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June 30, 2017

Michael Kulesza – Chairman  
Town of Norfolk – Zoning Board of Appeals (ZBA)  
One Liberty Lane  
Norfolk, MA 02056

**Re: Norfolk, MA – The Preserve at Abbyville/Abbyville Commons  
Comprehensive Plan**

Dear Mr. Kulesza:

On June 30, 2017 we receive a peer review letter from BETA Group, Inc. The BETA review comments are listed below with our responses immediately following the comment and are italicized.

**Civil/Site**

- 1) The roadway typical sections shown on sheet 88 and sheet 89 depict a 24 foot wide roadway and an 18 foot wide roadway. Traffic volumes for the development are anticipated to exceed an ADT of 1,500 vehicles for the Preserve and over 1,900 including the Commons. This would indicate that the main roads (Buckley Road, Eliot Boulevard, Annie's Loop and Mann's Loop) should be considered Primary Roadways.

Recommendation: Given the volume of traffic anticipated, further discussion of waivers from the Subdivision standards for primary roadways is warranted.

*UCI: We anticipate the Zoning Board will discuss the primary roadway waivers at the traffic public hearing in August of 2017.*

- 2) Designated rights of way are shown for the roadways within the Preserve. This indicates the possibility that the Town could be asked to accept the streets in the future. This should be a consideration in evaluating requested waivers for roadway geometry.

Recommendation: Further discussion of waivers from the Subdivision standards for primary roadways is warranted.

*UCI: We anticipate the Zoning Board will discuss the primary roadway waivers at the traffic public hearing in August of 2017.*

- 3) It appears that roundabouts are proposed at the Buckley Road/Annie Loop intersection and at the Eliot Boulevard/Mann Loop intersection. However, it does not appear that the roadway layout reflects the appropriate geometry for roundabouts. Given the volume of traffic anticipated on the main roadways, appropriate geometry should be incorporated for safety.

Recommendation: Incorporate appropriate approach and departure angles and splitter islands into the roundabout design. This may affect the proposed right of way.

*UCI: The applicants traffic engineer Green International will discuss the roundabouts at the public hearing in August of 2017.*

- 4) With the exception of Green Circle, the various dead-end roads, while depicting circular right-of-way geometry at their termini, do not propose roadway cul-de-sacs; rather, the roads simply terminate, with adjacent head-in parking spaces that could theoretically serve as a T-turnaround.

Recommendation: The proposed dead end roads should adhere to the geometric requirements for cul-de-sacs, and the proposed parking spaces thereby displaced should be relocated elsewhere in the development. It is noted that the Fire Chief's letter of June 16, 2017 indicates that the Applicant has agreed to:

1. Connect Thomas Drive to Albert Circle
2. Create a cul-de-sac at the end of Waite Circle
3. Connect Wick Road to Morse Road
4. Create a cu-de-sac at the end of Thayer Circle
5. Create a cul-de-sac at the end of Daniel Drive

*UCI: The roadways were revised by making Albert Drive and Wick Road through one way streets. The parking spaces were eliminated at all the cul-de-sac areas. The cul-de-sac pavement was expanded to a 47' diameter as required in the sub-division rules and regulations. The proposed ROW diameter is 48' and a waiver will be requested.*

- 5) The proposed site grading indicates that there will be significant cuts and fills throughout the site, and based on a conversation with the applicant's designer, it is anticipated that the project will generate a significant volume of excess material.

Recommendation: The applicant should perform a site-wide cut and fill analysis and assess the potential impacts of removing significant volumes of material from the site via adjacent local roadways. Evaluation should at include at a minimum:

- Effect on ground water table
- Number of construction trucks per day anticipated and the duration of the earthwork operation
- Blasting requirements/ledge removal, if any
- Construction routes and impact to the existing bridge over Bush Pond.

