

Memorandum

To: Bassett Creek Watershed Management Commission (BCWMC)
From: Barr Engineering Co. (Greg Wilson, PE; Stephanie Johnson, PhD, PE)
Subject: Item 6D – Consider Approval of Scope of Work and Budget for Wirth Lake Aeration Study
BCWMC September 17, 2026 Meeting Agenda
Date: September 10, 2026

6D. Consider Approval of Scope and Budget for Wirth Lake Aeration Study

Recommendations

- a) Consider approving the proposed scope of work and budget of \$42,000 for Commission Engineer assistance with the Wirth Lake Aeration Study.

Background

Wirth Lake is classified by the BCWMC as a priority one deep lake. It is located within Theodore Wirth Regional Park immediately south of Hwy 55 and directly adjacent to Bassett Creek (Figure 1). The Bassett Creek Watershed Management Plan includes CIP #36: Wirth Lake Aeration (originally slated for 2027). A study of the status of aeration in the lake and establishment of goals and justification for continued aeration (similar to a CIP feasibility study) is recommended ahead of ordering a CIP project.

The Wirth Lake Aeration System was originally installed by the Minneapolis Park and Recreation Board (MPRB) to improve water quality, prevent winter kills, and help support the lake's fisheries. Various versions of the original system have been in use within the lake since the 1970s. The system has been largely non-operational since 2022 because of damaged pipes, clogging, and aging infrastructure.

The Wirth Lake Aeration System was originally installed in the 1970s. Work within the lake at that time was focused on separating the lake from the creek, improving clarity, restoring game fishing, reducing internal phosphorus loading, and experimenting with summer aeration and biological filtration. Those efforts included installing an outlet barrier to disconnect the creek, and installing bubbler aerators, using a biological activated soil filtration unit, and performing a lake-wide rotenone (chemical) fish kill followed by fish restocking. Some of this early infrastructure did not function as intended, especially the filtration system, and parts of the original system were later abandoned or repurposed.

Through the 1980s and 1990s, the management strategy for the system shifted toward winter aeration aimed at reducing fish kills while maintaining safe ice conditions and enhancing shoreline recreational fishing. A winter cascade aeration concept was developed for the system, eventually leading to Minnesota Department of Natural Resources (MNDNR) involvement and the installation of a pump-and-cascade system using parts of the old filtration infrastructure. A 1997 agreement between MPRB and MNDNR formalized the goal of benefiting the lake environment and fisheries, with MPRB taking responsibility for the long-term maintenance and operation of the system. By the early 2000s, an underground cascade and permanent pump system had been installed, although records have missing information about how some pieces of the system were rebuilt or connected.

In recent years, the system has become increasingly difficult to operate and sustain. The wet well and intake system have experienced repeated clogging and pump failures caused by vegetation, muck, debris, and even animals entering the system. Investigations performed by the MPRB found that the current intake configuration differs from historic plans: the pipe opening appears to be exposed, close to the lake bottom, without the expected screen or manifold attachment, and it may be pulling in mud and vegetation. Additional issues include holes in the pipe closer to shore, difficult access, limited ability to remove equipment safely, and staff injury concerns. Because of these problems, the system has been turned off since March 4, 2024, pending a decision on how to move forward and to prevent further clogging or pump damage.

The water quality within Wirth Lake currently meets applicable standards for lake eutrophication; however, there are concerns about chemical stratification due to high chloride concentrations in deeper waters, and the combined effects of high chloride and low oxygen on fish and aquatic ecology. MPRB staff question if continued or modified aeration could potentially help to more thoroughly distribute chlorides within the lake, reduce low-oxygen conditions, prevent chloride impairment, and support fishery and habitat goals. Given that the lake is also located within high-quality surrounding parkland and is largely groundwater fed, and noting the potential for future wetland restoration work south of the lake, suggests that the desirable goal for the lake may be more than simply meeting minimum state standards.

Improvements to the Wirth Lake Aeration System are included on the BCWMC's CIP list, originally slated for 2027. This study is intended to inform any future improvements to the system, through evaluation of historical water quality and fisheries data, further discussion of the MPRB and BCWMC's goals and current need for the aeration system, and consideration of the different potential retrofit and/or aeration system improvement options, including determining whether a repaired or redesigned system is still needed, and how changes to the system might affect chloride stratification, dissolved oxygen, water quality, fisheries, winter recreation, ice safety, and MPRB's operation and maintenance burden.

Scope of Work

Work on this study is proposed to begin in the fall of 2026 and extend through approximately June of 2027 to accommodate the collection of additional winter season monitoring data and analysis. Work will begin with a preliminary effort to gather input from applicable agency partners.

