Board of Health

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MEMORANDUM

TO: **Sherborn Zoning Board of Appeals**

FROM: **Daryl Beardsley (Chair) and Julie Dreyfus (Vice-Chair) on behalf of the Sherborn Board of Health**

DATE: **November 19, 2024**

RE: **Comments Regarding Pines Residences / 41 North Main Street, Sherborn**

KEY POINTS

- The proposed wastewater flow exceeds Title 5's nitrogen loading limits for the site and would require the use of nitrogen credit land, unless the project size is reduced.
- A mounded system would be required to meet Title 5, based on prior, Board-observed soil testing performed in the proposed area of the SAS.
- Well pump testing performed to date for the wells on the adjacent property is *not* sufficient to demonstrate reliable yield or the lack of detrimental impacts to surrounding wells.
- Comments on the applicant's requested waivers to Sherborn Board of Health (BoH) regulations are provided in Addendum A.

INTRODUCTION

This memorandum provides preliminary comments from the BoH regarding public health aspects of the most recent concept for the Pines Residences project at 41 North Main Street (per the May 21, 2024 Site Plan). The applicant has chosen to not provide technical or design details for the project's septic system or water supply until after a Comprehensive Permit is granted, although the BoH typically reviews detailed data and plans presented to it for assessment of compliance. Thus, in this case these comments are based upon:

- information in BoH files from previous investigations performed at the property (and nearby or similar properties);
- experience overseeing compliant and protective water and wastewater management systems/infrastructure within Sherborn; and
- an overall understanding of groundwater conditions across the Town.

SEPTIC SYSTEM ISSUES

Substantial Change

Although MassHousing determined for this latest project plan "that the proposed changes are not a Substantial Change in accordance with 760 CMR 56.04(5) and 760 CMR 56.07(4)(c)", the change from managing wastewaters at an off-site, advanced treatment facility, which are required to regularly test and report effluent discharge quality to MassDEP for compliance with stringent standards, to an on-site Title 5 septic system is substantial in terms of likely increased detrimental impacts to groundwater quality.

Wastewater Volume

The 7.24-acre site cannot receive the wastewater volume from the project as it is currently described because it is in a nitrogen sensitive area. Based on the information available on the Site Plan, the calculated wastewater volume from the proposed residences exceeds what is allowable under Title 5 by up to approximately 200% (i.e., up to 3 times the permitted flow, depending on technical details).

Title 5 Potential Wastewater Discharge to the Project Site in a Nitrogen Sensitive Area		
Site Acreage		**Total Permissible Flow**
Standard Acres (43,560 ft²)	**Title 5 Acres (40,000 ft²)**	**(@ Standard 440 GPD[1] per Title 5 Acre)***
7.24	7.88	***3,469.1 GPD***
* If loading at a rate of 550 GPD/acre, by using an approved Nitrogen Reducing Technology, the potential total site flow would be 4,336.4 GPD.		

Estimates of the Proposed Project's Wastewater Generation		**Wastewater Design Flows (GPD)**	
		(with garbage grinders)	(without garbage grinders)
Title 5 design standards per bedroom →		165	110
Bedrooms for 28 new units	56	9,240	6,160
Bedrooms for existing structures	10	1,650	1,100
Other water uses	unknown	?	?
Total wastewater design flow	approximate	***10,890*** **	***7,260***
** With design flows of 10,000 GPD or greater, compliance with MassDEP regulations associated with wastewater treatment facilities is required (e.g., 314 DMR 12.00, 257 CMR 2.00, 314 CMR 5.00, etc.).			

See Addendum B for additional septic regulatory and flow volume information details.

[1] GPD = gallons per day

It is not clear what use will be made of the existing house and other structures and whether they will be discharging to the shared septic system. The site plan parses the existing apartment unit, currently a 10-bedroom dwelling according to Assessor records, onto a 1.01-acre lot (Lot A). This would make the existing structure non-compliant with Title 5, unless discharging into the shared septic system that has been designed to accommodate that structure's flow.

Nitrogen-Loading and Nitrogen Credit Land

Assuming the proposed 28 new units (56 bedrooms), and existing 3 apartment unit (10 bedrooms), are aggregating flow and discharging to a shared septic system, to meet the nitrogen-loading requirement of Title 5, ***nitrogen credit land*** would need to be used in conjunction with a Facility Aggregation Plan according to 310 CMR 15.216.

