



January 26, 2016

**BY ELECTRONIC MAIL: jeanne.guthrie@sherbornma.org
AND BY HAND**

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

Re: Application for Comprehensive Permit – 247 Washington Street, Sherborn

Dear Members of the Board:

As you may recall, this firm represents neighbors and abutters to the proposed 32-unit residential development located at 247 Washington Street in Sherborn (the “Project” and the “Project Site”), which is the subject of a pending application for a comprehensive permit under General Laws Chapter 40B, Sections 20-23 proposed by The Fields at Sherborn, LLC (the “Developer”). This supplemental comment letter offers our current position on the Project’s impacts on natural resources and well protection, based on the best evidence that is publicly available at this date two weeks before the deadline to close the public hearing. We expect that the Board will be continuing the hearing beyond this evening, to accommodate the presentation of the Town’s hydrologist, James Vernon. We expect that Mr. Vernon’s report and findings will substantially inform your decisionmaking, and as such we will provide our recommendations on proposed conditions and actions on the Developer’s waiver requests after we have an opportunity to review Mr. Vernon’s report.

In the meantime, our hydrologist, Scott Horsley, has reviewed the Developer’s latest septic design plans and supporting materials, and has provided a supplemental comment letter concerning the Project’s impacts on proximate wells and wetlands. That letter is attached hereto.

A. Septic System Impacts

The Developer’s floor plans have been in flux through at least January 19, 2016, making it difficult to evaluate whether the Developer needs a waiver from the Board of Health’s regulations with respect to the design flow of the septic system. Specifically, the regulations require each room above the first floor to be counted as a bedroom, and require that in all cases the number of bedrooms shall be not less than one-half the total number of rooms (for dwellings exceeding 8 rooms). Unfortunately, confusion still reigns on this issue because the Developer

has not identified which specific floor plans it intends to use for each home in the project, instead referencing four different floor plans and reserving the option of picking and choosing which ones to use. Two of the floor plans show two bedrooms, and the other two floor plans show three bedrooms. Here's what we do know about design flow for the Project:

- (1) The Developer has committed to capping the total number of bedrooms to 76.
- (2) The following floor plans are available for use in the Project: (a) Kirkland 3-bedroom, (b) Kirkland 2-bedroom, (c) Adams 3-bedroom, and (d) Adams 2-bedroom.
- (3) The Developer states that there will be 18 Kirkland homes (exterior units) and 14 Adams homes (interior units).
- (4) The Kirkland plans (both the 2-bedroom and 3-bedroom options) show seven total rooms, not including any finished basements.
- (5) The Adams plans each show 8 total rooms, not including finished basements.

Applying the rule cited above, the 14 Adams units must be assumed to contain 4 bedrooms each (8 total rooms, divided by 2). Under the regulation, as well as Title 5, the calculation of design flow assumes a population of two people per bedroom, and 55 gallons per day per person. Thus, each Adams home would have a design flow of 440 gallons per day. The 8-room rule is not applicable to the Kirkland homes if one accepts that Kirkland floor plans only depict 7 rooms. This, of course, would change if the basements are finished. The Kirkland two-bedroom plan shows an "open loft" area on the second floor, which could be converted into a room if walls are added. However, we are giving the Developer the benefit of the doubt, and not treating this as a bedroom.

Since the Developer has not provided a breakdown of how the floor plans will be distributed among the 32 homes in the Project, we have to make some assumptions. Below is a table showing a realistic breakdown in the distribution of floor plans to homes.

Table 1 – Design Flow Based on BOH Regulation

Floor Plan	# of homes	Total # of bedrooms (Developer)	Total # of bedrooms (BOH Regulation)	Design Flow
Kirkland 2-Bedroom	11 homes	22	22	2420
Kirkland 3-bedroom	7 homes	21	21	2310
Adams 2-bedroom	9 homes	18	36	3969
Adams 3-bedroom	5 homes	15	20	2200
Totals	32 homes	76	99	10,899

The Board of Health regulation also stipulates that “all single family dwellings shall be designed for a minimum of three bedrooms.” See, §7.1.¹ Applying this rule, the 11 Kirkland 2-bedroom homes would be considered 3-bedroom units instead of 2-bedroom units for purposes of design flow, and therefore the overall design flow would be increased, as illustrated below (changes are in *italics*).

