

Attachment D

Groundwater Protection Committee
Review of Farm Road Homes Development Plans

To: Sherborn Zoning Board of Appeals, ZBA **Date: September 18, 2023**

From: Sherborn Groundwater Protection Committee (GPC)

Subject: Revised GPC Comments for ZBA on the proposed 40B Farm Road Homes (approved by vote at GPC 9-13-23 meeting).

Please know that the GPC is quite concerned with the acute lack of more affordable housing within our community. We encourage the Select Board, Town Administrator, and all Town residents to redouble efforts to find ways of adding, in a safe and compatible manner, more diverse and affordable housing stock. But the town's lack of a modern public water supply along with no public modern wastewater disposal system, to serve any parts of Sherborn, brings major public health challenges in constructing dense housing developments.

Please see our revised comments provided here and in the included set of figures/maps, for your consideration in conducting the continuing series of ZBA public hearings that started August 1, 2023, on this proposed 32-unit 40B project. This document includes key edits and additions from our initial draft comments to the ZBA sent on July 31, 2023. An added section summarizing the requests to the ZBA by the GPC contained in the body of the comments may be found at the end of this document.

Four major topic areas of concern to the GPC are briefly covered. More details and/or additional GPC concerns may be raised throughout the series of ZBA hearings as more information becomes publicly available. Comments here are limited to the current set of project files now posted on the Town's website, as of September 13, 2023.

1. **General Concerns:**

    a. The yet to be provided detailed plans for the i) one large private septic system, ii) seven private drinking water wells, and iii) site stormwater management plan and storm water structures, will each require significant review by the ZBA-designated engineering and scientific professional peer reviewers along with the appropriate Town boards and committees, including the GPC.

    b. The applicant is asking for very broad waivers that would essentially negate all existing Town bylaws that were adopted years ago to protect public health and the environment in this semi-rural town (no public water or wastewater services). We respectfully request that the ZBA not waive any of the Sherborn bylaws protective of groundwater, surface water, and stormwater, so that the ZBA can ensure the new residents of the proposed 32-unit development and all current and future Sherborn residents may continue to enjoy safe and contaminant-free groundwater.

    We believe multiple important local health risks are inherent in the proposed development plan, including foremost maintaining clean water standards that serve both the development and surrounding local private and public water supply wells, that are not adequately protected by compliance solely with applicable state standards. Understand that MA Chapter 40B does not override local protection of water resources. (Please see: **Reynolds v. Stow Zoning Bd. of Appeals**, MA Appeals Court No. 14-P-663, Sept. 15, 2015).

It is important to note here that both private wells (regulated by the Sherborn BOH) and public water supply wells (PWS, regulated by MassDEP) in Sherborn have been found within the past two years to contain unhealthy levels of PFAS (summary Sherborn PFAS data available from the GPC, and has been previously provided by the GPC to the Select Board and Town Administrator), suggesting that both our current Board of Health by-laws and MA Title V regulations may not be protective enough of groundwater against current and past contamination from "forever chemicals" like PFAS (PFAS and many other synthetic organic compounds are not degraded/destroyed when released in the environment, and pass through intact after "treatment" by simple Title V septic systems and more advanced treatment technologies like large multi-stage municipal wastewater treatment plants). Hence the GPC requests that no waivers of current Sherborn Board of Health and State regulations on septic and/or drinking water well designs should be granted by the ZBA for the proposed project.

c. Tree removal: Removal of trees for the development, roadways and the proposed Solar Panels will result in warmer temperatures of the ground, more evaporation and loss of groundwater, less surface water infiltration, and more potential for soil erosion. Please condition the project to limit the amount of mature tree removal in undisturbed areas.

2. **Wastewater/Septic Concerns:**

a. Project as proposed would generate a significant amount of septic effluent from the 32 new housing units (particularly as compared to the septic flow expected from the 4 homes as shown in the original by-right plan for this site and adjoining parcel), raising major concerns about septic leach field capacity (soils, mounding and distance to groundwater table, nitrogen (nitrate) loading, protection from storm water runoff/flooding, etc.) and long-term wastewater treatment system performance. Based on the total bedroom count (76) and the per bedroom design flows of 110/gal/bedroom, an estimated wastewater flow for the project is **8,360 gal/day**, as listed in the proposed plans.

The ZBA and the developer must always keep in mind that Sherborn is about 95% reliant on private drinking water wells and private septic systems, with existing 1-to-3-acre residential zoning allowing the wells and septics to be co-located on each 1 to 3-acre residential parcel for public health protection and for providing enough distance between on-site and abutter's wells/septics. A dense development with onsite wastewater generation requires a specific and conservative design plan that accounts for reliance on private well and septic and is protective of neighboring properties, given the plan of concentrating **8,360 gal/day** septage within a single large leaching field area.

Current state regulations require MassDEP permitting of septic systems with flows of greater than **10,000 gal/day**, with annual sampling/monitoring covered in the permits to head off any future issues, the most concerning of which being groundwater contamination (see MA 310 CMR 15.000, current 7-7-23 published version available at: https://www.mass.gov/regulations/310-CMR-15000-septic-systems-title-5 . THE STATE ENVIRONMENTAL CODE, TITLE 5: STANDARD REQUIREMENTS FOR THE SITING, CONSTRUCTION,

INSPECTION, UPGRADE AND EXPANSION OF ON-SITE SEWAGE TREATMENT AND DISPOSAL SYSTEMS AND FOR THE TRANSPORT AND DISPOSAL OF SEPTAGE). Could the ZBA condition the project and proposed septic system to seek MassDEP design review and annual monitoring? It would seem obvious that a 32-unit 8,360 gal/day wastewater system should not be seen as comparable to a single-family 4-bedroom home's 440 gal/day Title V septic system in terms of a threat to groundwater contamination and risks to public health. The safeguards afforded to systems with flows greater than 10,000 gal/day septage by MassDEP permitting and oversight would be most protective of public health for this large development.

Please be aware also that recent studies on the presence of "emerging contaminants of concern", like PFAS (per- and polyfluoroalkyl substances) are showing up now in concentrations above the most current US EPA health advisory levels (see: https://www.epa.gov/sdwa/and-polyfluoroalkyl-substances-pfas) in Massachusetts private wells state-wide (ref: **MassDEP Private Well PFAS Study 2021-22**; see: https://www.mass.gov/info-details/pfas-in-private-well-drinking-water-supplies-faq . In Sherborn 34 homeowners participated in this study, and 5 wells were found to exceed the current MA PFAS6 MCL of 20 ppt, which the US EPA has now proposed to lower further to 4 ppt for each of two individual PFAS, PFOA and PFOS (see earlier EPA reference). The Sherborn private well exceedances above 20 ppt MA PFAS6, equaling about 15% of the small data set of Sherborn wells sampled, is running about 3 times the State average of 5% for the approximately 1,800 private wells tested state-wide.

Also, there are currently 14 public water supply (PWS) wells regulated by the MassDEP in Sherborn, and over the past two years, 4 of the 14 PWS wells have reported sampling events with MA PFAS6 levels above 20 ppt, and another 7 Sherborn PWS wells were at > 10 ppt PFAS6. (PWS data available at: https://eeaonline.eea.state.ma.us/portal#!/search/drinking-water). These concerning PFAS occurrences in the Sherborn private and public wells may be in part attributable to influences of nearby septic leachate, largely from single-family homes and small businesses/Churches/municipal buildings septic systems, discharging PFAS into their septic systems as the source of the groundwater contamination **("PFAS in the Commonwealth of Massachusetts"**, MA Legislature PFAS Interagency Task Force, final report: file:///C:/GIS%20data_Pace%202023%20Course/Massachusetts/Census%20Data/Downloads/HD5054%20(1).pdf).

b. USGS Surficial Materials maps of this site area indicate a significant amount of bedrock outcrops, and shallow depth of overburden soils, including areas not far from the general location of the set of proposed two large septic leach fields located west of proposed house units # 11 – 18 (**Figure 1**, general area of proposed site, mapping source: MassGIS).

Given the amount of bedrock known to be present at this site, sufficiency of the overburden soil absorption areas and depth/volume of soils to treat adequately this large amount of septic effluent must be evaluated by an independent professional hired on behalf of the Town.

Infiltration of this large daily volume of wastewater onto the bedrock-controlled land could result in untreated water reaching nearby properties. Groundwater tends to flow preferentially along the soil overburden-bedrock interface. Untreated wastewater would also flow along this

interface in the direction of the slope of bedrock. Untreated septic waste could also enter bedrock fractures and flow to neighboring properties and wells. The topography of the land at the septic system shows a steep downward slope downward to the west/southwest, so properties to the west/southwest are downgradient of the septic system and could be impacted by it. Since the impacts of mounding and the direction of bedrock fractures is not known, locations in other directions may also be downgradient and impacted by the septic waste.

c. The depth to the groundwater table needs to be well defined and monitored over the seasons and after rain events in the areas of proposed septic and stormwater infiltration areas. Depth to groundwater can vary dramatically on a day-to-day basis, especially for land where bedrock is shallow, and groundwater can be perched on the bedrock. Increased storms and precipitation events could result in shallower groundwater table depths than those observed at the site during the test pit program. This needs to be carefully defined to ensure proper infiltration capacity is available.

d. We respectfully request the ZBA now have a professional analysis undertaken of subsurface conditions by the applicant, to include bedrock geology, with a profile of the depth to top of bedrock at key areas within the property including proposed leach field areas and stormwater management infiltration locations, plus determinations of soil absorptive capacity, leaching capacity, and hydrologic modeling to identify potential fate and transport of leachate both on- and off-site. This detailed study should include a rigorous nitrate loading analysis taking into consideration the existing abutters wells, the multiple public water supply wells (PWS) west of the site, and the new proposed development's seven private wells. Please be aware that prior to this 40B proposal submission this same site was under local review for a development by this 40B applicant involving just a few new homes. At that time an abutter's hired expert water resources consultant calculated from the associated proposed septic plans a modeled groundwater nitrate concentration above the MassDEP nitrate MCL (max contaminant level) that could negatively impact abutters existing properties and drinking water wells (see Scott Horsley BOH testimony of Feb 16, 2022, meeting minutes at: https://www.sherbornma.org/sites/g/files/vyhlif1201/f/minutes/m22-0216.pdf , video recording available). With this significantly larger 40B proposed project a more extensive nitrate study needs to be performed and new attention be paid to protect both the new 40B dwelling drinking water wells, the existing abutters wells, and the several PWS wells located west of the site, (Rt 16/27 area, **Figure 2**), and downgradient wetlands.

