# Main Stem Lagoon Dredging Project—Phase II (2027, CIP Project BC-7) Feasibility Report

*Golden Valley, Minnesota*

Prepared for
Bassett Creek Watershed Management Commission

Prepared by
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June 2026

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# Certification

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# Main Stem Lagoon Dredging Project—Phase II (2027, CIP Project BC-7) Feasibility Study

June 2026

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# Abbreviations

| | |
|---|---|
| AA | assessment area |
| AACI International | American Association of Cost Engineers International |
| BaP | benzo(a)pyrene |
| BCWMC | Bassett Creek Watershed Management Commission's |
| BMP | best management practice |
| BWSR | Minnesota Board of Water and Soil Resources |
| CCC | Civilian Conservation Corps |
| CIP | Capital Improvement Program |
| CSW | construction stormwater |
| CWA | Clean Water Act |
| CY | cubic yards |
| DBH | diameter at breast height |
| DRO | diesel range organics |
| EAW | environmental assessment worksheet |
| EIS | environmental impact statement |
| EPA | U.S. Environmental Protection Agency |
| EQB | Minnesota Environmental Quality Board |
| FQA | floristic quality assessment |
| IPaC | Information, Planning, and Conservation System |
| LGU | local government unit |
| MBS | Minnesota Biological Survey |
| MCES | Metropolitan Council Environmental Services |
| MDNR | Minnesota Department of Natural Resources |
| MnSHIP | Minnesota Statewide Historic Inventory Portal |
| MPCA | Minnesota Pollution Control Agency |
| MPRB | Minneapolis Park and Recreation Board |
| NHIS | Natural Heritage Information System |
| OHW | ordinary high water |
| PAH | polycyclic aromatic hydrocarbons |
| Plan | 2026-2035 Bassett Creek Watershed Management Plan |
| RAM | rapid assessment method |
| RGU | regional government unit |
| RMP | resource management plan |
| SLV | soil leaching value |
| SRV | soil reference value |
| SWA | subwatershed analysis |
| TEP | technical evaluation panel |
| TMDL | total maximum daily load |
| TP | total phosphorus |
| TSS | total suspended solids |
| USACE | U.S. Army Corps of Engineers |
| USFWS | U.S. Fish and Wildlife Service |
| UST | underground storage tank |
| VOC | volatile organic compound |
| WCA | Minnesota Wetland Conservation Act |

| | |
|---|---|
| WIMN | “What’s in my Neighborhood?” database |
| WOMP | watershed outlet monitoring program |
| WRAPS | watershed restoration and protection strategy |
| WSE | water surface elevation |

# 1 Executive Summary

## 1.1 Background

The Bassett Creek Watershed Management Commission's (BCWMC) current Capital Improvement Program (CIP) (Table 4-6 in the 2026-2035 Bassett Creek Watershed Management Plan (Plan) reference (1)) includes project ID #15 "Bassett Creek Lagoon Dredging in Theodore Wirth Park (BC-7)" (Main Stem Lagoon Dredging Project Phase II).

This study examines the feasibility of implementing a second phase of dredging accumulated sediment from lagoons within Theodore Wirth Park (see Figure 1-1). This study also examines the potential for wetland restoration in one of the lagoons. The goals of the original Main Stem Lagoon Dredging project were to remove accumulated sediment from Lagoons D, E, and F to re-establish an aesthetic and function similar to the original open water design from the 1930's. As described within this feasibility study, the project also has the potential to provide other benefits. If ordered, this project is anticipated to be implemented in 2027. Funding for the project is proposed to come from an ad valorem tax levied by Hennepin County on behalf of the BCWMC.

## 1.2 Site Conditions

The Bassett Creek Main Stem lagoons are located in the City of Golden Valley within the Minneapolis Park and Recreation Board's (MPRB) Theodore Wirth Regional Park, and along Ȟaȟá Wakpádaŋ/Bassett Creek, which is a Minnesota Department of Natural Resources (MDNR) public watercourse. Lagoon E (2.8 acres), also named Ski Jump Pond, and Lagoon G (4.3 acres), also named The Rapids, are public water basins (MDNR #27065100P). Lagoons D and F (1.2 and 1.5 acres respectively) are not listed as public water basins. Lagoons E, F, and G are located north of Plymouth Ave. N, and Lagoon D to the south (see Figure 1-1).

Land adjacent to the lagoons consists of open grassy areas used for golf and other recreation, wooded uplands, and various wetland communities. The lagoons are bordered along the eastern edge by a recreational trail, which runs alongside the BNSF railroad.

A field wetland delineation was conducted within and adjacent to the Lagoon G project area on September 15, 2025. Six wetlands (with a total area of approximately 5.35-acres) were delineated along or near Bassett Creek within the Lagoon G project area. Wetland community types within and adjacent to the Lagoon G project area include fresh (wet) meadow, shallow marsh, floodplain forest, shrub-carr, and shallow, open water. A Level I Desktop Wetland Determination for Lagoons D, E, and F was completed in 2019 as part of the previous Phase I dredging project.

Sediment sampling showed that concentrations of polycyclic aromatic hydrocarbons (PAHs) (as BaP equivalents) and diesel range organics (DRO) are high in all four lagoons; based on this, the accumulated sediments within the lagoons do not meet Minnesota Pollution Control Agency (MPCA) guidelines for Unregulated Fill (MPCA, 2012), indicating it is not suitable for unrestricted offsite reuse. In addition, BaP equivalents are above the MPCA Industrial Soil Reference Value (SRV), indicating the sediments are not suitable for reuse at other commercial or industrial properties. Based on the sediment sampling results and MPCA guidelines, the dredged material will require landfill disposal.

## 1.3 Project Alternatives

Multiple alternatives were evaluated for removing accumulated sediment, flood risk reduction, improving water quality, restoring wetlands, and improving habitat along Ȟaȟá Wakpádaŋ/Bassett Creek within the project area. The various design options were organized into three potential project alternatives for the purposes of analysis.

### 1.3.1 Alternative 1 – Additional Dredging of Lagoons D, E, and F

Alternative 1 proposes to go back to Lagoons D, E, and F to remove additional accumulated sediment that was missed in Phase I. On average, roughly 2 feet of sediment that was originally intended to be removed as part of the Phase I project remains in each of these lagoons. The goals of this alternative are to build on the improvements from Phase I of the project to achieve an average depth of 6 feet below the estimated normal water level of the lagoons, remove additional contaminants, improve water quality treatment capability, and extend project longevity.

### 1.3.2 Alternative 2 – Dredge Lagoon G

Alternative 2 proposes to build on the concepts from Phase I by moving upstream to Lagoon G. The goals are similar to Alternative 1, focusing on the removal of accumulated sediment from Lagoon G to achieve an average depth of 6 feet below the estimated normal water level, restoring the original design aesthetic and function, removing contaminants, and increasing water quality treatment capability. Dredging would be limited to work within the existing banks and estimated footprint of the original design, and no proposed upland improvements would be included.

### 1.3.3 Alternative 3 - Wetland Restoration and Dredging of Lagoon G

Alternative 3 is focused on the restoration of existing wetland areas within the Lagoon G project area. This alternative includes shallow grading in several areas to the north of the Lagoon, re-connecting multiple wetland areas to the Lagoon, and for removal of existing invasive vegetation. Restoration in wetland and upland areas would focus on replacement with native plant species. In addition, this alternative proposes to incorporate dredging of portions of Lagoon G by focusing on areas where existing wetland vegetation is dominated by invasive species. In addition to providing water quality benefits, this alternative prioritizes ecological and habitat improvements beyond dredging alone.

### 1.3.4 Phasing / Combining Alternatives

Consideration was also given to options for phasing of the dredging alternatives – completing all lagoons together or separately. Full descriptions of the alternatives considered are provided in Section 5. Recommendations related to the chosen alternatives are discussed in Section 8.


Project Area
Open Channel
Culvert or Bridge

Imagery: NearMap 04/05/2025

0 500 1,000
Feet

**Site Location Map**
Main Stem Lagoon Dredging
Phase II Feasibility Study
Golden Valley, Minnesota

FIGURE 1-1

BARR

Bar Footer: ArcGISPro 3.6.1, 2026-04-09 11:34 File: I:\Client\BassettCreek\Work_Orders\2025\Phase II Lagoon Dredging\Maps\Main Stem Lagoon Dredging Project Phase II Feasibility_Study.aprx Layout: Figure 1-1: Site location Map User: AMB5

## 1.4 Dredging Project Impacts and Estimated Costs

Potential impacts from the dredging project alternatives are discussed in Section 6 and include permit requirements (e.g., MDNR public waters work permit), temporary impacts to wetlands, temporary trail closures and park impacts, and impacts to aquatic species. One significant concern is the need to manage trail usage to maintain pedestrian safety and park use during the project. Continued coordination with the MPRB will be required during design of the project to address and mitigate this issue. Another concern noted by project stakeholders is impacts to turtles that may be present in the lagoons during the proposed work. The BCWMC will continue to coordinate with the MDNR in the design phase, as needed, to consider methods for mitigating impacts from the project to turtles, such as exclusionary fencing.