Table 2 – Design Flow with Min. 3-Bedroom Assumption

Floor Plan	# of homes	Total # of bedrooms (Developer)	Total # of bedrooms (Regulation)	Design Flow (gpd)
Kirkland 2-Bedroom	11 homes	22	33	3630
Kirkland 3-bedroom	7 homes	21	21	2310
Adams 2-bedroom	9 homes	18	36	3969
Adams 3-bedroom	5 homes	15	20	2200
Totals	32 homes	76	99	12,109

The Board of Health regulation, Section 1.4, requires that all septic systems comply with Title 5. Under Title 5, any system that exceeds 10,000 gallons per day is not governed by Title 5 but rather through the Groundwater Discharge Permit Program, 310 CMR 5.00, et seq., requiring elevated levels of treatment. See, 310 CMR 15.006. Further, systems that are located in “Nitrogen Sensitive Areas” trigger the nitrogen loading limitations of Section 15.214 – 15.216 of Title 5. Under these regulations, the total design flow of a septic system cannot normally exceed 440 gallons per day, per acre of design flow, unless (i) an “aggregation plan” is proposed, through which the applicant places development restrictions on other “credit land” outside the project site itself, or (ii) an enhanced nitrogen removal system is proposed.

The Project Site is within a “Nitrogen Sensitive Area” because the Site would contain both septic systems and on-site drinking water wells. The Developer has already conceded this point – in its December 11, 2015 “project details update” memorandum, the Developer acknowledged the applicability of the Nitrogen Sensitive Area regulations, but contended that with 76 units, its design flow falls just below the 440 gpd/acre limitation. The Developer’s calculation of the threshold, which we agree with, assumes that the parcel is 764,478 square feet in size (19.11 “Title 5 acres”). This area, multiplied by 440, yields a maximum design flow of 8,408.40 gallons per day. If the design flow of the Project is calculated based upon 76 bedrooms, the Project would fall under the 8,408.40 gpd design flow cap for Nitrogen Sensitive Areas. However, as discussed above, when applying the Board of Health’s regulations the number of bedrooms is increased, and the design flow is commensurately increased to either

^{1/} We recognize that there may be a debate over whether the type of homes proposed here (townhouse-style homes) are “single family dwellings” as that term is used in the Board of Health’s regulation. However, we don’t think the Board intended to exclude townhouse-style homes when it adopted the 3-bedroom assumption for single-family homes, since there is no scientific basis to make such a distinction – the fact that the homes may be attached to one another would not affect the quantity or quality of the wastewater generated by these homes.

10,899 or 12,109, in any event over the 8,408.4 gpd cap for the Project Site. The Developer has not proposed an “aggregation plan” or an enhanced nitrogen removal system.

Presumably, re-calibrating the design flow for the Project puts the Project in even greater nonconformity with other Board of Health regulations. We note that in the Developer’s waiver list, dated October 5, 2015 (the most current list that we are aware of), the Developer is seeking a blanket waiver of Sections 5.0 (testing requirements) and 7.0 (system size and design). As we stated before, such blanket waiver requests are inappropriate under Chapter 40B; the Board has no way of determining whether the waivers are justified (outweighing the regional need for housing) if they are not identified with particularity.

