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November 19, 2014

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

FILE

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EXHIBIT RECEIVED

Engineering.com

**Subject: Appaloosa Drive
Preliminary Plan and MRDSP Review**

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Dear Joe:

**PLANNING BOARD
GRAFTON, MA**

We received the following documents on October 7, 2014:

- Correspondence from McCarty Engineering, Inc. to Mr. Joseph Laydon, Town Planner dated October 6, 2014 re: Response to Town Planner review.
- Correspondence from McCarty Engineering, Inc. to Mr. Joseph Laydon, Town Planner dated October 6, 2014 re: Response to peer review comments.
- Plan (rendering) Overall Subdivision Plan, Bull Meadow LLC, Appaloosa Drive N. Grafton, MA dated August 27, 2014, prepared by McCarty Engineering, Inc. (1 sheet)
- Plan (rendering) Overall Flexible Subdivision Plan, Bull Meadow LLC, Appaloosa Drive N. Grafton, MA dated August 27, 2014, prepared by McCarty Engineering, Inc. (1 sheet)

We also received the following documents on November 6, 2014:

- Document entitled Traffic Impact and Access Study, Proposed Bull Meadow Residential Development, Appaloosa Drive Grafton, Massachusetts dated November, 2014, prepared by Green International Affiliates, Inc.
- Full and reduced size plan sets entitled Preliminary Conventional Subdivision Plans, Bull Meadow, LLC, Appaloosa Drive North Grafton, Massachusetts 01536 dated August 27, 2014 and revised November 4, 2014 prepared by McCarty Engineering, Inc. for Bull Meadow, LLC (6 sheets)
- Full and reduced size plan sets entitled Preliminary Flexible Subdivision Plans, Bull Meadow, LLC, Appaloosa Drive, North Grafton, Massachusetts 01536 dated August 27, 2014 and revised November 4, 2014 prepared by McCarty Engineering, Inc. for Bull Meadow, LLC (6 sheets)

Graves Engineering, Inc. (GEI) has been requested to review and comment on the plans' conformance with applicable "Rules and Regulations Governing the Subdivision of Land; Grafton, Massachusetts" revised through April 27, 2009; "Grafton Zoning By-Law" amended through October 14, 2013; and standard engineering practice. As part of this review, GEI performed a reconnaissance site visit on September 19, 2014.

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This letter is a follow-up to our previous review letter dated September 23, 2014. For clarity, comments from our previous letter are *italicized* and our comments to the Applicant's responses are depicted in **bold**. Previous comment numbering has been maintained.

Our comments follow:

Zoning By-Law

Conventional Plans

1. The minimum required frontage was correctly listed as 140 feet in the Zoning Summary table on Sheet 1; however as shown on Sheets 2 and 3, Lot 10 will only have approximately 137.5 feet of frontage. (§3.2.3.2)

Acknowledged. Lot 10 has been corrected to allow 140 feet of frontage.

2. The minimum required lot area was correctly listed as 40,000 s.f. in the Zoning Summary table on Sheet 1; however as shown on Sheet 3, Lot 5 will only have approximately 38,904 s.f. (§3.2.3.2)

Acknowledged. Lot 5 has been corrected to allow the minimum lot size of 40,000 s.f.

Flexible Plans

3. The conventional plans propose 17 lots plus open space whereas the flexible plans propose 20 lots plus open space. In the Project Description & Narrative, the applicant is claiming a bonus provision relative to the number of lots. We understand that the Planning Board will address the issue of a bonus provision. (§5.3.5.2)

No further comment.

4. The Zoning Summary table on Sheet 1 listed a required average front setback dimension of 15 feet; however 20 feet is required. The minimum front setback requirement is 15 feet. (§5.3.6.D)

Acknowledged. The zoning summary table has been updated with the correct setbacks.

5. The Zoning Summary table on Sheet 1 listed a required average lot area of 25,000 s.f.; however 20,000 sq. ft. is required. The table also listed a minimum required lot area of 20,000 s.f. whereas the requirement is 12,500 s.f. (§5.3.6.a & §5.3.6.b)

Acknowledged. Zoning summary table has been updated with the correct areas.

6. The building on Lot 7 encroaches on the required minimum 50-foot buffer area. The building on Lot 7 is proposed only about 24 feet from an adjacent tract of land. (§5.3.6.h)

Acknowledged. The proposed dwelling on Lot 7 has been relocated to provide the required 50 foot buffer area.

7. The total amount of common land meets the minimum requirement of 40% common land. The proposed development consists of 55.7% common land. However it is unclear what percentage of the common land consists of upland. At least 50% of the required common land must be upland; at least 6.88 acres of common land must be upland. (§5.3.7.)

Acknowledged. A breakdown of the open space into upland and wetland area has been provided. The amount of upland provided is 6.9 acres, which is above the minimum requirement of 6.88 acres.

Subdivision Rules & Regulations

Both Conventional and Flexible Plans

8. The plans were prepared with ten-foot contour intervals, but five-foot intervals are required. (§3.2.4.1.h)

Acknowledged. The plans have been updated to provide five-foot contour intervals.

9. Road A is proposed with a slope of 0.00% between stations 13+76 and 14+21. The minimum centerline grade requirement is 0.08% (§4.1.5.1.)

Acknowledged. The proposed slope has been revised to 1.50%.