Overall, the proposed project will result in increased permanent pool volume and sediment storage volume in the lagoons, resulting in a reduction of sediment and phosphorus loading to Ȟaȟá Wakpádaŋ/Bassett Creek and all downstream water bodies, including the Mississippi River. For Alternative 3, there would be an additional focus on increased ecological function and benefits for wetlands surrounding Lagoon G.

The feasibility-level opinion of costs for implementing each alternative, as well as the cost per pound of total phosphorus (TP) removed, and total suspended solids (TSS) removed, is shown in Table 1-1. The capital cost estimate includes estimated construction costs, construction contingency, and engineering costs (all costs rounded to the nearest $1,000).

**Table 1-1 Feasibility Level Cost Estimates Summary - Dredging**

| Alternative | Lagoon | Dredged Volume (cy) [1] | Capital Cost Estimate [2] | TP Load Reduction (lb/yr) [3] | TP Reduction ($/lb/yr) [4] | TSS Load Reduction (lb/yr) [3] | TSS Reduction ($/lb/yr) [4] |
|---|---|---|---|---|---|---|---|
| 1 | D | 4,200 | $288,000 | 80 | $190 | 21,500 | $1.50 |
| | E | 7,650 | $816,000 | 135 | $310 | 35,500 | $0.90 |
| | F | 2,100 | $485,000 | 39 | $640 | 9,400 | $0.70 |
| | ALL | 13,950 | $1,417,000 | 254 | $290 | 66,400 | $0.80 |
| 2 | G | 33,700 | $3,110,000 | 510 | $320 | 132,000 | $1.20 |
| 3 | G [5] | 23,000 | $2,476,000 | 363 | $350 | 94,000 | $1.34 |

[1] Sediment from all lagoons is considered contaminated and any dredged material will require landfill disposal.
[2] Includes estimated initial construction cost (with 30% contingency) and design/permitting/ admin costs (estimated at 20% of construction cost for Alternatives 1 and 2, and 25% of construction cost for Alternative 3).
[3] Based on estimated removal from Walker 1987 (reference (2)) relationship applied to average annual TP load from MCES WOMP monitoring at Ȟaȟá Wakpádaŋ/Bassett Creek station.
[4] Pollutant reduction cost/lb based on 30-year annualized cost, annualized cost divided by estimated annual pollution load reduction.
[5] Estimated water quality benefits for Alternative 3 based only on the dredging component of the proposed work and excludes any TP or TSS reduction from wetland restoration.

The methodology and assumptions used for the cost estimates are discussed in Section 7, and the cost estimates for all alternatives considered for this study are provided in Table 7-1.

## 1.5 Recommendations

The BCWMC Engineer recommends completing Alternative 3 - Wetland Restoration and Dredging of Lagoon G. As compared to Alternatives 1 and 2, the additional focus on habitat and ecological benefits that are attained with this alternative are more fully aligned with BCWMC goals. This recommendation is contingent upon a future agreement between the BCWMC and MPRB/Golden Valley for the long-term maintenance of the wetland vegetation. If such an agreement cannot be achieved, the BCWMC Engineer recommends completing a dredging-only effort within Lagoon G. Additional information on this alternative is included in Section 8. Some additional considerations for the recommendation are as follows:

- Being that the project area lagoons are connected in series, the dredging in Lagoon G will inherently extend the life span of Lagoons D, E, and F downstream and extend the projected life span of improvements completed in Phase I
- Access to Lagoon G does not require use of the parkway, avoiding impacts to park users and risk of damage to the roadway (parkway is not designed for heavy truck traffic and presented challenges in Phase I)
- Alternative 3 has received the most interest and favorable comments from project stakeholders throughout the feasibility process
- The deeper water in Lagoons D, E, and F creates additional construction challenges for dredging
- The success of Alternative 3 – the Wetland Restoration component at Lagoon G will be dependent on a successful vegetation management strategy and long-term maintenance of the restored areas
- If wetland restoration is not included, dredging only alternatives within Lagoon G target water quality benefits and an open water aesthetic consistent with previous designs while removing contaminated sediment and extending the lifespan of Lagoons D, E, and F downstream.
- The BCWMC Engineer recommends that the BCWMC use the opinions of cost identified in this study to develop a levy request for the selected project and that the project proceed to design and construction. Due to the high cost of this alternative, we anticipate that the BCWMC would likely need to spread the CIP funding over more than one year to construct the project.

# 2 Background and Objectives

The BCWMC's 2026-2035 Watershed Management Plan (Plan) (reference (1)) identifies improving water quality conditions within the watershed as amongst the Commission's highest priorities. The Plan also identifies a goal for restoring and enhancing priority wetlands and restoring riparian areas adjacent to BCWMC CIP projects as opportunities arise. This project is consistent with the goals (Section 3.0) and policies (Section 4.1) identified within the Plan. The Plan's 10-year CIP (Table 4 6 in the Plan) includes project ID #15 "Bassett Creek Lagoon Dredging in Theodore Wirth Park (BC-7)" (Main Stem Lagoon Dredging Project (Phase II)). The BCWMC approved the 5-year (2025 – 2029) CIP at their April 17, 2025 meeting, which included the Main Stem Lagoon Dredging Project (Phase II) to dredge lagoons (either Lagoons D, E, and F, or Lagoon G) in Theodore Wirth Park, with project construction in 2027.

The Main Stem Lagoon Dredging Project Phase II will also need to show compliance with and obtain permits from several federal, state, and local government agency plans and regulatory programs. Based on discussions to-date with the US Army Corps of Engineers (USACE) and state regulatory agencies, it is expected that the project will require compliance with federal Section 106 of the National Historic Preservation Act, Section 404 of the federal Clean Water Act, and the federal Clean Water Act Section 401 Water Quality Certification. It is also expected that the project will require compliance with the MN Wetland Conservation Act (WCA), the MN Department of Natural Resources public waters work permit, and completion of a MN Environmental Assessment Worksheet (EAW). Some level of cultural resources inventory may also be required for the project to comply with federal Section 106 requirements.

## 2.1 Project Area Description

The lagoons are located in the City of Golden Valley, within the MPRB's Theodore Wirth Regional Park, along Ȟaȟá Wakpádaŋ/Bassett Creek. The Civilian Conservation Corps (CCC) constructed the lagoons in 1937 by excavating approximately 405,000 cubic yards (CY) of soil to create seven lagoons. The project created 27 acres of open water and 36 acres of land usable for recreation.

Since their creation in 1937, significant development has occurred throughout the watershed upstream of the lagoons. A study performed by Barr Engineering, Co. (Barr) in 2015 found that the lagoons remained relatively unchanged until the early to mid-1990s, when dramatic changes started to occur. The study concluded that a sediment pulse in the early 1990's was the main contributor to rapid sedimentation in the lagoons. Through comparison of historical aerial imagery, it was apparent that the lagoons were filling in, becoming noticeably shallower with sediment deposits forming along the banks and creating multiple sediment islands in Lagoon E (these islands were removed in Phase I).

Sedimentation in Lagoon G (which was not addressed in the original Lagoon Dredging Project) has allowed several new wetland communities and a new creek channel to re-establish. In addition to improving flow capacity and floodplain storage, deepening the lagoons improves habitat for fish, macroinvertebrates, and turtles, and has the potential to improve downstream water quality by acting like a stormwater pond to trap sediment and associated pollutants like phosphorus in the lagoon(s), thus minimizing sediment (and pollutants) passing downstream.

The MPRB owns and manages the lagoons and surrounding park property, which includes traditional and disc golf courses, and numerous trails for hiking, biking, and cross-country skiing. Due to their proximity to the park, the lagoons are considered part of the Minneapolis Grand Rounds System, which the U.S. Department of the Interior has deemed eligible under the Historic Preservation Act for listing on the National Register of Historic Places (once a site is deemed eligible, it is treated as being on the list).

The Minnesota Pollution Control Agency (MPCA) lists Ȟaȟá Wakpádaŋ/Bassett Creek as impaired (on the 303d list) for chloride, fecal coliform bacteria, and fish bioassessments. The United States Environmental Protection Agency (EPA) approved total maximum daily load studies (TMDLs) for chloride (Twin Cities Metro Area Chloride TMDL, 2016) and fecal coliform (Upper Mississippi River Bacteria TMDL Study and Protection Plan, 2014). There is no TMDL completed for the fish bioassessment impairment.

