



Town of Carlisle
Office of
BOARD OF HEALTH
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MEMORANDUM

To: Lisa Davis Lewis, Chairman
Zoning Board of Appeals
From: Board of Health
Date: June 12, 2015

Re: **Lifetime Green Homes (LGH) 40 B Application - Waiver Requests**

At a public meeting held on June 9, 2015, the Board of Health unanimously voted not to support the granting of local health waivers requested by Lifetime Green Homes (LGH). To do so in the Board's opinion will imperil the health, safety and environment of the Carlisle community.

15.100 – General Provisions:

- The state recognizes that large (>2000 gpd) systems pose greater risks to public health and the environment.¹ The 5 mg/l of nitrogen at the boundary perimeter was established by the Board of Health for large systems because of the variability in models. It provides a safety measure that 10 mg/l² will not be exceeded. It has been used in communities where protection of groundwater is critical. High levels of nitrogen interfere with the oxygenation of blood in the human body. Infants and children are particularly susceptible to this malady which can result in what is commonly known as “blue baby³” syndrome.
- No elevation of groundwater at the perimeter boundary limits the transport of nitrogen and other wastewater pollutants onto adjacent properties. Most Carlisle drinking water wells are installed in the bedrock fracture aquifer system. Little is known about these bedrock fractures except that they can act as a conduit for more water soluble constituents. Carlisle has no back up public water supply should a bedrock aquifer become polluted.
- There has been no data or conclusive site investigation provided by the applicant to prove that granting relief will not endanger the health, safety and environment of the Carlisle community.

15.211 – Distances

- The Board believes that increasing the setback between a large soil absorption system and a private well is another critical safety feature to protect groundwater (drinking water). There are so many variables that can affect the transport of wastewater pollutants that providing this additional safety margin is the prudent thing to do.

¹ Guidelines for Title 5 Aggregation of Flows and Nitrogen Loading 310 CMR 15.216

² EPA has set 10 mg/l of nitrate measured as nitrogen as the maximum contaminant level for safe drinking water.

³ methemoglobinemia

Lifetime Green Homes – 40 B Waiver Requests

- The applicant has not demonstrated that a lesser setback is equally as protective other than to defer to Title 5 minimum setback distances.
- Title 5 only provides minimum standards for the protection of public health and the environment.

Title 5 specifically states in “15.003: Coordination with Local Approving Authorities”

- **“Specific site or design conditions, however, may require that additional criteria be met in order to achieve the purpose or intent of 310 CMR 15.00”.**

This section further states:

- **“Local approving authorities may enact more stringent regulations to protect public health, safety, welfare and the environment . . .”**

Clearly the state recognizes that local site limitations may supersede the minimum standards set by Title 5 when necessary. Since 1987 Carlisle has had supplementary sewage disposal regulations and most like the reason that Carlisle continues to have a high percentage (89% in 2014) of passing Title 5 Inspections.

- Studies have also shown that housing density may impact groundwater quality, particularly in nitrate concentrations.⁴ For the LGH project there is no additional land area available. Housing, septic and wells are closely confined to the very limits of available land area. A failure of one project component will inextricably impact other infrastructure. There will be no easy remedies.
- The Board believes that the 150’ setback between systems and wells is necessary due to the size of the proposed waste water treatment for the facility (6380 gpd), the uncertainties of the bedrock aquifer and nitrogen/nitrate transport models submitted by the peer reviewer and consultant for the abutters that demonstrate levels of nitrogen that exceed 10 mg/l at various points in the overburden.
- The Zone I for a public water supply (which the Board believes this project requires) would typically be much larger than the 150’ minimum local setback. If the applicant believes that state standards are sufficient. The 150’ setback should be acceptable since LGH is not proposing a PWS.
- There is an emerging concern about the disposal of Pharmaceuticals and Personal Care Products (PPCP’s) into septic systems which can include an array of hormone disrupters that are eventually introduced into groundwater (well water source)⁵.
- The applicant has not presented site specific evidence that the 100’ minimum setback distance is adequate.

⁴ “The Relation of Ground-Water Quality to Housing Density, Cape Cod, Massachusetts”, by James H. Persky. U. S. Geological Survey Report (1986)

⁵ <http://www.mass.gov/eea/agencies/massdep/toxics/sources/pharmaceutical-and-personal-care-products-faqs.html>

15.221 – General Construction Requirements

- This section is intended for single family homes and does not apply. Individual units are not relevant only the total number of bedrooms for the entire project.

15.290-293 Shared Systems, Condominiums and Systems over 2000 GPD

- Decisions affecting land use have never been taken lightly in Carlisle mainly to protect groundwater. The Carlisle community is 100% dependent upon onsite sewage disposal systems and private drinking water wells (with a few exceptions such as the school, churches, senior development). Carlisle land is also limited because of a high water table, ledge, poor draining soils, and wetlands.
- In order to deal with the peaks and flows of wastewater discharge⁶ the Board of Health in 2008 imposed a 50% safety factor of 165 gpd per bedroom for large systems.
- **The Board believes that this requirement is one of its most crucial since it protects the groundwater which belongs to all residents of Carlisle and is the only source of drinking water for the town. Under no circumstances should the requirement be waived.**
- The 165 gpd design capacity increases the leaching area not the actual flows. A larger dispersal area spreads the wastewater discharge throughout the treatment area and into the naturally occurring soils below with less force than a smaller dispersal area with the same amount of flow. The larger dispersal area also reduces the impact of the groundwater mounding. The greater the mound the greater the driving force of the wastewater pollutants into groundwater.
- System Users are one of the greatest hazards to the functioning of a system and one of the most difficult to control. Additional capacity provides an important safety factor should a problem arise.
- Historically the Board of Health has never waived the 165 gpd requirement for multi-unit housing. All of these currently permitted leaching areas are functioning. There have been no failures. To change this trend for a site that has a high housing density is not being judicious.
- Many towns in Massachusetts have adopted additional sewage design flow requirements (for example: Norwell, Duxbury, Pembroke, Carver, Mansfield, Pepperell).
- The Board does not have a problem with allowing the monitoring wells installed in the proposed leaching area location to be removed. The Board will want a minimum of three monitoring wells for each leaching area as a condition for the project.

⁶ According to the 1991 study “Technical Evaluation of Title 5 the State Environmental Code 310 CMR 15.00” prepared by DeFeo, Wait & Associates, Inc. “the actual wastewater volume discharged from an individual dwelling on any single day is typically within the range of 50 to 150 percent of the average daily flow.”

Water Supply Regulations

- See 15.211 above.

The Board appreciates this opportunity to provide its recommendations to the Zoning Board. If you have any questions, please contact this office.

/LGH