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ALLEN & MAJOR ASSOCIATES, INC.

April 9, 2021

To: Mr. Richard S. Novak, Chair
Zoning Board of Appeals
Town of Sherborn
19 Washington Street
Sherborn, MA 01770

A&M Project #: 2513-02

Re: Response to Peer Review of Stormwater Management System & Stormwater Report
Apple Hill Estates – Hunting Lane
Sherborn, Massachusetts

Copy:

Dear Chair Novak and Members of the Zoning Board of Appeals:

Please find Allen & Major Associates, Inc. (A&M) responses to the Stormwater Peer Review dated March 20, 2021 as prepared by Professional Services Corporation, PC (PSC) in reference to their review of Apple Hill multifamily residential community to be located at 33 Hunting Land in Sherborn, Massachusetts (hereafter referred to as the "Project". Listed below are the non-traffic related comments from the PSC peer review letter followed by our response on behalf of the Applicant. Responses to the remaining comments will be provided by others under separate cover.

PART II – THE APPLE HILL STORMWATER
APPLE HILL – STORMWATER COLLECTION SYSTEM

Comment 22. Analyze and map the municipal stormdrain system in Hunting Lane and determine if it is a catchbasin-to-catchbasin system.

Response: **The municipal storm drain system in Hunting Lane is catch basin-to-catch basin and is shown on the site plans.**

Comment 23. If the municipal stormdrain system in Hunting Lane is a catchbasin-to-catchbasin system, revise the design of the on-site stormwater management system to eliminate or severely restrict any additional discharge.

Response: **As mentioned above, the municipal storm drain system in Hunting Lane is catch basin-to-catch basin. As is acknowledged in the letter provided by PSC, the Project drainage system has been designed such that additional discharge is already restricted, since peak discharges are slightly reduced for each of the design storm events. In order to alleviate concerns of re-suspending material within the sump of the connected catch basin, we are proposing to install a new drain manhole, upstream of said catch basin. By doing this, in combination with reducing peak flow rates for each design storm event, we believe that any concern of re-suspending materials within the catch basins can be eliminated.**

Comment 24. Determine the use to capacity ratio based on total system flow in the municipal drain system at the point of connection and limit the site discharge to the available capacity based on the hydrograph for the municipal system.

Response: **As mentioned above, the project reduces the peak rate of runoff for each design storm event. For the 25-year event, which is the typical storm event used for sizing pipes, the Project reduces the peak flow rate directed to the connection point by over 26%. We are not aware of any existing problems with the municipal drainage system and therefore see no reason to reduce the flow rates any further.**

Comment 25. Relocate the discharge from DB2 to another location on-site that will not direct runoff towards the 400 ft. radius for a water supply well and away from the top of slope to minimize erosion.

Response: The reference to a 400 foot radius is incorrect. Given the amount of water proposed to be withdrawn from the well, the protective radius will be a maximum of 250 feet. With regards to erosion, the purpose of the gabion is to provide a level spreader where a slope exists. The discharge is spread over 30 linear feet and the energy is dissipated by releasing the flow inside of a stone filled baskets. A level gabion mattress downstream will further dissipates the energy. Furthermore, the entire slope on the east side of the site will be stabilized with erosion control fabric.

APPLE HILL – LOW IMPACT DEVELOPMENT

Comment 26. Include a detailed evaluation of Low Impact Development measures considered and specific reasons why they could not be implemented.

Response: Bioretention areas are considered a form of Low Impact Development (LID) and have been incorporated into the design, in two locations. Other forms of LID, such as vegetated rooftops and permeable pavement are considered impractical. Vegetated rooftops are not suited for a residential development and permeable pavement is not well suited to sites with shallow groundwater and steep slopes.

APPLE HILL – HYDROLOGY

Comment 27. Revise the HydroCAD calculations categorizing the roof areas as impervious.

Response: The HydroCAD calculations have been revised as requested.

APPLE HILL – BMPs

Partial Exfiltration Basin

Vegetated Above Ground Stormwater Basin DB2 is a "partial exfiltration basin system" (SWHB V. 2: C. 2: P. 88). No test pits are provided to determine the allowable infiltration rate or to establish the elevation of seasonal high groundwater. A minimum of three test pits are required (SWHB V. 2: C. 2: P. 88-89). The test of the drainage report states that test pits were obtained but the logs of the test pits have not been provided.

In order to receive credit for TSS removal, the basin must have a sediment forebay complying with the Stormwater Handbook (SWHB V. 2: C. 2: P. 13). No separate TSS removal credit is given for the sediment forebay but the forebay must be a component of the basin to receive any TSS removal credit.

