



April 17, 2024

Town of Groton
Earth Removal and Stormwater Advisory Committee
173 Main Street
Groton, MA 01450

Re: Peer Review Response
Age Restricted Multifamily, 797 Boston Road, Groton, MA.

Dear Committee Members,

HSH is in receipt of the peer review comments for the Age Restricted Multifamily project at 797 Boston Road, Groton, Ma. based upon the “Earth Removal Stormwater Advisory Committee” Regulations, Chapter 352, Article II, Stormwater Design Criteria from the Code of the Town of Groton, latest version; and The Massachusetts Stormwater Management Standards by Nitsch Engineering dated March 18, 2024.

GROTON STORMWATER DESIGN CRITERIA AND THE MASSACHUSETTS STORMWATER MANAGEMENT STANDARDS

1. Section 352-11.C.(3) states the compaction of soils in designated recharge areas must be minimized during and after construction.

Nitsch recommends the proposed Plans include a note or callout to minimize compaction in recharge areas during construction.

The area at the porous pavement has been shown to be protected during initial construction on the Demolition and Erosion Control Plan. This is the only area that uses infiltration within the stormwater management system.

The existing depression is also continuing to be used as a design point for the project and is modeled in both pre and post development as having infiltration associated with it. The base of the depression is being maintained and an area added to it only to allow for a continued direction of overland flow around the building into the depression. The area in which the infiltration is planned will be protected by erosion control as a limit of work and therefore will not need construction fencing to prevent compaction.

2. Section 352-11.C.(14) states a mounding analysis must be performed when the vertical separation from the bottom of an exfiltration system to seasonal high groundwater is less than four feet and the recharge system is proposed to attenuate peak discharge from a ten-year or higher twenty-four-hour storm. The mounding analysis must demonstrate that the recharge volume is fully dewatered within 72 hours and that the groundwater mound that forms under



the recharge system will not break out above the land or water surface of a wetland. The Hantush or other equivalent method may be used to conduct the mounding analysis.

The Applicant is proposing a Rain Garden as a recharge BMP that attenuates peak discharge from the ten-year and higher twenty-four-hour storms. The Applicant should conduct at least two test pit explorations within the footprint of the Rain Garden to determine the seasonal high groundwater elevation and verify the vertical separation from the bottom of the system to determine whether a mounding analysis is required. The Applicant can also verify soil texture at subgrade to determine if a higher exfiltration rate can be used.

At the proposed Detention Basin, vertical separation from the bottom of the system to seasonal high groundwater is less than four feet. A mounding analysis should be provided for the Detention Basin.

The only area proposed that uses infiltration is the porous pavement and that system is more than four feet in elevation from the estimated seasonal high groundwater in the area therefore mounding is not required.

The existing depression is also continuing to be used as a design point for the project and is modeled in both pre and post development as having infiltration associated with it. Based upon the nearest test pit, the bottom of this existing depression is 4 feet from the estimated seasonal high groundwater onsite and as an existing depression that is proposed to receive both less flow and volume, should not require mounding.

3. Section 352-12.B.(6) states pretreatment devices shall be sized to hold an annual sediment loading based on the provided calculation.

The Applicant should provide calculations to confirm the sediment forebay has been designed to provide a minimum of one year of sediment storage volume.

Pretreatment sizing is only required for areas in which sanding will occur. As the site uses porous pavement, no sanding will be allowed. The only area that will be sanded, or expected to be sanded, would be within the right of way of Forge Village Road. This area was calculated a volume provided for the treatment chain including the Fox Hole and small sediment basin. See the Supplemental Data Report for calculation.

4. Section 352-13.G. states the Applicant shall use the curve number (CN) values as provided in Table 2 to calculate stormwater runoff rates for pre-/post-construction ground surface conditions.

The Applicant has used some CN values that are different from the values found in Table 2. The CN values used for grass cover assume a “good” condition while this Section requires CN values for grass cover assume a “poor” condition since the post-construction amount of grass cover cannot be predicted or guaranteed (refer to Note 2 under Table 2). Also, the proposed CN value used for woods assumes a “good” condition while this Section requires the proposed CN value for woods assumes a “fair” condition since the soils will be compacted due to the equipment used to remove trees. The Applicant should provide supporting documentation for these CN values and request a waiver from this Section or revise the hydrologic calculations to only utilize CN values from Table 2.



The HydroCAD both pre and post development have been updated to the specific values for curve numbers (CN) specific to Groton within Table 2.

5. Section 352-26.A.(1)(b) states bioretention systems shall include a minimum three-inch thick transition layer of 3/8-inch pea gravel above the stone reservoir and below the soil media.

The Rain Garden should include a three-inch thick layer of 3/8-inch pea gravel between the stone reservoir and filter media.

The rain garden has been removed from the design. Therefore, this is no longer applicable.

6. Section 352-26.A.(2) states the soil media shall have a maximum fines content of 5% and shall consist of 20-30% topsoil, 20-30% organic materials (combination of wood chips/mulch and compost), and 50-55% sand.

The Applicant should update the filter media design to comply with this section.

The rain garden has been removed from the design. Therefore, this is no longer applicable.

GENERAL COMMENTS

7. A MassDEP stormwater checklist should be provided.

A MassDEP checklist has been added to the Appendix of the Supplemental Data Report.

