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GeoHydroCycle, Inc.

Hazardous Waste
Water Supply

Assessment
Remediation
Analyses
Permitting
Modeling
Software

October 19, 2014

Mr. Steven Ventresca, P.E.
Nitsch Engineering
2 Center Plaza, Suite 430
Boston, MA 02108

RECEIVED
OCT 21 2014
TOWN CLERK-CARLISLE
CHARLENE M. HINTON

re: Comments on Lifetime Green Homes
100 Long Ridge Road
Carlisle, MA
GHC #14015

Dear Mr. Ventresca,

GeoHydroCycle, Inc. (GHC) provides the following comments and recommendations for the proposed Lifetime Green Homes project. Our comments and recommendations are based on our review of the following documents:

- Lifetime Green Homes letter to Carlisle Zoning Board of Appeals dated 9/12/14.
- Northeast Geosciences, Inc. letter to Jeffrey Brem dated 9/15/14.
- Hill Law letter to Carlisle Zoning Board of Appeals dated 10/3/14.
- Horsley Witten Group letter to Hill Law dated 10/3/14.
- ENSR memorandum to Carlisle Zoning Board of Appeals dated 4/19/07.

Based on Carlisle regulations and comments from abutters and their consultant, it is clear that the protection of Carlisle groundwater, and the private wells of homeowners abutting and near the proposed Lifetime Green Homes development at 100 Long Ridge Road is the primary issue. The issue relates to groundwater quantity and groundwater quality, putting the task of insuring that the yields of existing wells are not significantly reduced and that those wells do not draw in contaminated groundwater on Lifetime Green Homes.

In their letter, Lifetime Green Homes agreed to adopt Carlisle regulations concerning wells, including:

- Conduct a nitrate-nitrogen loading analysis,
- Conduct a contaminant time-of-travel analysis,

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- Conduct a pathogen impact analysis on downgradient receptors,
- Conduct well quantity and quality testing on abutting and nearby wells before drilling any project wells, with the owner's permission,
- Conduct well testing according to the Carlisle Board of Health Section VII during construction of the nine proposed Lifetime Green Home wells,
- Establish a $12,000 security deposit to make right abutting or nearby wells that are shown to be impacted, provided the well owner has previously agreed to testing, and
- Conduct a groundwater mounding analysis.

In their letter outlining a scope of work to accomplish the Lifetime Green Homes letter, Northeast Geosciences agreed to conduct the testing and analyses specified in the Lifetime Green Homes letter.

Hill Law and the Horsley Witten Group represent 26 neighbors and abutters to the proposed Lifetime Green Homes development, and their comments on the proposed Lifetime Green Homes hydrogeologic analyses include:

- Demonstration to the Carlisle ZBA during the public hearing phase that septic systems will not contaminate abutting or nearby wells,
- The hydrogeologic analyses proposed by Lifetime Green Homes is insufficient, and a more robust analysis is required,
- The proposed nitrate analysis is over simplified and a more detailed analysis is needed that determines nitrate concentrations at specific locations and at the property boundary,
- The explanation of the time-of-travel and pathogen analyses need more details,
- Given that bedrock wells draw water from fractures in the rock and the complicated nature of bedrock aquifers, a trace fracture or dye analysis is needed to determine the direction and rate of flow and probable transport routes in the bedrock aquifer, and
- The extent of the study area should be expanded to 500 feet downgradient of the property, and groundwater flow should be determined on the property.

Based on our understanding of the issues and comments presented to-date, GHC makes the following recommendations:

1. To determine nitrate concentrations downgradient of leach fields, it is necessary to include a calculation of the nitrate plumes that will develop downgradient of the proposed leach fields.

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2. Massachusetts DEP uses a minimum groundwater travel time of 2 years between leach fields and public wells. A travel time should be proposed to determine what constitutes a septic pathogen impact on nearby wells.
3. Groundwater flow rate and direction will need to be determined for the transport and plume analyses. It should be done for both the surficial and bedrock aquifers for the Lifetime Green Home project area and the area 500 feet down gradient of the project area.
4. Impacts from a 24-hour pump test often do not extend out far enough beyond the pumped wells to be able to determine whether an impact has occurred. For the testing of Lifetime Green Home water supply wells, a minimum 48 hour test should be required while monitoring abutting wells during the test.
5. The issue of water quantity impacts should be discussed and agreed to before any well testing. A method should be developed to determine what constitutes a significant loss of water for abutting or nearby wells.
6. In conducting a groundwater mounding analysis, the analyses should be based on site specific hydraulic conductivity, porosity and specific yield. Also, a seasonal high groundwater elevation should be determined for each leach field location.
7. A $15,000 per well security deposit should be established to cover the potential costs of a new 650 foot well, including: well drilling, pump replacement, hydro-fracking, water quality sampling and analysis, well disinfection, and costs related to connecting the new well to the home.

If you have any questions, please call me.

Sincerely,
GeoHydroCycle, Inc.

Stephen W. Smith, P.E., P.HGW., L.S.P.

GHC Comment Ltr.lwp

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Newton, Massachusetts
02458

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