

Engineering has reviewed the plans for the Woodlands at Echo Farms-Phase 1-Tract 3B project submitted January 10, 2018 and have the following comments:

General

1. Please submit the High Density Residential deed restrictions. Form can be found at: <https://www.wilmingtonnc.gov/departments/engineering/plan-review-section/stormwater-permits>

Stormwater Management Permit Application Form

2. The individual impervious quantities for each pond when added together equal more than is listed in line item 9. For example, the impervious pavement total for all 4 ponds is 166,639sf (35,966+88563+23383+18,727). If this is all on-site newly constructed impervious pavement then it should equal what was listed in line item #9 (165,739).

Supplement EZ Form

3. Wet Pond 3.1: Wet Pond MDC #5: Clean out depth for forebay should be 48 inches.
4. Wet Pond 3.2:
 - a. Breakdown of BUA: Roadway needs to show as MUP.
 - b. Wet Pond MDC #5: Should be 48 inches for entrance depth of forebay.
 - c. Wet Pond MDC #5: Should be 36 inches for exit depth of forebay.
5. Wet Pond 3.3:
 - a. Breakdown of BUA: Roadway needs to show as MUP.
 - b. Wet Pond MDC #5: Should be 60 and 72 inches for entrance depth of forebays.
 - c. Wet Pond MDC #5: Should be 48 and 60 inches for exit depth of forebay.
 - d. Wet Pond MDC #5: Should be 48 and 60 inches for clean-out depth of forebay.
6. Wet Pond 3.4: Verify numbers based on pond design comments.

Operation & Maintenance Agreement

7. Wet Ponds 3.2 and 3.3 have multiple forebays. Please add a header that addresses this in the Wet Detention Pond Design Summary.
8. Forebay information for Pond 3.4 does not agree with the detail on C4.5.

Stormwater System & Erosion Control Calculations

Woodlands Pond 3-1 Sd's

9. Provide what the tailwater conditions of 13.30' and 14.00' represent.

Woodlands Pond 3-2 Sd's

10. Storm Sewer Tabulation: Line 6: Drainage area does not appear to match sheet C1.7. Does DA 3.2B-12, 3.2B-12A, 3.2B-3-OS and 3.2B-4-OS drain to DI 3.2B-07? If so, the DA should be 1.06 acres instead of 0.54 acres.
11. Storm Sewer Tabulation: Line 25: The line has a DA of 0.36 acres coming to it, but the plans label it is as a JB. Should this be a DI and the 0.36 acres is correct? If a DI, how will the runoff from the rear of the lots get to the inlet? Please verify.
12. Storm Sewer Tabulation: Line 28: Minor revision: verify that the total DA matches the summation of the four smaller DAs.
13. Storm Sewer Tabulation: Line 30: This structure does not appear to have a drainage area for it shown on C1.7.
14. Storm Sewer Tabulation: Line 33: 0.93 acres appears to be larger than the DA shown on C1.7. Please verify.
15. Storm Sewer Tabulation: Line 36: Pipe length does not match plans (55' v. 81').
16. Provide what the tailwater conditions of 7.50' and 8.50' represent.

Hydraflow Storm Sewers Extension (Appleton Way Existing/Upgrade System)

17. Based on the existing system inverts on C1.3, the flow split appears to occur at EX CI 3.2-106 instead of EX SDMH 3.2-105. Please verify.

18. If the flow split occurs at EX CI 3.2-106, then the proposed system upgrade should account for the drainage areas from EX CI 3.2-106 to EX 3.2-101. It does not appear that all the drainage areas area accounted for in the model.

Woodlands Pond 3-3 Sd's

19. Storm Sewer Tabulation: Line 8: It would appear that the drainage area for DI-3.3B-9 would include drainage areas DA-3.3B-11 and DA-3.3B-6-OS. Please verify.
20. Storm Sewer Tabulation: Line 9: It would appear that the drainage area for DI-3.3B-5 would include drainage area DA-3.3B-2-OS. Please verify.
21. Storm Sewer Tabulation: Line 12: It would appear that the drainage area for FES-3.3B-10 would include drainage area DA-3.3B-6-OS. Please verify.