8. The Stormwater Pollution Prevention Plan (SWPPP) should be submitted before construction begins to address pollution prevention measures. Nitsch recommends this requirement be included as a condition of the stormwater management permit.

Yes, agreed. A SWPPP will be created prior to construction once a contractor is selected, and we are set to apply for our NPDES permit.

9. An erosion control barrier should be provided along the north edge of the site to control and manage stormwater runoff into the site from Forge Village Road.

A section of erosion control barrier has been added along Forge Village Road to the Demolition and Erosion Control Plan with a break at the point in which runoff enters the site. At this point, a small sediment basin is located to capture the runoff from street and allows sediment to settle.

10. The Applicant should consider using NOAA Atlas 14 rainfall precipitation data for the hydrologic analysis.

NOAA Atlas 14 WAS used within our HydroCAD modeling and we verified as part of this response.

11. The Applicant should provide backup calculations for the time of concentration for subcatchment S201.



All Tc's greater than 6 minutes, the minimum acceptable by HydroCAD, have been labeled within the Pre and Post Development Maps.

12. The time of concentration path for subcatchment S203 should end at the edge of the Detention Basin.

All Tc's have been updated and edited for the new design.

13. On the Post-Condition Drainage Plan, subcatchment labels S203 and S204 should be swapped. S203 drains to the Detention Basin and S204 drains to the Rain Garden.

All labels for the Post Development Plan have been updated and checked against the HydroCAD model for consistency.

14. The water quality volume calculations for the Rain Garden and Sediment Forebay should be updated to reflect the total impervious area within subcatchment S202 (8,062 sf). Provide stage storage tables for both BMPs so provided water quality volumes can be confirmed.

The proposed revised design, although trying to keep it separate from the private site drainage as much as practicable, and specifically separate from the porous pavement, we have calculated our system to treat, recharge and attenuate the Town drainage that enters this property.

15. The Plans indicate runoff from impervious surfaces, including the north driveway and parking lot, drain via surface flow to the porous pavement system. Volume 1, Chapter 1 and Volume 2, Chapter 2 of the MassDEP Stormwater Handbook states that porous paving must not receive stormwater runoff from other drainage areas (run-on).

The stormwater design has been updated to include the entirety of the parking lot to be surfaced as porous pavement. The site driveways, a small section coming into the site and leaving the site enter the porous from overland flow.

In my opinion, the intention of the handbook is to keep landscape areas or uncurbed areas outside of the private property from entering the system, potentially clogging the surface. Within this application, the only areas draining to the porous are curbed paved surfaces which will be maintained by the management company hired by the developer of the project.

16. The porous pavement does not provide adequate water quality volume based on the contributing impervious area. A weighted water quality volume for the entire site is not allowed. Each BMP must provide the minimum water quality volume required based on its contributing impervious area.

The larger porous section that has been designed based on the increased parking areas provide the adequate water quality volumes for the impervious areas contributing.

17. The Plans should provide detailed grading information for the proposed swale which includes horizontal and vertical dimensions and slopes to confirm there is enough capacity to prevent overflow to the abutting properties during all storm events. Modeling of the swale in HydroCAD is recommended.

See revised stormwater design and calculations within the Supplemental Data Report.



18. The Plans should include design information for the Yard Drains, including rim and invert elevations along with the size and material for the connecting pipes. The Plans show the drain pipes from the Yard Drains terminating at the parking lot curb. The Plans should be updated to show how the Yard Drain pipes connect to the site drainage system.

Please see updated plans and details for additional information about the yard drains.

19. At least one test pit should be conducted within the footprint of the proposed Detention Basin to confirm the soil texture and estimated seasonal high groundwater elevation are consistent with nearby test pits TP-102 and TP-103.

Please see the updated plans and details for the stormwater system.

20. A minimum of one foot of freeboard is recommended for the proposed Detention Basin.

The Detention Basin has been removed from the design.

21. The Plans should include spot grades at the north driveway to verify the delineation of subcatchment S202 and confirm runoff from Forge Village Road will not enter the site via the driveway.

The western driveway (in) along Forge Village Road has been spot graded to show that the stormwater runoff will follow the new gutter line at the base of the vertical granite curbing. The drainage will enter the site at the eastern driveway (out) as the flow currently enters the site now and creating curb or highpoint at the road will trap stormwater within Forge Village and create an impoundment.

22. The roof leader pipes terminate at the parking lot curb. The Plans should be updated to show how the roof leader pipes connect to the site drainage system. The Plans should also include sizes for the roof leader pipes.

The roof leader pipes have been connected to the reservoir beneath the porous pavement for infiltration of clean roof runoff.

23. The Plans should include sizing information for the stone apron at the outlet to the Detention Basin, including dimensions for the stone apron and the D50 stone size.

The Detention Basin has been removed from the design.

24. The Operation and Maintenance Plan should include the Detention Basin, Sediment Forebay, and swale.

The Operation and Maintenance Plan has been updated to include all Best Management Practices utilized by the new stormwater design.

25. A closed drainage system analysis should be provided to confirm pipes are sized appropriately.

The only piping that exists within the revised design capture and send small areas of stormwater runoff from the yard drains into the stormwater system. These pipes have been modeled within HydroCAD to show that the sizing is appropriate.



Sincerely,

Katie Enright, P.E.
Associate Principal/ Senior Civil Engineer