## 2.2 Prior Dredging and Commission Action

In the winter of 2022/2023, the BCWMC dredged Lagoons D, E, and F in Theodore Wirth Regional Park as part of the Main Stem Lagoon Dredging Project (Phase I). The original design for the dredging planned for an excavation depth of 6 feet below the normal water level. The completed project resulted in an average depth of approximately 4 feet below the normal water level, due to complications during construction. The total volume of sediment removed was approximately 25,650 CY, roughly 13,950 CY less than the 39,600 CY called for in the original design. The sequence of dredging operations, unseasonably warm winter weather, spring road restrictions, and struggles with the general contractor led to acceptance and closeout of the project as constructed, even though it was not constructed to specifications.

While Phase I of the project did achieve significant water quality benefits – reducing the total phosphorus load by an estimated 390 pounds per year and the total suspended solids load by an estimated 101,000 pounds per year (approximately $210/lb total phosphorus/year) – additional dredging within these lagoons could provide further benefits. Immediately following closeout of the project, the BCWMC Technical Advisory Committee (TAC) met for a “lessons learned” discussion and was in general agreement that it would be worthwhile to consider returning to Lagoons D, E, and F to perform additional dredging. The TAC also noted that dredging Lagoon G, upstream from the original lagoons, might be more beneficial and cost-effective.

At their February and March 2024 meetings, the TAC discussed potentially adding a Phase II of this project to the next 5-year CIP. MPRB staff proposed that the Commission consider either (a) performing additional dredging in Lagoons D, E, and F, or (b) dredging accumulated sediment in Lagoon G, further upstream in Theodore Wirth Park. The TAC discussed the pros and cons of both options. They noted that it may be difficult for a contractor to remove additional sediment in Lagoons D, E, and F due to now-steeper side slopes. They also discussed the more natural features of Lagoon G, noting that although it was constructed as an open water lagoon in the 1930’s, the stream seems to have reclaimed its channel through the area. The group wondered if the area should be left in its more natural state, closer to conditions before the 1930’s, or if the presumably contaminated sediment should be removed to improve environmental conditions. Because of these complex questions, the TAC recommended that the Commission perform another feasibility study to fully assess the dredging options and their impacts.

At their April 17, 2025 meeting, the Commission approved the TAC’s recommended 5-year (2025 – 2029) CIP, which included the Main Stem Bassett Creek Lagoon Dredging (Phase II), Wirth Park (BC-7) project to dredge lagoons (either Lagoons D, E, and F, or Lagoon G) in Theodore Wirth Park, slated for construction in 2027.

At their August 2025 meeting, the Commission approved moving forward with a feasibility study to evaluate the different alternatives for dredging within the lagoons. As is required for BCWMC CIP Projects, a feasibility study must be completed prior to BCWMC holding a hearing and ordering the project. This feasibility study will estimate the amount of material to be dredged, identify sediment contamination issues, discuss methods for dredging the material from the lagoons and disposing of the

dredged material, review environmental and permitting requirements, and develop concept plans and cost estimates for the project. At their March 2026 meeting, the Commission approved the addition of an alternative to also consider a wetland restoration concept within Lagoon G as part of this study. Results of the feasibility study will be used to inform recommendations for the final project design and to set a maximum levy for project implementation in 2027.

## 2.3 Goals and Objectives

The goals and objectives of this feasibility study are to:

- Review the feasibility of removing accumulated sediment from Lagoons D, E, F, and G, and evaluate the cost-benefits of performing additional dredging within these lagoons (separately, or a combination thereof).
- Review the feasibility and evaluate the cost-benefit of restoring wetland areas within Lagoon G.
- Develop conceptual designs.
- Provide an opinion of cost for design and construction of the alternatives.
- Identify potential project impacts and permitting requirements.

The goals and objectives of the dredging alternatives are to:

- Reduce sediment loading to Ȟaȟá Wakpádaŋ/Bassett Creek and improve downstream water quality by restoring permanent pool storage in the lagoon(s).
- Remove accumulated sediment that is contaminated with PAHs, elevated lead, and petroleum associated with DRO.
- Restore the intended design aesthetics and function of the original 1937 lagoon project.
- Preserve natural beauty along creek and contribute to natural habitat quality and species diversification by improving the vegetated buffer around Lagoon G.
- Restore flood conveyance through Lagoon G.
- Improve fish habitat by deepening the lagoons.

The goals and objectives of the Lagoon G wetland restoration alternative are to:

- Reduce the quantity of invasive vegetation and improve the quality of vegetation in the wetlands associated with Lagoon G through native vegetation improvement (buffering, reseeding, live planting).
- Improve the ecological health of Ȟaȟá Wakpádaŋ/Bassett Creek within this area.
- Reduce sediment loading to the creek, remove at least a portion of the contaminated sediment from the lagoon, and improve downstream water quality.
- Improve fish and wildlife habitat.

## 2.4 Considerations

Key considerations when developing the project alternatives included:

- Maximizing the amount of permanent pool storage and water quality benefit.
- Maintaining or improving the functionality of Lagoons D, E, F, and G, including water quality, flood control, and habitat functions.
- Minimizing wetland impacts.
- Improving wetland function (restoration).
- Minimizing tree loss.

The considerations listed above played a key role in developing final recommendations from this feasibility study and will continue to play a key role through final design.

## 2.5 Relationship to Watershed Management Plan

The BCWMC included the Main Stem Lagoon Dredging Project (Phase II) in its Capital Improvement Program, based on the following "gatekeeper" criteria from the BCWMC Plan. Items in ***bold italics*** represent those that directly apply to the Main Stem Lagoon Dredging Project (Phase II).

Only projects that meet one or more "gatekeeper" criteria will be considered by the BCWMC for inclusion in the CIP:

1. ***Project is part of the BCWMC trunk system (See Appendix A, Figure A-11)***
2. ***Project improves or protects water quality in a priority waterbody***
3. Project addresses an approved Total Maximum Daily Load (TMDL), watershed restoration and protection strategy (WRAPS), or subwatershed analysis (SWA)
4. Project addresses flooding concern, or other high-priority water quantity issue

The BCWMC scores and ranks projects being evaluated for inclusion in the working CIP using a prioritization matrix. The matrix includes criteria in four over-arching categories with specific criteria in each, including, but not limited to (items in ***bold italics*** represent those that directly apply to the Main Stem Lagoon Dredging Project (Phase II)):

"Primary benefits" such as:

- Project addresses a TMDL, WRAPS, or SWA
- Project protects addresses chloride pollution
- Project addresses a pollution "hot spot"
- Project addresses a flooding concern or other high priority water quantity issue

“Jurisdiction” such as:

- ***Project is in an intercommunity subwatershed***
- Project is located in an area of social vulnerability

“Opportunity” such as:

- ***Project partners are identified***
- Coordinated with redevelopment or infrastructure project

“Secondary benefits” such as:

- ***Habitat***
- ***Project increases the quality or quantity of wetlands***
- Educational
- Groundwater improvements

The Main Stem Lagoon Dredging Project (Phase II) meets several gatekeeper criteria and has the potential to advance numerous goals of the BCWMC, including: improving water quality by reducing the amount of sediment and pollutants that would otherwise travel downstream in Bassett Creek and into the Mississippi River, reducing flood risk during smaller and more frequent events, improving wildlife habitat, and improving the overall ecological health of the area through project design.

# 3 Site Conditions

## 3.1 Ȟaȟá Wakpádaŋ/Bassett Creek Watershed

The Main Stem of Ȟaȟá Wakpádaŋ/Bassett Creek watershed area tributary to the lagoons encompasses nearly the entire 40-square-mile watershed, including portions of nine cities. The watershed is nearly fully developed; existing land use includes single-family residential, commercial/industrial, highway, parks and undeveloped land, multi-family residential, and water surface.

## 3.2 Proposed project location characteristics

The lagoons are located in the City of Golden Valley within Theodore Wirth Regional Park within the Ȟaȟá Wakpádaŋ/Bassett Creek (see Figure 1-1).

### 3.2.1 Topographic, Bathymetric, and Utility Surveys

The BCWMC Engineer completed topographic, bathymetric, and utility surveys of Lagoon G in fall 2025 to develop the existing conditions base map and to use in the development and evaluation of the concepts. A Topcon GR5 VRS, base/receiver, and Topcon PS Total Station were used to gather topographic and utility information within the project extents. Topographic information was collected in Hennepin County NAD83 horizontal datum and NAVD88 vertical datum. Topographic survey information was imported into AutoCAD Civil 3D to create an existing conditions base map for this feasibility study.

The existing conditions topographic, bathymetric, and tree survey results can be found in Appendix D.

Post-construction bathymetric surveys of Lagoons D, E, and F were performed in the spring of 2023. Results from those surveys are included in Appendix E.

