OPTIONS FOR BEECHMAST POND: SUMMARY

This document contains information presented at the FHA Open Meeting on April 27, 2021 regarding the Beechmast Pond study.

Below you will find the presentation slides that were used in that meeting. A table shows the total cost of the different options to help clarify information.

Please consider all of this information when expressing your desires for the long-term solution for Beechmast Pond. The board will make a decision based on your preferences, as expressed through an upcoming survey.

The slides that are included below are the result of a study by Kris Bass Engineering. In 2020 the FHA Board asked Kris Bass Engineering to do a study of the Beechmast pond due to the expense associated with dredging the pond. The information associated with the slides are the result of that study.

INTRODUCTION / EXISTING CONDITIONS

The Beechmast receives runoff from approximately 0.62 square miles (397 acers) composed of Forested, Urban, Shrub/Grassland, and Crop lands (Figure 1). The watershed is composed of approximately 85% Hydrologic Soil Group (HSG) B moderately well drained soils and 15% HSG C moderately drained soils. The predominate soil classification in areas around the pond and adjacent to pond tributaries are Wedowee Sandy Loam with slopes at 2% or greater.

Pond Spillway becomes active with what is termed a 5yr storm, or a rain storm that occurs only once every 5 years

Annual maintenance expenses are approximately $12,000

Incised and unstable tributary as show above are the sources of the erosion and sediment that flows into the pond

Erosive soils, moderate slopes, and altered hydrology likely increases sediment load

CONCEPT 1: FOREBAY

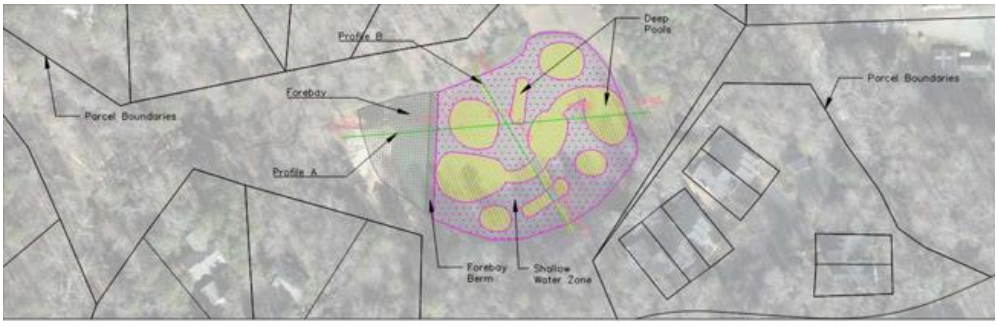
Construct a forebay appropriately sized for the pond volume. The existing forebay and western areas of the pond will be excavated with spoils used for the construction of a forebay berm. The forebay consist of a deep pool at the inlet of the pond separated from the main pool by a submerged berm. This area is designed to be approximately 25% of the total pond volume with the deepest area nearest the inlet and a berm which is submerged at normal pool. This configuration maximizes sediment capacity and provides a large volume to capture sediment between dredging events. This forebay guidance provided by the NC Department of Environmental Quality (NCDEQ) was considered in this designed process.

Dredge once every 5 years depending on level of fill

Dredge cost $10k-$15k, averaging $3,000 per year

Cost estimate to build $50k-$70k

CONCEPT 2: WETLAND CONVERSION



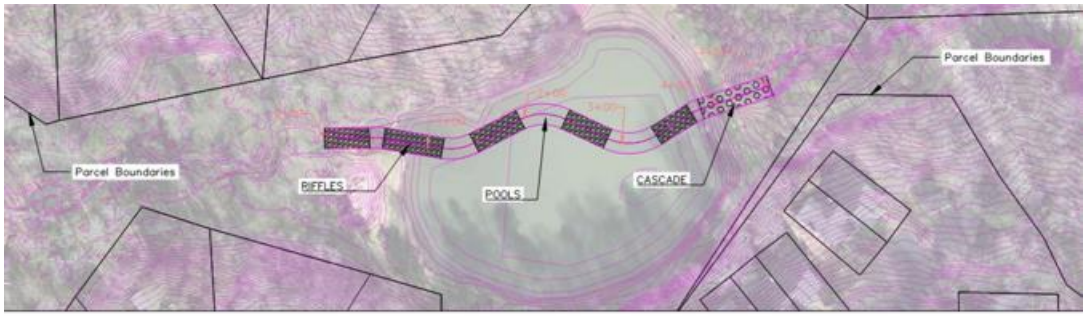
This concept proposes to convert the existing wet pond to a wetland. To accomplish this, the water level in the pond will be lowered by 2 ft. Similar to Concept 1, a large forebay will be constructed at the western end of the pond. However, more fill will be needed to build shallow water areas of the proposed wetland. This provides the opportunity to excavate a larger and deeper forebay with a greater capacity for sediment capture, reducing dredge frequency. Shallow water areas will be planted with native flowering and non-flowering wetland plants to create a productive and attractive environment for pollinators, wildlife and recreators.

