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.

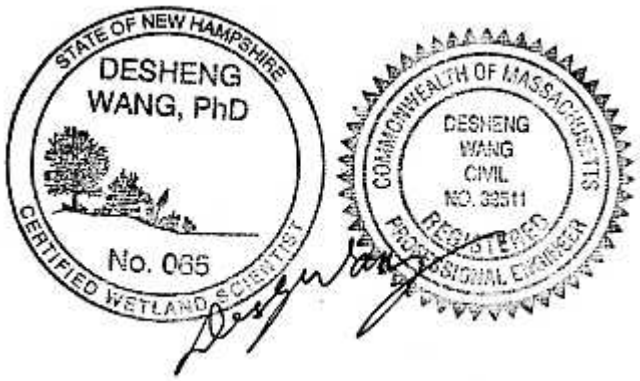
It is our professional opinion, based on our review of all of the available information and our extensive experience in the Town of Sherborn, that the recommended testing will likely support our conclusion that these projects are much larger than the environment can support (5 times larger than a conventional 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.

[Balance of Page Intentionally Left Blank]

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:	

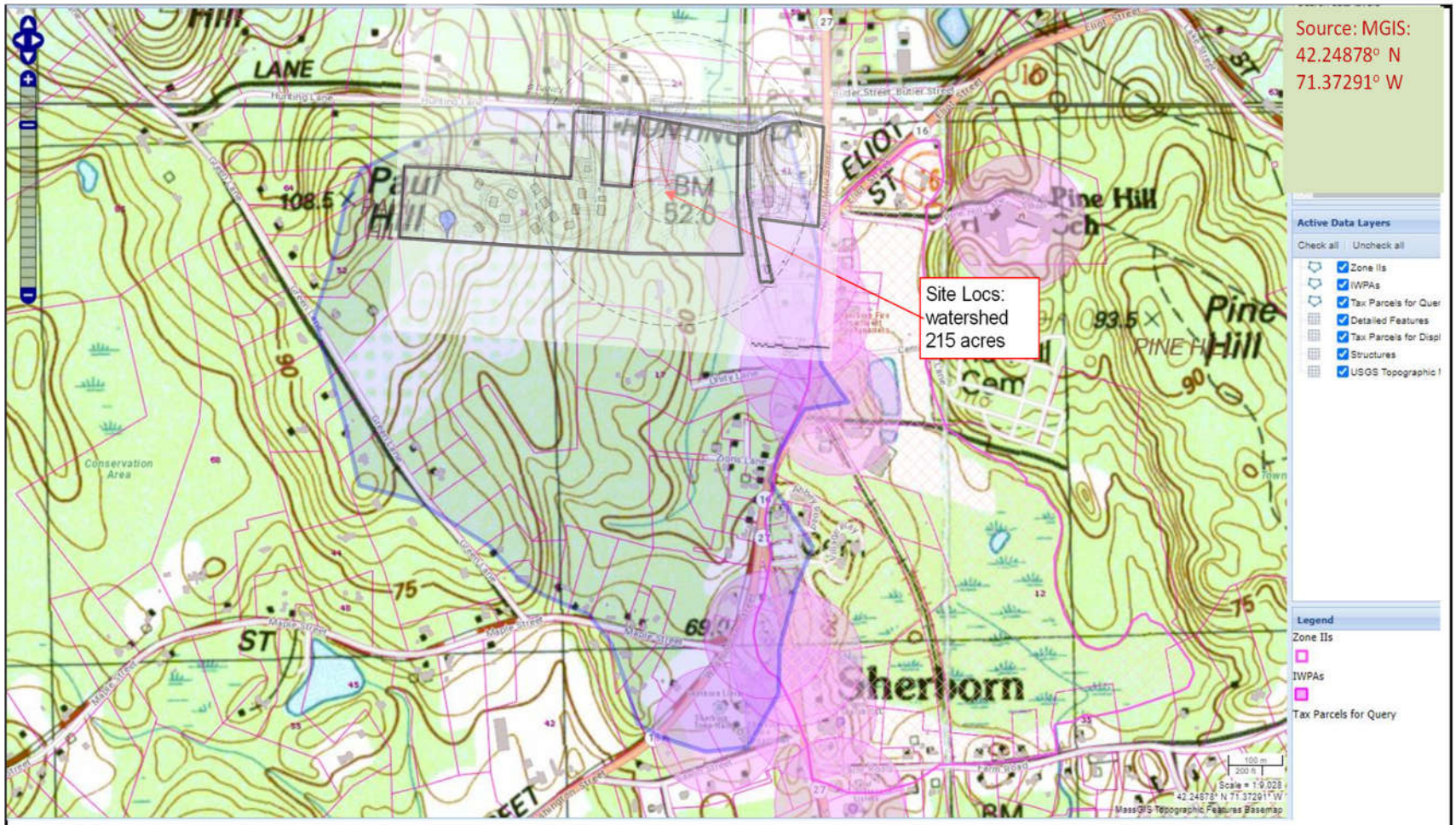
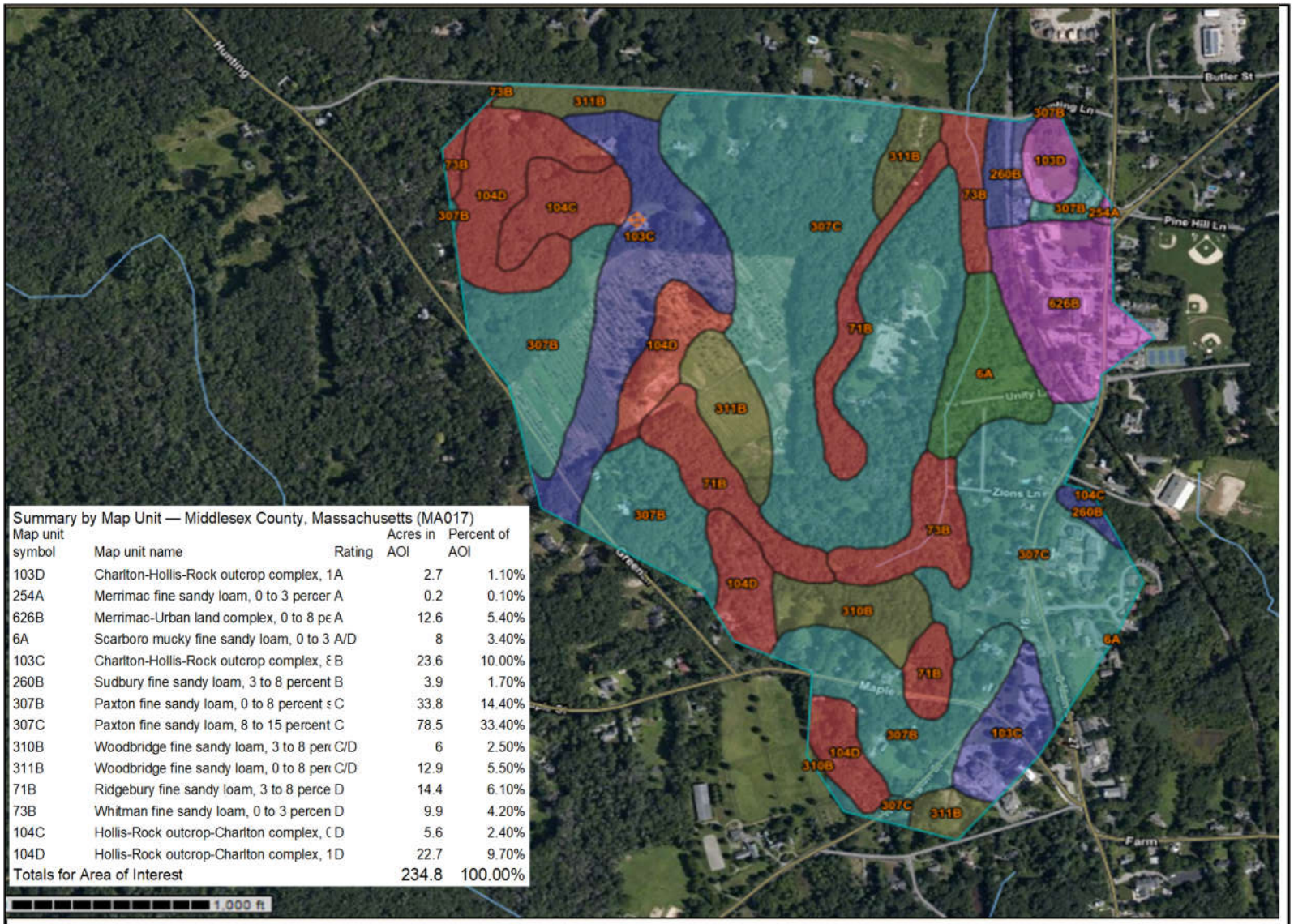


Figure 1.