### 3.2.2 Environmental and Land Use History

Barr performed a review of the MPCA's "What's in my Neighborhood?" (WIMN) database to assess whether historical releases of known environmental contaminants may have impacted soil or sediments that are planned to be excavated as part of this project. Barr identified and reviewed files related to the following two MPCA petroleum leak sites within 500 feet of the project limits:

- **Theodore Wirth Golf Course**
    - **LS0004162:** A fuel oil release from a 1,000-gallon underground storage tank (UST) was reported on June 21, 1991. The UST was located east of the Theodore Wirth golf course clubhouse, west of the current parking lot (approximately 470 feet west of Lagoon E). 180 cubic yards of impacted soil were excavated and thermally treated offsite. Groundwater monitoring from 1991 through 1996 identified petroleum contamination primarily near the former tank basin location, including diesel range organics (DRO) and petroleum-related volatile organic compounds (VOCs). In 1996, groundwater monitoring indicated the contamination was limited to an area immediately around the former tank. Groundwater flow direction was reported to the northeast, toward Lagoon E. MPCA closed the site in 1997, determining residual contamination (if present) is low risk and no further action is required.

Based on the contamination being limited to the area immediately surrounding the former tank, the distance from the former tank to the project, and the closed regulatory status, this release is not expected to impact the project soil or sediments.

- **Courage Kenny Rehab Institute - Golden Valley**

    - **LS0019181:** A fuel oil release identified during UST removal was reported on July 25, 2013. Three USTs were located at the site, which is approximately 350 feet west of Lagoon G. Investigation and excavation activities documented limited petroleum impacts to the soil, with groundwater analytical results below reporting limits. The MPCA closed the release site on August 28, 2013, concluding that remaining contamination, if present, does not pose a threat to human health or the environment under current conditions.

      Based on limited impacts to area soil, no documented impacts to groundwater, the distance from the lagoon dredging project site, and the closed regulatory status, this release is not expected to impact the dredging project soil or sediments.

Barr identified and reviewed the files related to the following MPCA Voluntary Investigation and Cleanup (VIC) non-petroleum release site within ½ mile of the proposed project:

- **Hidden Lakes**

    - **VP8310:** This site was historically used as a healthcare facility from approximately the 1930s through the late 1980s. Following facility closure, the property was redeveloped beginning in the mid-1990s, during which construction and demolition fill was placed onsite, primarily in a former valley area. Documented releases include asbestos-containing materials (ACM) within demolition fill placed largely during the 1970s, petroleum releases associated with former USTs and site operations prior to redevelopment, a localized PCB release from an electrical transformer spill identified during redevelopment activities, and naphthalene-impacted soils associated with buried drums and stormwater pond excavation. These releases primarily affected soil, with limited groundwater impacts identified during later investigations.

      Cleanup and response actions were implemented primarily between 1998 and 2000. These actions included excavation and off-site disposal of petroleum-impacted soils associated with former USTs, removal of PCB-impacted soils following the transformer spill, excavation of debris pits and buried drums, and removal of accessible ACM-containing materials. Remaining demolition fill containing low percentages of non-friable ACM was consolidated, compacted, and covered with clean soil. USTs were removed during redevelopment, and contaminated soils were either removed or managed onsite where approved.

      Residual contamination at the site consists of non-friable ACM remaining within consolidated demolition fill at depth, beneath engineered clean soil cover, as well as petroleum-contaminated soil that was managed onsite. This condition is managed through recorded institutional controls, including a restrictive covenant recorded in 1999, which limits subsurface disturbance without MPCA approval and requires contingency measures if impacted materials are encountered. Based on the completed investigations and response actions, MPCA issued No Association Determinations in April 1999, a No Further Action (NFA) determination in December 2000, and Minnesota Environmental

Response and Liability Act (MERLA) authorization for completed response actions in December 2001. No active remediation or groundwater monitoring is documented as ongoing, provided institutional controls remain in place and site conditions are not disturbed.

Based on the distance from the proposed project, the limited groundwater impacts, and the closed regulatory status, these releases are not expected to impact the soil or sediments within the project limits.

In addition, because the surrounding area has been used as a golf course for several decades, herbicides, pesticides, and Resource Conservation and Recovery Act (RCRA) metals related to historical turf management practices may be present in the proposed project area.

### 3.2.3 Sediment Sampling

The BCWMC Engineer conducted sediment sampling in Lagoon G in November 2025 in accordance with the MPCA's *Managing Stormwater Sediment, Best Management Practice Guidance* (reference (3)), as described in detail in Appendix A. The purpose of sediment sampling and characterization is to evaluate whether the sediment in a pond can potentially be reused, or if other management methods, such as landfill disposal are required. A total of four sediment samples were collected from Lagoon G. Sediment samples were analyzed for baseline parameters (arsenic, copper, and PAHs) listed in the MPCA stormwater sediment guidance. Gasoline range organics (GRO), diesel range organics (DRO), and all 8 RCRA Metals were also tested.

Excavated sediment and soils that do not exhibit field screening impacts and do not exceed MPCA Residential SRVs or applicable Soil Leaching Values (SLVs) may be considered Unregulated Fill that is suitable for off-site reuse according to the MPCA document *Best Management Practices (BMPs) for the Off-Site Reuse of Unregulated Fill* (reference (4)). Sediment or soil excavated from stormwater ponds that does not meet MPCA guidelines for Unregulated Fill are often disposed of at an industrial solid waste landfill. If the soil meets MPCA Industrial SRVs, other options for managing sediments could be considered if suitable locations and uses are available. However, the associated costs are often prohibitive for finding a suitable reuse site for sediment that exceeds one or more Residential SRVs, and landfill disposal may be the most cost-effective option.

Results of sediment testing of Lagoon G are detailed in Appendix A. The sediment sampling results were compared to MPCA's Soil Reference Values and Screening Soil Leaching Values. Based on concentrations of PAHs as BaP equivalents, accumulated sediments in Lagoon G do not meet MPCA guidelines for Unregulated Fill (MPCA, 2012). The BaP equivalents values were above the Residential SRVs for all Lagoon G samples, but below the Industrial SRVs. No other parameters exceeded Residential SRVs. Therefore, the sediment in Lagoon G would be considered "Level 2" material, meaning that it could be reused on properties with an industrial or commercial land use, but cannot be used for residential land use. Based on the sediment sampling results and MPCA guidelines, the dredged material would be best managed by disposing in a landfill. Reuse of the sediment on a property with industrial or commercial land use could be considered, but associated costs to do so may be more expensive than landfill disposal.

Sediment testing for Lagoons D, E, and F was performed during the Phase I feasibility study. The results of that testing showed that the material in all of these lagoons required landfill disposal for similar contaminant levels of BaP equivalents, DRO, and elevated lead levels. Due to the sampling depths and the likely mixing of the material within the lagoons, the remaining sediments are expected to have the

same contaminants as the material already removed in Phase I. Therefore, we do not expect that additional sampling would change the determination that the material from D, E, and F needs to be landfilled.

### 3.2.4 Wetland Delineations

**Table 3-1 Lagoon G Delineated Wetlands**

| Wetland ID | Wetland Sample Point ID | Upland Sample Point ID | HGM Classification | Eggers & Reed Community Type | USFWS Circular 39 Type | USFWS Cowardin Type | Area (acres) |
|---|---|---|---|---|---|---|---|
| Wetland 1 | BC1W, BC3W | BC1U, BC3U | Riverine | Fresh (Wet) Meadow, Shrub Carr | Type 2, Type 6 | PEM1B, PSS1B | 1.06 |
| Wetland 2 | BC9W, BC2W, BC10W, BC8W | BC8U, BC10U | Riverine | Fresh (Wet) Meadow, Shallow Open Water, Shrub Carr, Floodplain Forest | Type 2, Type 5, Type 6, Type 1 | PEM1B, PABGx, PSS1B, PFO1A | 2.30 |
| Wetland 3 | BC4W | BC4U | Riverine | Fresh (Wet) Meadow | Type 2 | PEM1B | 0.11 |
| Wetland 4 | BC5W, BC6W, BC7W | BC5U | Riverine | Shallow Marsh, Shrub Carr, Fresh (Wet) Meadow | Type 3, Type 6, Type 2 | PEM1C, PSS1B, PEM1B | 1.77 |
| Wetland 5 | BC12W | BC13U | Depression | Fresh (Wet) Meadow | Type 2 | PEM1B | 0.05 |
| Wetland 6 | BC13W | BC13U | Riverine | Fresh (Wet) Meadow | Type 2 | PEM1B | 0.06 |
| **Total** | | | | | | | **5.35** |

HGM Hydrogeomorphic Method
USFWS United States Fish and Wildlife Service

Barr conducted a field wetland delineation within and adjacent to the Lagoon G project area on September 15, 2025. Six wetlands (with a total area of approximately 5.35 acres) were delineated along or near the Ȟaȟá Wakpádaŋ/Bassett Creek within the project area. Wetland community types within and adjacent to Lagoon G include fresh (wet) meadow, shallow marsh, floodplain forest, shrub-carr, and shallow, open water (Table 3-1) (Figure 3-1). Some of the wetlands are complexes that contain two or more different community types. Wetlands in Lagoon G were classified using the U.S. Fish and Wildlife Service (USFWS) Cowardin System (reference (5)), the USFWS Circular 39 system (reference (6)), the Eggers and Reed Wetland Classification System (reference (7)), and the Hydrogeomorphic (HGM) classification system (reference (8)).

