



November 30, 2017

David Blaszkowsky, Chair  
Sharon Planning Board  
90 South Main Street  
Sharon, MA 02067-1954

Re: The Cape Club Townhouses  
Stormwater Review

Chairman Blaszkowsky and Members of the Board:

Professional Services Corporation, PC (PSC) prepared this stormwater review of the Cape Club Townhouses (Proposed Project) at 25 Tiot Street on behalf of the Planning Board. The Proposed Project encompasses approximately 202 acres overall and involves modifying the existing golf course layout, modifying the access and parking facility serving the existing multiuse clubhouse, and constructing 52 new dwelling units in 26 duplex buildings. Existing on-site access drives, unities, and stormwater management facilities will be modified and expanded to serve existing and new development.

Currently, there are minimal formal stormwater facilities on the site and most runoff from pavement and roofs is not controlled. The proposed stormwater management system includes both low impact country drainage with seven open infiltration basins and a closed stormwater collection system with a subsurface infiltration facility and a surface infiltration basin. Roofwater is collected and recharged in separate systems including 5 surface basins and 10 subsurface infiltration structures. In some locations, roofwater is also discharged overland and flows to surface infiltration basins. Individual unit driveways have porous pavement.

Coneco Engineers and Scientists serves as the engineer of record. Overall, we find that the stormwater management system is properly designed and generally complies with applicable regulations and standard engineering practice.

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## BASIS

### Submittals

- A. "The Cape Club Townhouses Permitting Plans, 25 Tiot Street, Sharon, Massachusetts 02067," prepared on September 15, 2017 as prepared by Coneco Engineers & Scientists.
- B. "Stormwater Management Report, Project Site: The Cape Club Townhouses Permitting Plans, 25 Tiot Street, Sharon, Massachusetts 02067," dated September 15, 2017 as prepared by Coneco Engineers & Scientists.

### Reference

- "The Town of Sharon, MA, Code, Division 1: Bylaws, Part II: General Legislation, Chapter 275: Zoning," particularly with respect to "§4390. Recreation and Residential Overlay District (RROD)" and "§4500."
- "The Town of Sharon, MA, Code, Division 1: Bylaws, Part II: General Legislation, Chapter 262: Wetlands Protection."
- "Department of Environmental Protection Regulations 310 CMR 10.00: Wetlands Protection Act Regulations."
- "Department of Environmental Protection, Massachusetts Stormwater Handbook."

## OVERVIEW

1. The stormwater management systems for The Cape Club Townhouses Project must comply with the Massachusetts Stormwater Management Standards and the Massachusetts Stormwater Handbook (S.H.).
2. Depending on the dates of property transfers, temporary construction easements are required for basins, discharges, and embankments.
3. Permanent easements are required for flow paths, swales and other conveyances, closed drainage system components, and stormwater basins on a lot benefiting another lot or lots and downgradient of points of discharge directing runoff across a lot line.
4. The stormwater design must encompass the entire Recreation and Residential Overlay District (RROD). The stormwater management design must include analysis and appropriate



upgrades of the stormwater facilities at the existing multiuse clubhouse and the golf course maintenance facility.

#### CALCULATIONS AND METHODOLOGY

5. The submitted HydroCAD calculations are based upon rainfall taken from Technical Paper 40 (TP-40) whereas rainfall taken from NOAA Atlas 14 is required (Code: Division 1: Part II: Ch. 275: Article IV: §4394 C. (4)).
6. A "Soils Plan" must be provided extending to the Recreation and Residential Overlay District boundary showing soil group boundaries and the HSG assigned to each soil group by the competent soils professional for areas designated as udorthents and urban land.
7. For HSG classifications, compliance with the "Stage 1B" procedures of the Stormwater Handbook must be documented. Test pits must be furnished at a rate of one test pit per acre in locations where HSG have not been established by NRCS.
8. Test pits furnished in compliance with the above shall be witnessed by a Town representative. Arrangements shall be made through the Town Engineer.
9. For soils with dual classifications (A/D, B/D, AND C/D), the appropriate soils group must be assigned by the competent soils professional based on the depth of soil saturation.
10. A "Drainage Plan" must be provided for the entire Recreation and Residential Overlay District showing catchment area boundaries, flow paths, cover types, CN values, and soils. See plan requirements in the MassDEP "Checklist for Stormwater Report."
11. Predevelopment and post development runoff peak rates and volumes for the 1, 2, 10, and 100-year frequency storm events must be quantified at the Recreation and Residential Overlay District project boundary in order to demonstrate compliance with requirements for attenuation of peak rates of discharge at the project boundary (Code: Division 1: Part II: Ch. 275: Article IV: §4394 C. (4)). Peak rates and volumes may also be analyzed at additional interior boundaries to demonstrate peak rate changes affecting resource areas or adjacent properties. All areas included in this analysis must be shown on the above "Drainage Plan."
12. The drainage analysis must demonstrate no increase in the peak rate of stormwater runoff at the Recreation and Residential Overlay District boundary for the 1, 10, and 100-year frequency storm events (Code: Division 1: Part II: Ch. 275: Article IV: §4394 c. (1) and (4)).