The proposed forebay in Concept 2 will have a capacity of approximately 330 cu.-yds. This concept attempts to balance cut and fill of shallow water areas with greater excavation of the forebay and lowering of the PP elevation.

This results in a dredge frequency of approximately 1-2 years at a cost of $8,000-$10,000, averaging $5,000 per year.

The estimated design and construction cost of this concept is $60,000-$80,000.

CONCEPT 3: RESTORED STREAM CHANNEL



This concept manages sediment by removing the pond. Removing the pond will eliminate the sediment sink, allowing influent sediment to move downstream and thus eliminating the need to dredge the pond. This concept proposes to remove the dam embankment and use embankment fill to grade the pond. A new stream channel will be constructed through the existing pond with reconnected floodplain. Streambanks and riparian areas will be planted and stabilized. Sediment delivered to the restored stream will be transported through the restoration area and move downstream.

The estimated design and construction cost of this concept is $200,000-$240,000. Maintenance will vary from year to year, but should not average more than $500. A competitive grant funded project would require a 50% matching contribution by the HOA. Possible grant funding sources include the Environmental Protection Agency 319 Watershed Restoration Grant, North Carolina Environmental Quality Water Resources Development Grant Program, or the Clean Water Management Trust Fund.

SUMMARY OF THE OPTIONS

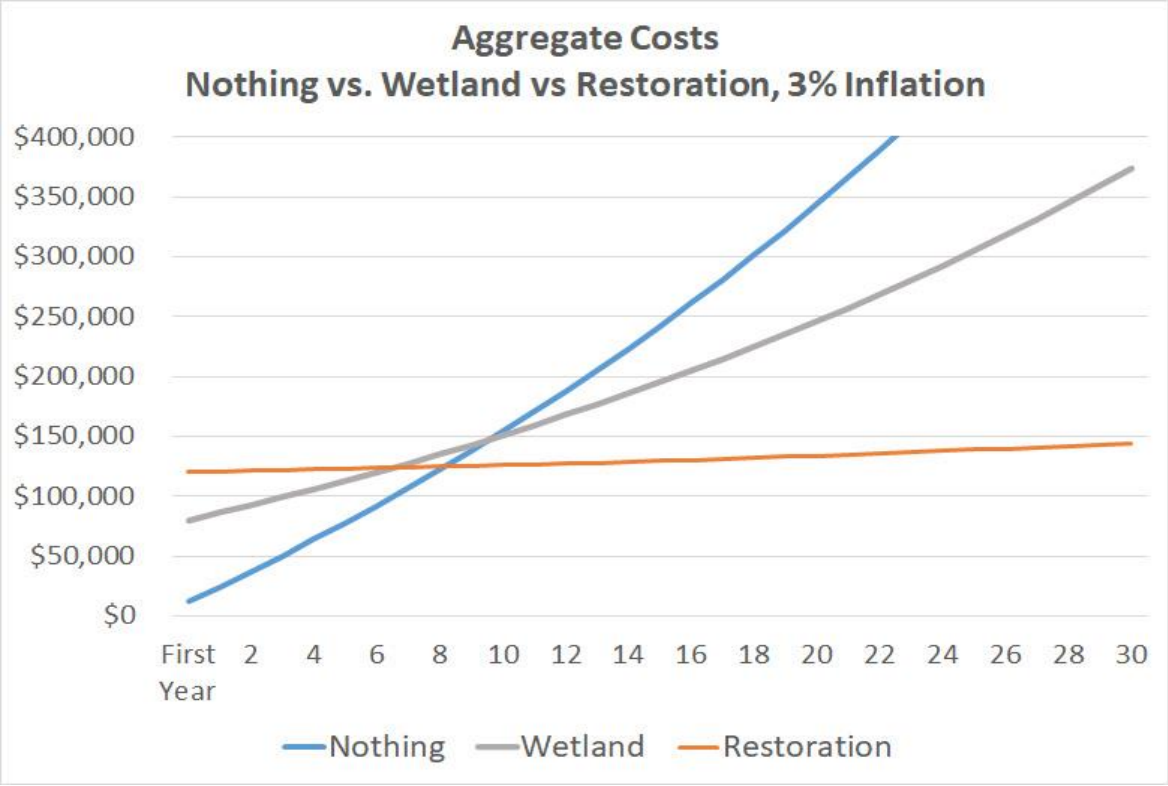
Summary of The Three Options, with Pros, Cons, and Costs

