

September 6, 2016

Margaret Hoffman, AICP
Planning Coordinator
Town of Wenham

Wenham, MA

Re: Engineering, Conservation and Zoning Review
Wenham Pines, Wenham, MA

Dear Ms. Hoffman:

Design Consultants Inc. (DCI) is pleased to submit this peer review of the above reference project. This review is limited to the Notice of Intent filing. The Project Applicant is Wenham Pines LLC (Applicant). The Project's civil engineer is Hancock Associates. (Engineer). The following documents have been provided by the Town of Wenham (Town) for review:

- Hancock Associates., "Notice of Intent, 56 & 60 Main Street in Wenham, MA, 18 July, 2016", (NOI).

The following are DCI's comments on the Notice of Intent submitted to the Wenham Conservation Commission. Comments on the Flexible Development Application will be submitted under separate cover. It is important to note that the comments in this letter also apply to the Flexible Development Application, and will be duplicated in the Flexible Development Application only as necessary.

Notice of Intent

A. General Information

1. WPA Form 3 (2) Applicant – Robert F. Tambone is listed on the Commonwealth's Certificate of Organization. Anthony Tambone is not listed as a member of the LLC. Contact information is not provided.
2. WPA Form 3 (2) Property Owner – Contact information not provided.
3. The Notice of Intent Filing is incomplete. Project details are not included. A Riverfront Alternatives Analysis is not included.

B. Buffer Zone & Resource Area Impacts

4. a. Bank is checked however no footage is provided.
5. b. Bordering Vegetated Wetland (BVW) is checked however a value of 0 is provided for the size of the proposed alteration and the proposed replacement.
6. f. 3. Riverfront Area – The applicant has indicated there are 240,000 square feet of Riverfront on site. Our calculations indicate that there are 257,161 square feet north of the "River".

7. f.4. The amount of Riverfront alteration is significantly under estimated. The NOI indicates that a total of 8,390 square feet are altered, that 6,000 square feet are altered within 100 feet and 2,390 square feet are altered between 100 feet and 200 feet. DCI estimates that 33,800 total square feet are proposed to be altered with 14,700 square feet within 100 feet and 19,100 square feet within 100 feet. In addition, the NOI Plans do not show the proposed trail to be constructed in the Riverfront Area that has been submitted with the Flexible Development Application.
8. f.5. An alternatives analysis is required.

D. Additional Information

9. 3. The NOI need to provide the methodology for BVW and other resource area boundary delineations.

Project Narrative

10. Project Delineation Methodology: The Applicant should attach documentation of the methodology used to delineate the Bordering Vegetated Wetlands (BVW) boundary (e.g. BVW Field Data Form, Final Order of Resource Area Delineation or other delineation method) as well as methods used to delineate any other resource areas proposed for alteration. The flagging appears consistent with the vegetated wetland boundary existing on-site, however it appears that historical mowing may have encroached on areas that hydraulically function as wetlands and have hydric soils. DCI has not confirmed the resource area delineations.
11. Project Delineation Methodology: In the final paragraph the Applicant discuss “three (4) wetland resources” areas as identified by the Wetlands Protection Act. Then proceeds to list four. Please clarify.
12. Project Delineation Methodology: The Applicant failed to identify Bank, Wetlands, Water Bodies, Waterways and Adjacent Upland Resource Areas under the Town’s Wetlands Regulations (100 CCR).
13. Bordering Vegetated Wetlands: The Applicant proposes to replace the 6-inch PVC pipe connecting the B & C Series Wetlands with a 10-inch ductile iron pipe. The Applicant has not provided any discussion regarding the impacts during construction or changes to the hydrology that may arise do to the change in the pipe. In addition, the DI pipe is large and has limited cover. The Applicant should review the pipe profile to determine is it will have adequate cover.
14. Bordering Vegetated Wetlands: The Applicant has identified three invasive plants as identified by the Massachusetts Invasive Plant Advisory Group. These plants include: purple loosestrife (invasive), multi-flora rose (invasive) and reed canary grass (invasive).
15. Riverfront Area: The Applicant needs to provide an alternatives analysis.
16. Inland Bank: The inland bank is not identified on any of the drawings.

