

January 19, 2017

Joseph Laydon
Town Planner
Grafton Municipal Center
30 Providence Road
Grafton, MA 01519



RECEIVED

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PLANNING BOARD
GRAFTON, MA



100 GROVE ST. | WORCESTER, MA 01605

T 508-856-0321

F 508-856-0357

gravesengineering.com

**Subject: Estates at Bull Meadow, Appaloosa Drive
Definitive Plan Review**

EXHIBIT

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Dear Joe:

We received the following documents in our office November 22, 2016:

- Correspondence from McCarty Engineering, Inc. to Town of Grafton Conservation Commission dated October 11, 2016, re: Definitive Subdivision Revised Submission, Estates at Bull Meadow.
- Correspondence from McCarty Engineering, Inc. to the Grafton Conservation Agent dated November 22, 2016, re: Estates at Bull Meadow, Response to Peer Review Comments.
- Correspondence from EcoTec, Inc. to Town of Grafton Conservation Commission dated November 18, 2016, re: 109 Adams Road, Grafton.
- Document entitled "Bordering Vegetated Wetland Replication Construction Protocol: Estates at Bull Meadow, North Grafton, MA" dated November 18, 2016, prepared by EcoTec, Inc.
- Water quality volume calculations dated November 29, 2016, prepared by McCarty Engineering, Inc.
- Stormceptor sizing calculations for "Estates at Bull Meadow, North Grafton, MA" dated November 11, 2016.
- Drawing entitled "Proposed Conditions Watershed Plan, Estates at Bull Meadow, Definitive Plan, North Grafton, Massachusetts" date June 10, 2016 and last revised November 22, 2016, prepared by McCarty Engineering, Inc.
- Plans entitled Definitive Conventional Subdivision Plans; Estates at Bull Meadow; North Grafton, Massachusetts dated June 10, 2016 and last revised November 22, 2016, prepared by McCarty Engineering, Inc. (29 sheets)

We also received the following documents in our office on January 9, 2017:

- Correspondence from McCarty Engineering, Inc. to Town of Grafton Conservation Commission dated January 9, 2017, re: Definitive Subdivision Revised Submission, Estates at Bull Meadow.

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- Correspondence from McCarty Engineering, Inc. to the Grafton Conservation Agent dated January 9, 2017, re: Estates at Bull Meadow, Response to Peer Review Comments Dated December 6, 2016.
- Correspondence from EcoTec, Inc. to Town of Grafton Conservation Commission dated December 27, 2016 (revised January 6, 2017), re: 109 Adams Road, Grafton.
- Memorandum from McCarty Engineering, Inc. to Maria Mast dated January 9, 2017, re: Conservation Bond Estimate.
- Plans entitled Definitive Conventional Subdivision Plans; Estates at Bull Meadow; North Grafton, Massachusetts dated June 10, 2016 and last revised January 9, 2017, prepared by McCarty Engineering, Inc. (29 sheets)
- Full-size and reduced-size plans entitled Estates at Bull Meadow, Definitive Plan, North Grafton, Massachusetts dated January 9, 2017 showing wetland areas, buffer zone impacts, buffer zone impact reductions and the wetland crossing & replication area, prepared by McCarty Engineering, Inc. (4 sheets)

This letter is a follow-up to our previous review letters to the Planning Board dated July 19, 2016 and November 1, 2016. For clarity, comments from our previous letters are *italicized* and our latest comments to the design engineer's responses are depicted in **bold**. For brevity, comments previously addressed by the design engineer and acknowledged by GEI have been omitted. Previous comment numbering has been maintained.

Our comments follow:

Subdivision Rules & Regulations (SR&R)

2. *A north point needs to be shown on Sheet 6 and for the three viewports on Sheet 18. (§3.3.3.6)*

November 1, 2016:

North arrows have been added to the three viewports on Sheet 18, however, one is still needed on Sheet 6.

Acknowledged. Sheet 6 was revised to include a north arrow.

5. *The profile for Paddock Ridge Drive shows fill greater than 6 feet between stations 12+75 and 14+60. We understand a waiver request was submitted and will be reviewed by the Planning Board. (§4.1.2.1.b)*
No further comment necessary.

6. *The minimum K requirement for vertical curves was not met at station 12+24 (proposed sag curve with K=27) and at station 13+81 (proposed crest curve with K=6). (§4.1.5.3)*

November 1, 2016:

The minimum K requirement for a crest vertical curve is 28, however, a crest curve with K=7 is proposed at station 13+81. The Engineer responded that the curve meets the AASHTO requirement regarding sight distance for a design speed of 20 MPH. Nevertheless, the grades of the approach tangents are shallow and the height of the crest curve is low, such that a driver located in the low point of the road on one side of

the vertical curve will be able to see an object in the road at the low point on the opposite side of the vertical curve. In short, based upon the information submitted with the revised plans and upon further evaluation of sight lines, we do not take issue with the sight distance provided at the crest curve and we find the K value of 7 to not be unreasonable in this particular situation.