Please also note that MA Title V regulations address nitrate concerns, and recommend for septic systems larger than 2,000 gal/day flows:

"For design flows of 2000 gpd or greater, the local approving authority or DEP may require a site-specific mass balance analysis for the area of impact. The mass balance analysis must demonstrate that the groundwater quality standard of 10 mg/l total nitrogen and 10 mg/l nitrate nitrogen will be met at the downgradient credit land property boundary, or at the nearest downgradient sensitive receptor." (Ref: MassDEP GUIDELINES FOR TITLE 5 AGGREGATION OF FLOWS AND NITROGEN LOADING, 310 CMR 15.216).

Areas of potential impact down gradient of the proposed large septic leach field include private wells and nearby wetlands.

3. **Drinking Water/Groundwater Concerns:**

a. Seven private wells, located largely along the northeast border of the site, are planned to provide potable water for the 32-unit development, presumably to preclude the alternative installation of a fewer number of wells that would trigger regulation as public water supply wells by MassDEP (service of 25 or more residents per a single PWS well). This 7-well design is not particularly protective of the health of the new residents, as the Sherborn current BOH regulations only require "private" well water quality sampling/testing at the time of initial well installation, and nothing more in the way of water quality testing **at any time in the future**. MassDEP regulation of PWS wells often requires (dependent on total expected flows and population served) annual testing for certain common contaminants and would alert residents of any future public health risks. We suggest that the proximity of these seven wells to each other function as one or more public water supply well(s) and should be managed as such.

We are aware of the August 14, 2023, letter from MassDEP to the developer regarding a preliminary determination and approval by the agency that the 7 wells be not regulated as PWS wells.

The ZBA should also request extended well pump quantity (flow) testing with additional concurrent monitoring at existing abutter wells, given the number of occupants (76 bedrooms as proposed) and associated water production requirements for the seven wells. Pump tests should reflect conditions when all seven wells are pumping at the same time as they will work independently to provide water to specific and distinct housing units. Even with projected increased storms and rainfall, future drought conditions are also expected to be worse as we have seen in Sherborn just recently with the record 2022 drought (storm events do not necessarily contribute appreciably to available groundwater volumes due to fast surface runoff).

b. We have concerns that untreated or inadequately treated wastewater could infiltrate bedrock fractures, and rapidly travel to any new or existing bedrock drinking water wells on- or off-property, thus compromising drinking water quality (see **Figure 2**). Moreover, it can take years for problems to develop in deep bedrock wells, given the unknown flow patterns underground.

c. Bedrock blasting, hammering, or drilling related to construction activities near bedrock outcrops in other parts of Sherborn in recent years have mobilized pollutants (e.g. manganese) and impacted nearby drinking water wells. If this development requires any blasting to address observed bedrock outcroppings around the site, please request a condition to preserve the integrity of the existing wells in the vicinity

4. **Stormwater Concerns:**

a. The entire project, with 32 new homes and associated paved sidewalks, driveways, parking areas, and the access road represents a significant amount of new impervious surfaces all concentrated in the center of the 14-acre property. The stormwater plans will require rigorous peer review by a professional hired by the Town. One large stormwater basin is proposed to be located adjacent to and upgradient from the development's large pair of septic leach fields.

Stormwater that infiltrates or overflows and reaches the septic system leach field area could compromise the capacity and treatment capability of the septic system.

b. Another proposed stormwater basin is located downhill to the existing pond at the southeast end of the property. The pond already varies constantly in total size and depth based on average seasonal precipitation and groundwater levels (see **Figure 3**, with two examples of the change in pond size/area over the years). The new main entry road and potentially some housing units, as currently shown in the plan, may experience flooding, even with the proposed berm addition, if the pond expands significantly following a future storm event, and adding additional storm water to this area from the development's stormwater basin would worsen flood conditions. Future climate change trends will only exacerbate the extent of this flooding. A stormwater plan evaluation would need to account for the full drainage area tributary to the overall site and especially the existing pond.

c. As discussed during earlier Town board/committee reviews of previous development applications for other projects at this site and an adjacent parcel the last few years, residents along this area of Farm Road have complained to Town officials about general current flooding issues on this section of Farm Road, and, on a nearby property (see minutes from Select Board 4-6-23 meeting at: https://www.sherbornma.org/sites/g/files/vyhlif1201/f/minutes/04-06-2023.pdf , corresponding video recording also available).

Moreover, the current USGS surface water resources map for this area (USGS StreamStats, https://streamstats.usgs.gov/ss/) depicts a water course feature on the site running along the southern edge, parallel to Farm Road, flowing west into a wetlands just downhill of this property, and eventually connecting to the larger Sewall Brook stream west of this site (see **Figure 4**). We request the stormwater plan review consultant hired by the ZBA take these known facts into consideration when determining the adequacy of the final stormwater management plan, and future stormwater flows that may impact neighboring properties and Farm Road itself; currently the Town of Sherborn is dealing with flooding issues on Farm Road adjacent to this site.

d. The critical topic of future climate change impacts needs to be taken into serious consideration in the design of this project and the required stormwater mitigations, given the future projected much larger storm events with expected larger rain/snow amounts, and higher annual precipitation levels.

The future higher than past historical annual and per storm event precipitation levels now predicted as compared to current design standards need to be considered for all the concerns raised by the GPC here on groundwater/septic/stormwater including the existing pond on the property that varies in size and depth based on annual precipitation amounts. ZBA should request consideration of climate change in the selection of "design storms" that are used to size and capacity of stormwater management features. The expected storm sizes predicted for the next half century are quite large for eastern Massachusetts, illustrated by the table shown here (taken from "Charles River Climate Adaptation Flood Mitigation Implementation Plan", MA MVP grant, Charles River Watershed Association, 2022; table 2.2 on page 6, pdf document available at: https://www.crwa.org/watershed-model)

Table 2.2 Proposed 24-hour design storm rainfall depths for future scenarios used in the Charles River Flood Model

Recurrence Interval	Present Day Baseline (in) (NOAA Atlas 14)	2030 Cornell IDF Projections (in) (2 °C Average Annual Temperature Change)	2050 Cornell IDF Projections (in) (3 °C Average Annual Temperature Change)	2070 Cornell IDF Projections (in) (4.5 °C Average Annual Temperature Change)
2-yr	3.34	3.82	4.09	4.53
10-yr	5.22	5.97	6.39	7.07
25-yr	6.39	7.31	7.83	8.66
100-yr	8.19	9.38	10.04	11.11
500-yr	11.18	12.80	13.69	15.16

Summary of GPC requests of the ZBA and peer reviewers on the proposed development:

1. ZBA to not waive any Sherborn by-laws protective of groundwater, surface water, and stormwater.
2. ZBA to ensure thorough study of all septic plans (including nitrate/nitrite loading), drinking water well plans, and stormwater management plans by experienced peer reviewers.
3. ZBA to keep to a minimum the disruption of undeveloped lands and mature trees on the property.
4. ZBA to consider, if proposed development is to be approved, to condition the project to add protective measures and oversight on design of 8,360 gpd septic as per MA Title V 10,000 gpd regulations.
5. ZBA to require a comprehensive nitrate loading/mass balance study be performed by the developer on the larger than 2,000 gpd septic system.
6. ZBA to require a professional analysis be undertaken of subsurface conditions by the applicant, to include bedrock geology, with a profile of the depth to top of bedrock at key areas within the property including proposed leach field areas and stormwater management infiltration locations, plus determinations of soil absorptive capacity, leaching capacity, and hydrologic modeling to identify potential fate and transport of septic and stormwater leachate both on- and off-site.
7. ZBA to require extended well pump quantity (flow) testing on the seven new private wells servicing the proposed development, with additional concurrent monitoring at existing abutter wells, by the applicant and overseen by peer reviewers and BOH.
8. ZBA to direct peer reviewer studying site stormwater plans to pay particular attention to current and future abutter and Farm Road flooding issues and impacts.
9. The impacts of increasing severity of future larger storms, higher temperatures, and more frequent droughts (climate change impacts) needs to be fully evaluated by a knowledgeable peer reviewer to evaluate impacts to groundwater supply (quantity and quality) and stormwater mitigation.

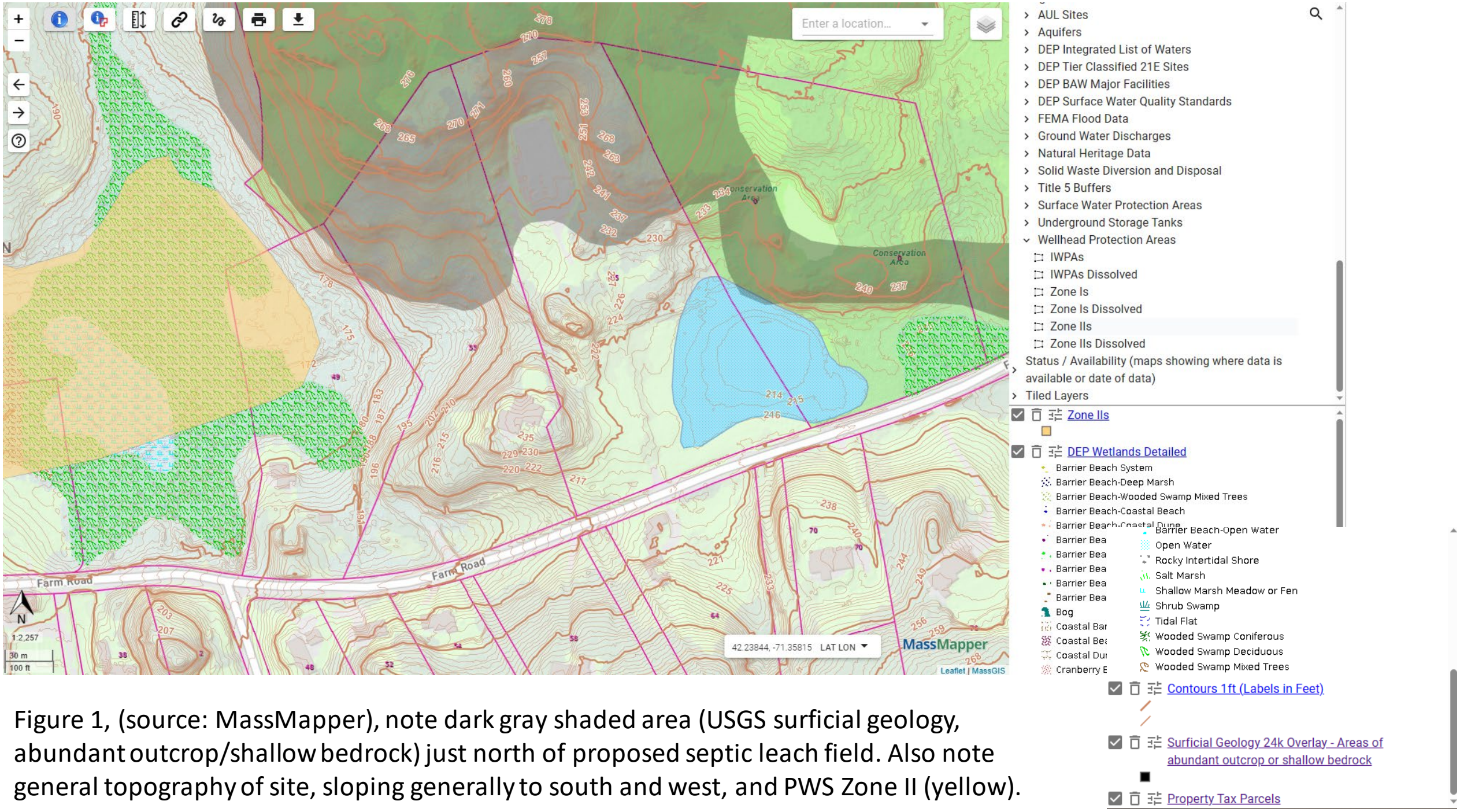


Figure 1, (source: MassMapper), note dark gray shaded area (USGS surficial geology, abundant outcrop/shallow bedrock) just north of proposed septic leach field. Also note general topography of site, sloping generally to south and west, and PWS Zone II (yellow).