Data Report

17. 2.1 Project Site: It is DCI’s understanding that the brook which drains Wenham Lake is named “Alewife Brook”. Please refer to the brook by name in all documents for consistency.
18. 2.3 Floodplain Analysis: The provided flood plain volume calculations appear to be incorrect. DCI has scaled the areas in the excavation and it appears that the volume in the 37-foot to 38-foot contour is 9,500 cubic feet. Please review the calculations and reduce the area if needed.

19. 3.1 Drainage System: The drainage system should be designed to keep the total volume for each storm event equal.
20. 6.0 Erosion and Sedimentation Plan: This site will have great than one acre of disturbance and requires a Stormwater Pollution Prevention Plan (SWPPP) under the EPA's Construction General Permit. This section does not meet the minimum requirements for a SWPPP.
21. 7.0 Stormwater Operation and Maintenance Plan: This plan does not provide any details for a maintaining roof infiltration systems. Typically, an O&M Plan identifies each Best Management Practice, describes the BMP, and provides criteria for inspection and maintenance. A BMP inspection form is provided for each BMP type.
22. TSS Calculations not included.

Plans

23. It is important to note that the Plans submitted with the Notice of Intent were incomplete and many of these comments are based on review of the Wenham Pines Permit Plans submitted to the Planning Board.
24. From the site walk, there are many large diameter trees missing on the existing conditions plans. All trees should be shown. Any trees planning to be removed in the Resource Areas should be shown. The alteration caused by the tree removal should be shown.
25. No disturb areas should be shown around the B & C series wetlands and Upland Resources Areas. Typically orange construction fencing is used to delineate areas that should not be disturbed. Clearly show a limit of work line.
26. The side slopes of the compensatory flood plain are 3 horizontal to 1 vertical (3:1). These slopes are much steeper than the natural topography. In addition, this area could be moved outside the Adjacent Upland Resource Area and the Riverfront Area by moving it to both sides of the intermittent stream.
27. The detention basins side slopes are 1.5H:1V. These are extremely steep and unstable. The Engineer needs to provide details and engineering calculations to support this design.
28. Details were not provided with the plans.
29. The detention basins are not labeled and are actually perform as infiltration basins. For the purposes of this letter, the detention basin to the north will be identified as DB1 and to the south will be identified as DB2. This is consistent with HydroCAD[®] analyses.
30. The flow from DB1 is routed to DB2. As the discharge from DB 1 has been treated, it should not be send into the sediment forebay #2A. The forebay has not been designed to handle these flows and may result in sediment being re-suspended.
31. CB#12 and CB# 13 flow into a Drainage Manhole (DMH) that has not been listed. This flows than to Flared End Section (FES) #4 directly into the intermittent stream, without any erosion protection. In addition it appears that Inland Bank maybe disturbed. This system is not modeled in the Stormwater Calculations.
32. The alignment of the roadway crossing appears to destroy that natural channel. The structure is not parallel to the crossing.
33. The wing walls for the crossing should be in a straight line with the edge of the crossing to minimize the amount to fill in the resource area.
34. Test pits should be excavated in the compensatory flood storage area to determine the estimated season high ground water table. Based on a review of ground water elevations and surface water elevations, it appears that the excavation will intercept the groundwater table. This may result in seepage at the toe of the slope, which might result in slope failure.
35. The overflow from each sediment forebay into the detention basins needs to be detailed.

36. The invert of FES#1 is at elevation 44-feet. This invert is at the same elevation of the bottom of the forebay and will result in re-suspension of sediment. The Stormwater Handbook shows the outlet above the sediment volume and outlet invert.
37. Several cart paths, bridges and pipes are located within the wetlands. DCI recommends removing the bridges and pipes, and the extra fill from the cart paths. The cart paths should be removed to a depth of six inches below grade and the soil replaced with an organic mix suitable for wetlands plant and seeded with a wetlands mix. A Certified Wetlands Scientist should oversee the work.
38. The plans do not indicate the type and model number of the Votrtechnics Unit to be installed. Design data is not included.
39. Units No. 12 to 15 could be re-orientated to move the driveways out of the buffer zone.
40. The erosion and sedimentation controls shown on the plans are minimal. A separate drawing showing the erosion and sediment controls should be provided. The site is large and has steep slopes in locations. The minimal perimeter controls shown are not adequate.
41. Units No. 1 to 4 and Detention Pond No. 2 could be moved outside of the Riverfront Area.
42. FES#3 discharges to the Buffer Zone and Adjacent Upland Resource. Details have not been provided for preventing erosion at this outfall.