Assuming garbage grinders are not used, such that there is a design flow of 7,260 GPD, and with a standard loading rate of 440 GPD/acre, the project would require a minimum of *8.6 Title 5 acres of nitrogen credit land*, in addition to the site's 7.88 Title 5 acres. Title 5 has clear qualifications for nitrogen credit land under 310 CMR 15.216:

(2) To qualify as Nitrogen Credit Land, the land must:

(a) be within the same Nitrogen Sensitive Area as the facility if the facility is in a Nitrogen Sensitive Area;

(b) be within the same subdivision in an area where the use of both on-site systems and drinking water wells are proposed to serve the facility;

(c) not have any manmade sources of nitrogen, including, but not limited to, wastewater discharges and nitrogen-based fertilizer located thereon;

(d) not be used for raising, breeding or keeping of animals;

(e) be pervious;

(f) be outside of Zone As, Velocity Zones and Regulatory Floodways;

(g) not be covered by any surface water body including, but not limited to, a river, stream, lake, pond, or ocean;

(h) not be currently designated as nitrogen credit land; and

(i) meet the criteria set forth in the Department's Guidelines for Title 5 Aggregation of Flows and Nitrogen Loading.

For design flows greater than 2,000 GPD, the Zone I of a public water supply well may NOT be used as nitrogen credit land. In addition, nitrogen credit land must carry the above restrictions into perpetuity and be appropriately recorded with the Registry of Deeds.

Depth to Groundwater

Subsurface testing was observed by the BoH in the Spring of 1999 in the area identified as the intended soil absorption system (SAS) location by the current Site Plan. Depths to high

groundwater levels were determined by the observation of soil mottles, which is considered the most reliable indicator. The depths to soil mottles were recorded as 60 inches, 36 inches, and 36 inches in test locations DTH-A, DTH-B, and DTH-C, respectively. To meet Title 5's minimum requirement of 48 inches, a mounded system would be required in this area.

Mounded System Challenges

Mounded systems typically have reduced treatment effectiveness in comparison to systems underlain by an equivalent thickness of naturally deposited soils, which are inherently more complex.[2] Another complication of a mounded system for this project is that it further complicates the roadway sited *over* the system. In general, driveways/roadways over SASs are not ideal because they increase the potential for damage to the system and alter both the aerobic and rainwater infiltration dynamics of an SAS (which can alter the system's expected treatment performance).

Easement

An easement to Lot A may be needed to construct all or part of the septic system within its boundaries.

Impact to Drinking Water Supplies

Due to the SAS' proximity to both public water supply wells (e.g., especially that serving Fireside) and private wells in the downtown area, it will be prudent to evaluate expected effluent impacts to groundwater quality through nitrogen[3] loading analyses. At a minimum per Title 5, this shall include a groundwater mounding analysis, determination of hydraulic conductivity, groundwater flow direction, determination of the areas of impact, and calculation of the total nitrogen concentration at the nearest downgradient receptor (e.g., property line, well, wetland, etc.).

WATER SUPPLY

Jurisdiction and Responsibility

The BoH understands that the project proponent will need to go through MassDEP's application and review processes for the water supply since the population to be served exceeds the threshold for being classified as a public water supply (PWS). Demonstration of adequate water supply quantity and quality is:

- a key responsibility of BoHs, and

[2] Note that research is on-going to identify design enhancements for mounded systems that can increase their treatment performance so as to be more comparable to systems installed in/on naturally deposited soils.

[3] Nitrogen is a key contaminant found in septic system effluent. The mix of other contaminants present in septic effluent can be quite variable depending on what specifically is introduced into wastewaters. A nitrogen loading analysis can be used as proxy for other contaminant loadings to groundwater.

- per state housing code, the first step in establishing whether residences can be supported at a particular location and the confirmation of this must take place prior to dwelling and other infrastructure construction.

Sherborn's stewardship of its water resources fosters the health and well-being of its residents (including the future residents of Pine Residences) and the financial stability of the community. Thus, the following issues are also of concern.

Adequacy of Well Yield Testing

It is more difficult to assess the dynamics of water supplies drawn from bedrock wells than from overburden aquifer wells.

