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October 19, 2020

Susan Noyes, Administrator
Newbury Zoning Board of Appeals
12 Kent Way, Suite 200
Newbury, MA 01922

Re: The Villages at Cricket Lane
55R Pearson Drive
Peer Review

Dear Ms. Noyes:

Please see our responses to the peer review letter comments below which are bulleted, bold, italicized directly below Mr. Serwatka's bold comments. Please note that only six of Mr. Serwatka's comments required a response so only those items have been included in this response letter.

- Section 3.1(e) of the Comprehensive Rules and Regulations states "where a subdivision of land is involved, a definitive subdivision plan, conforming to all of the requirements of the Planning Board's Rules and Regulations for the Subdivision of Land" shall accompany the application. The right-of-way layout, width and cul-de-sac dimensions do not conform to the subdivision regulations. Of particular concern is the 100' radius provided at about station 2+00, where the engineer should demonstrate that the required 200' sight distance is provided.
  The response states that "a 200' site distance line has been added to the plan", but it has actually been added to sheet 7 of 18. The response states that "there are no obstructions above the line of site that interfere with this line". It would be important that no trees shrubs or walls are installed in this area that could interfere with sight lines. The board may want to make this a condition of any approvals.

  We would agree that a condition of approval is warranted.

- Top and bottom elevations should be provided for the retaining walls depicted.
  Elevations have been provided which depict an 8' retaining wall. The wall plans will need to be stamped by a structural engineer. The board may want to make this a condition of any approvals.

  We would agree that a condition of approval is warranted

- At SMH 1-6 there will be about 2 feet of cover over the pipe, given the elevations shown. Sewer mains should have 4 or more feet of cover, or be insulated properly. The engineer should address this issue. The response states that the septic system plan has been revised to indicate insulation shall be provided, but those plans are not included in this submittal. I would recommend that this plan set contain adequate information to construct the entire gravity sewer system up to the first septic tank. The engineer should provide sewer manhole, trench, insulation details as necessary.

A sewer profile sheet has been added to the set, but no sewer manhole detail, sewer trench detail, or insulation detail has been provided, to the best of my knowledge. The contractor has very little guidance on how to install the 2" rigid insulation. The engineer should provide these items. Further, the sewer profile sheet only includes the "1" series sewer structures, not the "2" series.

We have only included the profile os sewer lines within the roadways. The sewer profile sheet refers the reader to the septic system design plans for the full profiles. At this point in time the septic system is under review by the Board of health.

- The response states that the sewer profiles are part of the septic system design plans. As noted previously, I would recommend that this plan set contain adequate information, including sewer profiles, to construct the gravity sewer system up to the first septic tank.
  The response states that sewer profile "sheets" have been added but, as noted above, only one sheet has been provided, which only addresses half of the sewer design.

  See response to item above

- The "Subsurface Investigation" section of the narrative states that "sufficient soils were found beneath the proposed detention/infiltration basin to allow for infiltration at a rate of 1" per hour". This is not accurate, in my opinion. The plans depict one hand-dug pit (HP6) in the area of Galley System P3-1, whereas the Policy require a minimum of three test pits. Further, the hand-dug pit exhibits only 6" of C layer. The engineer should conduct the required number of test pits, with a machine, and submit the data for review.
  The response states that additional test pits were performed and added to the plans, but I am unable to locate the test pit data on the plans or in the Stormwater report. The engineer should provide this data.
  Test pit data has been provided which appears to indicate loam and silt loam as the parent material in the area of the detention/infiltration basin. The corresponding infiltration rates are 0.52 and 0.27 inches per hour, not the 1 inch per hour that appears to have been used. A revised stormwater report was not included in the submittal, so I cannot verify that the infiltration calculations have been revised. The engineer should provide the revised calculations, as is customary.

  The drainage report includes a typo in the Subsurface Investigation section on page 8 of the report. A copy of the infiltration time calculations is attached to this response which indicates that the 0.27 inches per hour figure was used in the report.

- The Standard 3: Recharge section of the checklist states that soil analysis has been provided. As stated previously, only one hand-dug test pit, demonstrating only 6" of C Layer, has been depicted in the area of the galley infiltration system. The engineer should provide the minimum 3 test pits required in the infiltration area. Further, sufficient information has not been provided relative to the proposed roof infiltration systems. The engineer should provide additional soil testing for the roof infiltration systems and provide system elevations relative to groundwater.
  As noted previously, the new test pit data was not included in the submittal. Also, there are issues that need to be addressed with the roof infiltration systems. See previous comments.

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As noted above, additional test pit data has been provided which would appear to indicate that the infiltration rate used in the calculations should be revised. The engineer should address this issue. Also, no response has been provided relative to the roof infiltration systems.

See response above regarding the attached calculations which use the correct infiltration value for silt loam.

We will be at the meeting Thursday to discuss these items.

Sincerely,

Benjamin C. Osgood, Jr., PE
Sr. Engineer

Per the soil survey, the general characteristics of the four (4) hydrologic soil groups are as follows:

> Group A – Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.
>
> Group B – Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.
>
> Group C – Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.
>
> Group D – Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a clay pan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Subsurface Investigation

Test pit investigations were conducted within the site to determine the presence of the Seasonal High Groundwater (SHGW) elevation and depth to bedrock. The soils were found to be consistent with a B soil type as indicated in the USGS soil survey report. Sufficient soils were found beneath the proposed detention/infiltration basin to allow for infiltration at a rate of 1" per hour.

typo
should be .22"/hr

The stormwater management act requires that the amount of infiltration be adjusted to reflect the reduced surface flowing to the infiltration systems. The adjustment equation is proportional to the areas is as follows:

Total site impervious area / impervious area flowing to infiltration systems = adjustment factor. The equation for this site is as follows:

101,378 sf impervious area on site / 67,397 sf flowing to infiltration systems = 1.50

The required available infiltration capacity must be adjusted by 1.50. The required infiltration can be calculated as 1.50 x 2,956 cu ft. = **4,434 cu ft. < 4,705 cu ft. provided**

72-Hour Drawdown Calculations

The drawdown time for the detention basin is determined with the following equation.

$$\text{Time (drawdown)} = \frac{\text{ReV}}{(\text{K}) \times \text{Area}}$$

Where, ReV = recharge Volume Provided
K = Saturated Hydraulic Conductivity (Rawls Rate for HSG B soils)
Area = Average Surface area of basin bottom

Six (6) soil samples were taken on site, one of which was beneath the buried infiltration / detention system in the cul de sac or other upland areas which indicate that the underlying soil is a silt loam. The infiltration rate associated with the silt loam is .27 inches per hour and is the rate used in the drawdown calculations below.

Detention Basin

$$\text{Time (drawdown)} = \frac{3{,}217 \text{ cf}}{(.27''/\text{hr})/12 \times 3{,}944 \text{ sf}} = 36.25 \text{ hours}$$

Roof Infiltrators

$$\text{Time (drawdown)} = \frac{101 \text{ cf}}{(.27''/\text{hr})/12 \times 90 \text{ sf}} = 49.8 \text{ hours}$$

Standard 4: Water Quality – Met

According to Standard 4, the project is subject to an 80% TSS Removal Rate requirement and the one half-inch rule for the water quality volume calculations. The project increases the impervious paved area by 101,378 square feet. Water quality will be provided in two separate treatment trains as detailed below.