*UCI: Refer to the project phasing and proposed phasing schedule for construction and site work in Appendix H.*

- 6) The proposed roadway profiles do not appear to take advantage of the maximum grades allowed in the Subdivision Regulations. This contributes to the significant earthwork required for the roadway construction, as well as, the lot construction. This also effects the grading of abutting lots.

Recommendation: Evaluate the proposed profiles, particularly along Elliott Boulevard, Mann's Loop and Annie's Loop, and the proposed lot grading to better utilize the existing topography and reduce earthwork quantities.

*UCI: The roadway profiles were created based on the perimeter development extent existing grades. The primary roadways have been proposes to have slopes in the vicinity of 3 percent to allow for the roadway and driveway connections to occur with leveling areas as required by the subdivision regulations.*

- 7) The plans depict a connection of Elliott Boulevard to land owned by the Town.

Recommendation: The Board should determine whether this connection provides a future benefit to the Town.

*UCI: No comment...*

- 8) The project includes 148 single family units and 48 rental units. All the units will utilize subsurface disposal systems for sanitary disposal. Given the density of the development and the relatively small lot size, there is concern regarding the overall potential impact of the subsurface disposal systems on groundwater, adjacent private wells and Bush Pond.

Recommendation: The project needs to be in conformance with the guidelines in Title V for Aggregation of Flows and Nutrient Loading as outlined in 310 CMR 15.216. The applicant should provide a hydrogeological analysis of the site development to evaluate groundwater flow, water table depth, the potential nutrient loading and any associated impacts to abutting private wells (within 400 feet of the site), wetlands or Bush Pond.

*UCI: A hydrogeological analysis is forthcoming*

- 9) A previously noted, the ownership units are proposed to have septic systems on individual lots. It is not clear how the size of the systems shown on the plans was determined. Percolation tests will be required to determine the necessary size of the systems. However, given the potentially significant change in grade these tests may not be able to be conducted until the general grading is complete. Given the proposed lot areas/layout, there is limited area on the lots for the systems. An increase in the size of the system may affect the constructability of certain lots. Also, a number of systems are located close to proposed or existing slopes. Breakout distance will be a consideration in the design of these areas and may affect the constructability of these lots if significant changes to the layout of the septic systems are required.

*UCI: Upon approval of the project septic system testing and designs will be completed for each of the lots and will be done in conformance with Title V.*

- 10) There are a two water main junction locations (Wick Road between lots 76 & 77 and overland between the ends of Daniel Drive and Morse Road) where it appears that isolation gate valves would be appropriate, but no valves are proposed.

Recommendation: The applicant should add isolation gate valves at both locations.

*UCI: Gate valves were added at both suggested locations.*

- 11) There are multiple locations where proposed water mains and appurtenances will cross and/or occupy portions of proposed private lots. The Plan of Land sheets, which depict the proposed right-of-way and lot geometry in detail, do not indicate any proposed utility easements for the water system.

Recommendation: The applicant should depict adequately sized (i.e. sufficient for the utility owner to perform its operation and maintenance of the water system) utility easements in any locations where common infrastructure will be located on private lots.

*UCI: Easements were added at the water main locations that are located on private lots.*

## **Preliminary Drainage Report & Stormwater Management Design**

- 12) **Background, Page 1** – This section states the following:

*‘A portion of the overall site was previously used for textile manufacturing, which has been abandoned and the building demolished.’*

BETA understands that there is an AUL (Activity & Use Limitation, RTN #2-3000173) over a portion of the site, associated with the prior manufacturing activity thereon. Further, based on information gathered from the site walk, the area of the AUL appears to be relatively close to and downgradient of proposed Infiltration Basin 1. The AUL is not directly referenced or discussed in the drainage report, nor is it depicted on the post-development watershed map.

Recommendation: The applicant should provide any relevant excerpts from the AUL that could have bearing on the stormwater management for the development, and should assess any potential impacts that the use of infiltration close to the AUL could have on the contaminated materials within the AUL.