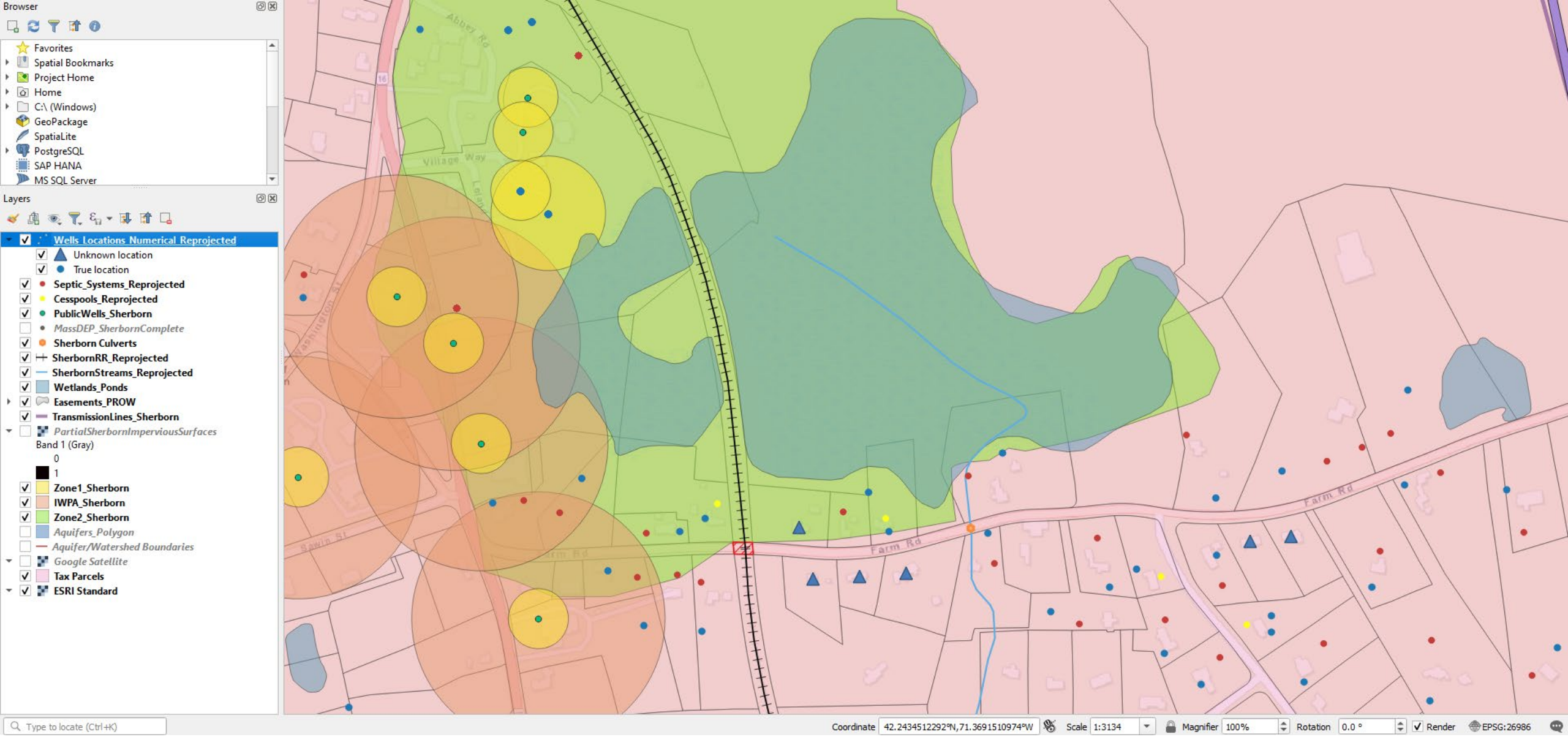
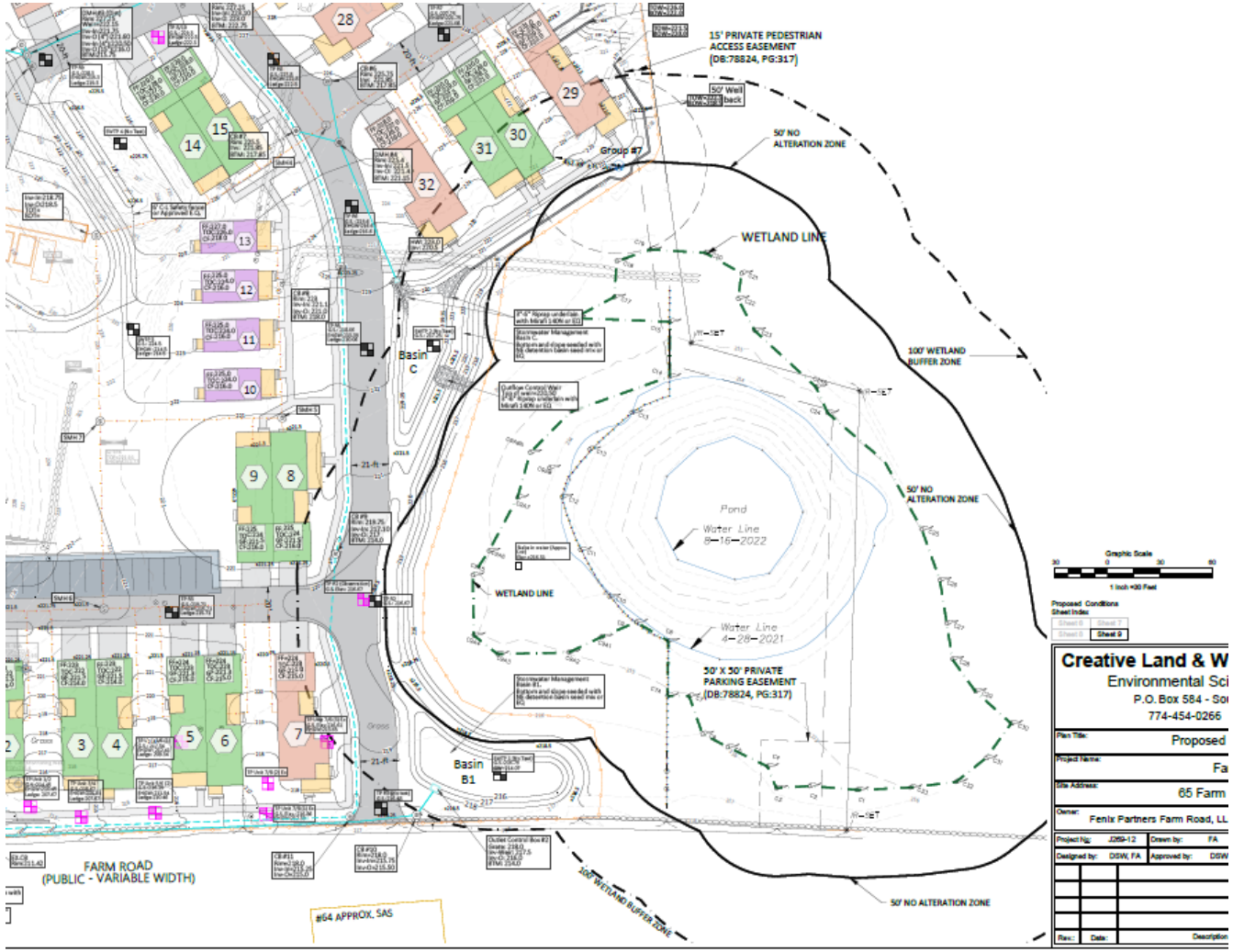