Concerning Section 5, the regulations require a minimum of three test pits within the boundaries of each leaching field. §5.1(c). In Primary Leaching Areas 2 and 3, only two test pits were dug. The regulations require the pits to be dug and data collected between November 1st and April 29th. §5.1(b). Three of the test pits (#3-1, 3-2, and 3-3) were dug and data collected on June 25, 2015. Presumably these are the provisions for which waivers are being sought, but the Developer should clarify. Further, as we noted in our letter of September 14, 2015, it is unclear whether the Developer’s engineer complied with the regulation’s requirements for determining seasonal high groundwater. The regulation, §5.1(b), requires the use of monitoring wells where redoximorphic features are not found in the soils, as was the case here. We have not received an answer to this query. In any event, no waivers should be granted from these sections, since the requirements, if enforced, would result in more groundwater information being provided to assist in the determination of impacts, as discussed above.

The Developer’s attempts to allay concerns of septic system impacts on wells and wetlands are not convincing, and are unreliable. The Developer’s “area of impact” map, revised as of December 8, 2015 and reflecting the design change to the septic system, is erroneous for a number of reasons. First, as explained by hydrologist Scott Horsley in his comment letter dated today, the Developer has not considered the impact that groundwater mounding underneath the septic system will have on groundwater flow direction and rates of flow in the overburden aquifer. It is commonly accepted that groundwater mounding has the effect of radiating flow around the perimeter of the septic system, moving water in directions other than natural subsurface contours. The Developer plotted groundwater contours on the “area of impact” map, as well as on a separate plan filed with the Board and Board of Health labelled “GW2.” These contours do not take into consideration changes in flow direction that are likely to result from mounding. The septic system is set back only 10-20 feet from the Ham property, and therefore it is likely that mounding will cause radial flow of wastewater in the direction of, and across, the Ham property line.

Further, the groundwater contours plotted by the Developer conflict with other data. Specifically, a groundwater map prepared for the Town of Sherborn by the engineering firm Woodard and Curran provides groundwater elevation data in the vicinity of the Project Site. Mr. Horsley prepared an overlay map showing the Woodard and Curran water table contours on and abutting the Project Site. The Developer’s map assumes that groundwater moves in a southerly

direction from the proposed septic system, bypassing the property of Eugene and Elizabeth Ham at 257 Washington Street, but the overlay map with the Woodard and Curran data indicates that groundwater moves in a southwesterly direction, across the Ham property.² This flow direction is supported by groundwater elevation levels recorded by GLM Engineering in the location of the Hams' septic system when the system was installed (168'). It does not appear that the Developer or its design team investigated septic system or well plans for abutting properties when it developed its contour map. Further, the Developer only measured groundwater elevations in one test pit in the location of the septic system (DHT 2-1), which is a small sample size for such a critical issue. Mr. Horsley's opinion on groundwater flow direction is based on the limited information available provided by the Developer to date.

Under Title 5's nitrogen loading guidelines, a project cannot discharge wastewater that would result in Nitrogen concentration in excess of 10 mg/l at the downgradient property boundary or downgradient wells. The 10 mg/l standard is the state's groundwater quality standard. See, Reynolds v. Stow Zoning Board of Appeals, 88 Mass. App. Ct. 339, 342 (2015), citing, 310 CMR 22.06(h), and *Guidelines for Title 5 Aggregation of Flows and Nitrogen Loading*, Mass. Department of Environmental Protection (2009). Mr. Horsley determined that based on the presumed groundwater flow direction, nitrogen concentration from the septic system will exceed the state groundwater quality standard at both the Ham property boundary as and the 100' protective radius around the Ham well. This evidence alone would be sufficient under the recent Appeals Court decision in Reynolds to deny waivers and impose restrictive conditions on the comprehensive permit to eliminate the threat of contamination of abutting wells (not to mention Project wells). Our recommendations for waivers and conditions are provided further on in this letter.

B. Legal Standard of Review

As we discussed in our previous letter to the Board, the Board's job under Chapter 40B is to consider whether and to what extent local bylaws and regulations should be applied to a proposed project. In doing so, it must weigh the need for affordable housing against the need to protect the environmental, public health, safety, and planning interests. In Reynolds v. Stow Zoning Bd. of Appeals, the Court ruled that it was "unreasonable" for the zoning board to grant waivers from local bylaws that were more restrictive than state requirements governing septic systems in environmentally-sensitive areas, where it was established that such bylaws would have protected private wells from being contaminated by a project's septic system.

