



A C O R N

ENGINEERING, INC.

Memorandum

To: Werner Gilliam, Director of Planning & Development
Town of Kennebunkport, Maine
6 Elm Street
Kennebunkport, ME 04046

From: Aubrey L. Strause, PE and Travis Letellier, PE (Acorn Engineering, Inc.)

Date: January 25, 2023

Subject: Glen at Gooserocks Preliminary Subdivision Application
Tax Map and Lot 15-1-1B, Kennebunkport, ME 04046

Overview:

Acorn Engineering, Inc., was requested by the Town of Kennebunkport to review the proposed Glen at Gooserocks Residential Subdivision project, submitted by applicant K.J. Trudo Properties, LLC, and prepared by Atlantic Resource Consultants. The Professional Engineer of Record for the design is Jason Vafiades, PE.

The project proposes the improvements to a 43.5-acre lot located off Goose Rocks Road near the intersection with Log Cabin Road (Tax Map & Lot 15-1-1B) in Kennebunkport, Maine. The proposed work includes developing nine (9) new single family home lots with associated driveways and yards, as well as the creation of one open space lot with two 15-foot wide easements for access to the open space lot. The applicant proposes the construction of five (5) gravel wetlands and no-disturbance forested stormwater treatment buffers on each lot as stormwater best management practices (BMPs).

Natural resources on the parcel include four vernal pools, substantial wetlands, and two stream segments that join on the property. The application proposes two wetland crossings and two stream crossings. With at least 10,200 SF of wetland impacts, the application will require a Natural Resources Protection Act (NRPA) Tier 1 permit.

Acorn Engineering's review focused on stormwater management but includes limited comments on natural resources where they are *directly related to* proposed stormwater management.

Our review included the following, dated October 26, 2022 and prepared by ARC:

- Preliminary Subdivision Application, including:
 - Exhibit 1, Development Description
 - Exhibit 7, Deed Restrictions/Covenants
 - Exhibit 12, the Stormwater Management Report
 - Exhibit 13, Wildlife Habitat
 - Exhibit 15, Additional Permits

- Exhibit 17, Site plans. These are dated October 26, 2022 and prepared by ARC except with the exception of:
 - The Boundary Survey, dated October 26, 2022 and prepared by JPS Professional Services;
 - The Plat Plan, dated September 14, 2022 and prepared by JPS Professional Services.

Sheet numbers and names of plans reviewed by Acorn are as follows:

SHEET INDEX:	
1 OF 11	COVER SHEET
-----	BOUNDARY SURVEY
2 OF 11	EXISTING CONDITIONS PLAN
-----	PLAT PLAN
3 OF 11	CONCEPTUAL DEVELOPMENT PLAN
4 OF 11	PLAN & PROFILE ROADWAY I
5 OF 11	PLAN & PROFILE ROADWAY II
6 OF 11	EROSION & SEDIMENT CONTROL NOTES
7 OF 11	EROSION & SEDIMENT CONTROL DETAILS
8 OF 11	SITE CIVIL DETAILS
9 OF 11	STORMWATER TREATMENT DETAILS I
10 OF 11	STORMWATER TREATMENT DETAILS II
11 OF 11	STORMWATER TREATMENT DETAILS III

COMMENTS

The following sections represent Acorn's comments on this submittal.

General

1. Please update the Legend on Sheet C-101 as follows:
 - a. Show the hatching used to represent the proposed forested stormwater treatment buffers.
 - b. Show the hatching used to represent Open Space.
 - c. Show the linetype used to represent the stream centerline.
 - d. Show the linetype used to represent the 75-foot stream setback buffer.
 - e. Clarify what is intended by "buffer", with a dashed linetype, in the Legend.
2. Sheet C-101 shows two unidentified features that use the same hatching (which is not included in the Legend), which may be proposed drainage or stormwater maintenance easements
 - a. One extends from the cul-de-sac near the driveway to on Lot 7 to the property line between Lots 6 and 7.
 - b. The other extends from the cul-de-sac near the driveway to Lot 3 to the property line between Lots 2 and 3.

Please identify both features, adding hatching to the legend as needed. If either is a proposed drainage or stormwater maintenance easement, state this clearly on the plans.