Further the minimum permitted separation between the basin and downgradient structures is 100 feet (SWHB V. 2: C. 2: P. 88). Four proposed residences are within this prohibited distance and either the basin or the residences must be relocated.

Unimpeded access around the basin with a minimum width of 15 feet is required (SWHB V. 2: C. 2: P. 91).

The spillway as designed shuts runoff toward the residences (SWHB V. 2: C. 2: P. 91).

Calculations are provided for infiltration BMPs draining within 72 hours; however, calculation input is not consistent.

Comment 28. Provide the logs of all 4 test pits taken to date. Ensure that a minimum of three test pits are located within the footprint of Basin DB2, are logged by a Massachusetts soil evaluator, and are witnessed by the Town.

Response: Test pits were performed in the locations of DB-1 and DB-2, the locations of which are shown on the Grading & Drainage Plan. Test pit logs are provided in the Appendix of the revised Drainage Report. The estimated seasonal high ground water within the test pits was found to be too shallow to provide the separation necessary to allow for infiltration. Therefore both DB-1 and DB-2 will be lined and infiltration has been provided elsewhere onsite. The two basins have been revised to include a bioretention/filtration layer and underdrains. This provides additional storage and treatment for TSS and phosphorus.

Comment 29. The design infiltration rate must be the slowest of the infiltration rates based on Rawls.

Response: The test pits indicated that shallow soils onsite are predominantly loamy sand with sandy loam at deeper depths. A design infiltration rate of 1.02 inches per hour was used, which is the Rawls infiltration rate for sandy loam, the lower of the two soils found.

Comment 30. Verify that a minimum of 2 feet of separation is provided to seasonal high groundwater.

Response: Since the basis related to this comment has been converted to a lined system, this comment is no longer relevant. Furthermore, the now re-located infiltration system will be constructed above existing ground, therefore the required separation to seasonal high groundwater is provided. As the system will be constructed above the existing grade, the fill material can be closely monitored and an evaluated for permeability during the construction process. Specific notes regarding the placement of fill under the infiltration system have been added to the plans.

Comment 31. Provide a mounding analysis if the separation provided to seasonal high groundwater is less than 4 feet.

Response: As mentioned above, the infiltration system provided is located above existing ground, therefore the required separation to seasonal high groundwater is provided. A mounding analysis is not necessary.

Comment 32. Provide a sediment forebay.

Response: A sediment forebay is not necessary as pretreatment is provided by the hydrodynamic separator style water quality devices.

Comment 33. The "time to drain" calculations are not consistent with the volumes and wetted areas shown in the HydroCAD calculations.

Response: The "time to drain" calculations have been updated to reflect the design changes.

Comment 34. Relocate the residential buildings or the basin as required to provide the required 100 ft. downgradient setback.

Response: The infiltration system has been relocated and there are no longer any buildings within 100 ft. downgradient of the system.

Comment 35. Provide a fence around the basin.

Response: Fences are not required and can impede wildlife movement, therefore not proposed.

Comment 36. Provide a 15 ft. wide vehicular access way around the basin.

Response: The above comment is in reference to the previously proposed infiltration basin, which has been converted to a bioretention area. The Stormwater Manual does not have the same requirement for bioretention areas. The design incorporates an 8' wide access around the bioretention areas which is adequate for machinery to access and perform maintenance.

Comment 37. Regrade downgradient of the basin spillway to ensure that the discharge does not impact residences.

Response: The area downgradient of the basin spillway has been regraded as requested.

Dry Detention Basin

Comment 38. Provide at least one test pit to determine soils, depth to bedrock, and depth to water table.

Response: Test pits have been performed. Locations are depicted on the Grading & Drainage Plan and test pit logs are included in the Appendix of the revised Drainage Report.

Comment 39. Slope the bottom pf the basin at 2%.

Response: The basins have been modified and now include a perforated underdrain as well as a filter media layer. Sloping the bottom of the basin is no longer necessary.

Comment 40. Relocate the spillway to existing ground, not in the embankment.

Response: The spillway has been relocated as requested.

Comment 41. Provide low flow underdrains.

Response: Underdrains are provided beneath each of the basins, as requested.

Comment 42. Provide a fence around the basin.

Response: Fences are not required and can impede wildlife movement. A fence is not proposed.

Comment 43. Provide a 15 ft. wide access way is required connecting the roadway to the outlet control structure.

Response: The above comment is in reference to the previously proposed dry detention basin, which has been converted to a bioretention area. The Stormwater Manual does not have the same requirement for bioretention areas. The design incorporates an 8' wide access around the bioretention areas which is adequate for machinery to access and perform maintenance.