Concept	Pros	Cons	Cost Estimate	Annual Maintenance
#1 Forebay	Lowest upfront cost	Modest sediment improvement	$50K - $70K	Average $3,000
#2 Wetland Conversion	Aesthetic improvements. Improved flood control	Minimal sediment improvement	$60K - $80K	Average $5,000K
#3 Restore to Stream	Eliminates need to dredge. Removes dam. (Possible funding support of 50%)	Higher upfront cost. No open water	$200K - $240K ($100K - $120K)	Average $500

The annual maintenance costs, as shown in the table above, will be subject to inflation, and thus become more significant relative to the initial expense. We can assume an average inflation rate of 3%, which is typically used when planning allocations for long term reserves budgets.

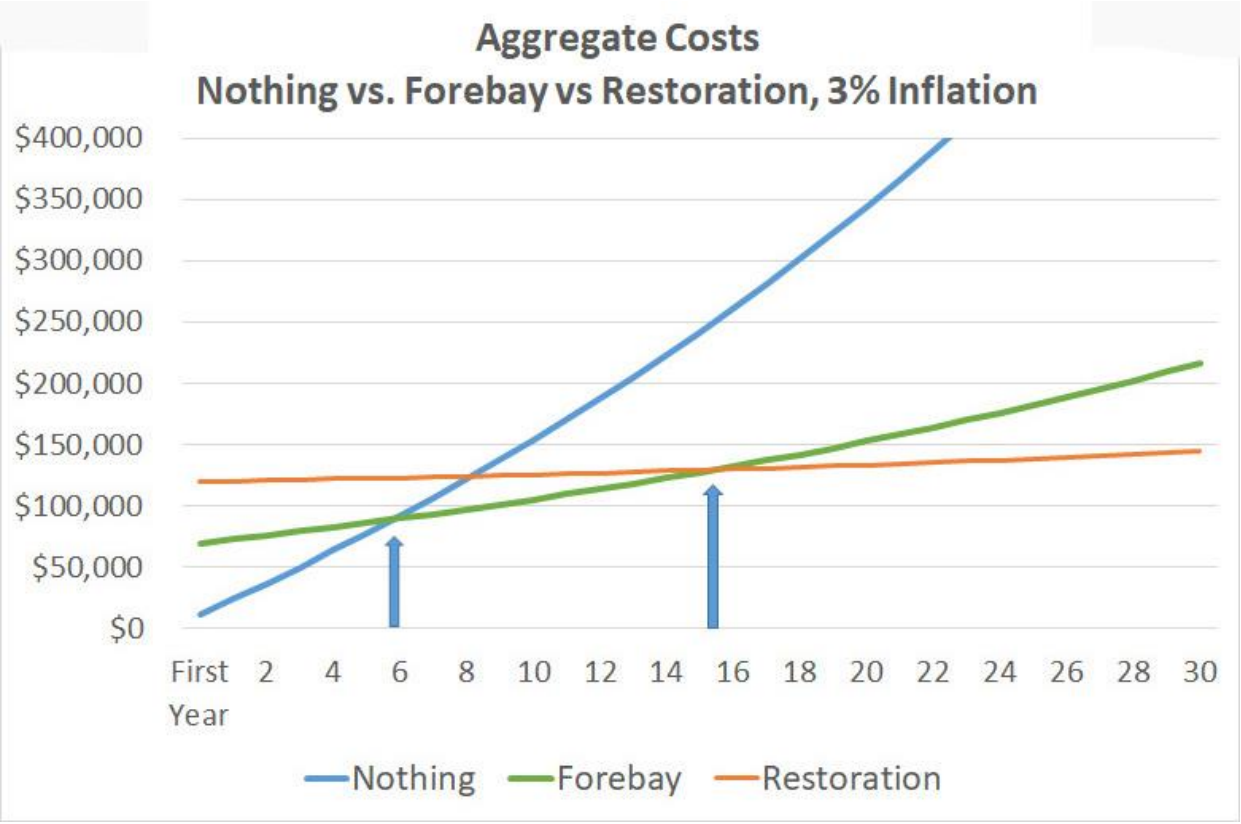
We have also assumed the availability of a matching grant for the Restoration option. Even with the grant, the initial cost of the Restoration plan (Option 3) is higher than the initial cost of any other. The subsequent annual costs remain low, however. In contrast, doing nothing entails no special initial cost, but the annual costs grow steadily due to inflation. The Wetland option is intermediate in both respects.

