

Date: 9/11/2023

TO: DRB

FROM: Janet Showers Patterson

RE: Gunther Boathouse Application

I have reviewed the Town's warning, the Gunthers' application and I also attended the site visit for this project and wish to draw the DRB's attention to several issues that I believe warrant the DRB's consideration under Greensboro's 2022 Bylaw.

The warning states that this project is to be considered under bylaw sections 2.7 and 8.7. There are other bylaw provisions that must also be considered.

- Obviously, the conditional use standards of 5.4 must be considered. Particular attention should be given to 5.4(C7) which concerns viewshed. One of the purposes of the Shoreland Protection District in 2.7 is to *"Preserve the undeveloped wooded vegetation views both to and from the lakes and to avoid problems resulting from continued development of the lakeshores which would cause natural resource and scenic resource degradation."* With potential trimming of branches on the lower third of the trees along the lake, the proposed structure (with a shed roof, the structure presents itself with a full 15' high by 22' long lakeside elevation, positioned only 10' from the lake) will be potentially visible to boaters and degrade the scenic views. More scenic degradation would also occur should any trees along the lake shore be cut.
- All the provisions of Article 8, not just the warned 8.7, must be complied with including the provisions of 8.6 General Standards in the Shoreland Buffer Resource Zone, in which this project is located. In particular, provisions 8.6(5) Steep Slopes, (6) Impervious Surface and (7) Vegetative Cover (all 3 provisions are new in the 2022 bylaw) must be met. There is no information provided by the applicant which addresses these provisions and shows how the various percentages have been calculated. The lack of that information is particularly noteworthy in view of the substantial prior development on the parcel.
- Section 8.10(B7) states *"Development, grading or clearing of vegetation on land where the slope is greater than 15% is prohibited"*. Note specifically this prohibits *grading* on land where the slope is greater than 15%. At the site visit, Mr. Coe discussed adding fill to bring the lakeside corner of the proposed structure up to the level of the higher driveway side.
- In the 2022 bylaw, height is defined as measured from the average ground level to the roof ridge. The applicant's diagram "A2.0 Figure 2" shows a height of 15' measured from the floor of the boathouse, which is higher than the ground since it is built on posts. That does not comply with the bylaw definitions of height. Moreover, the diagram shows that the ground the structure is built on is level (in violation of the prohibition of grading in 8.10(B7)), rather than showing the ground having its actual significant slope. Accordingly measured per the bylaw, the height of the structure exceeds the maximum permitted 15' height of a boathouse.

#### Computing the Slope:

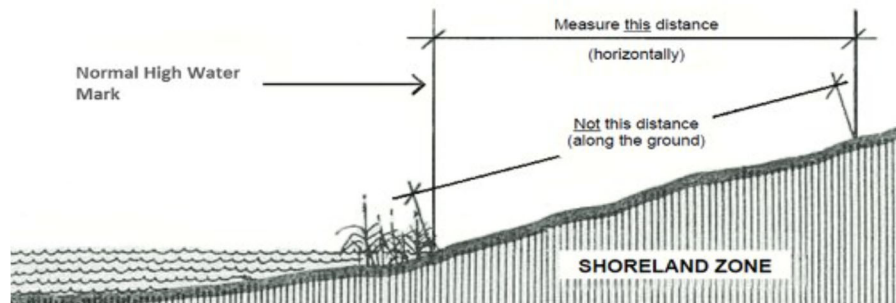
In school, we all were taught that slope is "rise over run". However correctly computing it can be tricky. The Shoreland Protection Act Handbook defines slope as *"the vertical rise divided by the horizontal run of a plane expressed as a percentage."*

Mr. Coe suggested the slope of the land under the proposed footprint was 15%. 8.6(5) requires slope to be “determined based on the most currently available lidar data from the state or by a current topographic survey of the project site prepared and stamped by a licensed Vermont surveyor.” Such a determination of slope has not been presented by the applicant.

I have calculated the slope based on the site plans submitted by the applicant and have estimated slopes between 20% and 30%.

Two important details in calculating slope are:

- “Run” must be measured in a horizontal plane and not along the ground surface, as is depicted in the below figure from the Shoreland Protection Act Handbook. Measuring run along the ground surface produces a larger distance than measuring horizontally and would produce a smaller slope than if computed correctly using the horizontal run.



- The horizontal run must be computed perpendicular to the slope; that is, perpendicular to the elevation contours (which are lines of constant elevation). Source: Shoreland Protection Act Handbook, Appendix B. Water will flow or a ball will roll down the steepest path on the hill and that path is perpendicular to the contour lines; this is the difference between trails going straight down the mountain versus having switchbacks along which the slope is gentler. Once again, using a measurement of run that is not perpendicular to the contour lines will estimate a larger run and will bias the slope lower.

I measured slope from the applicant’s site plans which include elevation contour lines (I believe them to be spaced 1’ apart and have verified that is consistent with elevation data available online on the VT Natural Resources Atlas). Calculating slope based on contour lines and maps is one of the methods which is suggested by the state. See the attached enlargement of the applicant’s boathouse site plan:

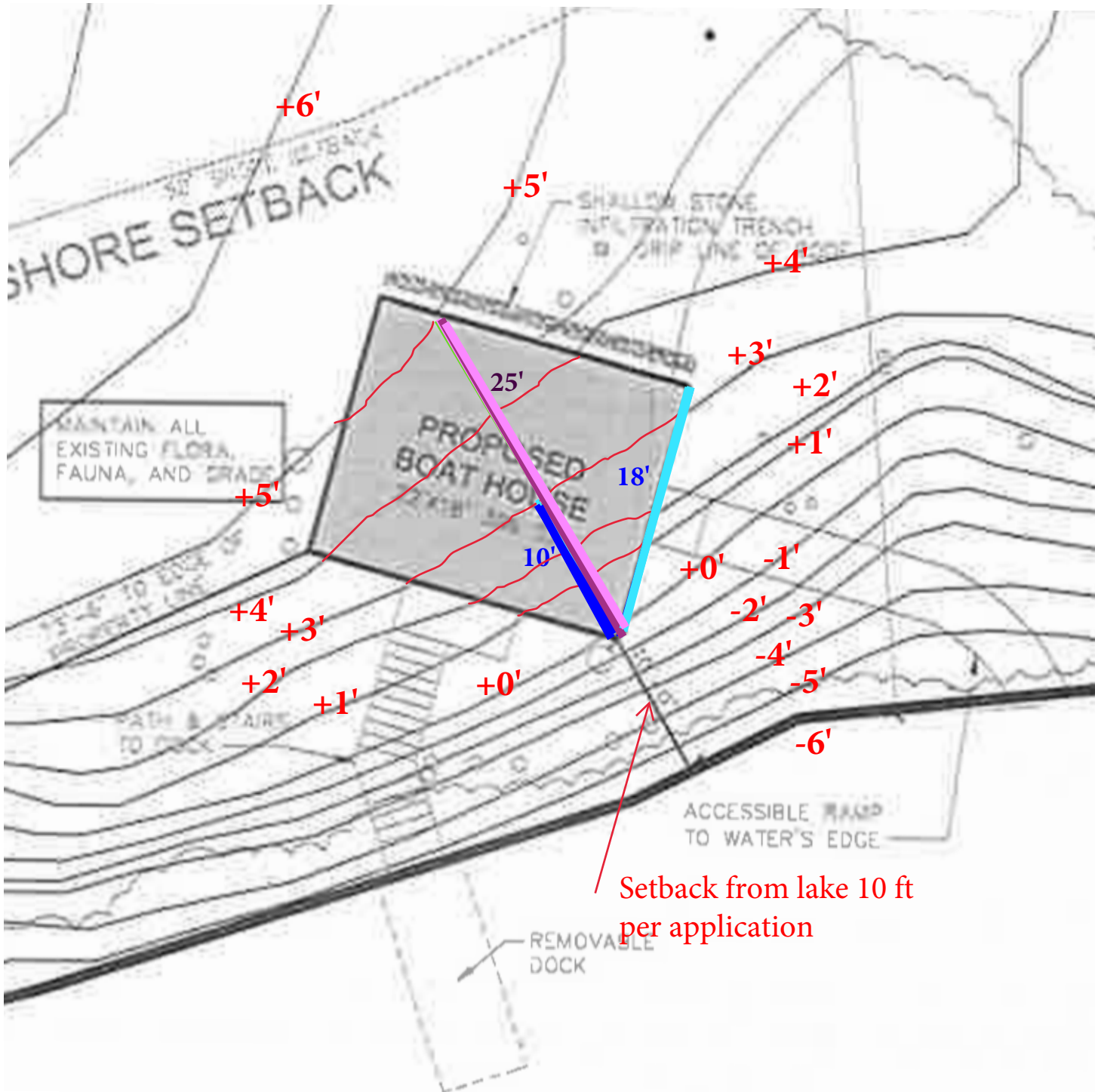
- In the attachment, I have labeled each of the elevation contours by the vertical distance relative to the southeast corner of the proposed building which is located 10 feet from the lake.
- The northeast corner of the proposed building is +3’ higher than the southeast corner.
- The eastern edge of the footprint is 18’. However, to use that distance as the “run” in computing slope is incorrect because that building edge does not run perpendicular to the elevation contours. The distance between the southeast corner and the +3’ elevation contour is only 10’

when measured perpendicularly to the contour lines. Thus, done correctly, slope =  $3'/10' = 30\%$ .  
Conclusion: the slope of the proposed site closest to the lake is double the allowable 15%

- This analysis can be extended to include the slope of the entire BH site. In this case, the contour lines show a +5' difference in height (not a 3' difference). The perpendicular run is approximately 25'. Slope =  $5'/25' = 20\%$  which is still higher than the allowable 15%.

This analysis suggests that the slope of the project side is >15% and not in compliance with the bylaw. This could be rectified by moving the proposed site plan away from the lake where the ground is more level.

Mitigation: My final comment does not address the current boathouse application, but rather the applicant's 2021 ADU project. I also realize that the landowner may not be finished with the construction of that ADU project. I just want to make sure that the mitigation that was proposed for the ADU project is going to be completed – especially with another major construction project now being proposed. In the 2021 ADU application, the applicant proposed significant mitigation including rain gardens between the ADU and lake for infiltration and absorption, returning the footprints of the removed cottages to natural woodland, and rain barrels to retain roof generated storm water. I did not observe any of that mitigation had been completed at this weekend's site visit but did notice erosion potential.



Slope = Rise/Run in %

Run is measured perpendicular to contour lines.

Run is measured in the horizontal plane, not along the ground.

**Dark Blue Line:**  
 Rise = 3'  
 Run correctly measured perpendicular to contour lines = 10'.  
 Slope =  $3'/10' = \underline{30\%}$

**Aqua Line :**  
 Rise = 3'  
 Run incorrectly measured along east end of footprint = 18'.  
 $3'/18' = \underline{16.7\%}$

**Pink Line:**  
 Rise = 5'  
 Run = 25'  
 perpendicular to contour lines  
 Slope =  $5'/25' = 20\%$

Setback from lake 10 ft per application