*UCI: The AUL documentation was forwarded by the applicant to the ZBA as well as BETA. Please refer to the Infiltration Basin 1 plan and profile referenced in Appendix L.*

- 13) **System Performance, Page 2** – This section states that the stormwater management system is projected to *‘Exceed the minimum pollutant (TSS) removal rate of 80%.’* The drainage report does not contain a TSS Removal Worksheet, which lists the various elements of the stormwater management system, their respective TSS removal rates, and the cumulative anticipated TSS removal rate of the “treatment train” (all stormwater elements operating in series).

Recommendation: The applicant should provide a TSS removal worksheet for each of the three (3) proposed stormwater management basins.

*UCI: TSS removal calculations were completed. Please refer to Appendix F.*

- 14) **DEP Stormwater Standards, Standard Number 4, Page 3** – This section states that the design complies with the standard, though the report does not contain a TSS Removal Worksheet.

Recommendation: See previous comment.

*UCI: TSS removal calculations were completed. Please refer to Appendix F.*

- 15) **HydroCAD Printouts – 100-Year Storm** – The drainage report presents the results from the HydroCAD analysis for just the 100-year storm, which all of the basins have been sized to handle without overflows. However, Table 2 – Discharge Analysis in the System Performance section lists the peak elevations in each of the proposed basins for the 2, 10, 25, 50 and 100-year storms. The report does not contain the HydroCAD report printouts to support the results in Table 2.

Recommendation: The applicant should provide HydroCAD summary printouts for each of the other analyzed storms (2, 10, 25 and 50) for just the sediment forebays and infiltration basins.

*UCI: The 2yr, 10yr, 25yr and 50yr Sediment Fore-bay and Pond reports have been included in Appendices A through D.*

- 16) **HydroCAD Analysis – Storm Duration** – The storm duration used in the analysis was from hour five (5) to hour 20 (20) of a twenty-four (24) hour storm. A number of the reaches in the model indicated earlier inflow than the five hour mark, and it is typical when modeling a twenty-four hour event for the exfiltration of the full runoff volume from the infiltration basins to take longer than twenty hours.

Recommendation: The applicant should revise the analysis duration in the HydroCAD model to at least the full twenty-four (24) hours of the modeled storms; in addition, if the model indicates that outflow is still occurring from any of the infiltration basins past hour twenty-four, the duration should be extended until such time as the full runoff volume has been exfiltrated from the basin.

*UCI: The storm duration was revised to include 0 to 36 hours.*

- 17) **HydroCAD Analysis – Reach Modeling with Storage-Indication & Translation Method** – The HydroCAD model structure consists of runoff from the individual subwatersheds to each drainage inlet structure routed through individual pipe reaches, which represent the pipe runs throughout the drainage system. The pipe reaches are linked in sequence, and run to the respective forebays/infiltration basins for each system.

The results of the 100-year analysis indicate a significant number of exceedances by the water elevation in downstream pipes of either the outlet elevation, and in some cases the upstream inlet elevation, of incoming upstream pipes (tailwater conditions). In many cases, the tailwater depth is relatively small, but in a number of cases the tailwater is significant, and will likely delay the movement of runoff through the system. The Storage-Indication & Translation Method used for the analysis does not account for dynamic tailwater conditions, however, and therefore the model may not be closely representative of the true function of the drainage system.

Recommendation: The applicant should consider revising the model to use the Dynamic Storage-Indication (DSI) analysis method, which will account for the tailwater conditions that will occur in many of the pipes throughout the drainage systems and better represent the overall function of same.

*UCI: The calculations were revised using the recommended method. We acknowledge there is some tailwater conditions which are occurring at pipe connections where the upstream pipes are not at or near capacity. Please note that the pipe out letting sediment fore-bay A is being utilized as a control and therefore will be submerged.*

- 18) **HydroCAD Analysis – Infiltration Basin Exfiltration Rates** – The preliminary stormwater analysis assumes an exfiltration rate of 8.27 in/hour for all three (3) of the proposed infiltration basins; this is the prescriptive Rawls rate for HSG A soils. However, the report presents field-determined permeability test results that all exceed the prescriptive Rawls rate by a significant amount, even after the standard 2:1 factor of safety is applied.