The City of Golden Valley, acting as the local government unit (LGU) for the Wetland Conservation Act, and the technical evaluation panel (TEP) approved the Lagoon G wetland delineation report for wetland type confirmation and delineation concurrence on December 15, 2025; the approved Notice of Decision from the TEP is valid for five years. The complete Lagoon G wetland delineation report and figures are included in Appendix B.

As part of the delineation, Barr also completed a MnRAM assessment of the existing wetlands. Results are shown in Table 3-2. Barr also completed a WI-MN RAM functional assessment of wetland quality and floristic quality assessment for Lagoon G based on observations during both the September 15, 2025, field visit and a follow-up field visit on May 19, 2026, for the purposes of comparing existing conditions to restoration potential. Results of these analyses are summarized for both existing and the Alternative 3 proposed conditions in Section 6.3.

**Table 3-2 MnRAM Wetland Management Classifications - Lagoon G**

| Wetland ID | Management Classification |
|---|---|
| Wetland 1 | Manage 1 |
| Wetland 2 | Manage 1 |
| Wetland 3 | Manage 1 |
| Wetland 4 | Preserve |
| Wetland 5 | Manage 2 |
| Wetland 6 | Manage 1 |

Barr conducted a Level I Desktop Wetland Determination for Lagoons D, E, and F on December 9, 2019. One 9.9-acre wetland complex was delineated within Lagoons D, E, and F along Bassett Creek. This wetland complex includes floodplain forest, riverine, shallow marsh, shrub-carr, and wet meadow communities. Wetlands in Lagoons D, E, and F were classified using the USFWS Cowardin System (reference (5)), the USFWS Circular 39 system (reference (6)), and the Eggers and Reed Wetland Classification System (reference (7)).

The City of Golden Valley, acting as the LGU for WCA, and the TEP, approved the desktop wetland determination and wetland boundary determination on January 29, 2020. The complete Lagoon D, E, and F desktop wetland delineation memo and figures are included in (reference (5)).


Project Area

Bassett Creek Watercourse (Field Delineated OHWM)

Delineated Wetlands

- Floodplain forest
- Fresh wet meadow
- Shallow marsh
- Shallow, open water
- Shrub carr

Imagery: NearMap 04/05/2025

N

0 200 400

Feet

**Lagoon G Delineated Wetlands**
Main Stem Lagoon Dredging
Phase II Feasibility Study
Golden Valley, MN

FIGURE 3-1

BARR

### 3.2.5 Threatened and Endangered Species

Barr submitted a request for an endangered, threatened, and special concern (ETSC) species review to the MDNR in December, 2025 to determine if any rare species would potentially be affected by the proposed project. A query of the Natural Heritage Information System (NHIS) database through Minnesota Conservation Explorer was conducted to identify records related to the project area in December 2025. The NHIS database identifies previously surveyed populations of state and federally listed threatened, endangered, and special concern species. The NHIS database identified four sensitive species within one mile of the project area (Table 3-3). On February 12, 2026, the MDNR responded to the ETSC species review and indicated the following ((10)): NHIS reviews are valid for one year and would need to be resubmitted if project activities have not been initiated within one year.

- An avoidance plan for Blandings turtles is required as part of the proposed project.
- Avoidance measures or a permit to take may be needed for rusty patched bumble bees if the project impacts more than 2 acres of suitable rusty patched bumble bee habitat.
- Tree removal should be avoided from June 1 through August 15.

**Table 3-3 Rare Species Documented within One Mile of Proposed Project Area According to MDNR NHIS**

| Common Name | Scientific Name | Federal Status | State Status |
|---|---|---|---|
| Blanding's turtle | *Emydoidea blandingii* | None | Threatened |
| Dwarf trout lily | *Erythronium propullans* | Endangered | Endangered |
| Twinleaf | *Jeffersonia diphylla* | None | Special concern |
| Rusty patched bumble bee | *Bombus affinis* | Endangered | None |

According to GIS data obtained from the MDNR, there is one Minnesota Biological Survey (MBS) site located approximately 0.74 miles south of the proposed project area. This MBS site is located southwest of the creek within Theodore Wirth Park (South Wirth) and has moderate biodiversity significance.

The U.S. Fish and Wildlife Service (USFWS) Information, Planning, and Conservation System (IPaC) database identifies potential suitable habitat for federally listed species. A query of the IPaC identified multiple federally listed, proposed, and protected species to be potentially occurring in the project area; results are noted below in Table 3-4. Additionally, it was noted that there is USFWS-proposed critical habitat for the rusty patched bumble within the project area (reference (11)). IPaC reviews are valid for three months.

**Table 3-4 IPaC Species List**

| Common Name | Scientific Name | Federal Status | State Status |
|---|---|---|---|
| Tricolored bat | *Perimyotis subflavus* | Proposed endangered | Special concern |
| Salamander mussel | *Simpsonaias ambigua* | Proposed endangered | Endangered |
| Monarch butterfly | *Danaus plexippus* | Proposed threatened | None |
| Rusty patched bumble bee | *Bombus affinis* | Endangered | None |
| Whooping crane | *Grus americana* | Experimental population, non-essential | None |
| Bald eagle | *Haliaeetus leucophalus* | Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act | Delisted |
| Golden eagle | *Aquila chrysaetos* | Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act | None |
| Migratory birds | N/A | Migratory Bird Treaty Act | N/A |

#### 3.2.5.1 Dwarf Trout Lily

Dwarf trout lilies occur in wooded floodplains or river terraces, typically on north-facing slopes above or near a stream, preferring densely shaded habitat during the summer. The dwarf trout lily species is federally and state-listed as endangered. Dwarf trout lily habitat is present within the project area. One community of the dwarf trout lily was identified within one mile of the project area through review in Minnesota Conservation Explorer, though there are no known surveys for dwarf trout lily to confirm if it is present. Based on the ETSC species MDNR response letter, the MDNR did not identify any concerns with the dwarf trout lily as related to this proposed project (reference (11)).

#### 3.2.5.2 Twinleaf

Twinleaf occurs in mesic hardwood forests characterized by a dense canopy of deciduous trees typically dominated by maple, basswood, and oaks. Twinleaf habitat is present in the surrounding hardwood forests outside of the project area. There are no known surveys for twinleaf that have occurred in the project area. One area where twinleaf occurs was identified within one mile of the project area through review in Minnesota Conservation Explorer. Twinleaf is a state-listed special concern species. The scope of work for the proposed project would be limited to the stream channel, the lagoons, wetlands surrounding Lagoon G, and adjacent upland areas for access and/or restoration activities. The proposed project is not anticipated to impact twinleaf.

#### 3.2.5.3 Blandings Turtle

The Blanding's turtle is a state-listed threatened species that uses a variety of aquatic habitats, including marshes, bays of lakes, slow-moving waters with areas of submergent and emergent vegetation, and wet meadows near these habitats. There is a suitable Blanding's turtle habitat in the immediate vicinity of the proposed project, and Blanding's turtles have been recorded within one mile of the project area through review in Minnesota Conservation Explorer. During the active season (considered March–November), this species spends the majority of its time on land. Nesting typically occurs May–June, and their nesting sites are in sandy soil within 300 meters (984 feet) of a wetland. The primary measure to avoid direct impacts to the Blanding's Turtle is to install exclusion fencing around the entire work area during the turtle's non-

nesting period (November–March). Fencing should be installed during the non-nesting period because Blanding's turtles have not yet traveled to and settled in their nesting locations.

As part of this project, contractors will be required to review the Blanding's turtle informational flyer (Appendix F). Blanding's turtles should be excluded from the project area prior to carrying out construction. Work can then be conducted any time of year as long as fencing is maintained. If a Blanding's turtle is observed in the work area, work should cease, and the MDNR should be notified. It is expected that work could resume once the turtle is removed from the construction area. The MDNR response from February 12, 2026, indicates that an avoidance plan for Blanding's turtles is required to demonstrate avoidance during project activities (Appendix F).

