



REPORT TO CITY COUNCIL

To: Honorable Mayor and Members of the City Council

From: Jason Simpson, City Manager

Prepared by: Adam Gufarotti, Community Support Manager

Date: August 22, 2023

Subject: Lake Elsinore Water Quality Plan, Agreements with Moleaer, Inc. and Solitude Lake Management, LLC, and Purchase of a Barge System from Poseidon Barge, LLC for Water Treatment of Lake Elsinore

Recommendation

1. Approve and authorize the City Manager to execute an agreement with Moleaer, Inc., in an amount not to exceed \$1,690,797 for the purchase and service of water treatment equipment in such final form as approved by the City Attorney and authorize the City Manager to execute change orders not to exceed a 10% contingency amount of \$169,000 for uncertainties and adjustments;
2. Approve and authorize the City Manager to execute an agreement with Moleaer, Inc., in an amount not to exceed \$229,899 for water treatment equipment service, lake bottom hardness mapping, and water testing in such final form as approved by the City Attorney and authorize the City Manager to execute change orders not to exceed a 10% contingency amount of \$22,990 for uncertainties and adjustments;
3. Approve and authorize the City Manager to execute an agreement with Solitude Lake Management, LLC in an amount not to exceed \$347,194 for annual Lake maintenance in such final form as approved by the City Attorney and authorize the City Manager to execute change orders not to exceed a 10% contingency amount of \$34,719 for construction uncertainties, adjustments;

4. Authorize the City Manager to purchase a custom barge system from Poseidon Barge, LLC in an amount not to exceed \$226,085 for a custom barge system and to execute change orders not to exceed a 10% contingency amount of \$22,608.50 for uncertainties and adjustments; and
5. Waive the formal bidding process per Municipal Code Section 3.08.070(G) for the purchases from Moleaer, Inc. and Poseiden Barge, LLC since the systems are non-replicable and custom.

Background

As Southern California's largest freshwater lake, Lake Elsinore is a vital resource for both wildlife and recreation. Located at the bottom of the San Jacinto Watershed, the lake has a history of algae blooms and frequent water quality challenges. The San Jacinto River Watershed, upstream of Lake Elsinore, covers 780 square miles in the western half of Riverside County. It begins in the San Jacinto Mountains and runs west through Canyon Lake, ending in Lake Elsinore. The natural water flow through the San Jacinto Watershed carries nutrient-rich sediment into our lakes each year. The sediment carries high levels of nitrogen and phosphorus that contribute to water quality issues and threaten aquatic life in Lake Elsinore.

Discussion

The City along with its partners have implemented several water quality projects over the last twenty years. In 2008, the Lake Elsinore & San Jacinto Watershed Authority (LESJWA) installed the Lake Elsinore Aeration and Mixing System (LEAMS) project that aerates and mixes lake water to improve the oxygen levels. We have studied the fish population and worked to remove harmful fish like carp from the ecosystem. In the fall of 2022, the City conducted a pilot study to explore long-term solutions to improving the water of Lake Elsinore.

After reviewing the results of the pilot study and coordinating with our aquatic biologist, we are implementing a water quality plan for the next twenty years. This plan or road map approach is not one large project but several strategies to improve Lake Elsinore. This road map includes immediate and long-term water treatment projects that will work together to improve the lake. The first treatment plans are outlined below and will be implemented in the next three months.

Nanobubble Treatment

One of the most effective ways to improving lake water is to aerate or introduce oxygen into the water column. Nanobubbles are 2,500 times smaller than a single grain of salt and efficiently deliver oxygen. In addition to delivering oxygen, nanobubbles also prevent and mitigate algae blooms through their oxidative properties.

City staff has received a proposal from Moleaer Inc. to install one of their proprietary nanobubble generation systems to increase oxygen and reduce algae in the lake. This system will treat 7.2 million gallons a day. This system will not be able to treat the entire lake but will treat the area adjacent to the equipment. This initial system will allow us to plan for future water treatment projects. The proposal includes baseline water quality testing and hardness mapping of the lake bottom. This testing will allow us to track the effectiveness of the equipment and determine how many future systems are needed to treat the whole lake.