SW Pond 3.1

22. SW Pond 3.1 – Woodlands 3B: The cumulative storage in the Main Pond does not appear to be calculating correctly starting at elevation 6.
23. SW Pond 3.1; Avg. Depth & Required Surface Area-Eq. 3 NCDEQ Design Manual 2017 Version: Recheck Average Depth, SA/DA ratio and Required/Provided SA requirements since the volume of the PP (main pool only) will have changed due to earlier comment.
24. SW Pond 3.1: Revise the Hyd. No. 1 title so it is understood that it is pre-development.
25. SW Pond 3.1: Hyd. No. 1: Provide the pre-development weighted curve number calculations. It would appear that there may be A, B and C type soils within the Pond 3.1 drainage area. Provide a drainage area map that illustrates the soils within the Pond 3.1 DA. Also, the city considers pre-development state to be woods in good condition for the purposes of determining runoff coefficients. It is not clear what land use was used.
26. SW Pond 3.1: Provide pre and post-development time of concentration calculations to support the routing calculations.
27. SW Pond 3.1; Pond Report: Pipe length and slope do not agree with the outlet pipe design on sheet C1. The outlet structure is shown at the top of the pond bank on C1 so the length and slope will change.

SW Pond 3.2

28. SW Pond 3.2 – Woodlands 3B- Forebay: The Main Pond Volume needs revising. See next comment.
29. SW Pond 3.2 – Woodlands 3B- Main Pond: It would appear that the sediment storage volumes from 3.2B-2 and 3 are being used to determine the volume of the permanent pool -main pool only. Please verify.
30. Avg. Depth & Required Surface Area-Eq. 3 NCDEQ Design Manual 2017 Version: Verify Average Depth, SA/DA ratio and Required/Provided SA requirements since the volume of the PP (main pool only) may change due to previous comment.
31. SW Pond 3.2: Hyd. No. 1: Provide a drainage area map that illustrates the soils within the Pond 3.2 DA. Also, the city considers pre-development state to be woods in good condition for the purposes of determining runoff coefficients. It is not clear what land use was used.
32. SW Pond 3.2: Provide pre and post-development time of concentration calculations to support the routing calculations.
33. Hyd. No. 1; Woodlands 3B Pond 3-2 PRE: Provide a drainage area map that illustrates the soils within the Pond 3.2 DA. Also, the city considers pre-development state to be woods in good condition for the purposes of determining runoff coefficients. It is not clear what land use was used for this pond.
34. SW Pond 3.2; Pond Report: Pipe length and slope do not agree with the outlet pipe design on sheet C1.4.

35. Swales-Pond 3.2 DA: There does not appear to be a swale 3.2B-1 listed in the table, but there is a swale with that label found on C1.3 behind lots 65 and 66. Conversely, Swale 3.2B-2 is listed in the table but I cannot find it in the plans.

SW Pond 3.3

36. Avg. Depth & Required Surface Area-Eq. 3 NCDEQ Design Manual 2017 Version: The percent impervious is incorrect. While the pond surface area provided is still larger than what is required, the numbers should be consistent.
37. SW Pond 3.3: Hyd. No. 1: Provide a drainage area map that illustrates the soils within the Pond 3.2 DA. Also, the city considers pre-development state to be woods in good condition for the purposes of determining runoff coefficients. It is not clear what land use was used.

SW Pond 3.4

38. SW Pond 3.4-Woodlands 3B Main Pond: It would appear that this stage-storage includes the forebay. Is that correct? Should this be main pool only? Verify the numbers below the table.
39. SW Pond 3.4-Woodlands 3B Forebay: The surface areas do not match with the surface areas in the Storage Volume above PP table. Verify the numbers below the table, including the forebay percentage.
40. Avg. Depth & Required Surface Area-Eq. 3 NCDEQ Design Manual 2017 Version: Verify the calculations based on earlier comments for pond 3.4.
41. Provide what the tailwater conditions of 8.10' and 8.90' represent.

