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HALL PARK LAKE RESTORATION PROJECT

CLIENT: Hall Park Lake
ADDRESS: Norman, OK

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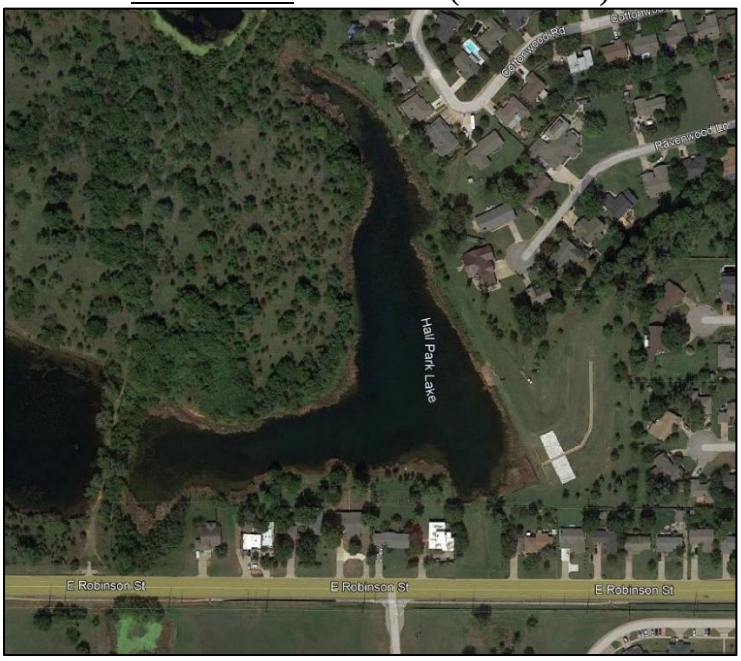
POND SIZE: 7.62 acres (Main Lake)



MAIN CONCERN**:** Excessive vegetation and filamentous green algae has become particularly problematic in the main pond at Hall Park. Dense stands of cattails that surround the entire perimeter, have almost eliminated shoreline access for residents. This paired with the reduced water level of the pond after spillway modifications have either completely, or near completely, eliminated the ability for some residents to see or access the pond shoreline around most of the perimeter. Upon initial consultation, watermilfoil and coontail were present in high abundance, and have started to take over the entire pond. Submerged vegetation like coontail, can quickly become so dense that most recreational activities; like angling, canoeing, kayaking, become extremely difficult. This combination of cattails and watermilfoil/coontail, have all but eliminated any recreational benefit to the residents, that the pond should have.

Like many ponds in the Norman area, this multi-pond system is older, and starting to show signs of aging. One of these, the excessive vegetation, is also likely the reason for a fish kill event in 2018 which was due to oxygen depletion. While the pond is designated for both recreational use AND as a retention pond, it is only currently functional for retention purposes. And while recreational functionality has largely been eliminated especially during warmer months, the aggressive and explosive growth of watermilfoil and coontail rapidly increases the rate of sedimentation, in this case, the biomass of vegetation accumulation. This accumulation could quickly reduce the total holding capacity which will drastically reduce its functionality as a retention pond. This will reduce the lifespan of pond system, leading to costly renovations more quickly than anticipated, which could greatly exceed budget expectations for the city of Norman. More importantly, reduction of volume can significantly increase flooding risks to Hall Park and downstream areas. When ponds are well maintained, not only do they increase property values to homes even without direct shoreline access,

but they also create recreational opportunities that enhance quality of life for residents. Conversely, poorly maintained ponds are not only an eye-sore, but they can also actively detract from home and property values, reduce recreation, increase likelihood of extremely costly repairs like draining and dredging, and are even a liability for flooding.

TARGET SPECIES**:** Coontail, blue-green algae, filamentous algae.

ADDITIONAL CONCERNS**:** Reduce the need for repeated chemical applications by natural forms of control such as, grass carp stocking, pond aeration, and pond probiotics.

Aeration System……..……..……$8,900.00

- fully installed, electric work, trenched lines, weighted tubing, 6 diffuser heads, 1 hp compressor motor with deluxe locking steel cabinet, 1-year maintenance included.

Vegetation Treatment…….…….$1,300.00

- combination of herbicide/algaecide to control excessive vegetation and algae all at once.
- **2 treatments likely needed in first year**

Grass Carp Stocking…….…….…….…….....$1,300.00

- 100 sterile triploid grass carp stocked directly in the pond.