10. The Road A vertical profile proposes a road grade of 4.20% at the intersection of Bridle Ridge Drive whereas a leveling zone with a grade no greater than 3% grade is required. (§4.1.5.6.a)

Acknowledged. The proposed slope has been reduced to 2.50%.

General Engineering Comments

Both Conventional and Flexible Plans

11. The plans propose a stormwater management area on Lot 14 of the Conventional Development Plans or on Lots 17 and 18 of the Flexible Development Plans. We are concerned how the stormwater runoff from Road A between station 12+00 and station 16+00 will be addressed. The grade of Road A slopes away from Road B and there is a wetland separating the low point of Road A (existing Appaloosa Drive cul-de-sac) from the stormwater management area. The design engineer should elaborate about how stormwater from this section of road will be managed.

Acknowledged. The design engineer responded that the intention is to manage stormwater on Lots 1 and 17. Based upon the existing and proposed topographic elevations, the response is not unreasonable. We concur with the design engineer that detailed design should occur during definitive plan design.

12. The vertical curve between stations 14+12 and 16+12 is proposed with a "K" value of 201. (Average rate of grade change is 1% in 201 feet.) Depending upon plan revisions to address comment #9, a "K" of 201 may be excessive. An excessively long section of road with a grade less than 0.8% will be susceptible to puddles and/or sand accumulation. If the vertical curve ultimately connects a downward grade to an upward grade or vice versa then a lesser "K" should be used. A vertical curve with a "K" value of 201 may be reasonable if it ultimately connects a downward grade to another downward grade or upward grade to another upward grade.

Acknowledged. The proposed K value has been reduced to a more suitable K value of 43.

General Comments

Both Flexible and Conventional Plans

13. The plans propose twenty-two-foot wide roads, which are the width required for a "Minor Street-C". Based upon ITE trip generation rates for single-family dwellings, both the conventional and flexible developments would be expected to generate less than 250 vehicle trips per day. However, based upon our experience at a project elsewhere in Grafton, a twenty-two-foot wide through road can make it difficult to maneuver around a parked vehicle or an opposing vehicle if snow is present along the road. Furthermore, the existing portion of Appaloosa Drive is thirty feet wide. The Board may wish to consider requiring a "Minor Street-B" width of 26 feet for the new through road (Road A) to provide better maneuverability. (§4.1.4.2)

The applicant will discuss the road width with the Planning Board. We stand by our recommendation that a road width of 26 feet should be considered.

14. We recommend that consideration be given to eliminating the existing Appaloosa Drive roadway cul-de-sac turnaround (but not necessarily the right-of-way) in order to provide a standard through-road layout with the requisite horizontal and vertical roadway geometry, including a transition from the existing thirty-foot wide Appaloosa Drive to Road A.

The design engineer has suggested maintaining the existing pavement limits and adding a raised center landscaped island as a traffic calming device. We concur that an island would serve the purpose of traffic calming. However, an island would also make snow removal more cumbersome than a thru-road. We're not opposed to a traffic island, but we defer to the Planning Board and Grafton DPW how the existing cul-de-sac turnaround should be configured if the subdivision is approved. If not already done, the Board may wish to solicit comments from the Grafton DPW.

Conventional Plans

15. The cover sheet has two typographical errors; on the list of plan sheets, Sheets 2 and 3 were identified as "Conceptual Subdivision" plans instead of "Preliminary Subdivision" plans.

Acknowledged. The plans have been corrected.

Flexible Development Plans

16. Although not the subject of this Preliminary Plan review, we would like to bring an issue to the Board's attention. Per 310 CMR 15.00 (State Environmental Code Title V), in areas of private wells and septic systems the maximum wastewater loading rate for conventional septic systems is 440 gallons per day (gpd) (or four bedrooms) per 40,000 square feet of land area. The flexible development plans propose lots smaller than 40,000 square feet. In short the lot areas alone will not be large enough for conventional septic systems and private wells if four-bedroom dwellings are being considered. Title V does allow for increased wastewater loading rates if innovative/alternative septic systems are utilized and/or for the encumbrance of other land (e.g. the common land) through a Facility Aggregation Plan. Under a Facility Aggregation Plan the lot areas and other land such as the common land would be used to satisfy the wastewater loading requirements. The issue of wastewater loading is under the jurisdiction of local boards of health and MassDEP.

Acknowledged. The designer will review requirements with the developer.

Additional Comments, November 19, 2014

17. On Sheet 4 of the Conventional Subdivision Plans, the “high point” elevation at station 14+76.50 cannot be clearly read; it appears to be elevation 449.73 feet. If the plans are to be revised and resubmitted for any other reason, then the plans should also be revised to clearly show the elevation. Otherwise, the design engineer should confirm if our understanding of the elevation is correct.

18. We reviewed the narrative section (pages 1 - 26) of the Traffic Impact and Access Study. We have no issues with the methodology, data presented, conclusions or recommendations. We suggest that the recommendations be implemented by the Town or applicant as appropriate. For the record, it is our understanding that Bridle Ridge Drive, Morgan Drive and Appaloosa Drive are public ways; not private ways as indicated on page 3 in the *Neighborhood Residential Roadways – General Characteristics* section.

19. There is an existing drainage swale that Appaloosa Drive will cross at station 15+00+/- . A means for conveying stormwater across Appaloosa Drive will be required if the road is constructed. In our opinion, this level of detail could be addressed at definitive plan design if the project is approved.

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:Patrick McCarty , P.E.; McCarty Engineering, Inc.