Plans

42. Add Stormwater Approval blocks to all sheets in the plan set. If a sheet was done by others and you cannot get the block added to it, let me know so I can put a stamp on it at signing.
43. New public streets require monumentation per Section 18-372 of the City Code. Coordinate with Peter Brennan, the City Surveyor.
44. Provide all wetland impact permitting.
45. Label all easements as public or private.
46. Technical standards require a minimum of 2 feet of cover over storm drainage pipe. It appears that some pipes do not have adequate cover. Equalizer pipes under the roads require 2 feet of cover as well. Please verify.
47. I-1.1: There is a portion of the parcel in the center of the sheet that does not appear to have a soil type designation.
48. C0: If any changes are made to the onsite newly constructed impervious surfaces in the application, make sure the new impervious area table is updated.
49. C0/C0.1: Add the pond number to the labels for easier referencing.
50. C0.4: Does the 4" pear tree near the property line at the southern side of Pond 3.3B need to be removed?
51. C1:
- The outlet structure for 3.1B-1 appears to be in the wrong location in relation to the vegetated shelf.
 - A public drainage easement is needed for the 36" RCP inlet pipe from the Road L R/W to the FES for Pond 3.1.
 - It would appear that all impervious runoff from Lot 15 won't be captured. Please address. Look at Lot 5 as well. Will the rear of the lot be graded to direct flow to the swales?
 - It would appear that Swale 3.1B-3 cannot outlet into the wetland based on the spot elevation of the swale (10.25') and the existing grade elevation (>11') around it. Please verify.
 - Remove the 30" reinforced valley gutter from the road intersection. This is not a city standard.

- f. Inlet locations shall be in accordance with Technical Standard V.D.2.b. The inlets at the intersection of Road J and Road E do not appear to comply.
 - g. Verify with spot elevations that the path to the south of lots 27 and 28 will drain to the proposed swales.
 - h. Cul-de-sac appears to be larger than what is required by the city standard. See SD 3-04. Just bringing it to your attention.
52. C1.1:
- a. A public drainage easement is needed for the 24" RCP inlet pipe from the Road J R/W to the FES for Pond 3.3 and the equalizer pipe crossing under the Road J.
 - b. Add appropriate city standard details to detail sheet for installation of storm drainage pipe under the existing road and repair of existing pavement.
53. C1.2:
- a. Verify that the inlet drainage areas on Roads E and F match the road grading (grade breaks) shown on this sheet. It appears that the direction of flow near the intersection doesn't quite match up with the DAs on sheet C1.7. Verify that all drainage areas match the grade breaks along the proposed roads.
 - b. Per the technical standards, the maximum distance between structures is 400 feet. Add a structure between structures CI-3.2B-11 and CI-3.2B-8.
 - c. Public drainage easements are needed for the inlet pipes from Road E & F R/W to the FESs for Pond 3.2.
 - d. How will the rear of lots 66-68 be collected and treated? Is JB-3.2B-25 supposed to be a drop inlet?
 - e. Where is the outfall for Swale 3.2B-14?
51. C1.3:
- a. How are the rear of lots 60-62 to drain to Pond 3.2? Should JB-3.2B-26 actually be a CI to catch the runoff from those lots? The inlet drainage area map shows a drainage area for this area going to that structure. Please verify.
 - b. Can Swale 3.2B-4 be extended further around the lot to catch of the runoff from lot 56?
 - c. Proposed sidewalk along Appleton needs to be shifted away from the ditch.
 - d. The drainage easement from DI-3.2B-29 to DI-3.2B-32 should be in a private drainage easement.
 - e. Can CI-3.2B-49 and CI-3.2B-50 be slid further down towards Appleton Way to further limit the amount of runoff flowing into the Appleton R/W?
52. C1.7: How does DA-3.2B-18 get to Pond 3.2?
53. C4.1: Add city standard detail SD 15-05.
54. C4.2:
- a. The city prefers the use of NCDOT Roadway Standard Drawings for stormdrain pipes and structures located within the public right-of-way.
 - b. Remove the 30" Reinforced Valley Gutter Detail.
55. C4.4: The emergency spillway must be a minimum of 6 inches higher than the top of the outlet structure per the technical standards. Ponds 3.1, 3.2 and 3.3 have emergency spillways that do not meet this requirement.
56. Construction Management is performing a concurrent review of public roadway improvements. Review comments will be forwarded once received from CM.

Please submit one complete set of plans, the stormwater narrative, application, calculations and any other supporting documentation to Engineering for additional review. Please call or email if there are any questions. Thank you.