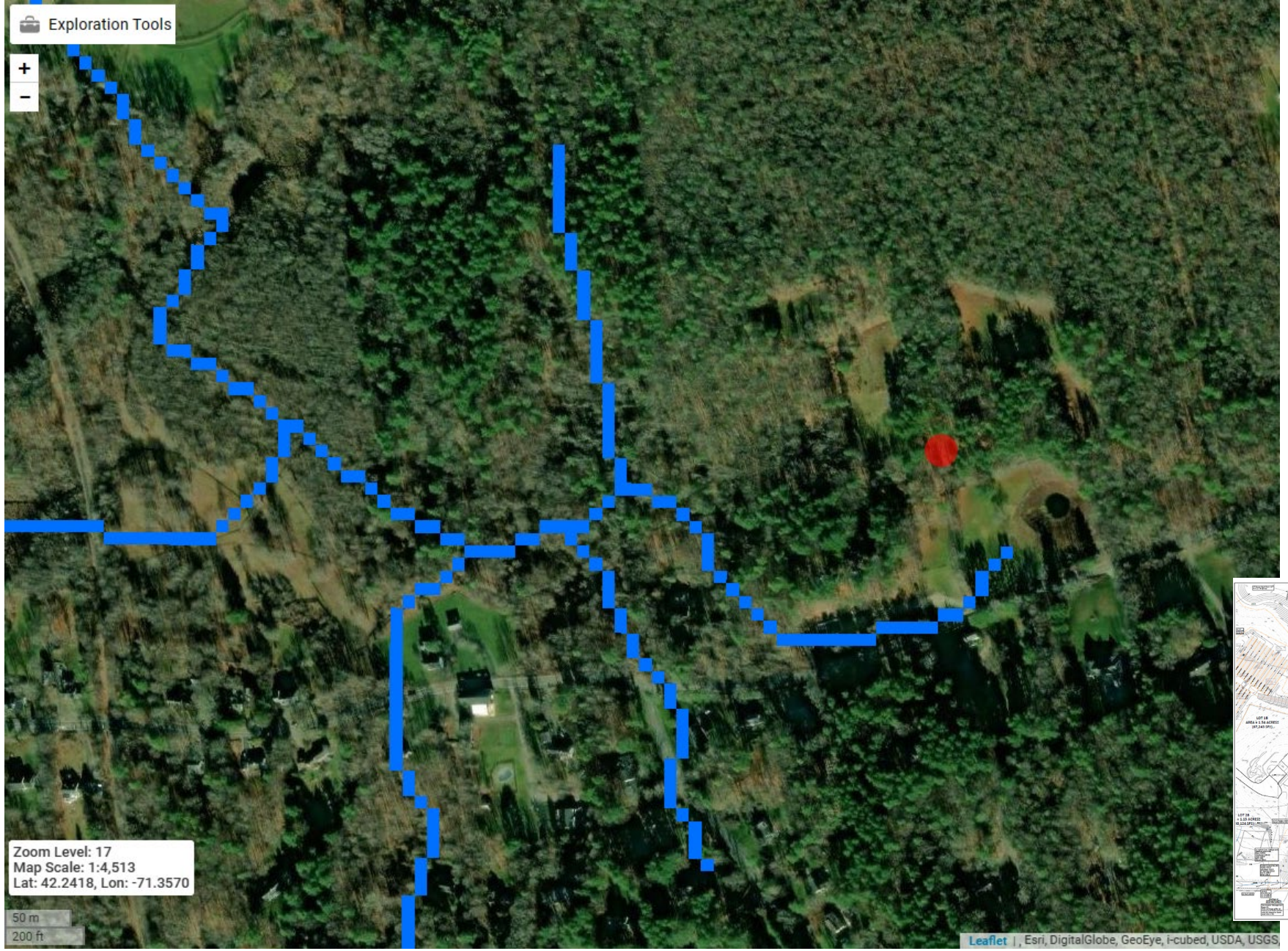
Figure 2. Protective zones of several Public Water Supply (PWS) wells – Zone 1 (yellow), IWPA (pink), and Zone 2 (light green) just west of proposed site. Map source: current GPC ARPA-funded Sherborn well/septic mapping project (MassGIS PWS layers). Blue dots represent known private well locations (BOH records), blue triangles indicate private well location unknown.

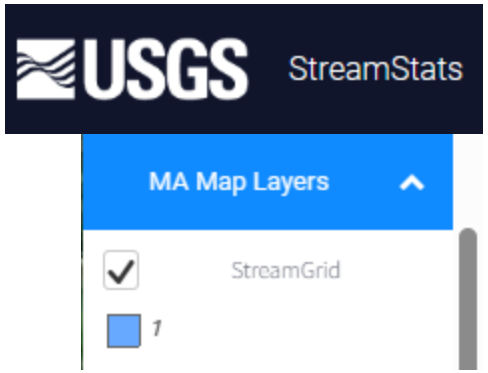


2005:

2021:

Figure 3. Proposed site plan (southeast section), above. Areal photo views, by year, from MassMapper, showing range in pond surface area along Farm Road.





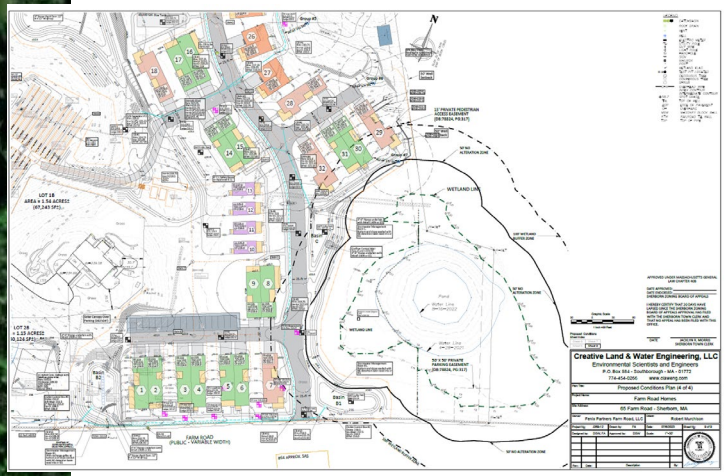


Figure 4, USGS StreamStats surface water features. Water course with known flows west to Sewall Brook.