- The BoH concurs with Nobis (May 5, 2021) that pump testing performed to date for the wells on the adjacent property is ***not*** sufficient to demonstrate (a) reliable yield for the project and (b) the magnitude of impacts to surrounding wells.
- The close proximity of the 2 existing wells significantly increases the likelihood that the wells are hydraulically connected. This means that bedrock fractures feeding one well are likely feeding the other such that, if pumped simultaneously, the yield will diminish for one or both wells.
- Confirmation of water supply adequacy is in the interest of the future residents of the projects. For larger projects in Town, such as this one, the BoH has consistently recommended extended pump testing (for a minimum duration of 48 hours) along with concurrent monitoring of drawdown and recovery in existing water supply wells in the vicinity.

Back-up Water Supply

Alternative water supplies, that can be relied upon if quantity and/or quality becomes a problem, are not readily available. To develop alternative supplies would be time consuming and likely financially and administratively challenging.[4]

OTHER

Walk-Out Basements

Walk-out basements are indicated on the Site Plan for some units (e.g., D1), but floor plans have not included basement-level information. If the walk-out basements are initially in an unfinished condition, history has shown that residents frequently want to finish those sorts of spaces, which can increase the original project room count and possibly the required septic design flow under Title 5 and Sherborn regulations. If the initial septic design does not take the finishing of

[4] As an example of diminishing availability of supply alternatives, water resources are a topic of significant importance and concern to The 495 Partnership, which is a consortium of public and private entities operating in municipalities near the Route 495 corridor. Although historically considered an abundant resource in this area, stresses to water resources are being encountered throughout the region.

unfinished rooms into account, then future residents may be disappointed that spaces seemingly inviting finishing cannot be finished due to limits on septic system capacity.

Bedrock Disruption and Soil Removal

Existing and proposed land contours are shown on the Grading Plan (dated September 27, 2024). It has not yet been presented how much earth will be removed from or added to the site to achieve the final grades proposed.

Reasons why bedrock disruption and soil removal are important to public health include:

- Soil removal from any location reduces the filtering of stormwaters and other waters infiltrating the project's lands. This results in less cleansing before those waters reach groundwater (drinking water) supplies. A goal of the current requirements is to encourage removal minimization.
- There is visual suggestion of bedrock outcropping on the portion of the project site towards the corner where North Main Street and Hunting Lane meet. If bedrock/ledge is to be removed as part of site contouring, note that bedrock disruption has the potential to significantly increase the leaching potential of some naturally occurring elements (e.g., manganese, lead) in quantities that can render groundwater supplies unsafe to drink. Thus, best management practices around bedrock disruption –and associated monitoring - are strongly recommended.

Without further information about bedrock disruption or soil removal, it is not possible to fully assess the situation. There appears to be a lowering of the site peak by up to 20 feet but whether that to be changed is all soil, all bedrock, or a mix of the 2 is not known.

A first step for assessing the need for complying with local regulations is for the applicant to provide the calculations about the volumes of earth materials affected and how they are to be affected (e.g., removed or not, how temporarily stored, etc.).

Once the magnitude of the activity is quantified and qualified (e.g., what earth material), then application of BoH requirements can be evaluated.

ADDENDUM A

BOH COMMENTS ON THE OCTOBER 20, 2024 LIST OF REQUESTED WAIVERS TO BOH REGULATIONS

Note: For non-40B new construction, the BoH does not grant waivers.

Regulatory Topic	Waiver Requested	Board of Health Recommendations
Sewerage Disposal	5.3 Watercourses and Wetlands (leaching area is 100 feet to BVW)	The ZBA should follow the guidance of the Conservation Commission on this topic. For example, if nitrogen loading analyses performed for the septic effluent indicate an unacceptable impact to the wetlands, then this waiver should be denied.
Sewerage Disposal	10.2 Minimum Distances (leaching area to a property line) and (leaching area is 100 feet to BVW)	If the nitrogen loading analyses performed for the septic effluent indicate an unacceptable impact to another property or to the wetlands, then this waiver should be denied. Be aware that reducing property line setbacks for this project means increasing the constraints on neighboring properties in terms of what actions (e.g., replacement well installation) can be taken on those properties, per required setbacks from septic systems.
Water Supply	17.3 Laboratory Tests (Non-detect standard for VOC results in unnecessary time, expense and wasteful pumping of substantial water from the aquifer). Artifacts from well drilling typically result in VOC detects at .1% to 3% of MA DEP and EPA drinking water standards.	If the project is to be served by a PWS, then the BoH regulations will not apply. Reasons that the BoH has a non-detect standard for VOCs include: (a) VOCs are rarely confirmed in new wells so, if they are detected, it may indicate the leading edge of a contamination plume, with levels potentially rising in the future; (b) the BoH has only one oversight opportunity for private well water quality review, after which testing is the responsibility of the well owner; (c) if VOCs are introduced during the drilling process, the contamination should be corrected; (d) knowing this standard, some well drillers will employ well installation techniques that minimize contamination risk.

