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July 21, 2014

Ms. Marcia Gasses
Town Planner and Land Use Administrator
Town of Barrington, Land Use Department
PO Box 660
Barrington, NH 03825

Re: Response to Engineering Review Letter
Homestead Subdivision
Barrington, NH

Dear Ms. Gasses:

This letter is provided in response to the engineering review letter provided by DuBois & King, Inc., dated August 28, 2013, for the above listed project. Please find enclosed the following:

DATE	# of Copies	DESCRIPTION
7/21/14	3	Revised Full Size Plans
7/21/14	12	Revised 11x17" Plans
7/18/14	3	Revised Drainage Analysis
7/21/14	1	Waiver Request
12/03	1	Test Pit logs

The review comments by DuBois & King, Inc. are shown below in italics in their original order followed by responses by MJS Engineering.

DRAINAGE COMMENTS

1. *Discrepancies were noted in the HydroCAD soil listings between pre- and post-development. We recommend that the soil area calculations be reviewed and adjusted as necessary, or that an explanation be provided to justify why the soil areas are different between pre- and post-development conditions.*

   The soil area calculations have been reviewed and adjusted to match in the pre- and post-development conditions.

2. *The watershed maps indicate that Pond 1 corresponds to the drainage pond at the corner of Gerrior Drive & St. Matthews Drive, however the HydroCAD input does not match the conditions depicted on Sheet 5 of 6 prepared by Doucet Survey. We*

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recommend that the discrepancies between the survey and engineering work be resolved.

The survey of Pond 1 shown on Sheet 5 is correct. The HydroCAD model has been adjusted to correctly model the drainage pond (Pond 1).

3. *Several reaches that represent open channel flow in both the pre- and post-development drainage models do not include the upstream land areas that contribute flow. We recommend that these upstream areas be modeled as subcatchments, and routed to the appropriate nodes.*

   Subcatchment 1B has been broken up into smaller subcatchments contributing runoff to the modeled reaches.

4. *The Post Watershed Map appears to contain a typographical error, with Subcatchment 1C labeled as 1D.*

   This error has been corrected.

5. *The existing index contours appear to be frozen on plan sheets C1-C5 . We recommend that these be restored to the appropriate viewports. We further recommend that the text size of the contour labels on the 100-scale sheets be enlarged to improve legibility.*

   The changes have been made as noted on plan sheets C1, C3, C4, and C5. Existing contours have been removed from sheet C2.

6. *We recommend that the engineer review the design of the 48" culvert (Reach 7) and the associated plunge pool, based on the following:*

   a. *Since the culvert is modeled as a reach, the engineer should verify that normal open-channel flow will exist under the proposed design. If a headwater or tailwater condition is determined to exist, the culvert should instead be modeled as a pond with a 48" culvert outlet.*

      The culvert has been modeled as a pond with a culvert outlet. The culvert has been increased to a 60" diameter culvert.

   b. *The riprap sizing calculations indicate a downstream channel bottom width of 25', 10:1 side slopes, a 48' long apron, and a top width of 59.80'. Though shown accurately in the detail, this geometry is not reflected by the contours shown on the plan and should be added to facilitate proper construction.*

      A plunge pool detail has been added to the plan set and the grading of the outlet revised.

   c. *To assure adequate detail is provided to the contractor, we recommend that design elevations be added to the downstream end of the plunge*

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pool. If the engineer intends to maintain normal open-channel flow in the culvert, the elevations will need to be set accordingly.

The design elevation of the plunge pool outlet have been added to the design plans.

7. *A number of proposed pipes are shown on the plans that are not included in the HydroCAD analysis. We recommend that these be added to the model with appropriate subcatchment areas to verify that grates and culverts are sized to accommodate the 50-year storm. Note also that the minimum diameter and length for driveway culverts required by the Town are 15" and 30', respectively.*

   All driveway culverts along Heritage Lane have been changed to 15" diameter and 30' long. To achieve adequate pipe cover, all swales along Heritage Lane have been made 6" deeper. All structures including grates and culverts are sized to accommodate the 50-year storm. Proposed Catchbasins #1 and #2, the regraded center of the cul-de sac, and two of the driveway culverts have been added to the analysis. The two driveway culverts are the last collection point on either side of Heritage Lane prior to reaching the catchbasins and can pass the 50-year storm. Therefore all upstream driveway culverts are sized correctly. The only driveway culvert not included in the analysis is located on the north side of Heritage Lane closest to the intersection and Proposed Drop Inlet #1 located on the shared driveway. The culvert is correctly sized to pass the 50-year storm. Likewise, Proposed Drop Inlet #1 also passes the 50-year storm. The grate capacity of PDI #1 will limit ponding to 1-inch during the 50 year storm.