Attachment E

Orthographic Documentation of Historical Seasonal Flooding on 53-55-65 Farm Road

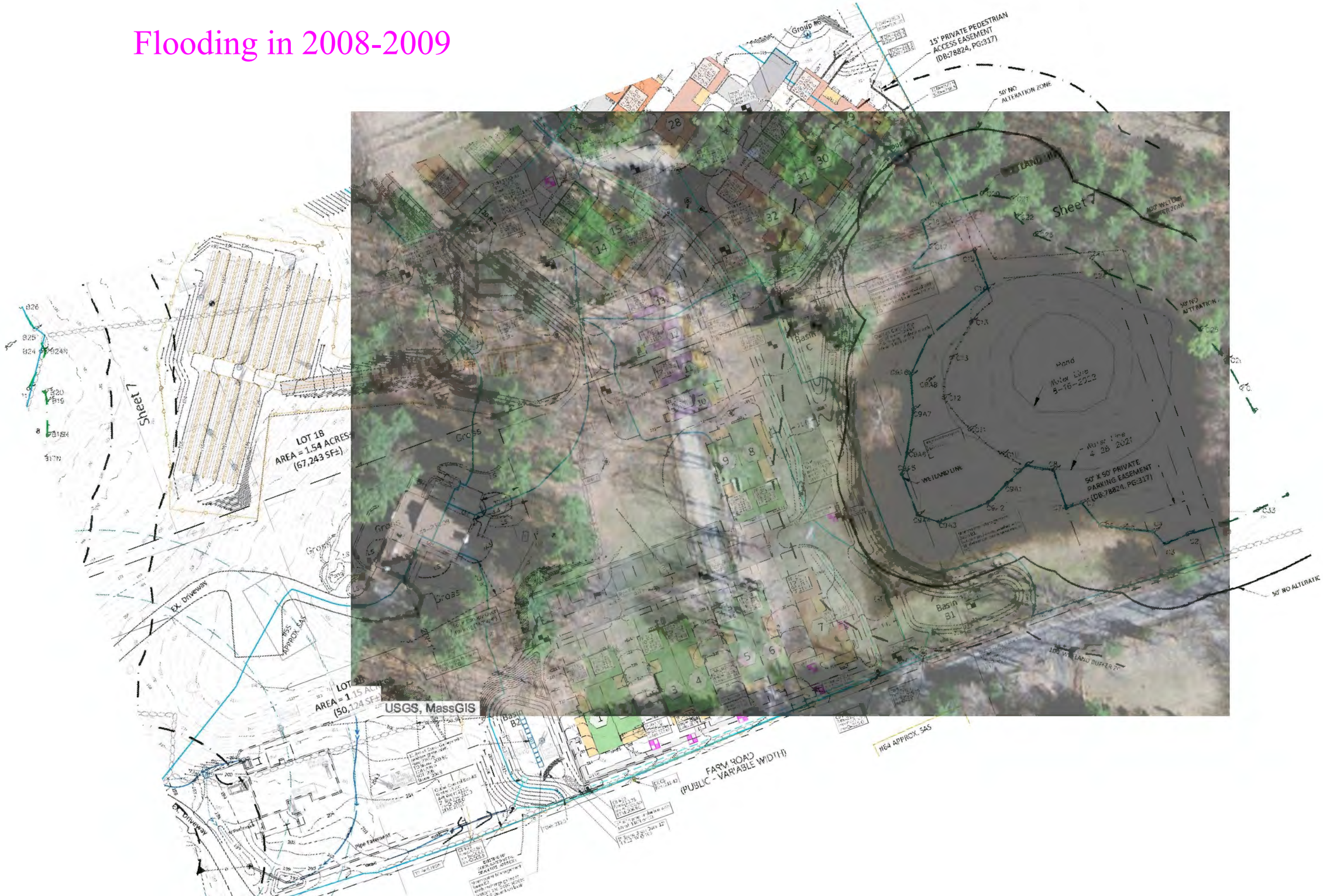
Flooding in 2013-2014

USGS, MassGIS

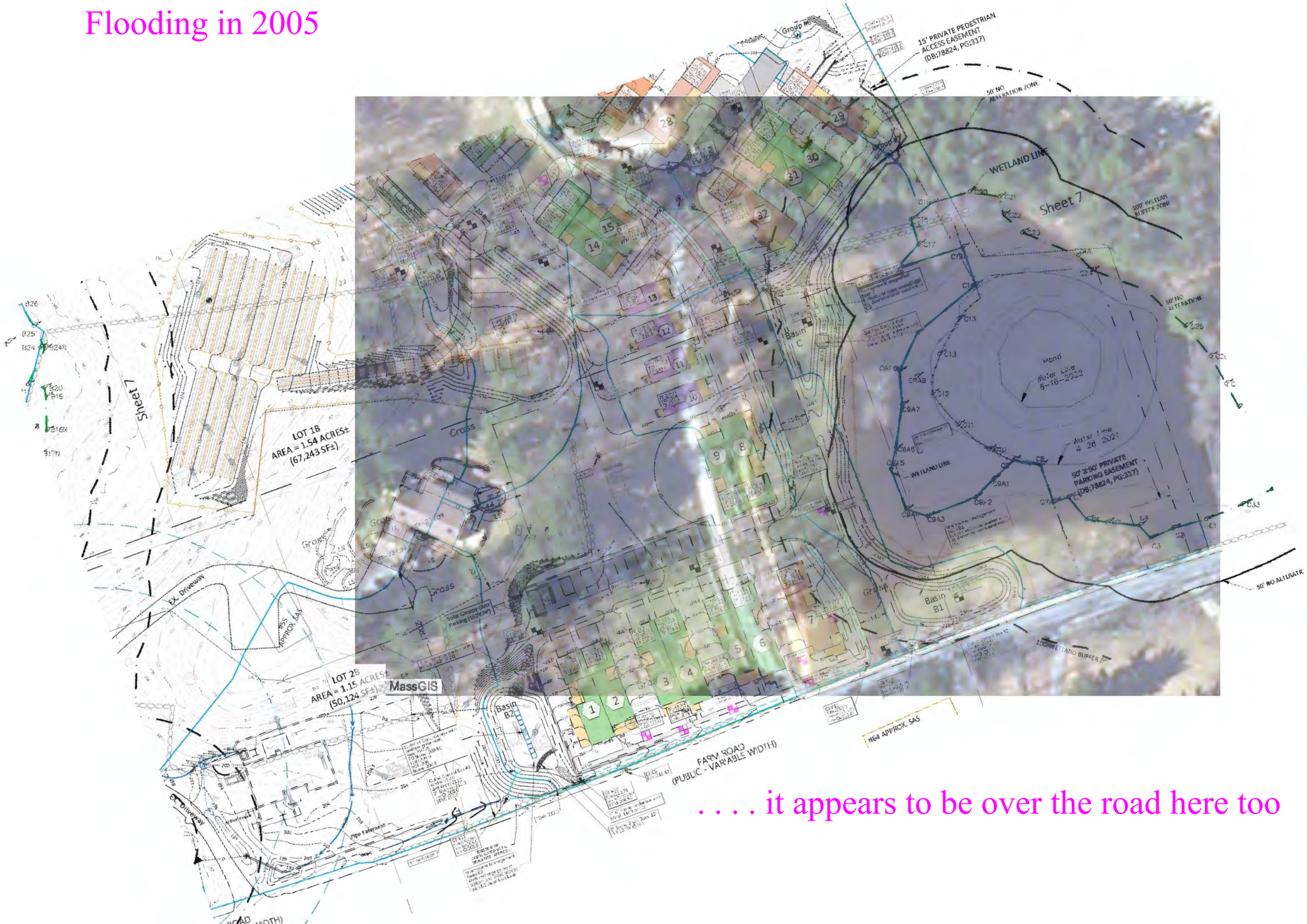
Flooding in 2011-2012

. . . . here it is over the proposed road

Flooding in 2008-2009

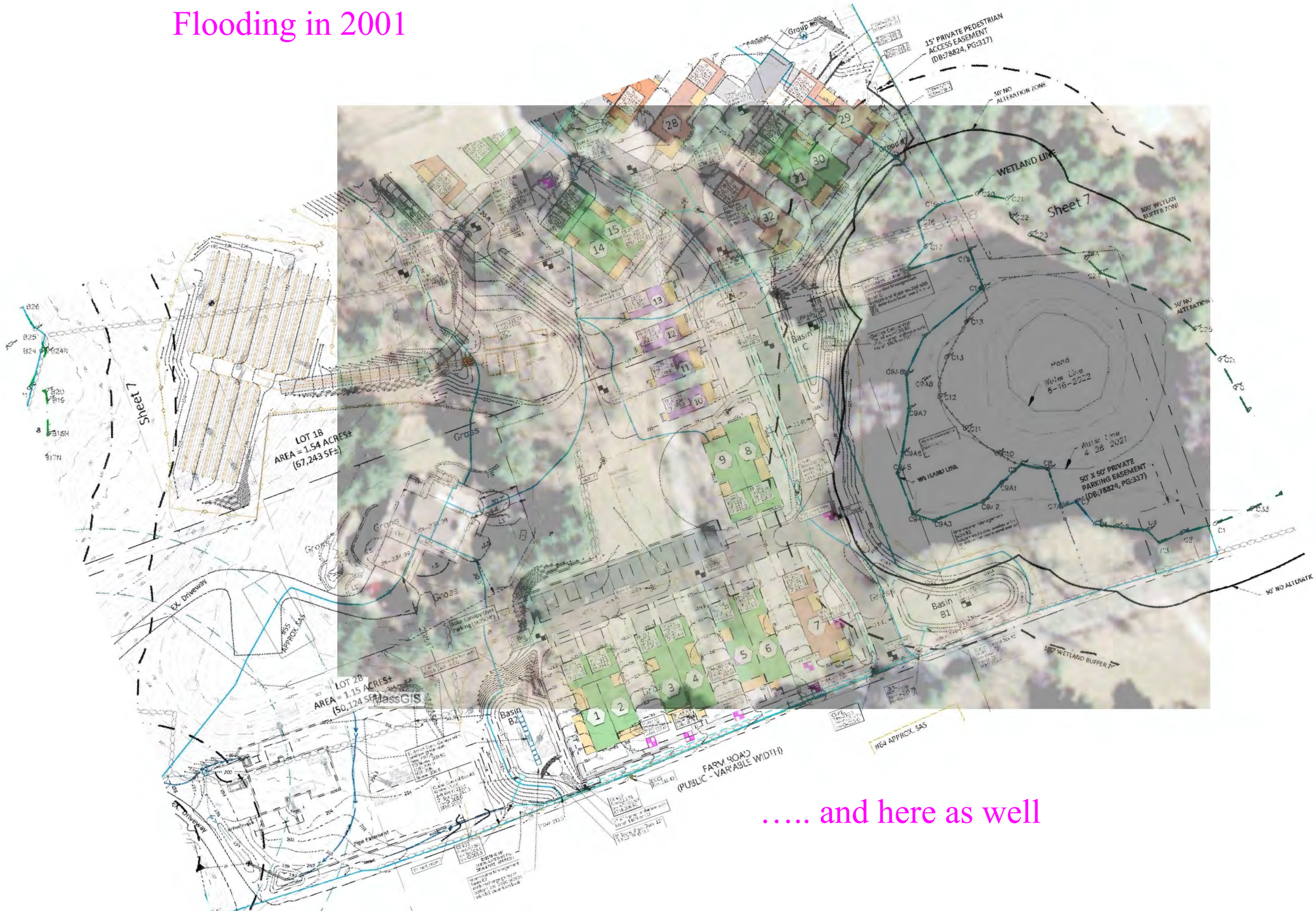


Flooding in 2005



. . . . it appears to be over the road here too

Flooding in 2001



….. and here as well

Attachment F

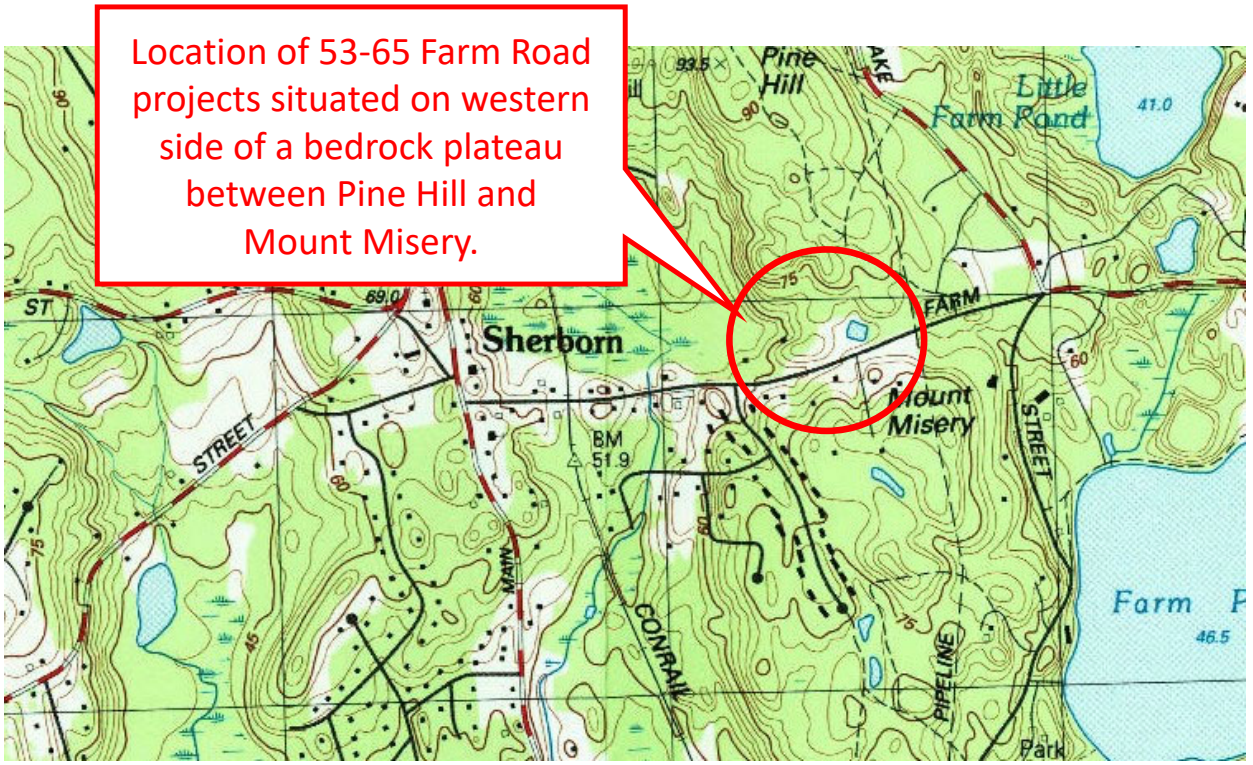
Presentation on the
The Farm Road Watercourse

The watercourse on 53-65 Farm Road.

Presented by Brian Moore

(Images reproduced from public domain documents published by MassDEP, USGS, and plans filed with the Town of Sherborn by Creative Land & Water Engineering LLC.)

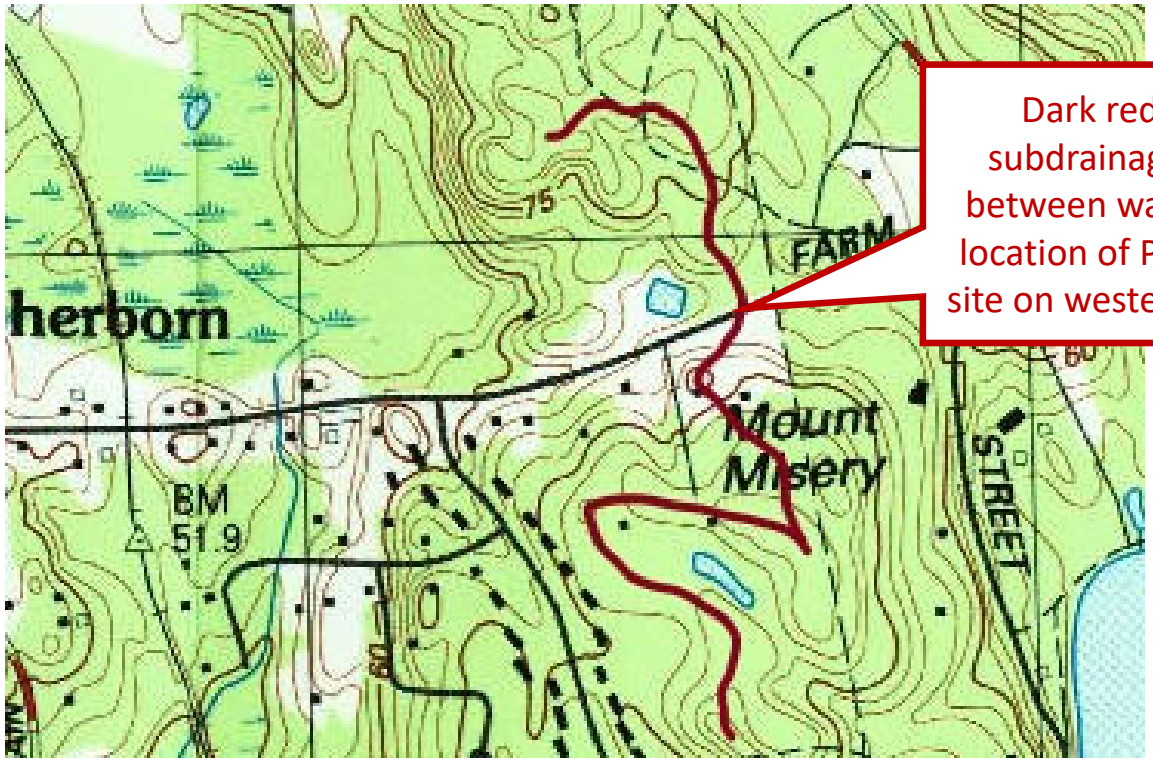
Surficial Geology of Sherborn is dominated by glacial till – a thin ice-contact deposit associated with low permeability and saturated thickness.



