



— A PROFESSIONAL LIMITED LIABILITY COMPANY —

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Marie Rodgers  
Town of Ipswich, Massachusetts  
Zoning Board of Appeals  
25 Green Street  
Ipswich, MA 01938

July 16, 2019

**RE: Primrose Farm – Map 30B, Parcels 33, 37A, and 63 – Town Farm Road – Locust Road**

Dear Ms. Rodgers,

I am writing in response to the Peer Review letter submitted to you by Robert B. Blanchette, Jr., P.E. and Denis M. Hamel, CPESC of W.C. Cammett Engineering, Inc., dated June 17, 2019 upon their review of our Plans and supporting calculations for the project mentioned above.

I have reviewed their comments and made the appropriate revisions to the plans and supporting documentation. I have written their comments below with our responses immediately following each comment in bold italics.

1. On the cover sheet of the project plan set, the following information has not been provided:
  - a. Scale for maps

***Response: A scale has been added to the Proposed Plan overview and the Locus Map***

2. Plan sheet SP-1;
  - a. data for CB-11 has been cut off from the viewport. Drainage structure data, test pit data, and existing and proposed grades, does not need to appear on the Site Plans.

***Response: The viewport has been adjusted to show these items and plot settings have been modified to better depict the existing contours. These items have been added to the Site Plans***

- b. Units 2, 3, and 4 are approximately 4 feet from the edge of the pavement of the

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roadway. The Building Inspector should review for safety issues.

***Response: The Roadway in the area of these units (from Sta. 0+00 to approximately Sta. 5+25) has been relocated four feet to the north to provide better separation from the dwellings. The revised location of the roadway and proximity to the proposed dwellings will be reviewed with the Building Inspector.***

- c. Vehicles existing units 1, 2, 3, and 4 will have to back into the roadway. The sight distance will be extremely limited due to the proximity of the homes to the edge of the roadway.

***Response: The distance from the garage door to the limit of the driveway is approximately 28 feet, allowing for a vehicle to turn around and exit the driveway. The relocation of the Roadway in this area will provide additional site distance when exiting the driveway.***

3. Plan sheet GD-I;

- a. Test pit locations and data should be indicated on this plan.

***Response: Test pits have been added to the plan.***

- b. Roadway stationing should appear on this plan to coordinate with the profile sheet.

***Response: Stationing has been added to the Plan.***

- c. Units 19 and 20 have slabs at elev. 46.1. If CB 12 is plugged the water elevation could rise to be elevation 46.4 which would flood units 19 and 20.

***Response: The grading in this area has been adjusted to allow any overflow from the area of the CB to exit the site without flooding the units.***

- d. Units 11 and 12 have slabs at elevation 48.4. There is a spot elevation of 48.8 behind Unit 12. There should be 8" above the finished grade to any wood on the house.

***Response: All of the proposed spot grades have been reviewed and adjusted where necessary to ensure that a minimum separation of 1 foot is proposed between finish grade and top of foundation.***

- e. The contour line around CB-3 is labeled 41, but CB-3 rim elevation is 41.3.

***Response: A revised stormwater analysis has resulted in a change to the grading in this area. As a result, the CB and the associated grading has been removed/adjusted.***

- f. The contour line around CB-6 is unlabeled.

***Response: The grading in this area has been adjusted.***

- g. Many of the HDPE Drain pipe has approximately 12" cover over the pipe. This is determined from the invert of the pipe to the rim grade of catch basins. This would include the thickness of the pavement. ASHTO recommends that a minimum of 12" of cover over 12" HDPE pipe

from the top of pipe to underside of flexible paving, with a minimum of 6" of structural fill over the top of the pipe.

***Response: A revised stormwater analysis has resulted in the resizing of many of the proposed pipes resulting in additional cover. Additionally, all of the proposed pipes within the proposed roadway have been changed from HDPE to Class IV or Class V RCP to ensure appropriate cover and pipe strength.***

4. Plan sheet UT-1;
  - a. Proposed grading and drainage data need not appear on this sheet for clarity

***Response: These layers have been removed from this plan.***

- b. Water valves for the intersection of Town Farm Road, and fire hydrants should be indicated.

***Response: Proposed water main gates have been added to the plan at the intersection of Town Farm Road and Locust Road in a 3-valve, 'T' configuration. Hydrants have been added to the Plans.***

- b. The sewer force main and the water main must have a minimum of a 10 foot horizontal separation.

***Response: The plans have been reviewed and adjusted where necessary to ensure that 10-feet of separation are provided between the proposed water main and sewer force main as well as between sewer service lines and water service lines.***

- d. There is an existing 16" water main behind units 1, 2, 3, and 4. The proposed design shows swales and an infiltration basin over the existing water main. The depth of the existing water should be determined to insure a minimum cover of 5 feet is maintained. The Water Department should review this condition and provide comments.