Comments on Water Quality

3. The applicant shows proposed development footprints (house, driveway, and parking) on each lot to demonstrate the buildability of the lot, and has included estimates in the Non-Linear Treatment Stormwater Management Treatment table. The proposed impervious and developed area that will receive coverage under a Maine DEP Stormwater Law permit is based on these assumptions. However, there does not appear to be a mechanism to limit actual impervious, landscaped, or developed area on each lot to the stated areas. The applicant will develop the lots, constructing the homes prior to sale. Local approval (and the Maine DEP Stormwater Law permit) should both state the impervious, landscaped, and developed that has been approved to be constructed.
4. There is a disconnect between proposed impervious area and developed area between the HydroCAD and the calculations that have been presented.
 - a. The HydroCAD summary indicates 64,000 square feet of new roof and driveways (impervious area) but the Non-Linear Treatment Stormwater Management Treatment table indicates only 79,500 square feet of impervious area for new roofs and driveways.
 - b. The HydroCAD shows an estimated 150,000 SF of new lawn areas (landscaped area), but the Non-Linear Treatment Stormwater Management Treatment table accounts for only 75,500 square feet of landscaped area (the difference between 155,000 SF of developed area and 79,500 SF of impervious area).

Please revise to provide consistency about proposed impervious, landscaped, and developed areas in HydroCAD and calculations.

5. There appears to be a discrepancy between treatment of proposed impervious and developed areas on several lots with the actual buildable area on those lots. For example:
 - a. The Non-Linear Treatment Stormwater Management Treatment table proposes approximately 6,500 SF of yard area on Lot 3. Development on this lot is highly constrained by the proposed forested stormwater treatment buffer, delineated wetlands, and minimum setback from Lot 2. The proposed yard area does not seem feasible.
 - b. The Non-Linear Treatment Stormwater Management Treatment table proposes approximately 6,000 SF of yard area on Lot 8, with another 6,000 SF of impervious area (12,000 SF total developed area). Development on this lot is highly constrained by the proposed forested stormwater treatment buffer and the minimum setback from Lot 9. Acorn estimates the buildable footprint is approximately 9,500 SF, far less than the 12,000 SF proposed. The proposed yard area does not seem feasible.
 - c. The Non-Linear Treatment Stormwater Management Treatment table proposes just 7,500 SF of impervious area on Lot 5, with another 5,500 SF of yard area (13,000 SF total developed area). This lot has few constraints, and the more likely development footprint on this lot will include a longer driveway and more yard area than represented in this table.
 - d. The Non-Linear Treatment Stormwater Management Treatment table proposes just 7,000 SF of impervious area on Lot 9, with another 5,000 SF of yard area (12,000 SF total developed area). This lot has few constraints, and the more likely development footprint on this lot will include a longer driveway and more yard area than represented in this table.

These assumptions should be reviewed and the table updated, as needed.

6. The applicant is proposing forested stormwater buffers for the treatment of Lots 1 through 9, per the Non-Linear Treatment Stormwater Management Treatment table included in the Stormwater .
 - a. No calculations were provided to demonstrate that flow path length of the proposed forested stormwater treatment buffers satisfies the requirements of Chapter 500 Appendix F for single-family home residential lots. These calculations should clearly state the slope, hydrologic soil type, and demonstrate appropriate grading (i.e., that runoff will flow consistently across the full flow path length). This latter may require the preparation of an additional plan sheet showing existing and proposed contours for each forested stormwater treatment buffer.
 - b. Stormwater treatment buffers cannot include wetlands. The proposed forested stormwater treatment buffers on Lots 2, 3, 4, and 9 (at a minimum) include portions of wetland. The boundaries for these proposed forested stormwater treatment buffers should be revised to avoid delineated wetlands.
 - c. Sheet C-101 shows proposed development footprints (house, driveway, and parking) to demonstrate the buildability of the lot. However, proposed development on Lots 3, 4, 6, 7, and 9 shows construction of the driveway and/or the house within the forested stormwater treatment buffer. Revise the proposed development footprints on these lots to avoid disturbance of the forested stormwater buffer.
 - d. Lots 3 and 8 include so little buildable area that only very limited yard areas are shown on plans. This increases the likelihood that the homeowner will disturb the immediately-adjacent forested stormwater treatment buffer. The applicant should demonstrate that proposed yard areas can be built without impact to the forested stormwater treatment buffer. (See also Comments #5a and #5b)
 - e. No Draft Homeowner Association (HOA) deed restrictions, bylaws, or covenants were included in the application. The applicant should ensure that proposed HOA documents include the deed restrictions that will apply to Lots 1 through 9.
 - f. The Stormwater Maintenance Plan included as Attachment D of the Stormwater Management report does not include post-construction inspection and maintenance requirements for the proposed forested stormwater treatment buffers. These forested stormwater treatment buffers are being used to achieve the required stormwater treatment of developed area, and should be included in inspection and maintenance documents like any other stormwater BMP.
7. This application did not include Homeowner Association (HOA) deed restrictions, bylaws, or covenants. The applicant should ensure that the proposed HOA documents clearly discuss the drainage and maintenance easements required for the proposed gravel wetland stormwater BMPs and related areas, which are located on Lots 1, 2, 3, 4, 5, 6, and 8, and clarify responsibility for these easements.