Regulatory Topic	Waiver Requested	Board of Health Recommendations
BoH Guidelines to Obtain a Building Permit [What is a bedroom?]	The applicant seeks to construct a twenty-eight (28) unit rental development which is not a permitted use in the RA zoning district.	No BoH waiver request is specified. However, note that the BoH evaluates bedroom count according to standard procedures for residential dwellings.
Public And Environmental Health Review Regulations And Standards For Other Than A Single-Family Dwelling On A Single Lot	A waiver is sought for this section in its entirety except as noted below, to the extent that it would apply additional local requirements to the project site or any portion thereof in excess of the Title V [sic] requirements. Instead, all work will be permitted pursuant to M.G.L. c. 40B and the regulations thereunder, as well as all state and federal regulation which may be applicable to the project site and any portion thereof.	If the wastewater design flow is 2,000 gallons per day or more, Title 5 requirements will cover Sherborn's requirement for mounding analysis. If Nitrogen Credit Lands (per an Aggregation Plan) are used for a project with a flow of 2,000 GPD or more, then Title 5 will cover Sherborn's requirement for nitrogen loading analysis. If Nitrogen Credit Lands are not used for the project, then Sherborn's requirement for nitrogen loading analysis is recommended. Title 5 is designed to be a minimum standard for the entire state and, as such, would not impose that requirement for areas that do not rely on local/close proximity groundwater sources that are highly likely to be impacted by a project's septic system. It is reasonable for Sherborn to request this technical evaluation pursuant to protecting (i) the integrity of a resource as vital to the Town as is water supply and (ii) drinking water quality for the future residents of the proposed project. See comments in the main body of the memo regarding bedrock disruption and soil removal, about the importance of local BoH regulations to these aspects of site development.

ADDENDUM B

SEPTIC SYSTEM FLOW VOLUME -- REGULATORY/TECHNICAL ISSUES

Sherborn is a Nitrogen Sensitive Area

Title 5's definitions of nitrogen sensitive areas apply to nearly all of Sherborn. The nitrogen sensitive area types that apply to the 41 North Main Street property include those defined by 15.214(1)(a)2 and possibly 15.214(1)(a)1, depending on the distances to surrounding public water systems, such as that serving Fireside.

310 CMR 15.214: Designation of Nitrogen Sensitive Areas:

(1) The following areas have been determined by the Department to be particularly sensitive to the discharge of pollutants from on-site sewage disposal systems and are therefore designated Nitrogen Sensitive Areas:

(a) Public and Private Water Supply Protection Areas:

1. Department-approved Zone IIs for wells or wellfields used by public water systems as defined in 310 CMR 22.02 and, in the absence of a Department-approved Zone II, the Interim Wellhead Protection Area (IWPA) for a public water system's well or wellfield as defined in 310 CMR 22.02; and

2. Any areas where the use of both on-site systems and wells that are not regulated as public water supplies under 310 CMR 22.00: Drinking Water serve facilities.

Nitrogen Loading Limitations for this Project

In accordance with 310 CMR 15.215: Nitrogen Loading Limitations

(1) Public and Private Water Supply Protection Areas. No facility owner for New Construction in Nitrogen Sensitive Areas designated in 310 CMR 15.214(1)(a) shall install a system designed to receive or allow a system to receive more than 440 gallons of design flow per day per acre except as set forth in 310 CMR 15.202 (use of recirculating sand filters), 310 CMR 15.216 (aggregate flows) or 310 CMR 15.217 (enhanced nitrogen removal).

Site Acreage		**Permissible GPD Flow per Title 5 Acres**		
Standard Acres (@ 43,560 sq.ft.)	**Title 5 Acres (@ 40,000 sq.ft.)**	**Basic**	**If More Stringent Regulatory Requirements Are Met**	
7.24	7.88	440 GPD/acre	550 GPD/acre	660 GPD/acre
Potential Total Site Flow		***3,469.1 GPD***	***4,336.4 GPD***	***5,203.7 GPD***