#### 3.2.5.4 Rusty Patched Bumble Bee

Rusty patched bumble bees are typically found in grasslands with flowering plants from April through October. They typically nest in underground and abandoned rodent cavities or clumps of grasses above ground in uplands. During the winter months, queens typically overwinter in underground cavities in upland forests dominated by maple-basswood or oak-hickory trees. According to the NHIS, rusty patched bumble bees have been recorded within one mile of the proposed project area.

The rusty patched bumble bee is federally endangered, and the project area is located within a USFWS-designated High Potential Zone for the rusty patched bumble bee. The proposed project is located within the stream channel, the lagoons, wetlands, and adjacent upland areas. Upland areas within the project area consist of mowed lawns and patches of upland forest.

While the proposed project area is within the rusty patched bumble bee High Potential Zone, it is anticipated that project impacts will be minimal. Upland areas within the proposed project area will be utilized for site access for heavy equipment. Access to the proposed project area will occur during the winter for dredging. Low-impact seeding may occur in spring and early summer when vegetation is not mature, though these areas would likely not be suitable habitat for the rusty patched bumble bee. There is suitable overwintering habitat in the adjacent upland forests; construction activities would avoid these areas where practical. The majority of the upland areas within the project area that are not manicured lawn are dominated by thickets of invasive species such as common buckthorn (*Rhamnus cathartica*) and tatarian honeysuckle (*Lonicera tatarica*). To minimize disturbances to overwintering habitat, tree removal would be limited to an as-needed basis. Other surface disturbances would be limited to the creek and the associated lagoons.

As part of the alternative to consider wetland restoration at Lagoon G, vegetation management, including herbicide treatment, scraping, disking, and burning within approximately 3 acres of wetlands, would potentially occur. The wetlands are not likely suitable habitat for rusty patched bumble bees, as the observed vegetation within these wetlands is primarily composed of and dominated by monotypic mats of invasive species. Vegetation management practices would target non-native invasive species such as reed canary grass and narrow-leaf cattail, and would not target native rusty patched bumble bee foraging species (reference (12)). Additional surface disturbance in the form of grading would occur to restore/improve the hydrologic connection from the creek to Wetlands 1, 2, 5, and 6 under the Lagoon G wetland restoration alternative. Surface disturbance under this alternative would primarily be limited to mowed upland areas and wetlands that are dominated by invasive species that are not suitable for rusty patched bumble bee habitat (reference (13)). It is anticipated that the proposed project is not likely to adversely affect the rusty patched bumble bee. The MDNR response on February 12, 2026, indicates that if the project will impact more than 2 acres of suitable habitat for rusty patched bumble bees within the

high potential zone, avoidance measures or a permit to take may be needed (reference (10). At this time, it is not expected that the proposed project would impact more than 2 acres of suitable habitat.

#### 3.2.5.5 Tricolored Bat

Tricolored bats hibernate in caves during the winter and utilize forested areas for roosting and foraging during their active season of April through October. Suitable roost trees for this species have trunks greater than three inches in diameter at breast height (DBH) with loose, peeling bark or crevices. Numerous trees exceeding three inches DBH exist in the project area. Removal of undesirable trees surrounding the lagoons and project area is expected to occur as part of the proposed project. Any tree removal completed as part of this project would occur during the tricolored bat inactive season (November 1 – April 15). The dredging project work will occur within the stream channel and the lagoons. According to the MDNR, the nearest hibernacula is approximately 3.14 miles southeast of the proposed project area, and no maternity roost trees have been identified within one mile of the proposed project area. It is anticipated that the proposed project is not likely to adversely affect the proposed federally endangered, state-listed special concern tricolored bat and is not expected to cause a prohibited take of this species. The MDNR response on February 12, 2026, indicates that in order to minimize impacts to the tricolored bat, tree removal must be avoided from June 1 through August 15 (reference (10)).

#### 3.2.5.6 Salamander Mussel

Salamander mussels are a habitat specific, sedentary species that are found under flat rocks or under ledges of rock walls buried in the sediment within permanent waterbodies. During the field wetland delineation for Lagoon G that was completed for this project, there were no ledges of rock walls observed. The salamander mussel is state listed as endangered and federally proposed as endangered. This mussel is currently restricted to the lower St. Croix River, where it is rare (reference (14)). Given that the salamander mussel is restricted to the lower St. Croix River, the proposed project is not anticipated to impact this species. According to IPaC, the proposed project area is within the range of federally listed freshwater mussels and the project may affect the salamander mussel. The MDNR response on February 12, 2026 did not indicate that an official mussel survey is required (reference (10)). A response from the USACE in June of 2026 indicated that no impacts to the salamander mussel nor its proposed critical habitat are anticipated.

#### 3.2.5.7 Monarch Butterfly

Monarch butterflies are typically found in areas with a high number of flowering plants, which provide sources of nectar. The monarch butterfly is federally proposed as threatened. Monarchs rely exclusively on the presence of milkweed (*Asclepias* spp.) to complete the caterpillar life stage. Proposed dredging of the lagoons would occur during the winter months when milkweed is not present. Low impact seeding may occur in spring and early summer when project area vegetation is not mature.

Under the concept for wetland restoration at Lagoon G, vegetation management including herbicide treatment, scraping, disking, and burning within approximately 3 acres of wetlands could potentially occur. Based on field investigations, the wetlands are not likely suitable habitat for monarch butterflies as the wetlands are dominated by invasive species. Vegetation management practices would target non-native invasive species such as reed canary grass and narrow-leaf cattail and would not target native flowering plants. Additional surface disturbance in the form of grading would occur to restore/improve hydrologic connection from the creek to Wetlands 1, 2, 5, and 6 under the Lagoon G wetland restoration alternative. Surface disturbance under this alternative would primarily be limited to mowed upland areas and

wetlands that are dominated by invasive species that are not suitable monarch butterfly habitat. Based on the scope of work, it is anticipated that the project will have no effect on monarch butterflies.

#### 3.2.5.8 Whooping Crane

Whooping cranes inhabit wetlands and other bodies of water; the population within their eastern migratory area is federally designated as an experimental population, non-essential. Although the Eastern Migratory Population of Whooping Cranes is designated as a nonessential experimental population under the Endangered Species Act Section 10(j), it is not expected to occur regularly in Hennepin County, Minnesota. The USFWS, via the Minnesota–Wisconsin Determination Key, has previously determined that routine projects in Golden Valley are not likely to affect this experimental population. However, if an individual whooping crane ventures into Hennepin County, Minnesota, it regains full endangered status. If this were to occur, formal consultation with USFWS would be required.

#### 3.2.5.9 Bald Eagle

Bald eagles are widespread throughout Minnesota, residing in a variety of different habitats. This species is protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Act. Bald eagles nest in mature trees near bodies of water. According to IPaC, bald eagles may be within the project area. The project area is located within a suitable bald eagle nesting habitat. If work occurs between January 15th and July 31st, an eagle nest survey is recommended not more than two weeks prior to the start of work for a 660-foot buffer around the project area. There are no known bald eagle nests within the project area; the closest identified bald eagle nest is approximately 2.9 miles southeast of the project area (reference (15)). If an active nest is observed and project work needs to take place during the time the nest remains active, consultation with the MDNR and USFWS would be required to determine next steps. Due to the scope of work, it is anticipated that the project may affect, but is not likely to adversely affect, bald eagles.

#### 3.2.5.10 Golden Eagle

Golden eagles winter in Minnesota and are primarily found in southeastern Minnesota along the Mississippi River valley, with birds also wintering in the northern portion of the state. This species is protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Act. According to IPaC, golden eagles may be within the project area; there is a small chance of golden eagle occurrence in the month of November. Golden eagles are not known to breed in Minnesota. Due to the wintering ranges being primarily found in southeastern and northern Minnesota, it is unlikely that golden eagles would be present in the project area. Due to the scope of work, it is anticipated that the project will have no effect on golden eagles.

#### 3.2.5.11 Migratory Birds

Several migratory birds were identified by IPaC to potentially occur within the project area. Migratory birds nest in a variety of habitats, including woody vegetation, on the ground, and on manmade structures. Suitable habitat for migratory birds is present within the project area. Migratory birds are protected under the Migratory Bird Treaty Act. Ground disturbance for Alternatives 1 and 2, which would involve dredging the lagoons to various depths, would occur outside of the migratory bird nesting season (April 15 – August 31) in Minnesota. Low-impact seeding may occur in spring and early summer, where vegetation is not mature; these areas would likely not be suitable for ground-nesting birds.

If chosen as the selected alternative, ground disturbance for the Lagoon G wetland restoration would likely occur during migratory bird nesting season and would involve invasive vegetation management (disking, mowing, scraping, burning) as well as restoring hydrologic connection (grading). The ground disturbances would occur in mowed uplands and wetlands that are dominated by invasive species.