***Response: A revised stormwater analysis has resulted in the ability to construct a grassed swale in this area which will require no excavation. The existing depth of the water main will be maintained or increased.***

5. Plan sheet DT-1;
  - a. AH imported soils (gravels, clay, common borrow) and rip-rap stone should be specified.

***Response: MassDOT specifications have been referenced where applicable on plans and details.***

- b. Typical Road Section -Loam and seed note is overlaid on the section view.

***Response: This label has been removed.***

- c. Typical section does not show the Cape Cod Berm in relation to roadway width. On plan sheet SP-1, the berm appears to be within the 20 foot section. Clarify where the berm is placed in the section view and the stationing where it will be used.

***Response: The cape cod berm has been added to the section to show a full 20-foot wide travel way.***

- d. Typical grass swale and the grass swale shown on the typical section have different side slopes.

***Response: The details have been adjusted.***

6. Plan sheet DT-2;

- a. HDPE typical Trench Detail does not specify bedding or backfill material

***Response: The specifications have been added to the detail.***

- b. Typical End Section indicates 7.9" of crushed stone above and below chambers. Infiltration System Section indicate 6" of crushed stone above and below chambers.

***Response: The detail has been corrected to show 6" of crushed stone.***

7. Plan sheet DT-3;

- a. Water Main Typical Trench Section indicates a 5 foot minimum cover. The Typical Road Section on plan sheet DT-1 indicates 4 feet. Stone and gravel note is obscured with other text. The Water Main pipe should be set on 6 inch min. of sand and bedded in sand. Imported soil materials should be specified.

***Response: The detail has been adjusted.***

8. Plan sheet DT-4;

- a. Deep Sump Hooded Catch Basin. Due to the shallow condition of the drainage system, most of the catch basins will require a flat top rather than a cone section shown. A detail of the flat top catch basin should be provided with dimensions to verify the catch basins with the shallow depths can be constructed to the invert and rim elevations indicated on the grading and drainage plan GD-1. The distance from the invert of the outlet and the bottom of the elbow should be shown to indicate the depth into standing water within the catch basin.

***Response: A flat top catch basin detail has been added to the sheet. Additionally, many of the pipe inverts have been adjusted.***

- b. Infiltration Basin Outlet Structure 1. The inlet orifice is at 39.0 and 0.5 feet high. The top of the orifice is 39.5. The recessed rim is 39. 7, leaving the top slab 0.2 feet thick. This cannot be constructed.

**Response: Based on the revised stormwater analysis and modelling the outlet control structure in Infiltration Basin 1 has been removed. A Class V RCP and headwall will serve as an outlet.**

c. Infiltration Basin Outlet Structure 2. The 10 inch inlet orifice is at 38.9. The top of the orifice is at 39.73. The recessed rim is at 40.0 leaving the top slab 0.27 feet thick. This cannot be constructed.

**Response: The outlet structure has been adjusted.**

d. Infiltration Basin Outlet Structure 3. The inlet orifice is at 39.5 and 0.5 feet high. The top of the orifice is at 42.4. The recessed rim is at 42.8 leaving the top slab 0.4 feet thick. The 24 inch ID HDPE pipe is at 40.3. The top of the HDPE pipe is at 42.45. This structure may not be able to be constructed.

**Response: The outlet structure has been adjusted.**

9. Plan sheet L-1;

a. Trees and shrubs are shown in the roadside swales which may not be appropriate for stormwater flow.

**Response: The Landscape Architect has been consulted the Landscape Plans have been revised to ensure that no plantings are proposed within swales.**

b. Plantings should coordinate with utilities such as Sewer Pumps, catch basins, and Fire hydrants.

**Response: The Landscape Architect has been consulted the Landscape Plans have been revised to ensure that no plantings are proposed that will interfere with utilities.**

10. Plan sheet L-2

a. Behind Unit 1 and around Infiltration basin 1 there are trees shown that appear to over the existing 16" water main. Coordination with the Water Department with the location of the plantings and the water main.

**Response: The Landscape Architect has been consulted the Landscape Plans have been revised. The tree has been removed from this area**

- The soil lines from the NRCS mapping need to added to the plan sheets EX-1 and Watershed Maps.
- Test pits and test pit logs

- Test pit must be provided at infiltration Basin 1.

***Response: The soil lines and test pits have been added to the revised Watershed Maps. Test Pit logs were included in the appendix of the Stormwater Report. A soil boring was performed in the area of Infiltration Basin 1 that is consistent with the test pits and soil borings throughout the site.***

- The bed bottom of Infiltration Basin 1 may have to be adjusted based on the actual seasonal high water in that location.

***Response: The ESHGW estimated for this location is consistent with test pits and soil boring information throughout the site.***

- Test pit logs must be performed by a competent soil professional (list name of person conducting the test pit). No name or qualifications of the person conducting the tests have been provided.