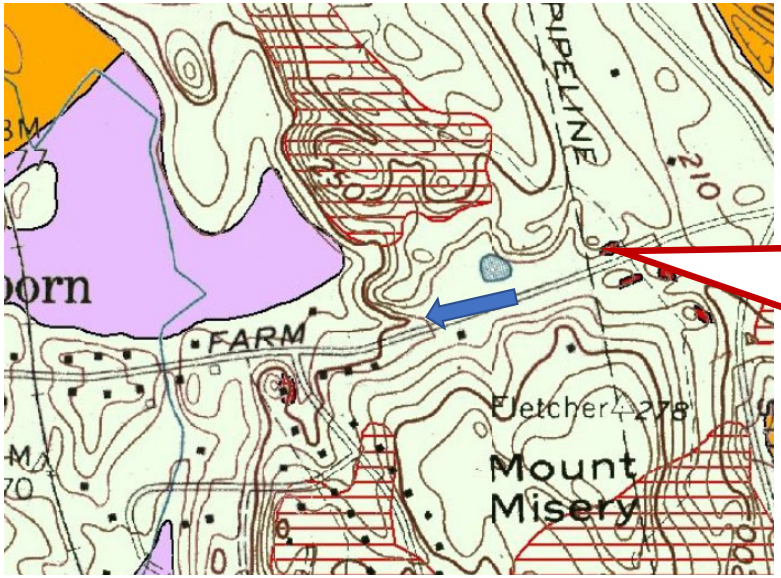
This deposit of thin glacial till contains a disproportionally high percentage of fines which serve as controlling factors in flow and recharge rates.

Groundwater can be ‘perched’ and typically interacts directly with surface waters in these types of unconsolidated surficial deposits.

Local drainage divides between subdrainage basins place this area in the Sewall Brook watershed where precipitation is directed into the Pond and regionally to the west.

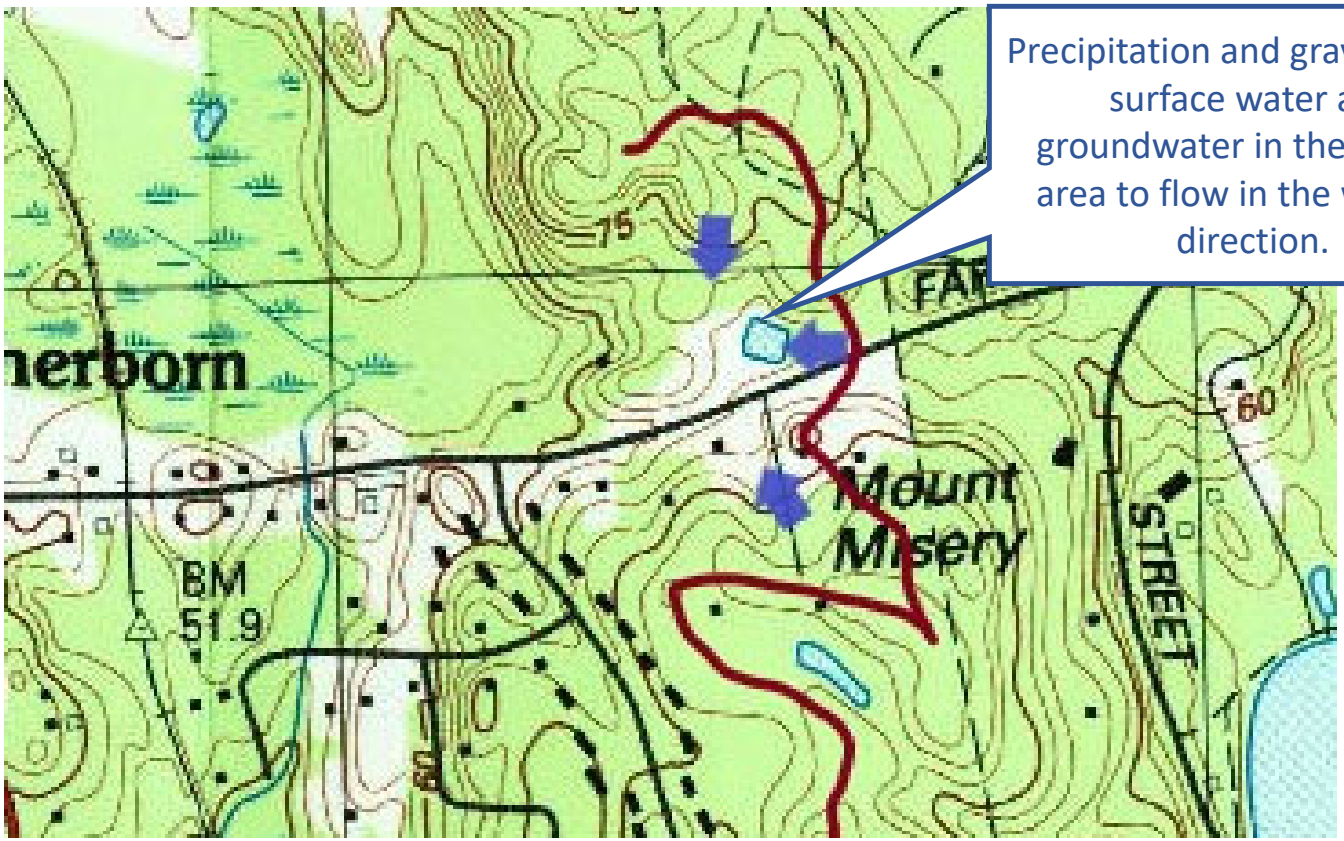


Local outcrops of ‘ledge’ indicate bedrock is protruding through or is located very close to the ground surface in the project area and therefore also serves to further control water flow through the overburden.



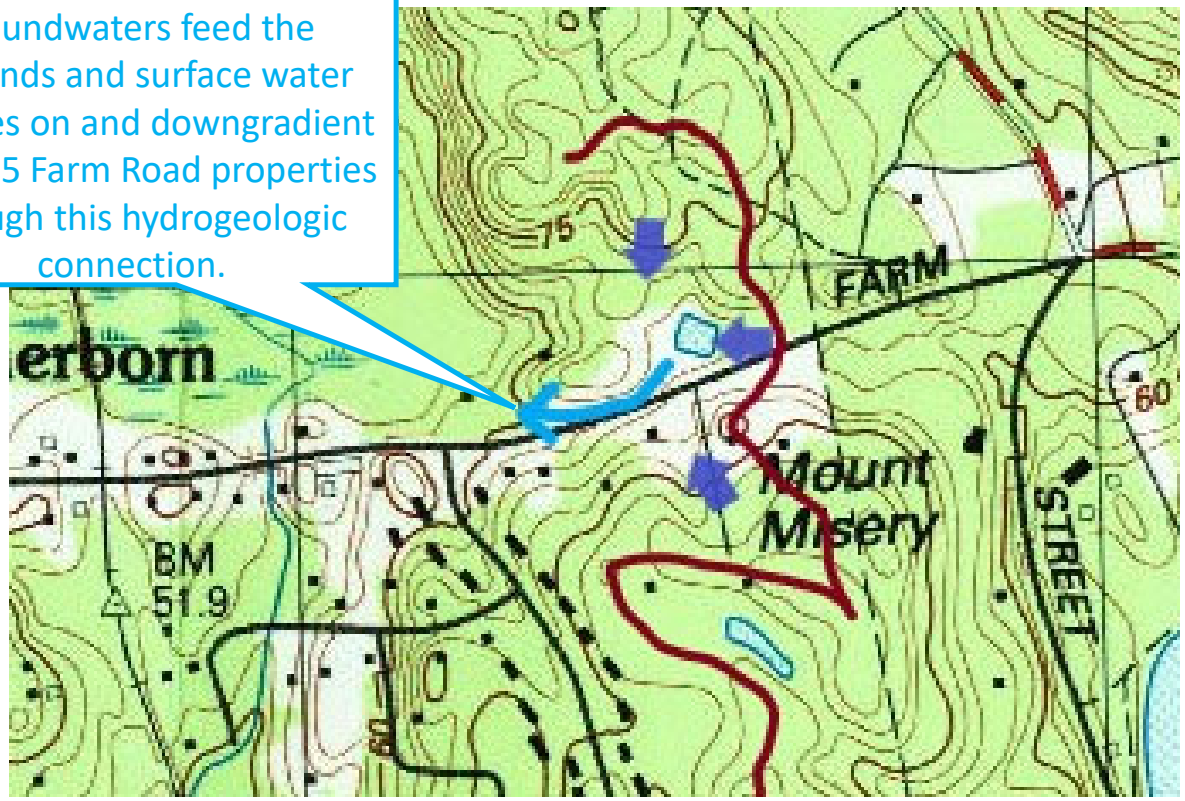
Dark red hatching depicts outcrops or bedrock, which serve as a type of funnel directing groundwater flow to the west.

Precipitation across project site recharges the Pond, groundwater, and wetlands to the west.



Surface water and groundwater then combine along a micro-valley which runs east-west parallel to Farm Road on the 53-65 Farm Road parcel.