If the wetland restoration option were selected, and ground disturbance were to occur during the nesting season, a visual inspection is recommended for the presence of active migratory bird nests within the project area prior to the start of work. With this recommendation, it is anticipated that the project would have no effect on nesting migratory birds. If active nests will be directly impacted by project work, USFWS consultation may be required. Activity-specific guidance may also be implemented to avoid the take of migratory birds.

#### 3.2.5.12 MBS Site within Theodore Wirth Park

One Minnesota Biological Survey (MBS) site is located approximately 0.74 miles south of the project area within Theodore Wirth Park. MBS sites are areas that have been identified to potentially have high-quality native plant communities, rare plants, animal aggregations, and/or rare animals. MBS sites are assessed based on the ecological characteristics of the site and the presence of rare species. A biodiversity significance rank is assigned to each MBS site based on the number of rare species, the quality of the native plant communities, the size of the site, and context within the landscape (references (16), (17)). The MBS site located near the proposed project area has moderate biodiversity significance. Due to the far proximity of this site in relation to the project area, no impacts to this MBS site are anticipated.

### 3.2.6 Cultural Resources

On December 1, 2025, Barr completed a review of the Minnesota Office of the State Archaeologist (OSA) online portal for archaeological site information for the proposed project area. Barr also reviewed the Minnesota Statewide Historic Inventory Portal (MnSHIP) for information pertaining to historic architectural resources. Barr focused on previously recorded cultural resources in or adjacent to the project area but also examined a 1-mile radius around the project to gain an understanding of the types of documented resources in the project vicinity (see Figure 3-2).

The records review determined that the project area is located within the Resource XX-PAK-00003, which consists of the Minneapolis Grand Rounds (Figure 3-2). The Grand Rounds is a 50-mile system of interconnected parkways and trails that encircle much of Minneapolis, making it one of the nation's longest continuous urban parkway networks (references (18), (19)). Conceived in the 1880s by landscape architect Horace William Shaler Cleveland and championed by early park leaders like Charles Loring, the Grand Rounds reflects the City Beautiful movement and its ideals of integrating natural landscapes into urban design (reference (18)). Its development in the early twentieth century was shaped by park board superintendent Theodore Wirth, who expanded the system, and for whom the park where the project is located is named (references (19), (18)). By 1943, the Grand Rounds encompassed over 5,659 acres of parkland and nearly 50 miles of parkways, forming a nearly continuous loop around the city (reference (20)). Recognized as a National Scenic Byway and considered eligible for the National Register of Historic Places (NRHP), the Grand Rounds is a significant example of visionary urban planning that preserved green space while fostering recreation and civic pride in Minneapolis for over a century (reference (21)).

Theodore Wirth Park, originally Glenwood Park, exemplifies the "large-land" landscape type within the Grand Rounds. Renamed in Wirth's honor in 1938, the park reflects his vision for expansive recreational spaces integrated with naturalistic design (reference (18)). During the Great Depression, federal relief

programs such as the Civilian Conservation Corps transformed wetlands in Wirth Park into a series of lagoons, creating scenic water features that remain defining elements of the park's character (reference (19)). These improvements enhanced recreational value, offering boating, fishing, and picturesque vistas. Wirth Park also houses the Eloise Butler Wildflower Garden, established in 1911, which underscores the park's role in promoting native landscapes and environmental education (reference (18)).

Five additional historic architectural resources are adjacent to the project area (Table 3-5). These include bridges, a railroad, and a transmission line, some of which are also eligible for the NRHP. Within 1-mile of the project area, 1,390 additional historic architectural resources have been documented, along with eight archaeological sites (Figure 3-2). Recorded historic architectural resources in the project vicinity largely consist of residences located in the neighborhoods east of the project. Recorded archaeological sites consist primarily of precontact lithics and a historic farmstead.

**Table 3-5 Documented Historic Architectural Resources Adjacent to the Project Area**

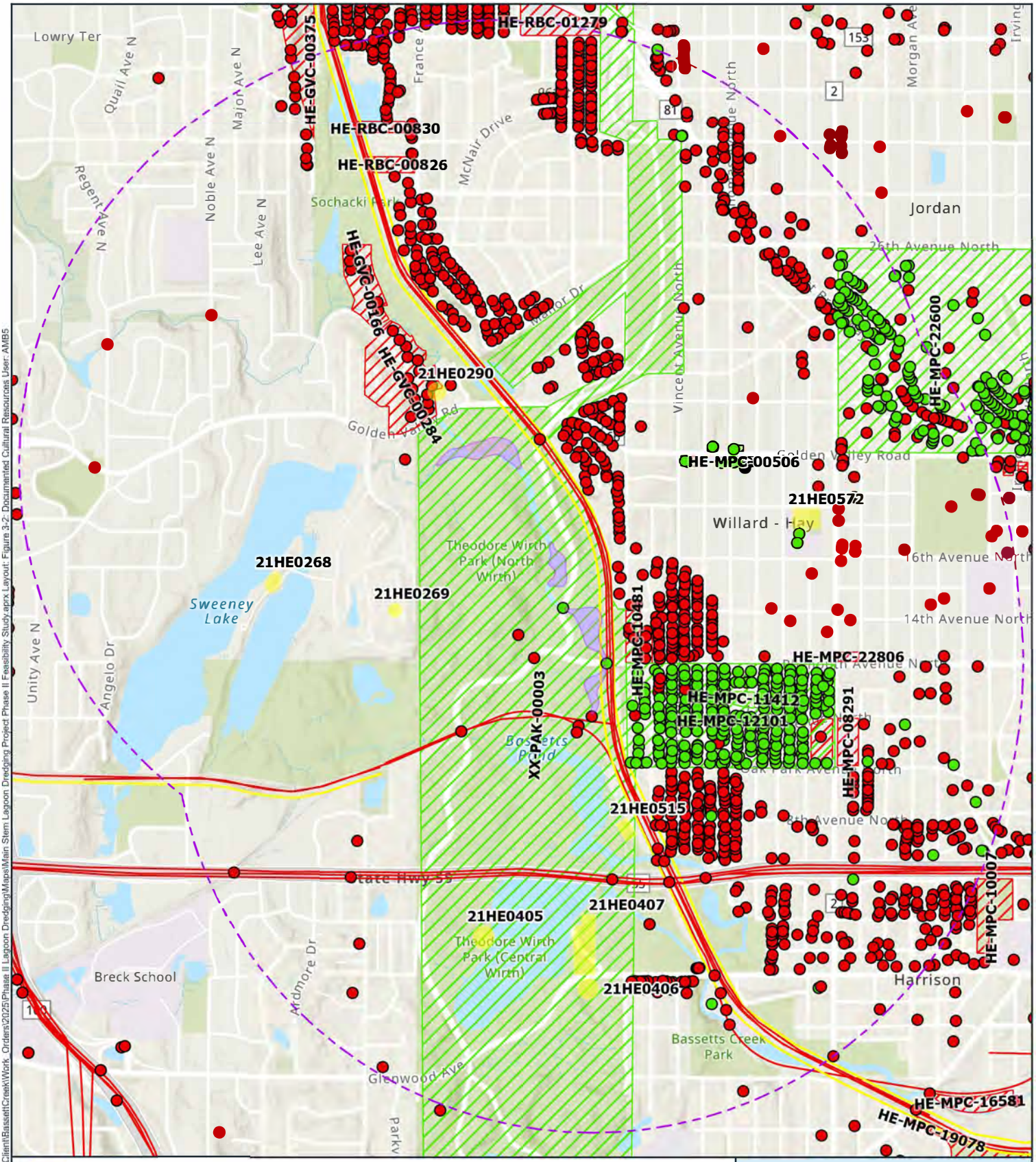
| Inventory Number | Inventory Name | Historic Function | NRHP Eligibility | Location |
|---|---|---|---|---|
| HE-GVC-00049 | Bridge No. 6247 | Transportation, Road-Related (Vehicular) | Eligible | Approx. 15 feet north of Lagoon D; Approx. 5 feet south of Lagoon E |
| HE-GVC-00050 | Bridge No. L9327 | Transportation, Road-Related (Vehicular) | Eligible | Approx. 20 feet west of Lagoon E |
| HE-GVC-00439 | Bridge No. 94168 | Transportation, Pedestrian-Related | Not Eligible | Approx. 10 feet south of Lagoon D |
| HE-RRD-00002 | Superseded by XX-RRD-GNR014 | n/a | n/a | n/a |
| HE-TRL-00001 | NSP Transmission Line | Energy Transmission | Not Eligible | Approx. 100 feet south of Lagoon D |
| XX-RRD-00010 | Superseded by XX-RRD-GNR014 | n/a | n/a | n/a |
| XX-RRD-GNR014 | Osseo Branch Line/ Minneapolis and Northwestern Railroad Company/ St. Paul Minneapolis and Manitoba Railway Company/ Great Northern Railway Company | Transportation, Rail-Related | Eligible | Approx. 30 feet east of Lagoon D; Approx. 60 feet east of Lagoon E |

None of the documented cultural resources in or near the project area will be adversely affected by the proposed project. The proposed project is not anticipated to adversely affect the Grand Rounds, as the planned dredging would restore lagoon depths to their original design, improve water quality, and enhance floodplain storage. Proposed wetland restoration activities would also be confined to the previously dredged and highly disturbed lagoon basin and would involve hydrologic and vegetative enhancements rather than new ground disturbance in undisturbed soils. These outcomes would maintain the project setting while improving the park's ecology, leading to overall positive effects for this portion of

the Grand Rounds. The project, therefore, is not anticipated to result in impacts to archaeological or other cultural resources.