***The name of the soil evaluator that conducted the test pits has been added to the plans.***

- Test pit 9 indicates a 30" depth to seasonal high water table. The existing elevation is approximately  $41.0 - 2.5' = 38.5$ . Two feet above the seasonal high water table would be 40.5. The bottom of Basin 3 is indicated to be 40.0. The bottom of the basin needs to be raised .5 feet.

***Response: The bottom of the basin has been raised.***

- Groundwater mounding calculations are required for each infiltration system that has less than 4 feet to the seasonal high groundwater. No groundwater mounding calculations were provided for Infiltration Basin 1. The duration of infiltration for all mounding calculations (t) must be adjusted in the drawdown calculation for that specific basin. Basin 2 has a drawdown time in 9.9 hours which is 0.41 days. Basin 3 is 15.8 hours which is 0.66 days. The Cultec Infiltration system is 3.9 hours which is 0.16 days. All three basins that have mounding calculations, indicate that the groundwater mounding will interfere with drawdown time by intercepting the bottom of the each basin.

***Response: Drawdown calculations provided were based on Mass. Stormwater Regulations method. For Infiltration Basin-1. While the elevated outlet serves to encourage infiltration and take advantage of the soil conditions at the site, it is not necessarily being used to attenuate the peak discharge from the site. In this drainage train, Infiltration Basin 2 is being used to attenuate peak flows. The Hantush Method mounding calculations provided meet the Mass Stormwater standards as the groundwater mound in each basin does not break out above the land or water surface.***

- A cross section of the berm for the stormwater basins has been provided. Soil specifications for the common borrow and impervious core should be provided. Compaction requirements and construction sequence should also be provided.

***Response: Applicable MassDOT specifications have been referenced. The impervious soil core has been replaced with an impervious membrane in the standard berm detail.***

- The Pre-Development and Post-Development Watershed plans show the Subcatchments extending over Town Farm Road. We conducted a site observation to observe this area and believe that Town Farm Road intercepts the stormwater flows and that area does not contribute to the water shed to the project. The subcatchments and the time of concentrations should be adjusted to reflect the site conditions.

***Response: The subcatchments have been modified and no longer reach beyond Town Farm Road. The stormwater analysis has been completed based on the new areas.***

- The minimum time of concentration is recommended by 'Hydro-Cad' to 6 minutes. Many of the Post-Development Tc's are less than 6 minutes. The Tc's should be revised and the calculations re-submitted.

***Response: Minimum Tc has been used in the revised modelling calculations.***

- The outlet structure details do not coordinate with the Stormwater calculations. The details for Outlet structure 1 and 3 indicate a vertical rectangular outlet of 6" high, however the Stormwater calculation indicate a broad crested weir.

***Response: The orifices in the outlet control structures have been adjusted.***

- The Stormwater calculations for outlet structures 2 and 3 indicate a vertical 24"x24" outlet. The details show a 24"x24" horizontal grate.

***Response: The outlet control structures have been adjusted.***

- It appears that aU three Infiltration Basin Outlet Structures cannot be constructed. See comments for Plan sheet DT-4 for comments on this issue.

***Response: The outlet control structures have been adjusted.***

- Based on the stormwater calculations, catch basin 3 overtops for the so year storm event. Catch basins 3,9,10,11,12 and Drain manhole 5 overtop for the 100 year storm event.

***Response: The stormwater calculations have been revised and the condition no longer exists.***

- Infiltration system analyzed as 'IS 1' is totally full at the 50 year storm event and overflows at the 100 year storm event. No emergency overflow outlet is provided. The overflow should be reflected in the Summary Link. The calculations submitted indicate no contribution from the overflow.

***Response: The stormwater calculations have been revised and the condition no longer exists.***

- The Stormwater calculations need to coordinate with the drawings. The results of the needed revisions will affect the results. The basin designs will need to be revised.

***Response: The plans and calculations have been revised.***

- The driveways for 1,2,3,4,5,21,22,23,and 24, have hazardous conditions associated with them as stated in the Peer Review dated 2-15-2019\ as well as this review. The Zoning Board should have the Police/ Fire departments and the Building Inspector provide an opinion on Building and Safety Codes.

***Response: The driveway dimensions have been discussed with local Boards and Commissions. The revised plans will be circulated to town departments at the request of the ZBA.***

- The design of the pressurized sewer system is should be evaluated by the Sewer Department once complete and before the first building permit is issued. The force main is within the pavement limit of Locust Road.

***Response: The proposed sewer system has been discussed with local Boards and Commissions. The revised plans will be circulated to the sewer Department.***

- An Erosion Control and Mitigation plan is required by the DEP for this project prior to approval. An EPA Construction General Permit will be required prior to Earth moving operations.

***Response: An Erosion Control and Mitigation Plan will be submitted prior to approval. An EPA Construction General Permit will be submitted prior to construction.***

Please find attached to this letter a revised set of Plans and calculations and please feel free to contact me at any time with questions or comments on this submission.

Sincerely,

Patrick L. Bower, P.E.

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