EXHIBIT A

2022-2023 Scope of Work

City of Tumwater & Barnes Lake Management District

Vegetation Management & Control Program

Northwest Aquatic Eco-Systems
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Introduction

The program presented herein by Northwest Aquatic Eco-Systems (NWAES) represents the most up to date methods for aquatic plant control associated with nuisance vegetation. The key elements of this program include the following:

- Aquatic Vegetation Survey & Mapping
- Drone Video Survey
- Vegetation Treatment
- Debris Removal Project Planning, Permitting & Implementation
- Reporting

Additional work, as either requested by individual members of the Barnes Lake Management District (LMD) or by the City of Tumwater (CITY), shall be invoiced per the costs and terms outlined herein. This scope of work expires on January 31, 2024.

NWAES is not a registered agent for any materials that have been selected to treat nuisance vegetation.

Aquatic Vegetation Survey & Mapping

This task includes both field sampling and digital vegetation surveys and mapping.

Field Sampling

The spring 2022 survey will incorporate the same protocol and equipment utilized during past surveys. Survey locations will first be established at various locations throughout the lake. At each point a rake will be dragged across the lake bottom and all plants collected on the rake will be identified and documented. Additional surveys will be conducted at these same locations to help the LMD understand trends in the macrophyte composition. A shift in the composition may prompt additional control activities.

Digital Vegetation Survey & Mapping

During the field sampling component described above, NWAES will employ sonar technology and BioBase software to generate the following:

- Weed density map
- Bathymetric contours map
- Sediment composition map

- Vegetative report identifying weed density at different depths

Sonar transects will be spaced approximately 50 feet apart to ensure accurate mapping. Maps produced will be similar in terms of extent and appearance to maps generated in previous years. Spatial data (compatible with ArcGIS) resulting from the surveys will be made available to the city. Optimum performance from the sonar logs occurs in water depths three feet and greater. For this reason, surveys should be performed during high water when the greatest lake access is available.

Digital surveys will be complete by June 30th each year. Digital maps and hard copies will be provided to the CITY no later than July 31st to ensure data is available for other LMD uses.

Drone Video Survey

The most efficient way to evaluate the long term progress of this project is through a video survey. A video survey of the lake will be conducted, via drone, a minimum of two times annually– once generally between mid-May and mid-June, and before chemical treatments (if any) are applied, and once following all applications in early October or when best determined by professional judgement to demonstrate results of the treatment or seasonal progression. NWAES will make the appropriate arrangements to complete this task and present results to the CITY and LMD.

Vegetation Treatment

2022 will be the second year following the 2020 lake-wide fluridone application. It is anticipated that only limited spraying will be required. One shoreline spraying for residual floating plants along residential shoreline areas is scheduled. This application will consist of a 1% solution of imazapyr, applied during late June or early July just prior to the time when boat access is no longer available. No submersed weed control is anticipated for 2022.

2023 will be the third year following the 2020 fluridone application. Once again a mid-season floating plant spray similar to the 2022 campaign likely will need to occur. The goal is to target limited minor infestations in an effort to avoid explosive growth noted during the 2020 season. 2023 may also produce isolated areas of submersed weed growth resulting from seeds deposited into the lake via waterfowl. Not all areas of the lake would be targeted just those that hinder access out into the main water body. Aquathol K may be applied at a 3.0 ppm rate to address submersed weed growth as necessary. Costs associated with floating plant control would be similar to the 2022 expenses noted above. Material costs for submersed weed control with Aquathol K, $700.00/acre.

Reporting

Following each treatment season, a draft final report (1 copy) will be submitted to the CITY for review by the CITY and the LMD. The draft will be received by **November 30** each year and shall summarize each year's program. The draft final report shall address the following elements:

- Detailed maps reflecting treatment activities and locations.
- Detailed description of the equipment and methods used for all treatment activities.
- Estimated acres of each type of aquatic weed removed.
- Estimated acres of each type of aquatic weed undergoing herbicide treatment.
- An estimate of the total percentage of the lake bed covered by native aquatic vegetation.
- A copy of the NPDES permit, copies of public notification and notification dates, and Pesticide Application Records.

- A summary of the current vegetation management program and recommendations for management actions in future years.