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



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%

1,000 ft

Figure 3. NRCS Soil Map
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

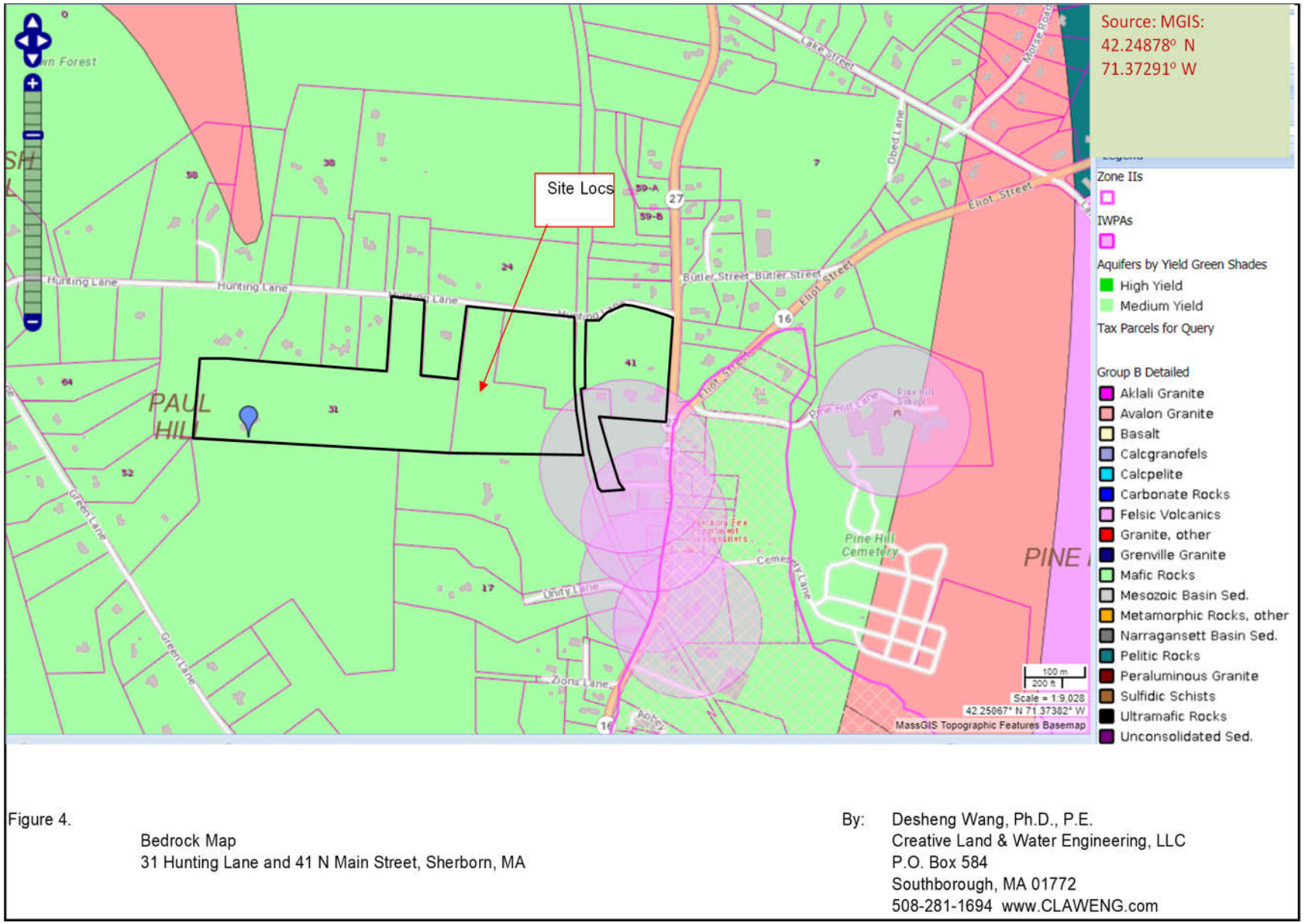


Figure 4.

Bedrock Map
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