Hydrologic Model and Water Quantity

8. Labeling used in the HydroCAD model and shown on the drainage plans is inconsistent: please revise for consistency and ease of review.
9. No soil summary was provided for pre-development or post-development conditions. Please include this in the revised submittal.

10. The following comments apply to all gravel wetland BMP designs:
 - a. The designer should review the porosity (void %) for media (i.e., crushed stone, Underdrain Type C, compacted gravel) in HydroCAD to ensure that assumptions are consistent with Maine DEP recommended values for each type of media.
 - b. The designer should review how the storage volume is calculated in HydroCAD. We have attached an Excel spreadsheet that shows the comparison between what was modeled in HydroCAD and how it should be modeled to accurately represent the design proposed, for GW-1. For example, the proposed storage volume for GW-1 is 5,490 cubic feet; however, Acorn calculates this is actually 3,947 cubic feet, which is still above the requirement of 2,273 cubic feet (which Acorn believes is correct). The gravel wetlands appear to have adequate treatment volumes with this revision; however, peak flows may be affected with a reduced storage volume (per this comment) and should be updated in the model.
 - c. The outlet of each gravel wetland should be restricted to ensure a drain-down time of the treatment volume within 24 to 48 hours (per Maine DEP). The current design appears to drawdown the treatment volume (via a six-inch outlet within the outlet control structure) in less than six hours. The device used to provide this restriction (i.e., orifice, cap, or ball valve) should be added and modeled in HydroCAD.
 - d. The design for the gravel wetlands should be revised to provide one foot of freeboard above the peak elevation in the 100-year storm event at the emergency spillway, per Maine DEP.
 - e. An interior spillway should be provided between gravel wetland cells to allow water to flow from the first cell to the second cell in larger storm events. The current design will allow stormwater to bypass the second cell, which does not optimize treatment provided by the BMP.
 - f. The invert elevation of the outlet within the outlet control structure (OCS) should be set at the top of the transitional layer. Example, GW-1 has a proposed invert elevation of 19.67; however, the top of the transitional layer is elevation 19.33. Outlet elevations for all gravel wetland designs should be checked.
11. The plan view for GW-5 on Sheet C-305 shows a direct connection between the inlet structure and the underdrain. This direct connection should be revised to mirror the approach for the other proposed gravel wetland BMPs (GW-1 through GW-4).
12. The Linear Treatment Stormwater Management Treatment table lists subcatchments RA-1 through RA-7. These subcatchments are not shown on the Post-Development Drainage plan, so Acorn is unable to verify these areas or confirm which stormwater BMP provides treatment. Please show these subcatchments on the Post-Development Drainage Plan and/or provide a Stormwater Treatment Plan that can be used to verify the treatment represented in the Linear Treatment Stormwater Management Treatment table.