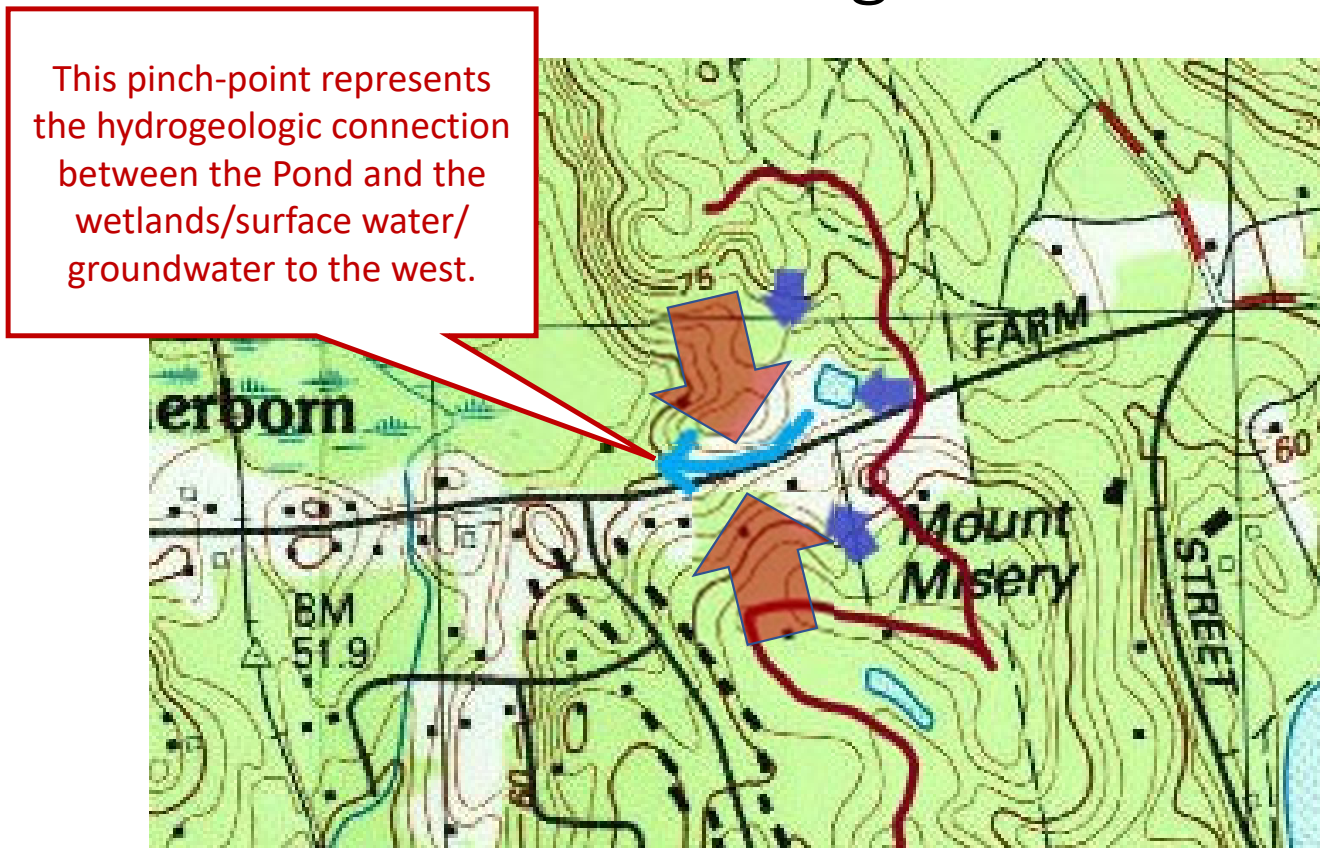
Pond discharge and groundwaters feed the wetlands and surface water features on and downgradient of 53-65 Farm Road properties through this hydrogeologic connection.



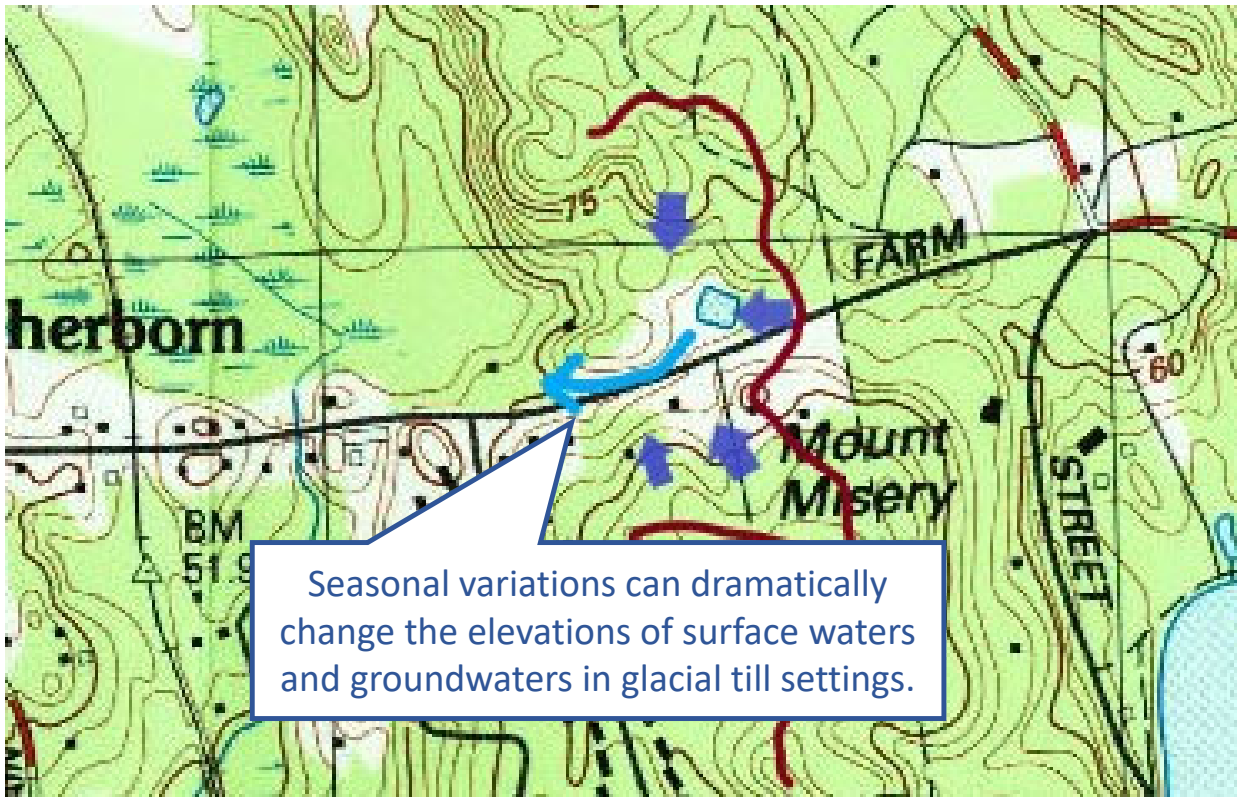
The Pond exists at an elevation of about 214 feet above mean sea level, while the micro-valley resides at an elevations between 195 and 205 feet above mean sea level.

This difference in head potential is what drives the groundwaters to the west through this watercourse.

The ‘watercourse’ feature which exists in this micro-valley is essentially a ‘pinch-point’ in the subdrainage basin.

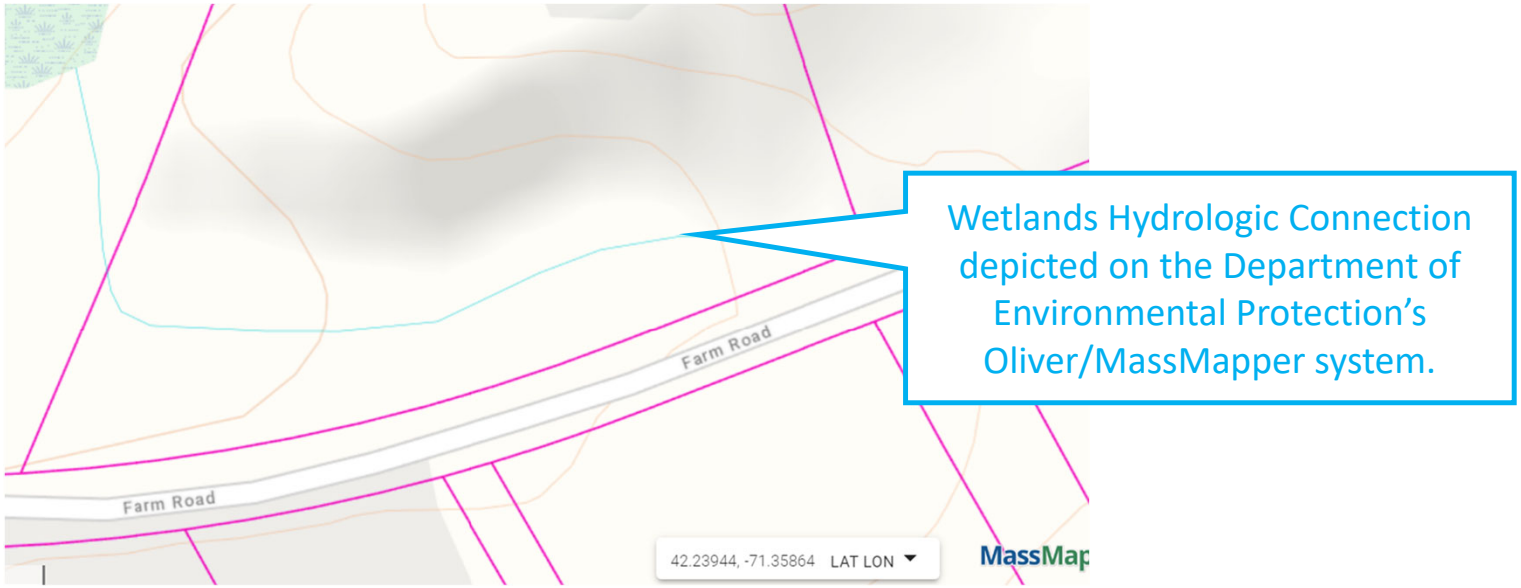


Along this watercourse from east to west, flow and volume increase from additional recharge and ‘daylighting’ of groundwater.

