



RANGER ENGINEERING GROUP, INC.

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November 1, 2021

Newbury Conservation Commission
12 Kent Way, Suite 101
Byfield, MA 01922

Re: Village at Cricket Lane
Professional Engineering Review

Dear Commission Members:

This letter is being provided to respond to the letter addressed to Daniel C. Hill, Esq. from Chessia Consulting Services LLC dated October 15, 2021, regarding the plans for the Village at Cricket Lane which is located at 55 Pearson Drive. In that letter Mr. Chessia outlines why in his opinion, certain aspects to the project need additional information or revision.

Our response to his comments is as follows.

I The project site

The parcel of land on which the project is located has no other access than what is proposed. The project is bordered by the Martin Burns Reservation on the north and west, residential house lots on the south, and a large wetland system on the east.

Soil testing data has previously been provided and is attached to this letter as well. Soil evaluations were done in many locations around the site.

II The proposed Project

Test pits were done in at least 30 locations on site. All of the test pits recorded ground water elevations no shallower than 24" below existing grade. Based upon this information the elevations of the nine roof infiltration systems were set based upon this conservative water table elevation. A table showing the existing grade at the roof infiltrator location, the estimated seasonal high ground water elevation, and the roof infiltrator elevation is located on sheet 20 of 30 in the plan set. This method of determining the ground water is conservative, acceptable, and approved by the Town's independent review engineer.

Individual downspouts will run to a pipe system dedicated for roof runoff which will flow to the roof infiltrator. This is a common practice and has been done many times by the project developer. There are three instances where a service line crosses an infiltrator location, these issues will be corrected in the field during construction.

The roof infiltrators are located >10 feet from the foundation, which is the distance required by the Stormwater management Standards. The foundation drain locations are shown on the plan, the



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basement floor elevations and the foundation drain outlet locations are shown on the topographic plan, enabling an installer to know the outlet invert of the drain.. There is enough information on the plans to install the foundation drains.

Sewer, water, and drainage systems are depicted on the project plans. Gas is not available on Pearson Drive and therefore will not be installed for this project. The only utility not shown is the electric distribution system which will be installed along the edge of the roadway under the sidewalk. No additional wetlands will be altered to install the electric system.

III General Design Comments

No response required

IV Grading

A retaining wall detail has been provided on the plans. The wall will be constructed from the back side of the wall. A construction area of five feet on the wetland side (front) of the wall has been accounted for in the wetland disturbance calculations. Five feet is more than enough room to install erosion control and construct the wall. This has been discussed and agreed to by the Town's independent review engineer.

V State Stormwater Management Regulations

A revised copy of the drainage calculations with the stormwater checklist stamped by this engineer has been provided to the town.

Stormwater Standard 1.

The outlet protection detail is not just a rip rap apron, it has an energy dissipation bowl which will hold and slow flows from the outlet pipe. The standard for this type of apron is a depression length of 3 times the pipe diameter and a width of 2 times the pipe diameter. The pipes are all 12" in diameter so the apron depression is required to be 3' long x 2' wide. The detail shows the full apron length of 8' and a width of 6' allowing the rip rap sides to be sloped up to grade.

It is this engineers opinion that the outlets are properly protected from erosion and standard 1 is met.

Stormwater Standard 2.

Existing condition

Our stormwater report uses design points that are at the limit of work for the project where the flows from the project enter the wetlands. These wetlands both have intermittent streams that convey water to the south. This is the standard practice, and we would only perform further off-site analysis if there were a known flooding problem or a potential to adversely affect a downstream property.



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In the opinion of this engineer subcatchments EX 2 and EX 3 use the hydraulically most remote flow paths. Subcatchment EX 1 can be adjusted to avoid the rise in topography, which shortens its flow length, which then results in higher peak flows for the pre existing condition in that subcatchments.

Using dense grass in the pre-development Time of Concentration (T_c) calculation for subcatchments EX 1 changes the T_c slightly with no effect on the runoff results.

This engineer does not agree that flows from the abutting property flow into this property. This opinion is based upon numerous sight visits made during the design process. Flow from that property flows towards Pearson Drive.

Proposed condition

Downspouts will be installed and piped to the locations shown on the plans as described previously. The watershed mapping is accurate and depicts the direction that stormwater will flow in the developed condition.

The calculations and watershed areas account for the 100 year storm event. The flooding elevation shown in the calculations does not have any storage associated with it and does not represent the elevation water will pond above the structure. It is an indication that the system is at capacity which can be expected in a 100 year storm. Storm conveyance systems are usually designed for the 25 year storm.