The best way to assess the overall cost of each option is to look at the total amount spent in a given period of time. The next two graphs show the total amount spent on each option over a 30 year period. I.e., for each year, what is the total amount of money that would have been spent at that point in time? Here's what these results look like, for Doing Nothing, Wetland, and Stream Restoration.



After 8 or 9 years, both the Wetland and Stream Restoration will have become less expensive than Doing Nothing, and the cost advantage of the Stream Restoration option becomes increasingly obvious as the years go by.

If we look at the Forebay option instead of the Wetland, the results are especially interesting. After 8 years the Forebay will have become less expensive than Doing Nothing, but then 8 years later (after 16 years altogether), the Stream Restoration plan becomes the least expensive. That is, it will take about 16 years for the plan with the highest initial cost to have become the least expensive overall.



Here is a tabular summary of the data shown in the graphs, looking at total expenses after 10, 20, and 30 years, with and without inflation being considered. The data based on a 3% inflation rate are surely the more realistic.

			Concept 1	Concept 2	Concept 3	
		Nothing	**Forebay**	**Wetland**	**Restore to Stream**	**Restore, with Grant**
Costs	**First Year**	$12,000	$70,000	$80,000	$240,000	$120,000
	Annual	$12,000	$3,000	$5,000	$500	$500
Total Cost (No Inflation)	**10 years**	$132,000	$100,000	$130,000	$245,000	$125,000
	20 years	$252,000	$130,000	$180,000	$250,000	$130,000
	30 years	$372,000	$160,000	$230,000	$255,000	$135,000
Total Cost (3% Inflation)	**10 years**	$153,694	$105,423	$150,847	$245,904	$125,904
	20 years	$344,118	$153,029	$246,059	$253,838	$133,838
	30 years	$600,032	$217,008	$374,016	$264,501	$144,501

Note that after 10 years, with inflation included, all three options will have become less expensive than doing nothing, except for the Stream Restoration plan with no matching grant assistance. After 20 years all three options look better than doing nothing, even without taking inflation into account.

CONCLUSIONS

Funding Resources

- Reserve funding might be available to fund either of these proposals without any special assessment.
- The most likely reserve surplus is specific to the expansion of The Gathering Place

Kris Bass Engineering recommends Concept 3: Restore to Stream Channel due to the excessive sediment delivery of this stream system. This concept removes the pond and allows the influent sediment to flow downstream thereby eliminating ongoing dredging. This concept has the highest upfront cost, but with grant funding support to match funds contributed by the HOA this concept with begin saving money compared to concepts 1 & 2 in less than 20 years. This design removes the dam and the risk associated with dam ownership. If constructed, when this design begins saving money, compared to the other design concepts, the riparian forest flaking the restoration area will be reaching maturity and will create a seamless riparian buffer from upstream to downstream through the restoration area.

FHA Board Considerations

The following principles guide our decision making with respect to selecting an option

- Continuing with our current approach is fiscally irresponsible
- Need to minimize community risks
- Going with Option 3 would require obtaining a grant
- Solution must assume that our rainfall amounts and runoffs will increase
- End result must provide an area where residents can enjoy nature
- Payback period is not a driving factor
- Residents' preferences will be considered when making the decision