As for the sag vertical curve at station 12+24, the plans were revised to propose a K of 28. The issue at hand is the ability to observe objects in the road if illuminated by a vehicle's headlights. In our opinion, the plans should be revised to provide a minimum K of 35 as required. Such a revision will require the length of the vertical curve to be extended from 164 feet to 208 feet and will result in the low point of the vertical curve being moved approximately sixteen feet and raised approximately 0.9 feet, thereby not impacting the efforts already made to address stormwater management.

Our opinion of the proposed crest vertical curve at station 13+81 stands; the proposed vertical curve is not unreasonable in this particular situation. As for the sag vertical curve at station 12+24, GEI acknowledges that the plans were revised to provide a K of 35 as requested.

7. *Street lights were not shown on the plans. (§4.7.6)*

Acknowledged. Street lights have been added to the plans. We understand that the applicant will have to coordinate the final street light locations with the Grafton Board of Selectmen.

8. *The three hydrants proposed along Paddock Ridge Drive between Carriage House Lane and Bridle Ridge Drive are proposed at spacing greater than the required maximum of 500 running feet. If not already done, the Planning Board may wish to solicit comments from the Fire Department and Grafton Water District relative to hydrant locations. (§4.7.7.1)*

The Engineer responded that they will solicit a response from the Grafton Fire Department and Water District.

11. *Concrete sidewalk needs to be shown across driveways. (§4.9.1)*

The Engineer responded that a waiver has been requested not to install concrete sidewalks across proposed driveways. GEI has not received any additional waivers as a part of this submittal; we understand waiver requests will be submitted directly to the Planning Board for review.

14. *Retaining walls are proposed within the Paddock Ridge Drive right-of-way between stations 12+50± and 14+45± and a waiver was requested. We understand that the Town of Grafton requires retaining walls to be outside the rights-of-way. (Schedule E, Standard Cross Section Minor Street B)*

No further comment. Please also see Comment #28.

Zoning By-Law

Comment was previously addressed and acknowledged.

Stormwater Management & Hydrology Review

20. *The plans should clearly show that the sides of the riprap spillways and down-gradient aprons are to also be lined with riprap in order to avoid erosion along the spillways' edges.*

November 1, 2016:

The plans show the width of the riprap spillways extending to the top-of-berm of the infiltration basins, however, there appears to be an issue with the revised grading of the basins at the spillways (see comment 21).

Acknowledged. The grading was revised.

21. *The riprap spillway elevations need to be labeled at Infiltration Basins 1 and 2.*

November 1, 2016:

Riprap spillway elevations have been labeled at the infiltration basins, however, revised grading is inconsistent with the riprap spillway elevation labels. For example, the spillway elevation for Infiltration Basin 1 is labeled as 437.0, while the proposed grading suggests the spillway elevation to be higher than elevation 438.0.

Acknowledged. The proposed topographic contours at the spillways were revised at Infiltration Basins 1 and 3.

22. *Soil testing has not yet been performed at Infiltration Basin 2 to demonstrate compliance with MassDEP's required two-foot offset to seasonal high groundwater. Based upon the soil testing data that was submitted (for fifteen building lots and Infiltration Basin 1), the proposed elevation for Infiltration Basin 2 does not appear to be unreasonable. Nevertheless, soil testing will have to be performed at infiltration Basin 2.*

The Engineer responded that soil testing will be conducted after Conservation Commission approval. Soil testing will also need to be performed at Infiltration Basins 3 and 4. Considering the extent of soil testing done to date, GEI does not take exception to this approach.

24. *There is an unlabeled area shown on the Proposed Conditions Watershed Plan in front of Subcatchment Lot 13.*

The area remains unlabeled.

25. *It is necessary to provide appropriately-sized riprap aprons at drainage system discharge points. Additionally, supporting calculations relative to the apron dimensions and riprap stone size must be submitted.*

November 1, 2016:

Calculations have been provided for sizing the riprap aprons, however, the calculations are not consistent with the plans. The calculations require a riprap apron length of twelve feet for FES 1 and sixteen feet for FES 4 and 5, however, based on the "Flared End w/ Riprap Detail" on Sheet 23 the lengths of these aprons would be ten feet.