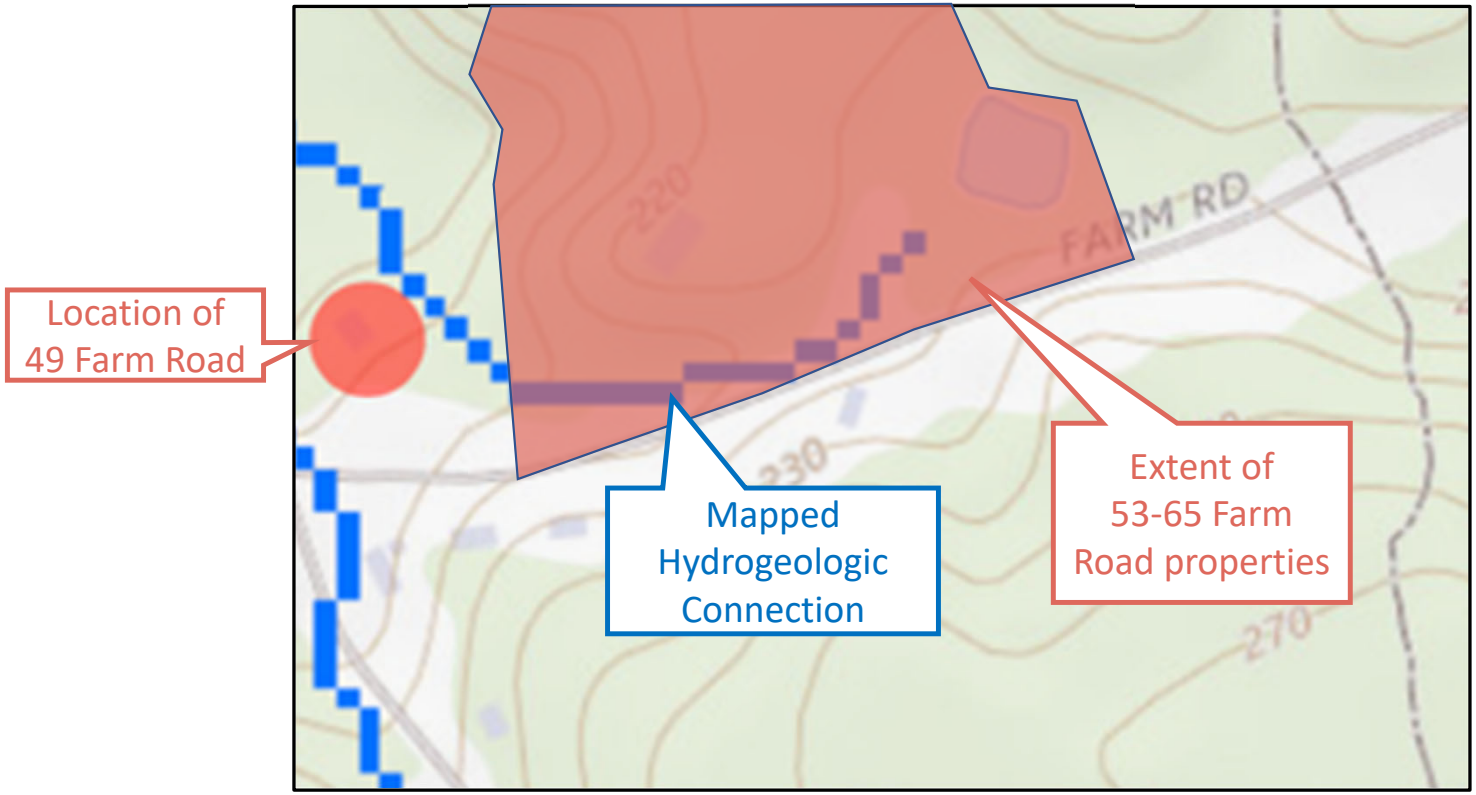


This watercourse serves an integral connection for surface waters located west of the site, for groundwater and private drinking water wells in the neighborhood, and for the Zone II delineated for Public Water Supply Wells Situated downtown

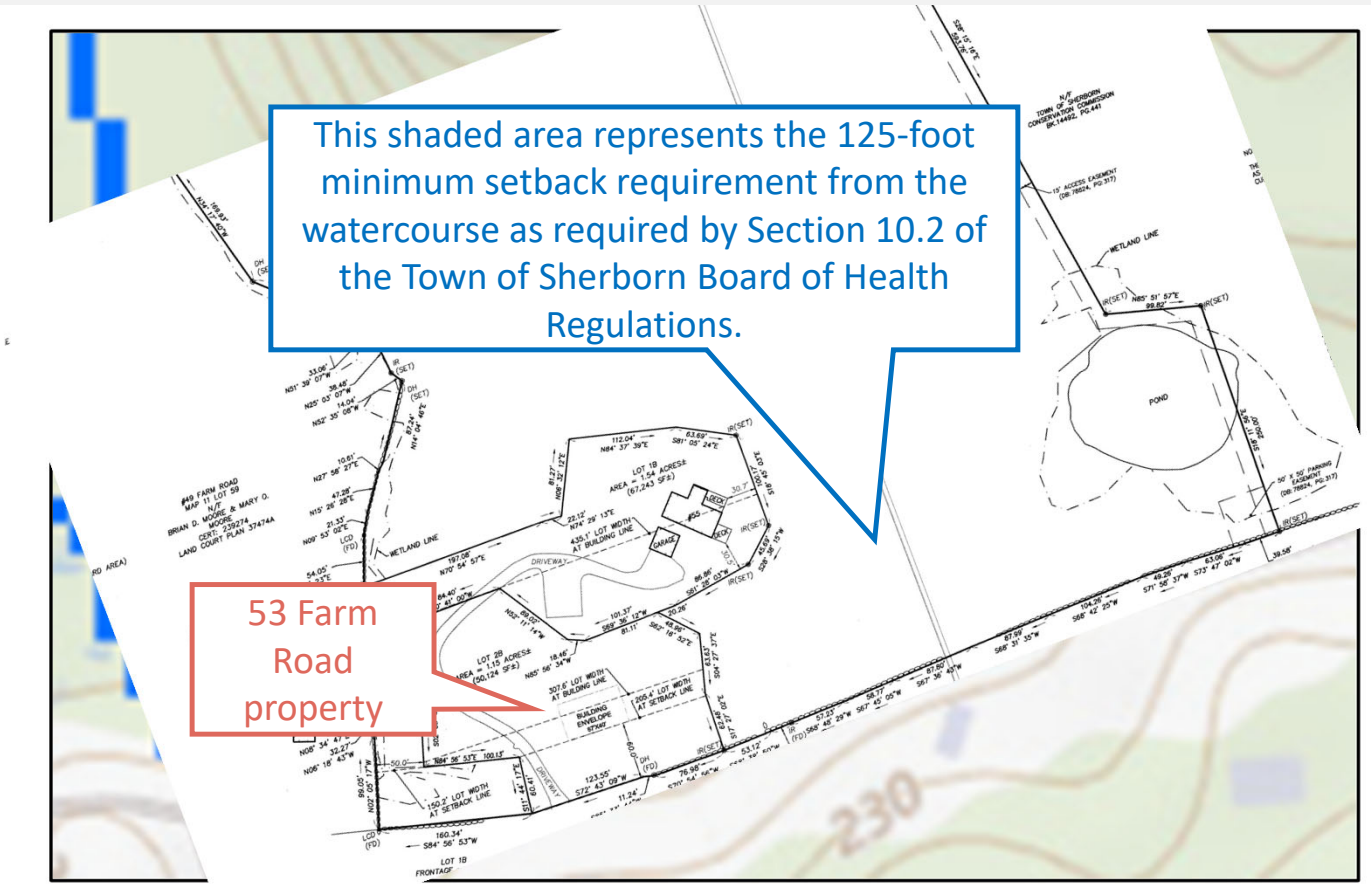
The Department of Environmental Protection has mapped this watercourse as a "Wetlands Hydrologic Connection."



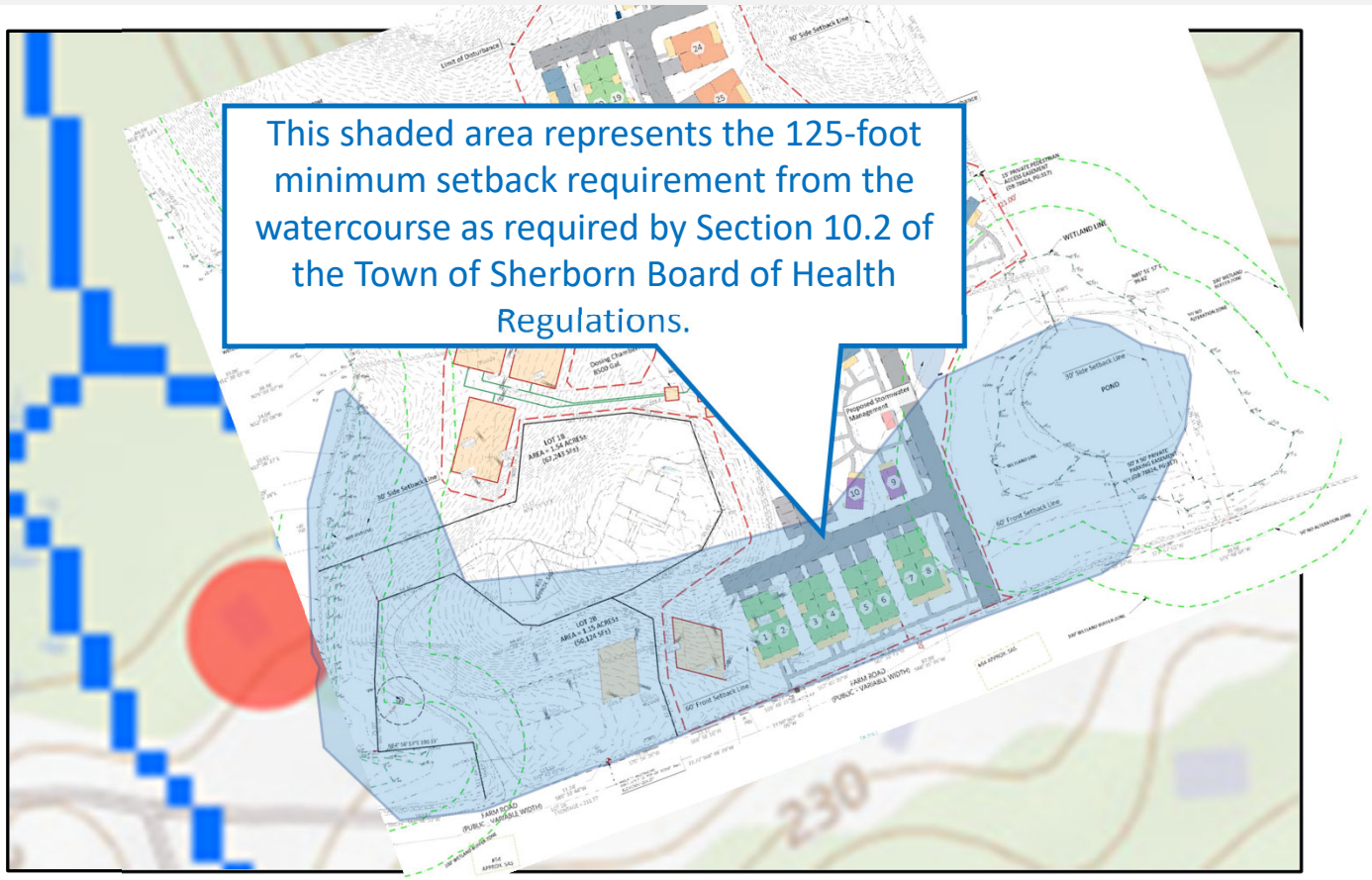
. . . and the United States Geological Survey has come to this same conclusion in their own published computer models.



. . . and it affects the septic currently being considered for the 53 Farm Road parcel. . .



. . . and the proposed project for the remaining land at 55- 65 Farm Road . . .



Please review the General Geologic Cross Section prepared and included as a separate file which depicts this watercourse.