The CITY and LMD will return comments following review by the LMD Steering Committee. NWAES will incorporate comments, if any, and provide three (3) bound copies of the final report to the CITY by **December 31** of each year.

As-Needed Shoreline Treatment

Thanks to the effectiveness of the past Fluridone treatment there are no specific lake-wide vegetation treatments prescribed for this contract; the next anticipated application of Fluridone is 2024. However, the LMD is prepared to engage NWAES in as-needed shoreline treatments. The costs for one day of submersed vs. emergent weed control activities are shown below. The feasibility of these treatments are dependent on lake water levels and accessibility. The CITY and LMD reserve the right to modify the type and quantity of vegetation treatments to ensure funds exist to achieve higher priority goals for lake management.

Treatments will be conducted by a Washington Department of Ecology (DOE) licensed applicator using equipment licensed by the Washington State Department of Agriculture. All equipment will be "sea-worthy" meeting all of the standards established for boating vehicles. A CITY and/or LMD representative is encouraged to monitor the treatment and confirm that appropriate equipment and materials are being utilized at the site.

NWAES will coordinate treatment dates with the CITY to minimize any potential disturbance to the surrounding residents or use of the waterbody and to ensure all residents receive proper notification. NWAES will complete all public notification as required by CITYs Aquatic Vegetation Management Permit, issued by DOE.

Aquatic weed control is a biological science that produces variable results. When dealing with noxious species eradication is often difficult to quantify results due to the possibility of re-introduction of the targeted plant back into the system while treatments are not conducted.

NWAES will guarantee that all treatment dates as specified and transmitted to the local residents will be met. NWAES will forfeit to the LMD/CITY $500.00 per missed treatment event or reporting deadline.

NWAES shall submit invoices for services regularly – no more frequently than once per month. All invoices for the calendar year shall be submitted no later than December 31.

Schedule of Costs

Please note: Given the potential for changing field conditions at Barnes Lake, the project must be considered as one that will evolve according to conditions experienced during any specific treatment year. Budget maximums for the project shall not be exceeded.

MANAGEMENT SERVICES	2022	2023	TOTAL PROJECT COSTS
Aquatic Veg. Survey & Mapping	$4,000.00	$4,000.00	$8,000.00
Admin Services (public notification, drone video survey, reporting, insurance, boat removal, and boat cleanup)	$2,420.00	$2,445.00	$4,865.00
Launch Upgrade	$3,000.00		$3,000.00

TREATMENT SERVICES	2021	2022	TOTAL PROJECT COSTS
Submersed Weed Control, 1-day (10 hr)	-	-	-
Labor	$1,750.00	$1,850.00	$3,600.00
Materials	$2,500.00	$2,700.00	$5,200.99
Site Mobilization	$500.00	$500.00	$1,000.00
Emergent Weed Control, 1-day (10 hr)	-	-	
Labor	$1,750.00	$1,850.00	$3,600.00
Materials	$500.00	$500.00	$1,00.00
Site Mobilization	$500.00	$500.00	$1,00.00
Sub-Total	*$16,920.00*	*$14,345.00*	*$31265.00*
Management Reserve	*$2,000.00*	*$2,000.00*	*$4,000.00*
TOTAL Contract Amount	***$18,920.00***	***$16,345.00***	***$38,265.00***

Itemized Costs:

Insurance	$675.00	$700.00
Spring Electronic Bottom Survey	$2,000.00	$2,000.00
Fall Electronic Bottom Survey	$2,000.00	$2,000.00
Aerial Survey (2)	$1,000.00	$1,000.00
Pre Treatment Mailing	$175.00	$175.00
Shoreline Posting Day of Treatment	$210.00	$210.00
Mobilization	$500.00	$500.00
Imazapyr 1 gal @	$175.00	$185.00
Aquathol K gal	$95.00	$100.00
Triclopyr gal	$150.00	$150.00
Aquathol K granular lb	$27.00	$28.00
Diquat gal	$75.00	$80.00
Airboat Operator hr.	$100.00	$105.00
Technician	$75.00	$80.00
Year End Report @ $90.00/hr.	$90.00	$90.00

If submersed weeds are treated at the same time the floating plants are sprayed then cost would be reduced since equipment would already be present on site.