The facts of the Reynolds case are almost identical to the facts presented here. The plaintiff in Reynolds, an abutter to the project, had urged the Stow Zoning Board to deny a request to waive a local water resource protection bylaw that would have imposed the same 440 gpd/acre nitrogen loading limitation that appears in Title 5 on the Stow project. The waiver was needed because the project would have grossly exceeded the 440 gpd/acre cap. The Zoning

^{2/} Mr. Horsley noted that the Developer's contour mapping predicts that groundwater is constrained such that it would not leave the Project Site, a "highly unusual condition."

Board granted the waiver and the abutter appealed, demonstrating that the project would cause nitrogen levels in excess of the 10 mg/l standard at his private drinking water well, as well as his neighbor's well. The trial court dismissed the plaintiffs' concerns, but the Appeals Court reversed, holding that where water quality is threatened, such concerns outweigh the regional need for housing under Chapter 40B.

C. Constraints on Evaluating Impacts

It would be nearly impossible in the context of this application with only two weeks left in the public hearing to conclude with certainty that the septic system will, or will not, contaminate abutting wells or degrade downgradient wetlands. This is due in part to the Developer's habit of providing incomplete data and its refusal to cooperate with the hydrogeological evaluation that we requested in our letter to the Board back on September 14, 2015. However, the subsurface conditions also make it inherently difficult to predict whether wastewater from the septic system, rich in Nitrogen and other contaminants, will end up in the vicinity of wells and wetlands, and if so, how quickly. We know from the limited information provided by the Developer's engineer that the soils in the area contain a layer of overburden of variable thickness, and then bedrock. As we noted before, groundwater flows through fractured bedrock at rates much faster than through sand or other soils, and therefore has the ability to carry pathogens, bacteria, and other pollutants faster, and in greater distances, before they are diluted or attenuated. Further, groundwater flow *direction* in bedrock is often unpredictable, as fractures can be oriented in directions opposite of surface contours.

Your consultant Steven Smith and the Town's hydrologist James Vernon will probably advise you that additional data collection could yield more information on direction and rates of flow through these aquifers, which would narrow these uncertainties (and allow you to control the risks through your comprehensive permit decision). The Board of Health regulations appropriately require an "environmental health impact report" for large residential projects, such as this, which must evaluate, among other things, groundwater flow directions and impacts of septic systems on sensitive receptors. The regulations specifically require a "hydrogeological evaluation," which the Developer has refused to do. Such an evaluation would include drilling monitoring wells to collect more groundwater information, which would better establish the surficial groundwater contours on and abutting the Project Site. There are tests that could be employed to determine the "time of travel" of contaminants including viruses within the aquifer, which would inform the severity of contamination within a well or wetland. A tracer test could be employed in the bedrock aquifer to determine the direction and rate of flow of bedrock groundwater.

Absent these additional measures, which would require additional time and money, the Board should follow the lead of other zoning boards in similar predicaments, and impose conditions in its comprehensive permit decision that provide a wide margin of safety to wells and the wetlands, by reducing the overall wastewater discharged on the site, and expanding the setbacks between sources of pollution and wells and wetlands. This was the approach taken recently by the Carlisle Zoning Board of Appeals, faced with an application for 20 homes being

served by private wells and private septic systems, adjacent to existing homes with private wells. That decision, a copy of which is attached, was appealed to the Housing Appeals Committee, where it is pending.

We will provide the Board with our specific recommendations for actions on the Developer's waiver requests, along with proposed conditions, at the next session of the public hearing, at which time we expect to have the benefit of the preliminary report and findings of the Town's hydrologist, James Vernon. We anticipate that the Vernon report will provide additional justification for the denial of waivers from bylaws and regulations that protect natural resources.

Thank you for your consideration.

Very truly yours,


Daniel C. Hill

Enc.

cc: Mark Kablack, Esq.
Board of Health
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James Vernon
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Clients