1. Project Kickoff

To kick off the project, we will hold an online meeting with the applicable cities and agency partners, including staff from MPRB, BCWMC, MNDNR, City of Minneapolis, Golden Valley, Hennepin County, and Minnesota Department of Transportation. The Commission Engineer will prepare materials for this meeting, and the administrator will make the meeting arrangements. As part of this discussion, we will review the original goals for the aeration system, discuss operations and existing conditions, and receive input toward the establishment of goals for the system moving forward. The Commission Engineer and administrator will prepare and distribute meeting notes following the discussion.

2. Evaluate In-Lake Data and Potential Improvement Options

Following the project kickoff, we will work with BCWMC, MPRB, city, and MNDNR staff to review and confirm the goals moving forward for the Wirth Lake Aeration System. Potential goals may include preventing winterkill, maintaining or improving water quality, supporting fisheries and lake IBI goals, reducing harmful algal bloom (HAB) and bacteria risks, preserving recreational safety for winter uses of the lake, and creating a system that MPRB staff can inspect, maintain, and operate with existing resources. The current system has historical value and has contributed to decades of water quality improvement, but its aging infrastructure, uncertain configuration, clogging problems, and safety concerns raise the question of whether it should be repaired, redesigned, replaced, removed, or managed differently going forward. As part of this task, we will consider up to three potential design alternatives for future aeration within the lake, including – potentially – the option of removing aeration from the system.

Work within this task will include a review of the available water quality data for Wirth Lake and a comparison of monitoring results (including dissolved oxygen, lake stratification, chloride levels, and occurrences of HABs) with the operational timeline and noted changes within the Wirth Lake aeration system. A documented Wirth Lake fish kill (under the “Low Oxygen (“Winterkill”) Affected Many Waters In 2010-11” heading and “Hennepin County” subheading at the DNR site:

<https://www.dnr.state.mn.us/areas/fisheries/westmetro/fishkills.html>) corresponds with a time where the existing aeration system was not running. As a result, this task will also include a more-detailed evaluation of the data provided by MPRB on winter oxygen levels within the lake over time and the winter aerator timeline that MPRB has put together. Most years within the MPRB’s existing water quality record have one sampling event with water quality profile measurements, but it is also expected that MPRB will collect more detailed monitoring data during the 2026-27 winter season to better evaluate oxygen demand and lake sediment phosphorus release which will be used when evaluating lake water quality and potential options and implications for winter aeration. MPRB has also provided information on the dates of operation for the aeration system over the past 30 years; in addition to ice on-off data for each year and days of ice cover.

One of the goals identified by MPRB for the Wirth Lake aeration system, and included in the BCWMC Plan, is related to maintaining or improving the fish IBI score for the lake. The MNDNR has not yet developed a fish IBI score for Wirth Lake and per conversations with MNDNR staff does not intend to do so within the foreseeable future. However, a major component of the calculation of fish IBIs by the MNDNR is the composition of the fish community. For this task (where applicable), we will also qualitatively evaluate and report on the MNDNR’s fishery survey data for the lake to-date and evaluate implications for the fisheries communities due to changes in the aeration system. As part of this work, we will coordinate with fisheries experts from the MNDNR to provide input into the evaluation.

Our evaluation of aeration system options will include the development of a matrix that compares the existing system with other feasible aeration concept options based on their individual advantages and limitations toward meeting the stated goals, cost-effectiveness and operation and maintenance requirements. Each aeration concept will be optimized based on life-cycle cost-benefit and future assurances for project implementation and compliance. Cost estimates for each concept will include a “30-year cost,” analysis of life expectancy, and annualized cost per pound of pollutant removal and/or level of ecological benefit expected from the project. As a part of the review and evaluation we will also consider MNDNR’s aeration rules and requirements for permit renewal.

3. Meetings and Aeration Study Report

At the completion of the project evaluation, Barr will prepare a draft report on the findings to summarize the approach, key data and winterkill prevention options evaluated, input received from project partners, and recommendations for potential improvement options. A first draft of the report will be completed and provided for review and comments from BCWMC and MPRB staff. The proposed budget includes a virtual meeting with BCWMC and MPRB staff to review any feedback. Comments will be incorporated into a revised draft.

The revised draft report will be shared with the MNDNR and other interested partners. The budget also includes presentation of the draft results to the BCWMC TAC to gather their input or recommendations to the Commission. Following these meetings, a final report will be completed incorporating feedback received during those discussions and the final report will be presented for approval at a monthly Commission meeting.