Proprietary Interceptors

Calculations are provided for three Stormceptor 450i catchbasin units (catchbasins CB-02, CB-03, and CB-05) and one inline unit (DMH-08). However, total suspended solids removal must be provided for systems and the site as a whole.

Comment 44. Provide TSS removal spreadsheets for each compete treatment train.

Response: The TSS removal spreadsheets for each treatment train have been provided as requested in the revised Drainage Report.

Roofwater Infiltration

The text of the report proposes infiltration of roofwater; however, this is not reflected on the drawings or drainage calculations.

Comment 45. Provide a prototype roofwater infiltration system for a singlefamily residence.

Response: A drywell detail is provided, see Detail 5 on sheet C-504. The roof area is modeled as impervious and the drywells have been added to the HydroCAD model.

APPLE HILL – PHOSPHOROUS

Comment 46. Reduce the Proposed Condition Phosphorous Loading to 2.23 lbs./yr. after revising the Proposed Condition phosphorous Loading per Comment.

Response: The phosphorus loading has been recalculated as requested. The target phosphorus load is now calculated as 2.03 lbs/yr. This is because the total site area has been revised to only include the property area. Areas previously were taken from the HydroCAD model and included offsite areas.

Comment 47. Recalculate Proposed Condition Phosphorous Loading using "High Density Residential" having a phosphorous load by land use of 2.32 lbs./ac./yr.

Response: The phosphorus loading has been recalculated as requested.

APPLE HILL – GEOHYDRO MODEL

The soil absorption system for the proposed wastewater treatment unit is located upgradient of the stormwater management system including DB2. The proposed soil absorption system is located in an area of low permeability soil (HSG D) and therefore the height and lateral extent of the wastewater mound will be significant. During the Groundwater Discharge Permit Process, it is also possible that the location of the soil absorption system may be moved to an area of higher permeability soil which is closer to the components of the stormwater management system. In comment 31, we recommend an initial mounding analysis if the separation between the bottom of the basin and seasonal high groundwater is less than 4 ft. However, the wastewater mound may impact DB2 or other components of the stormwater management system. We recommend that the Board reserve the right to reexamine the design of DB2 and other system components following conclusion of the Groundwater Discharge Permit Process. It is critical that DB2 be included in the Applicant's submitted GeoHydro model. To ensure that the GeoHydro model incorporates DB2, a representative of the Town should be copied on all written or electronic communication with DEP and should be invited to all in person or virtual meetings with DEP regarding the GeoHydro model. Should a Comprehensive Permit issue, a recommended draft Condition of Approval is as follows:

COA: DB2 is to be included in the submitted GeoHydro model. The Board shall be copied on all written or electronic communication with DEP and shall be invited to all in person or virtual meetings with DEP regarding the GeoHydro model. The Board reserves the right to require modification of DB2 or other component in order to maintain a minimum separation to mounded groundwater.

Response: The stormwater design has been revised such that DB2 is no longer an infiltration system. It will be a lined bioretention area with an underdrain. This comment is no longer applicable.

APPLE HILL – WELLHEAD PROTECTION

The site and in particular the developed portion of the site is in close proximity to the proposed wellhead serving as the project's source of water supply. The site is sensitive in terms of water pollution including non-point source pollutants. The water resource sensitivity of the site should be addressed by modifying the Operation and Maintenance Plan.

Comment 48. Include a "no salt' (sodium chloride) prohibition in the Operation & Maintenance Plan.

Response: The Operation & Maintenance Plan has been revised to indicate that sodium chloride should not be used, as requested.

Comment 49. Include a restriction limiting fertilizer to slow-release organic fertilizer in the Operation & Maintenance Plan.

Response: The Operation & Maintenance Plan includes instruction only use slow-release fertilizer.

Comment 50. Include a requirement to develop and implement an Integrated Pest Management Program in the Operation and Maintenance Plan.

Response: The Operation & Maintenance Plan includes instruction to implement an Integrated Pest Management program.

The source of water supply for the Proposed Project will be a water system on a separate lot in separate ownership. The well will serve over 200 persons daily for 365 days per year. DEP categorizes a water system serving over 25 persons dally for at least 60 days per year as a "Public Water System." The applicant has not provided information on the status of DEP permitting for the public water supply. However, as part of that process, DEP may designate a Zone 1, interim wellhead protection area or other protection zone at the wellhead. The nature and extent of regulatory protection zones will impact the design of the stormwater management system. We recommend that the Board reserve the right to reexamine the design of the stormwater management system following conclusion of the water supply permit process. Should a Comprehensive Permit issue, a recommended draft Condition of Approval is as follows:
COA: The Board reserves the right to reexamine the design of the stormwater management system should wellhead protection zones be designated by DEP or should other restrictions be placed on the public water supply impacting on-site stormwater management.