Pond Probiotics…….……...…….……..$400.00/month

- March – October, greatly enhances restoration speed.

(Budget provided by the City of Norman per Carrie Evanson)

Hall Park Lake Vegetation Control						
Summary of Costs						
	Main Pond		**West Pond**		**North Pond**	
Cost Item	**Installation Cost**	**Annual Maintenance**	**Installation Cost**	**Annual Maintenance**	**Installation Cost**	**Annual Maintenance**
Aeration System	$8,900.00	$4,500.00	$7,400.00	$3,700.00	$7,400.00	$3,700.00
Herbicide Application	$1,300.00	$1,300.00	$1,000.00	$1,000.00	$800.00	$800.00
Grass Carp Stocking	$1,300.00		$780.00		$520.00	
Pond Probiotics	$3,200.00	$3,200.00	$2,200.00	$2,200.00	$1,600.00	$1,600.00
Electricity Costs		$1,460.00		$1,460.00		$1,460.00
Monthly Inspection		$3,000.00		$3,000.00		$3,000.00
	$14,700.00	$13,460.00	$11,380.00	$11,360.00	$10,320.00	$10,560.00
Estimated POA Costs	$14,700.00					
Estimated City Costs for Yr 2	$35,160.00					
Estimated Ongoing City Costs after Yr 2	$35,380.00					
Estimated Ongoing City Costs after Yr 2 - No Herbicide	$32,280.00					

A new budget has been created to reflect more accurate estimates for the Hall Park Lake Restoration Project. It is important to note that only the Main Lake is being addressed in this plan and budget. This is based on the agreement between the POA and the City of Norman that implementation of similar restoration plans for the West and North lakes, are contingent on the success at the Main Lake after three years. Therefore, no installation costs to the POA or costs to the city will be incurred for the other two lakes during this period and have been eliminated from the city budget projections altogether. It is also important to note that the program may be terminated after the first year pending determination of the success of restoration efforts. If the program is deemed to be effective, planning for year two and beyond should then be revisited. Also, annual maintenance

estimates were refigured according to the recommendations made in the owner's manual for the compressor that has been recommended, and the projected time needed to complete maintenance tasks. It is also important to note that if herbicide treatments are necessary after the first year, the POA has agreed to cover these expenses. Also, "Monthly Inspection" costs has been eliminated as a line item from the budget pending justification by the City of Norman for necessity of monthly samples, examples of other Norman pond systems that are currently being monitored according to this protocol before and after restoration efforts, as well as what control values Hall Park parameters will be compared to. If monthly monitoring is deemed necessary, this should begin immediately at the city's expense, to provide a clear picture of the current lake status before restoration strategies are implemented.

YEAR ONE

Item	POA Cost	City Cost
Aeration System	$8,900.00	$0.00
Herbicide Application	$2,600.00	$0.00
Grass Carp Stocking	$1,300.00	$0.00
Pond Probiotics	$3,200.00	$0.00
Electricity Costs	$0.00	$1,460.00
Annual Maintenance	$0.00	$0.00
Total Cost	$16,000.00	$1,460.00

YEAR TWO*

Item	POA Cost	City Cost
Aeration System	$0.00	$0.00
Herbicide Application**	$1,300.00	$0.00
Grass Carp Stocking	$0.00	$0.00
Pond Probiotics	$0.00	$3,200.00
Electricity Costs	$0.00	$1,460.00
Annual Maintenance	$0.00	$1,000.00
Total Cost	$1,300.00	$5,660.00

YEAR THREE

Item	POA Cost	City Cost
Aeration System	$0.00	$0.00
Herbicide Application**	$1,300.00	$0.00
Grass Carp Stocking	$0.00	$0.00
Pond Probiotics	$0.00	$3,200.00
Electricity Costs	$0.00	$1,460.00
Annual Maintenance	$0.00	$1,000.00
Total Cost	$1,300.00	$5,660.00

TOTAL COSTS

	POA Cost	City Cost
Year One	$16,000.00	$1,460.00
Year Two	$1,300.00	$5,660.00
Year Three	$1,300.00	$5,600.00
Total Cost	$18,600.00	$12,720.00

* Year Two costs only applicable if Main Pond Project is deemed "successful"
** Herbicide application only if necessary, chemicals needed will be greatly reduced.