Proposed Timeline and Commission Engineers' Estimated Costs

The following table summarizes the estimated budget for Commission Engineers to complete this study and the anticipated schedule. Similar to a CIP feasibility study, the funding source for this effort is the budget for CIP#36 Wirth Lake Aeration.

Task Number	Task	Estimated Budget	Estimated Schedule
1	<u>Project Kickoff Meeting</u>	\$2,100	October 2026
2	<u>Review and Evaluate Water Quality Monitoring and Fisheries Data</u>	\$7,200	November 2026 – March 2027
	<u>Evaluate Improvement Options Including Cost-Benefit Analysis</u>	\$17,200	March — May 2027
3	<u>Meetings and Aeration Study Report</u>	\$15,500	May — June 2027
	Total	\$42,000	

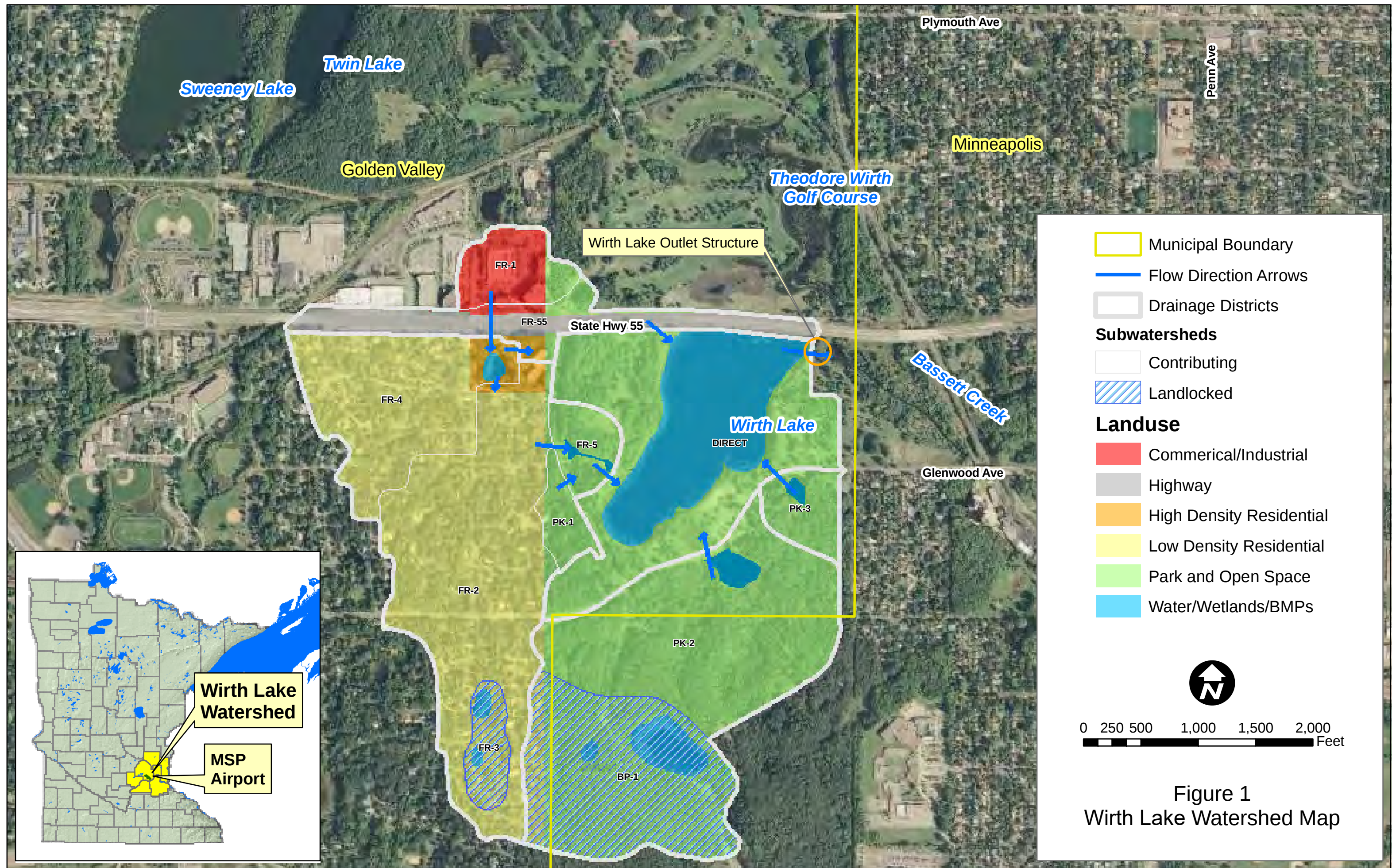


Figure 1
Wirth Lake Watershed Map