Comments on Natural Resources

13. The Wetland Delineation & Soil Test Pit Location plan prepared by Longview Partners, LLC shows the locations of Pool #1 and Pool #2, as well as the location of two other “non-significant” vernal pools identified in a 2018 study. Clearly showing locations of these four vernal pools on plans is critical to ensuring that appropriate setbacks to stormwater BMPs are provided. The four vernal pools should be shown on site plans including the Boundary Survey, Existing Conditions Plan, the Conceptual Development Plan (Sheet C-101), the Plat Plan, profile sheets C-200 and C-201, and on plan views of proposed gravel wetland BMPs on Sheet C-303 through C-305.
14. The proposed wetland impact associated with Gravel Wetland #1 (GW-1), shown on Wetland Impacts Figure #2, is 802 square feet. It may be possible to reduce these impacts if the proposed BMP were rotated 90 degrees. (See also Comments #17 and 18, which address natural resource impacts from the construction of GW-1)
15. Clearly show and label the stream centerline and 75-foot stream setback on Sheets C-200 and C-201 as well as on the Plan Views for GW-2 (Sheet C-303), GW-4 (Sheet C-304), and GW-5 (Sheet C-305).
16. It appears that development of several structures is proposed within the 75-foot stream setback, including:
 - a. A large portion of the driveway on Lot 2.
 - b. Part of the house and driveway on Lot 4.
 - c. A portion of the driveway on Lot 6.
 - d. The entirety of GW-5.
 - e. A portion of GW-4.

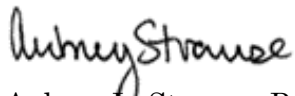
Exhibit 15 (Additional Permits) states that NRPA Permit-by-Rule (NRPA PBR) coverage has been requested for “adjacency within 75 feet” (i.e., under Section 2.C.1). Please demonstrate that the NRPA PBR Section 2 application reflected construction within 75-feet of the stream at all locations bulleted above.

17. It appears that grading for several stormwater BMPs is proposed within the minimum 25-foot setback from natural resources (i.e., NRPA PBR Section 2.C.2), including GW-1, GW-2, and GW-3. Please demonstrate that the NRPA PBR Section 2 application reflected grading within 25-feet at these locations.
18. The application requires coverage under NRPA PBR Section 7 (“placement of outfall pipes within a freshwater wetland”) for outlets associated with GW-1 and GW-2. Please amend the NRPA PBR application to request coverage for these activities.
19. The application states that the applicant will develop the lots, constructing the homes prior to sale. Deeds for individual lots should clearly state that the purchaser of each lot is responsible for permitting any additional wetland impacts on the lot.
20. The application states total wetland impacts (fill) of 10,202 SF, which are clearly shown on Wetland Impact Figures 1 through 4. However, it is unclear if there will also be wetland conversion impacts, where trees will be cut within forested wetlands, decreasing the value. This should be clarified in the resubmittal.

Acorn would be pleased to perform a peer review of a revised application package.

Please call me at (207) 641-7704 with any questions about this review.

Sincerely,



Aubrey L. Strause, P.E.
Municipal Services Coordinator
Acorn Engineering, Inc.

cc: William H. Savage, P.E. (Principal, Acorn Engineering)
Travis Letellier, P.E. (Acorn Engineering)

Attachments

A: Sample Storage Calculations for GW-1

Attachment A: Sample Storage Calculations for GW-1

GW1 Storage, as included in October 2022 Application					
Elevation	Surface Area (SF)	Void	Incremental storage (CF)	Cumulative storage (CF)	Comments or Observations
16.82	1600	0			
16.83	1600	0.4	6.4	6.40	
18.83	1600	0.3	960	966.40	
19.33	1600	0.15	120	1086.40	HydroCAD assumes 100% voids between elevation 19.33 and elevation 20.
20	1600	1	1072	2158.40	The incremental storage value of 1,072 CF over-estimates the actual voids between elevations 19.33 and 20.0
21	2335	1	1967.5	4125.90	
21.5	2790	1	1281.25	5407.15	
22	3244	1	1508.5	6915.65	
Corrected GW1 Storage					
Elevation	Surface Area (SF)	Void	Incremental storage (CF)	Cumulative storage (CF)	
16.82	1600	0			
16.83	1600	0	0	0	
18.83	1600	0	0	0	
19.33	1600	0	0	0	The gravel wetland will be flooded to elevation 19.67. The elevation of the outlet- with no voids- should not be used to calculate storage volume or treatment volume. Further, the wetland soils will have a hydraulic conductivity of 0.1 to 0.01 ft per day and will not provide any substantive storage volume
20	1600	0	0	0	
21	2335	1	1967.5	1967.50	
21.5	2790	1	1281.25	3248.75	
21.75	3017	1	725.875	3974.63	This gravel wetland BMP still meets the treatment volume standard; however storage volumes revised (per this comment) may change the peak flows of the system
22	3244	1	782.625	4757.25	