13. Copies of Figures 7 and 8 must be resubmitted at a readable scale showing catchment area boundaries, flow paths, cover types, and soils. Provide a narrative describing the methodology such as field verification and alteration of natural drainage patterns by constructed drainage systems. See plan requirements in the MassDEP “Checklist for Stormwater Report.”
14. For all HydroCAD calculations, longer time span must be used for full volumes. Using the full volumes, the sizing of the on-site infiltration facilities must be reviewed and adjusted as required.
15. A mounding analysis is required for basins where less than 4 feet of separation is provided between the basin bottom and seasonal high groundwater. Based upon the submitted plans, a mounding analysis is required for all on-site basins and for all subsurface infiltration facilities.
16. The submitted Total Suspended Solids Removal analysis incorrectly assigns a 50% TSS removal credit to the drainage channels connecting the on-site primary drives with the infiltration basins. Such credits are available for grassed channels; however, the design and analysis submitted is insufficient and does not comply with the Massachusetts Stormwater Handbook. Note that the submitted calculations use the phrase “Grassed Swales” which is not a defined term; however, from context the design intent appears to be to provide grassed channels.
17. If credit is to be obtained for grassed channels the design must be modified (S.H., V. 2, C. 2, P. 73-76):
  - a. For each grassed channel, provide a sediment forebay at the head of each channel.
  - b. For each grassed channel, revised the design as required and calculate the flow velocity for the “Water Quality Volume” and verify that the velocity is less than 1 foot per second (fps).
  - c. For each grassed channel, verify that a Hydraulic Residence Time (HRT) of 9 minutes minimum is provided.
  - d. For each grassed channel, verify the capacity of each channel to convey all design storms.
18. The project is located in a critical area, specifically an Interim Wellhead Protection Area. Discharges to critical areas require 44% TSS removal prior to discharge to the infiltration facilities. The grassed channel design must be modified or other another treatment train must be provided in order to demonstrate 44% TSS removal prior to discharge to the



infiltration facilities. The submitted design does not provide for 44% TSS removal prior to discharge to the infiltration facilities which is a violation of Stormwater Management Standard 6.

19. A sediment forebay is required as a pretreatment device before runoff is discharged to an infiltration basin (S.H., V. 2, C. 2, P. 13). The design of the infiltration basins must be modified in order to provide sediment forebays.
20. Until the design of the infiltration basins is revised to include a sediment forebay, the infiltration basins cannot receive the 80% TSS removal credit and the overall requirement for 80% TSS removal is not met. Failure to provide 80% TSS removal contravenes Stormwater Management Standard 4.
21. Until the design of the grassed channels and the infiltration basins is revised to comply with the Stormwater Handbook, to credit is accorded for pretreatment or TSS removal. These basins would be regarded as receiving untreated roadway directly which would contravene Stormwater Management Standard 6. Similarly infiltration basins 4, 5, and 9 would be regarded as discharging untreated runoff to wetlands which would contravene Stormwater Management Standard 1.
22. The Proposed Project is located in a critical area, but no source controls are provided and no analysis of the feasibility of source controls is submitted which is a contravention of Stormwater Management Standard 6.
23. One test pit for every 5000 ft. of basin area must be provided, with a minimum of three test pits provided for each infiltration basin. Samples must be taken at the actual location of the proposed infiltration basin and within the specific strata where infiltration is proposed in order to detect localized soil conditions (S.H., V. 2, C. 2, P. 88).
24. While most basins have one test pit within or in proximity to the basin, infiltration basins 3, 10, and 13 have no test pit in proximity to the basin.
25. No test pits are provided for roofwater infiltration trenches 1 through 10.
26. The submitted HydroCAD calculations for basins 1, 2, 4, 5, 6, 9, 10, 11, 12, and 13 contain the 10-year frequency storm event with minimal or no discharge; however, reanalysis is required with full volumes. These basins have discharges during the 100 year frequency storm event. Predevelopment runoff must be quantified and predevelopment and post development flows must be compared at design points that facilitate determination of



compliance with Stormwater Management Standard 2 in terms of whether peak discharges from the 100-year 24-hour storm increase off-site flooding.