Recommendation: The applicant may wish to consider using the field-determined soil permeabilities (at fifty (50) percent of the observed field rates) in the design of the infiltration basins. While using the Rawls rate could be considered conservative, it could also result in the infiltration basins being appreciably oversized.

*UCI: We have utilized an infiltration rate of 20" per hour for all of the infiltration basins.*

- 19) **Pond 94P: Infiltration Trench** – The 100-year analysis indicates a storage range exceedance of approximately 1,110 feet. This is typically the result of a pond with a relatively small footprint and capacity (in comparison to the flows it receives) and inadequate outflow devices (in this case only exfiltration); the model is forced to extend the storage exceedance vertically using only the footprint of the pond, resulting in artificially high peak elevations.

Recommendation: The applicant should revise this pond to include a properly sized emergency overflow device (e.g. a weir). In addition, the value of 45% voids is higher than typically accepted void ratio (and corresponding porosity) values for crushed stone; a porosity value of 33% is typical.

*UCI: The porosity value was revised and the trench has been revised to accommodate up to the 100 yr. storm.*

- 20) **Pond 80P: Forebay 2** – The 100-year analysis indicates a storage range exceedance of approximately 0.4 feet.

Recommendation: The applicant should revise this pond to eliminate the storage range exceedance, either by increasing the capacity of the basin, increasing the size (and outflow capacity) of the overflow weir, or a combination of both.

*UCI: Please refer to Forebay 2 in Appendix A.*

- 21) **Pond 108P: Forebay 3** – The 100-year analysis indicates a storage range exceedance of approximately 1.39 feet.

Recommendation: The applicant should revise this pond to eliminate the storage range exceedance, either by increasing the capacity of the basin, increasing the size (and outflow capacity) of the overflow weir, or a combination of both.

*UCI: Please refer to Forebay 3 in Appendix A.*

- 22) **Infiltration Basin 2/Forebay 2** – This basin and its forebay occupy portions of lots 7, 8 and 9. The Town of Norfolk requires that off-road stormwater management measures be sited on independent undeveloped lots, rather than on portions of other developed lots.

Recommendation: The applicant should revise this pond and/or the lot layout to site it completely on its own dedicated parcel.

*UCI: Infiltration Basin 2 was revised in size and shape. The lot line has also been revised.*

- 23) **Infiltration Basin/Forebay Equipment Access** – The plans do not indicate access paths for vehicles and/or equipment to reach the basins, for routine maintenance and/or periodic repairs.

Recommendation: The applicant should add access paths to the plans that will allow maintenance vehicles and equipment to reach the basins (particularly the forebays) from nearby roadways.

*UCI: Equipment access has been provided.*

- 24) **Sediment Forebay "A"** – This forebay, which discharges to Infiltration Basin 3, is located at the southeast corner of Elliot Boulevard and Annie Loop. It is relatively large and deep (8 feet relative to Elliot Blvd., 14 relative to Annie loop). It is unclear why an additional forebay is required for IB 3, as there is a forebay proposed immediately adjacent to that basin.

Recommendation: The applicant should evaluate the need for the forebay to provide pre-treatment for IB-3, and if it is required, consider alternative subsurface pre-treatment devices that would not require the creation of such a large and deep pond in such a central location within the proposed development.

*UCI: Sediment Forebay A has been designed to allow for treatment of the roadway runoff prior to the discharge into Infiltration Basin 1. The depth of the sediment forebay was designed to allow the inlet drainage pipes for the catch basin system located at the low spot of Elliot Boulevard. The sediment fore bay located adjacent to the Infiltration Basin is for a small area of roadway runoff from the Richard Road area.*