Response: The development of Apple Hill Estates is required to be outside of the Zone 1 wellhead protection area and has therefore been designed as such.

APPLE HILL – MASSACHUSETTS STORMWATER MANAGEMENT STANDARDS
APPLE HILL – MS4
Comment 53. Verify 90% TSS removal and 60% TP removal.

Response: 90% TSS removal and 60% TP removal have been provided. Calculations for each can be found in the Appendix of the Drainage Report.

Comment 54. Add the requirement to submit an as-built plan to the drawings.

Response: A note has been added to the Grading & Drainage Plan, as requested.

APPLE HILL – STORMWATER MANAGEMENT PROGRAM
The Stormwater Management Program incorporates as a post-construction ordinance the Rules and Regulations off the Planning Board Part 2.3.6.a.ii, §3.4.2.16 and §4.4 and §12 of the Board of Health Regulations.
The Planning Board Regulations require that all runoff be held on-site unless otherwise approved (RRPB §3.4.2.~~19~~ 16) (Comments 22 to 25).

Response: Pre vs post reduction achieved, which concludes that the net difference of the runoff is held on-site.

Soil percolation and/or permeability tests are required to document the capacity of the soil to accommodate the discharge design (RRPB §3.4.2.~~19~~ 16) (Comments 28 and 38).

Response: The test pits indicated that shallow soils onsite are predominantly loamy sand with sandy loam at deeper depths. A design infiltration rate of 1.02 inches per hour was used, which is the Rawls infiltration rate for sandy loam, the lower of the two soils found.

Impacts to adjacent properties caused by discharge of runoff must be authorized by ownership, i.e., drainage easements (RRPB §4.4.3.b.3) (Comment 3).

Response: *Adjacent property owner is also the applicant who is satisfied with the anticipated discharges.*

Comment 55. Evaluate the option of holding all runoff on-site.

Response: **As exists today, stormwater runoff exits the subject parcel and it is unrealistic to presume that this runoff would be required to held solely within the parcel limits ahead of any development. The intent of RRPB 3.4.2.16 is for the protection of adjacent properties or natural resources. Through the use of currently accepted methods (TR-55 Urban Hydrology for Small Watersheds, developed by the U.S. Department of Commerce, Engineering Division and the HydroCAD 10.00)an estimation of the peak rate of runoff from various rainfall events has been provided for both existing and proposed conditions. Through the implementation of a stormwater management system, the analysis indicates that the proposed site development reduces the rate of runoff during all storm events at the identified points of analysis. In our professional opinion, the spirit and intent of RRPB 3.4.2.16 is met as the difference in runoff (pre vs post) from the site is illustrated to be held on-site.**

RRPB §4.4.3.b. Impacts to adjacent properties. If surface water drains onto adjacent existing street right-of-way or onto adjacent properties not owned by the Applicant, the Applicant shall clearly indicate what course the discharge will take, and shall present to the Board and to the owner of adjacent property, evidence that such discharge is satisfactory and permitted by public or private ownership of adjacent street or property.

THE PINES – STORMWATER MANAGEMENT BYLAW REGULATIONS

The Stormwater Management Bylaw Regulations apply as disturbance exceeds 40,000 sq.-ft. The Regulations require compliance with the stormwater management standards. Neither the rate or volume of stormwater runoff leaving the site shall increase nor shall nor shall runoff be discharged to any adjoining properties, public ways, or any wetland resource areas, unless otherwise permitted based on improvement over existing conditions. The Regulations require application of fertilizers and pesticides sparingly and encourage use of slow-release nitrogen and low phosphorus fertilizers (Comments 48, 49, and 50).

Response: **The project reduces the rate of runoff for all design storm events, for all Study Points, which is an improvement over existing conditions. As mentioned above, the Operation & Maintenance Plan includes limitations on fertilizers and pesticides.**

We trust that this information is responsive to the comments that were raised in the March 20, 2021 *Peer Review of Stormwater Managements Systems and Stormwater Reports* prepared by PSC. If you should have any questions or would like to discuss our responses in more detail, please feel free to contact our office.

Very Truly Yours,
ALLEN & MAJOR ASSOCIATES, INC.

Michael A. Malynowski, PE
Senior Project Manager

Professional Engineer in MA, ME, and NH

Attachments
1. Revised Drainage Report

cc: G. Barsky - Barsky Estate Realty Trust (via email)
L. Sweet – LDS Consulting Group (via email)
P. Haverty – Blatman, Bobrowski & Haverty, LLC (via email)