The equipment will be installed in a 40-foot shipping container on a floating barge approximately 50 feet off the shoreline. The system will use an oxygen concentrator to produce oxygen and ozone that will be injected into the nanobubbles. The barge will be installed on the East side of the lake between Mohr Street and Davis Street with underwater intake and discharge lines. The nanobubbles will eat up the muck (organic matter) at the bottom of the lake, which will improve the water quality. As the area around the treatment zone is cleaned, the treatment area will expand.

After considering multiple installation sites along the lake shore, a floating barge has been recommended due to its cost savings and flexibility for future development. City staff evaluated installation sites on the cost to provide power, the cost to install intake and discharge pipes, and community safety. City staff has received three proposals to procure a modular barge system. Below are the proposal results.

Contractor Name	Proposal Amount
Poseidon Barge, LLC	\$226,085
Robishaw Engineering, INC.	\$229,280
Shugart	Unresponsive Bidder

City staff has extensively reviewed Moleaer, conducted reference checks, and discussed the proposal with our biological scientists from WSP. WSP has reviewed the project and has submitted a letter of support (Attachment A). In 2021, Moleaer was contracted by the Los Angeles County Department of Public Works to clean up the Dominguez Channel in Carson, California, after the channel started to omit a strong odor of rotten eggs. The smell was determined to be hydrogen sulfide and linked to a warehouse fire adjacent to the channel. The fire caused the release of chemicals in the channel that consumed all

the available oxygen in the water. Moleaer installed their nanobubble generators along the channel and treated 60 million gallons daily, resolving the odors and restoring the water quality.

Algaecide

As part of our water treatment plan, a peroxide-based algaecide will be used to control Algae Blooms. This algaecide is approved for use in waters containing fish and adds 13% bio-available oxygen to the water. The algaecide is mixed with lake water on a boat and is spread right into the lake. The contractor will start with small dosages of the algaecide and increase as needed depending on the growth of the algae. Peroxide based algaecides are safe for humans and pets. The algaecide will break down to sodium carbonate and hydrogen peroxide in water and sodium carbonate peroxyhydrate will not stay in the sediment layer or water.

Phosphorus Treatment

Phosphorus enters the water from run-off, or internally, from the nutrient-rich sediments on the bottom of the lake. Too much phosphorus can cause increased growth of algae, which can result in decreased levels of dissolved oxygen a process called eutrophication. High levels of phosphorus can also lead to algae blooms that produce algal toxins, that can harm human and animal health.

Canyon Lake currently uses Alum treatments to reduce its Phosphorus levels. Alum is not recommended for Lake Elsinore because the Ph of Lake Elsinore is higher than the recommended levels for Alum. Lanthum-based chemicals work the same way as Alum by removing the phosphorus from the water column and trapping it in the bottom sediment layer.

The City has received two proposals for algaecide and phosphorus treatments for Lake Elsinore. It is recommended to award a contract to Solitude Lake Management, LLC, for the treatment of Lake Elsinore.

Solitude Lake Management, LLC	\$347,194
Aquatechnex	\$419,555

City staff anticipates the Algaecide and Phosphorus treatments to start in September 2023, and the nanobubble equipment installed in the next three months. Regular updates on the status of these new projects will be included in our Lake Watch updates.

Future Projects

The City's roadmap approach to managing the lake includes long-term projects currently in the planning phase of development. The City has been working with the Army Corps of Engineers on a wetland restoration project that will help to filter the lake water and restore the natural habitat around the lake. This project is planned for the inlet channel that receives water from Canyon Lake and the outflow channel near Elm Grove Beach.

The City was recently awarded 1.5 million for a 2-year pilot project to install an algae harvester that will filter lake water, separate the algae, and return clean water to the lake. This project is planned to be installed on the north end of the lake but is still in the planning stage.

In 2008, the City and its regional partners installed the Lake Elsinore Aeration and Mixing System that you can see floating in the middle of the lake. This equipment is over 15 years old and has reached its useful life expectancy. The Lake Elsinore and San Jacinto Watershed Authority (LESJWA) is in the planning stage to replace this equipment.

Fiscal Impact

Funding costs are included in the Fiscal Year 2023/2024 Measure Z Budget.

Attachments

Attachment 1 - WSP Letter of Support

Attachment 2 – Agreement with Moleaer, Inc. for water treatment equipment

Attachment 3 – Agreement with Moleaer, Inc. for equipment service, lake bottom hardness mapping, and water testing

Attachment 4 - Agreement with Solitude Lake Management, LLC

Attachment 5 – Poseidon, LLC Proposal