Acknowledged. The construction detail, now referred to as "Rap Outlet Protection (Type A)" was revised. The construction detail is now located on Sheet 25.

26. *Sheet 10 refers to an infiltration basin while Sheet 12 refers to the same structure as a detention basin. The labels on the plans should be consistent and should follow MassDEP nomenclature.*

November 1, 2016:

The label for the basin has been removed from Sheet 12, however, while Sheet 10 refers to an infiltration basin, Sheet 7 refers to the structure as a stormwater management system, and Sheet 8 refers to the structure as a stormwater mitigation area. The labels on the plans should be consistent and should follow MassDEP nomenclature.

Acknowledged. Sheet 8 was revised.

General Engineering Comments

27. On Sheet 21, the floor fill in the precast drain manhole construction detail needs to have a channel as opposed to being a planar surface.

November 1, 2016:

The precast drain manhole construction detail has not been revised (now on Sheet 23).

Acknowledged. The precast drain manhole construction detail was revised.

28. Guardrails and pedestrian barriers (e.g. chain link fences) need to be provided at the tops of the retaining walls.

November 1, 2016:

A four-foot chain link fence has been added to the Precast Concrete Retaining Wall Detail, however, no guardrail is proposed between the roadway and the retaining wall. We believe a cross section of the right-of-way at the wetland crossing should be provided to show the proposed roadway, retaining walls, chain link fences, guardrails, sidewalk, and utilities.

A cross section of the right-of-way at the wetland crossing has been added to Sheet 23. GEI respectfully defers to the Planning Board regarding the location of the retaining walls at the wetland crossing. We offer the following for consideration: the cross section did not include a grass strip between the roadway's sloped granite edging and the sidewalk. This grass strip would serve the purpose of separating pedestrians from vehicular traffic and for snow storage (otherwise snow storage will occur on the sidewalk). Ideally, a grass strip should be provided. However, if the cross section is to be implemented then the sloped granite edging on the sidewalk-side of the street should be changed to vertical granite curb to better prevent drivers from being able to drive onto the sidewalk.

General Comments

29. We understand that the Planning Board or its staff will review any impact reports.
No further comment necessary.
30. We understand that the Grafton Water District will review the proposed water utility infrastructure.
No further comment necessary.
31. We are not aware if a meeting has occurred with Town staff/departments to address the configuration of the existing Appaloosa Drive cul-de-sac. At issue is whether the cul-de-sac should remain as is, be configured with an island or reconfigured as a through road. (MRSP 2014-8, Condition C3)

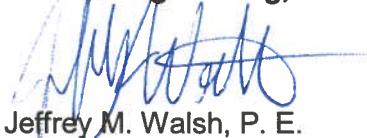
No further comment.

Additional Comments: January 19, 2017

- 37. The plans were revised to eliminate individual proprietary stormwater treatment units at certain catch basins in favor of a single proprietary treatment unit on the main line of each drainage system. GEI has no issue with this change, which we understand was requested by Grafton DPW. Supporting documentation was not submitted for the new proprietary units. For the record, Stormceptor sizing calculations and calculations to convert water quality volume to flow rate for sizing proprietary stormwater treatment practices (in accordance with MassDEP requirements) must be submitted for the proposed treatment units at DMH12 and DMH 13. Information was already submitted for the proposed treatment units at DMH 2, DMH 7A and DMH 9A (this unit was formerly proposed on the same drainage line at DMH 8).**
- 38. On Sheet 14, the profile view references a STC 450 stormwater treatment unit at DMH 8; this reference must be deleted. The treatment unit is now proposed at DMH 9A.**
- 39. Upon further review, on Sheet 17, the 18" diameter drain pipes between DMH 14 and DMH 17 have pipe slopes that will result in excessive water velocities; velocities greater than 12 feet per second (fps). The pipe slopes need to be adjusted. Drops at the manholes may be necessary.**
- 40. On Sheet 24 at the "Granite Bound Detail", the leader-note of bound dimensions (32" long) and the depth dimension (4'-0") need to be revised to require a five-foot long bound. (SR&R §5.11.1) Also, please note that it has been the policy of the Grafton Planning Department that bounds in lawn areas and other areas subject to mowing or personal activities (e.g. play areas) be installed flush with the ground surface as proposed, but bounds in wooded areas and other areas not subject to mowing or regular human activity be installed approximately six inches above finished grade. The construction detail should be revised accordingly.**

We trust this letter addresses your review requirements. Feel free to contact this office if you have any questions or comments.

Very truly yours,
Graves Engineering, Inc.



Jeffrey M. Walsh, P. E.
Vice President

Cc: Brian Marchetti, P.E., McCarty Engineering, Inc.