Stormwater Calculations

43. Roof Drainage Design: The units scale from 2,700 to 2,900 square feet, not the 2,400 square feet used in the calculations.
44. Roof Drainage Design: How are the roofs accounted for in the HydroCAD® analyses?
45. The flow paths and design points should be shown on the Drawings EW – Existing Watersheds and PW-Proposed Watersheds.
46. Sediment Forebay Design – The impervious surface areas for Sediment Forebays #2A and #2B in the HydroCAD® do not match the areas in the sediment forebay design calculations.
47. Sub-watershed PR1A discharges 2,949 square feet of untreated stormwater from impervious surfaces, resulting to no removal of Total Suspended Solids (TSS).
48. Several inverts do not match between the HydroCAD® and the Drainage Data Table. The following table identifies these discrepancies.

Structure or Node	Structure Out Invert (Drawings)	Pipe In Invert (HydroCAD®)
DMH 6	45.7	46.6
VORT#1	36.5	33.9
	Structure In Invert (Drawings)	Pipe Out Invert (HydroCAD®)
DMH6	45.8	46.7

49. The sediment forebays are included in the detention calculations and are designed to permit infiltration. By their nature, forebays do not allow water to infiltrate as the sediment clogs the soil surface. In addition, the forebays are not detention ponds, but pretreatment BMPs and should not be used in the detention calculations.
50. The two detention/infiltration basins are located in soils classified as Wareham Loamy Sands. According to the Web Soil Survey¹, these soils consist of Sand below 24-inches in depth. The

¹ <http://websoilsurvey.sc.egov.usda.gov/>

groundwater table is typically 0 to 18 inches below grade and the saturated hydraulic conductivity is high to very high (6 to 20 inches per hour). Test pits should be excavated in each detention basin location and permeability testing be performed. In addition, the season high groundwater table should be determined in each of the basin locations. As the soils appear to have rapid infiltration rates (>2.4 inches/hour), pretreatment must remove 40% of the TSS².

***Town of Wenham Water Resources Protective By-Law
And Regulations***

51. 10.51 General Provisions (1) Limited Projects (a) Access Road: The access road as designed impacts of 2,500 square feet of 10.02(1) (b) Any land subject to flooding. The proposed access road appears to impact of 9,000 square feet. In addition, the access road appears to impact 60 linear feet of bank, which is greater than the maximum 20 linear feet specified in this section.
52. 10.54 Adjacent Upland Resource Areas (3) (b): This project discharges roof and driveway runoff from a total impervious area greater than 4,000 square feet.
53. 10.54 Adjacent Upland Resource Area (4)(d): It is DCI's understanding that a foot path is planned. The Applicant should provide the details of this foot path and ensure that it meets the requirements of this section.

***Wetlands Protection Act
And Regulations***

54. 10.53: General Provisions(30)(e): The current design restricts flow as its foundations are located in the existing intermittent stream, the structure and fill is larger than needed and the crossing is not perpendicular to the stream. In addition, this crossing requires approval of the Planning Board.
55. 10.57 Bordering Land Subject to Flooding (4) General Performance Standards: Compensatory volume shall be provided within the same reach of the river, stream or creek. DCI recommends that the compensatory storage be moved along the intermittent stream.
56. 10.58 Riverfront Area (4) General Performance Standards (c) Practicable and Substantially Equivalent Economic Alternatives: An alternatives analysis in accordance with this section of the Wetlands Protection Act should be provided the Notice of Intent.

We trust that the contents of this report satisfies your current needs. Should you have any questions, please do not hesitate to contact me at (781) 733-1214.

Sincerely,
Design Consultants Inc.



Michael F. Clark, P.E.
Associate