27. TSS removal calculations should be provided for each on-site facility.
28. HydroCAD modeling of Infiltration System 11 must reflect the weir elevation of 57.33 as a control.

#### OPERATION AND MAINTENANCE PLAN

29. Implementation of the Long-Term Operation and Maintenance Plan (O&M Plan) is dependent upon the organizational structure, funding mechanisms, and responsibilities of organizations authorized by Site Plan Approval which may include one or more homeowners organizations, one or more business owners organizations, and an overall property owners organization (Code: Division 1: Part II: Ch. 275: Article IV: §4391 k.).
30. The O&M Plan must be revised to include the name of all of the stormwater management system owners per Comment 29.
31. The O&M Plan must be revised to designate the party responsible for operation and maintenance per Comment 29.
32. The O&M Plan must include a plan showing the location of all stormwater BMPs.
33. The O&M Plan must be revised to include the estimated operation and maintenance budget.
34. In addition to quarterly inspection and maintenance, the O&M Plan must require inspection when a discharge over a spillway occurs resulting from a storm event greater than the 10-year frequency storm event. Catchbasins, proprietary separators, and grassed channels must be inspected following storm events greater than the 10-year frequency storm event (5.28 inches in 24 hours).
35. Grassed channels should be inspected and any trash or debris should be removed quarterly.
36. For grassed channels and basin side slopes, grass mowing should be specified at a minimum interval of twice per year.



37. Add general landscape maintenance including two times per year, inspection, reseed or stabilize barren areas, and remove any soil from pavement

#### FACILITY DESIGN

38. Basin discharges at FES 05, FES 06, and FES 10 discharge within 25 ft. of the edge of a perennial stream (Rules and Regulations of the Sharon Conservation Commission §5.06 (b) i).
39. Infiltration basins 4, 5, and 9 do not provide the +minimum 50 ft. separation to surface water (S.H., V. 2, C. 2, P. 88).
40. One monitoring well is required per infiltration basin (S.H., V. 2, C. 2, P. 91).
41. A 15 ft. wide vehicular access should be provided around all infiltrations basins, particularly noting basins 5, 6, 9, and 10 (S.H., V. 2, C. 2, P. 91).
42. Although basin sideslopes comply with DEP requirements of 3 to 1 maximum, the basins should be fenced or slopes flattened to 4 to 1 or 6 to 1 for safety purposes.
43. Freeboard of 1 ft. is normally required whereas approximately 1½ inches is provided (S.H., V. 2, C. 2, P. 90).
44. In order to convey roof runoff from the rear of units 17 through 26, the infiltration facilities would have to be up to 10± ft. below grade which would be below observed groundwater elevations.
45. The plans need to specify that soils in the A and B horizons are to be remove under infiltration basins.
46. Spot grades needed at Tiot St. entrance to direct runoff from north side of roadway to curb inlet.
47. The HDPE pipe must be specified as smooth interior wall which is consistent with the HydroCAD calculations.
48. For Infiltration System 11, the inverts of the upgradient catchbasins are below the downgradient weir elevation of 57.33 causing all tributary catchbasins to be inundated



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resulting in remixing pollutants in the catchbasin sumps. The Stormceptor structure will also be surcharged.

49. Inundation of the catchbasins for Infiltration System 11 will impede their functionality for pretreatment. Without proper pretreatment, Infiltration System 11 will recharge untreated runoff which contravenes Stormwater Management Standards 4 and 6.

50. Rational formula calculations are required for pipe sizing (Code: Division 1: Part II: Ch. 275: Article IV: §4397 j.).

51. Two areas within subcatchment S-11 do not have CN values assigned.

#### CONSTRUCTION DETAILS

52. A detail of the curb inlet must be provided.

53. An external manifold is recommended for the Cultec chambers for infiltration system 11.

54. The impermeable liner beneath the Cultec chambers should be deleted from the detail.

We thank you for the opportunity of reviewing the stormwater management system for The Cape Club Townhouses project on behalf of the Planning Board.

Very Truly Yours,  
Professional Services Corporation, PC

Thomas C. Houston, AICP, PE  
President