8. *We recommend that the engineer review the Standard Drainage Pipe Trench detail, as it appears that some drafting errors may have occurred.*

   The Standard Drainage Pipe Trench detail has been updated accordingly.

9. *It is noted that the 12" pipe leaving drop inlet #1 is designed with less than 2' of cover. Where the NHDOT standard drop inlet requires a minimum of 26" cover (assuming a 4" frame mounted directly to the structure), we recommend that the engineer provide the appropriate detail to facilitate proper construction. Likewise, at catch basin #1, only about a foot of cover is provided, where a minimum of 19" is needed according to the NHDOT standard slab top catch basin detail (assuming a 4" frame mounted directly to the structure).*

   The 12" pipe leaving drop inlet #1 has been lowered to meet the minimum 26" cover required. The pipes entering and leaving catch basin #1 have been lowered to meet the minimum 19" cover required. Drop inlet and catch basin details have been added to the plans to show construction requirements.

10. *A typo of the word "spillway" was found in the note under the Rip Rap Spillway Typical Cross Section Detail.*

    The typo has been corrected.

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11. *Pursuant to the Stone Check Dam detail, we recommend that the locations and dimensions of stone check dams be added to the plan sheets. We further recommend that stone check dams be employed in the swales proposed along St. Matthews Drive in addition to the swales already called out on the plans.*

The locations of stone check dams have been added to the plan sheets, including along the proposed swales of St. Matthews Drive.

12. *Less than 12" of cover was noted at some of the HDPE driveway culverts - we recommend that the engineer check the culvert designs and make the appropriate revisions to ensure the integrity of both the pipe and pavement.*

As indicated above in the response to Item 7, the design of the driveway culverts has been revised. All culverts have been lowered as needed to achieve a minimum cover of 12". The Standard Drainage Pipe Trench detail has also been revised to include a note stating that the driveway culverts shall 15" HDPE (ADS N-12, or equal).

13. *Reach #8 is modeled as a 0.4' deep channel, however the 0.87' average depth of flow exceeds the specified storage range in the 50-year storm. We recommend that the engineer modify the input of the reach to accurately represent the flow characteristics during the 50-year storm.*

The reaches have been revised.

14. *We recommend that the Stabilized Construction Entrance Detail be expanded to specify the Mirafi filter fabric product selected by the engineer for this application. This will help to assure that the contractor provides the appropriate product for the intended use.*

The Stabilized Construction Entrance Detail has been revised in include a note stating that Mirafi 140N filter fabric shall be used.

15. *Discrepancies were noted when comparing the gravel wetland outlet shown in the plan set to the HydroCAD input. We recommend that the engineer review the design and make the appropriate revisions.*

The discrepancies between the model and plans have been corrected.

16. *The gravel wetland outlet control structure calls for a 36" dia. Nyoplast body, with a 24" grate assembly. The engineer should clarify how the grate assembly is to be mounted to the larger-diameter drain basin body. Simply upsizing the grate to 30" does not appear to address the matter, as the outside diameter of the assembly is 36" and the inside diameter of the drain basin body is 36".*

The grate assembly has been revised to a Nyloplast 30" weir structure and grate.

17. *The engineer should clarify the rim elevation of the gravel wetland outlet structure by adjusting the leader to point to the top of grate.*

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The Gravel Wetland Outlet Control Structure detail has been updated accordingly.

18. *We recommend that the location of Section B-B' Gravel Wetland Pipe Outlet Detail be clarified on the plans. It appears that Section B-B' is labeled as A-A'.*

The gravel wetland section labels have been updated accordingly.