An additional factor to consider, the roof drains are not routed separately to the drain system in the calculations. Although the roofs do not enter the catch basins, the calculations are done to consider that they do enter the system at the catch basin. This is a very conservative approach to designing the catch basins and the associated pipe networks.

In this engineer's opinion, the calculations are correct and demonstrate compliance with Standard 2.

Standard 3 – Recharge to Groundwater

The drainage report outlines how standard 3 is addressed. Stormwater is routed to buried detention and infiltration systems. Laboratory soil testing was used to determine the soil type beneath the infiltration systems and the infiltration rates used are as found in the Volume 3 of the Massachusetts stormwater handbook.

Calculations have been provided to demonstrate that the systems capture enough runoff, infiltrate that runoff, and that the systems drain in less than 72 hours. The bottom of the large infiltration system is above the existing grade in the area where it is being constructed which will require sand to be imported and installed beneath the system which will assist in maintaining the infiltration rate.

Mounding calculations have been provided that demonstrate a 2' offset to the adjusted water table, which was adjusted UP 1.64 feet.



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Any concern with conveyance of the roof runoff into the system can be addressed through construction monitoring to verify that the systems are being constructed properly.

In this engineer's opinion, the calculations demonstrate compliance with Standard 3.

Standard 4 – 80% TSS Removal

Subsurface Detention /Infiltration System

Deep Sump Catch Basins: The report indicates that three catch basins have an impervious area which is larger than $\frac{1}{4}$ acre, however, the roof drain systems do not pass through the catch basins as they have gutters and downspouts that connect to drain manholes. When the adjustment to impervious area is made just two catch basins have a larger contributing area than $\frac{1}{4}$ acre. The areas for both are approximately 30% larger than required. This can be addressed by adding a condition to the order that Catch Basins 7 and 9 be enlarged to be 5' in diameter and 5 feet deep.

Underground recharge chambers: This system, as previously noted, has been designed properly.

Wet Basin System

The deep sump catch basins in this system have no more than $\frac{1}{4}$ acre of impervious area flowing to them. Catch basin 4 has less than 6,000 square feet of paved area when the roofs, which are connected to gutters and downspouts and routed to drain manholes, are subtracted from that flow.

In the opinion of this engineer, the overflow grate on the pond is sufficient. The pipe has a capacity of 11.74 cfs, and the maximum inflow into the pond in the 100 year storm is 11.08 cfs.

In this engineer's opinion, the plans and calculations demonstrate compliance with Standard 4.

Standard 5 – Higher Potential Pollution Loads

Not Applicable

Standard 6 – Protection of Critical Areas

This project does not impact the critical vernal pool habitat. The stormwater pond P-1 is located more than 100 feet from the vernal pool as required by Table CA-2. The pond is designed as a dry pond and will be constructed as such.

The wet pond is over 250' away from the vernal pool and is located across a street from the vernal pool location making it unlikely that any critters will move from the pool towards that wet pond. In Addition, there is a retaining wall along the wetlands on the left side of the roadway which will act as a barrier to wildlife crossing the road in the location of the wet pond.

A correct water budget was submitted under separate cover to address Mr. Garner's letter. The result of a correct analysis concludes there is no impact to the water budget of the vernal pool.



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Standard 7 – Redevelopment Projects

Not Applicable

Standard 8 – Erosion and Sedimentation Control

An erosion and sedimentation plan have been included in the drainage report. A full EPA SWPPP will be developed, and a notice of intent filed with the EPA under the NPDES program.

If the commission would like additional erosion control measures a condition could be included in the order of conditions to have the full SWPPP and a revised erosion control plan submitted and approved prior to construction.

Standard 9 – Operation and Maintenance Plan

An operations and maintenance plan has been included in the drainage report. If the commission would like more detail, a condition that a revised plan be submitted and approved by the commission can be included as a condition in the order. Maintenance roadways are provided; however, they are not specifically called out on the plans. A plan showing the maintenance access and specific items that require maintenance can be provided prior to construction. A condition that this be included in the homeowner's association documents can be included as well.

Standard 10 – Illicit Discharges

An illicit discharge statement can be submitted as a condition of the order.

In closing, it is the opinion of this engineer that the project is designed properly and meets the requirements of the DEP Stormwater Management Regulations.

Sincerely,


Benjamin C. Osgood, Jr.
Sr. Engineer