19. *We recommend that the drainage easement be expanded to include the existing drainage system on the southerly quadrant of the Gerrior Drive/Heritage Lane intersection, on proposed lot #1.*

The drainage easement has been expanded accordingly.

20. *We recommend that test pit logs and soil data be provided for review of the gravel wetland design and to justify the omission of underdrain along the roadway cut sections.*

Test pit locations have been added to the applicable plan sheets and the test pit logs are included. Test Pit #7 was used for the design of the gravel wetland. Underdrain will be required along the roadway cut sections. This will be provided with the final plan submission.

ROADWAY COMMENTS

1. *Sheet C2 shows a proposed well within the Heritage Lane R.O.W. (near the end of the cul-de-sac). We recommend that the well location be shifted such that the well radius is on the lot that the well serves.*

The proposed well location has been updated accordingly.

2. *We recommend that grading information be added to the northeast end of Wallner Lane (between Sta. 4+50 and the end of the proposed shared driveway).*

Grading information has been added to the end of Wallner Lane. This includes the addition of proposed contours and spot grades on the plan view and additional information shown on the roadway profile and cross sections.

3. *We recommend that tack coat be applied to the binder course prior to placing the bituminous curb.*

Both the Bituminous Concrete Curb Detail and the Shared Drive Cross Section have been revised accordingly.

4. *We recommend that the curb conform to NHDOT standards for ease of construction.*

The Bituminous Concrete Curb Detail has been revised to conform to the requirements for NHDOT Type 'B' bituminous curb.

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5. *It was noted that there is a drafting error on the sign detail - the sign post appears to have been deleted.*

   The Typical Sign Detail has been updated accordingly.

6. *The sign detail calls for a MUTCD R7-6 "NO PARKING LOADING ZONE", whereas the plans call for STOP signs. We recommend that the engineer make the appropriate revisions to clarify this discrepancy.*

   The Typical Sign Detail has been updated to show a STOP sign.

7. *The road design calls for a 3' shoulder width in cut sections, where a 6' shoulder width is required. Further, the Subdivision Regulations require NHDOT Item 304.33 - Modified Crushed Gravel for shoulder construction. We recommend that the drawings be revised accordingly.*

   A waiver is being requested to allow a 3' shoulder. The typical roadway cross sections have all been revised to required NHDOT Item 304.33 - Modified Crushed Gravel for shoulder construction.

8. *In accordance with the Town's intersection design standards we recommend that the curb radius at the easterly quadrant of the Gerrior Drive/Heritage Lane be revised to comply with the requirements of Article 15.7 of the Subdivision Regulations. We further recommend that all driveway flares and intersection radii be labeled to facilitate proper construction.*
   Per Article 12.7 of the Subdivision Regulations, a minimum curb radius of 25' is required for a minor access road. The plans have been modified to show a 25' curb radius at the intersection of Heritage Lane and the existing gravel road. As further recommended, all driveway flares and intersection radii have been labeled.

9. *The plans call for the center of the cul-de-sac to be graded at 1% from the center toward the proposed street pavement, which is inconsistent with the profile which calls for the center of the cul-de-sac to be graded at 1% from Sta. 9+75 toward the southwest, and the cross-sections which call for the center of the cul-de-sac to be left undisturbed. We recommend that the engineer clarify the proposed grading of the center of the cul-de-sac for review and for proper construction. Furthermore, we recommend that the appropriate drainage systems be incorporated into the cul-de-sac design to prevent stormwater from the center of the cul-de-sac from draining onto the pavement, and the dashed 35' radius circle in the center of the cul-de-sac be labeled for clarity.*

   The cul-de-sac grading and drainage design has been modified per the recommendations noted above and per the Subdivision Regulations. Revisions have been made to the applicable plan sheets and the roadway profile and cross sections.

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We trust this letter and enclosures have addressed the engineering review comments and recommendations made by DuBois & King, Inc. If you need additional information, please do not hesitate to contact me at (603) 659-4979 x307.

Sincerely,

Mike Schlosser
Project Engineer

Cc: Jeffrey A. Adler, P.E.

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