Although no previously recorded archaeological sites associated with Native American or precontact occupation have been documented within the project area, review of OSA records identified several precontact archaeological sites within approximately one mile of the project area, including isolated lithic finds indicative of Indigenous presence and use of the broader landscape. These records, together with regional context information, indicate that the project area lies within a landscape that was historically utilized by Native American communities for habitation, travel, resource gathering, and ceremonial activities over thousands of years (reference (22)). At the same time, the project area itself has experienced extensive ground disturbance associated with historical lagoon construction, dredging, park development, utility installation, and ongoing maintenance activities, which substantially reduces the likelihood that intact archaeological deposits remain within the project footprint. Nevertheless, the presence of nearby precontact sites and the broader Indigenous cultural landscape are acknowledged, and Native American tribes with cultural affiliation to the area will be contacted as part of future project coordination (during design) to request any additional information and seek their input regarding the undertaking, including traditional knowledge or cultural considerations relevant to project implementation.

This review only reflects currently known cultural resources; it is possible that unidentified cultural resources may be present within the project area. Further cultural resources evaluation may be required as part of future design and permitting efforts.




Archaeological Site
Project Area
One Mile Buffer

NRHP Eligible Historic Architecture, Point
- No
- Yes

NRHP Eligible Historic Architecture, Linear
- No
- Yes

NRHP Eligible Historic Architecture, Poly
- No
- Yes

Basemap: ESRI Topographic

0 1,000 2,000
Feet

**Documented Cultural Resources**
Main Stem Lagoon Dredging
Phase II Feasibility Study
Hennepin County, Minnesota

FIGURE 3-2

BARR

# 4 Stakeholder Input

## 4.1 Project Kick-off and Technical Stakeholder Meeting

The BCWMC held a virtual project kickoff and technical stakeholder meeting on December 8, 2025. Attendees included the BCWMC administrator, commissioners, and engineers, and representatives from the City of Minneapolis, MPRB, City of Golden Valley, MDNR, MPCA, and USACE. Information regarding the existing conditions, general goals, and design concepts for the project were presented, which was followed by discussion related to technical feedback and permitting input. The items discussed included:

- Review of project background and history, including prior dredging project
- Review of desktop site information compiled to-date and completed site investigation work
- Review of potential design concepts
- Discussion of regulatory issues, potential permit requirements, and other considerations
- Discussion of next steps

Section 6.5 of this feasibility study summarizes the anticipated permitting requirements, based on the discussion at the agency meeting and follow-up correspondence.

## 4.2 Public Open House Meeting

The BCWMC held a public stakeholder open house meeting on February 19, 2026, at The Trailhead in Theodore Wirth Regional Park. The BCWMC administrator and BCWMC engineers attended the meeting, along with MPRB staff, an MPRB Commissioner, City of Golden Valley staff, and BCWMC Commissioner Polzin. The BCWMC display included a watershed map, a brief project description, possible design concepts, project history, and information about the BCWMC. Visitors to the Trailhead, including many skiers, had to pass by the boards, and several of them decided to stop and engage in the public meeting. Also, a group of students attending a civic engagement class also being hosted at the facility, showed interest in the project and provided feedback. Additionally, there were a few members of the public who came specifically for the meeting. Some of the notable comments / themes were:

- Don’t miss an opportunity to remove contaminated sediments
- Check with tribes to understand location of sacred sites
- There are interesting tradeoffs to consider between improved water quality and ecological restoration
- Consider Conservation Partners Legacy grant and Lessard Sams funding
- Several folks expressed interest or support for the wetland restoration concept

## 4.3 Review by BCWMC and Project Partners

A draft version of the feasibility report was provided to the BCWMC administrator, City of Golden Valley, City of Minneapolis, and MPRB staff for review and comment. The draft feasibility study was revised in response to the comments received. The revised draft of the study was presented to the Commission for review at their May 2026 meeting, and a final version was presented for approval at their June 2026 meeting.

# 5 Project Concepts

This section provides a summary of the three different project alternatives the BCWMC Engineer developed and evaluated as options for the Main Stem Lagoon Dredging project (Phase II) feasibility study.

## 5.1 Alternative 1 – Additional Dredging of Lagoons D, E, and F

Alternative 1 would deepen Lagoons D, E, and F to a depth of 6 feet below the estimated normal water level (Figure 5-1, Figure 5-2, and Figure 5-3, respectively). Deepening the lagoons to 6 feet would provide additional permanent pool volume, associated water quality improvement through additional sedimentation, and removal of contaminated sediments. This alternative (and Alternative 2) would involve multiple permitting considerations because it includes excavation within Ȟaȟá Wakpádaŋ/Bassett Creek, which is a MDNR public watercourse (Lagoon E is also a public water basin), and under USACE jurisdiction. Dredging additional sediment from Lagoons D, E, and F will increase the longevity of the dredging already completed in Phase I by adding additional storage volume.

In Phase I, dredging of D, E, and F was completed via mechanical dredging methods. Mechanical dredging, which is the standard in the industry, involves removing the accumulated sediment with an excavator or similar equipment by scooping and loading the material into trucks. Mechanical dredging is often performed in the winter so that the removed material can be allowed to freeze, which makes handling and acceptance at the dump site easier. Due to the increased water depth that now exists in these lagoons, it is possible that the dredging to be performed in Phase II could be completed via hydraulic dredging methods. Hydraulic dredging uses pumps and hoses, often with a mechanical agitator to mix the sediment and water into a slurry that is pumped out of the pond. Once pumped, the slurry passes through a filter (often a large permeable bag made of fabric) to separate the sediment from the water. Once the water has been removed, the resulting material is loaded into trucks for disposal. Should this alternative be chosen, either dredging method (mechanical or hydraulic) would be acceptable and future design documents could allow flexibility for a contractor to choose the most economical method. However, hydraulic dredging needs to be performed during non-frozen conditions for the filtration to work. Phase I relied on frozen conditions to protect Theodore Wirth Parkway, which is not designed for heavy truck traffic. Therefore hydraulic dredging could be seen as less favorable due to risk of damage to the roadway and increased costs to the project for repairs.

## 5.2 Alternative 2 - Dredge Lagoon G

Alternative 2 would remove accumulated sediment from Lagoon G to a depth of 6 feet below the estimated normal water level (Figure 5-4). Deepening Lagoon G to 6 feet would provide additional permanent pool volume, associated water quality improvement through additional sedimentation, and removal of contaminated sediments. This alternative would involve similar permitting considerations to Alternative 1 (Lagoon G is also a public water basin). This alternative would create approximately 3.3 acres of open water, remove approximately 2.0 acres of invasive vegetation, and remove and dispose of approximately 33,700 CY of contaminated sediment.

Similar to Phase I dredging of Lagoons D, E, and F, it is anticipated that mechanical dredging methods would be preferred for Lagoon G dredging. Work could presumably happen during either the winter or summer months, as access to Theodore Wirth Parkway is not required.

## 5.3 Alternative 3 – Wetland Restoration and Dredging of Lagoon G

Alternative 3 would involve restoring wetlands within Lagoon G by managing/removing invasive vegetation, improving native vegetation, adding/improving hydrologic connections, and increasing and establishing buffers around the existing wetlands to improve water quality and wildlife habitat within the project area. Under this alternative, sediment would be removed from Wetland 4 because this wetland has the highest concentration of contaminants. The sediment removal would also provide water quality benefits associated with recreating a permanent pool for sedimentation. Sediment would also be removed from the shallow, open water community of Wetland 2. Sediment removal could also improve fish habitat with more available pool volume in the dredged areas (Figure 5-5). This alternative would create approximately 2.3 acres of open water, remove approximately 1.7 acres of invasive vegetation and replace them with native vegetation, remove and dispose of approximately 23,000 CY of contaminated sediment, and create approximately 0.8 acres of improved wetland.

### 5.3.1 Restoring Hydrology

Based on a review of available historical desktop data prior to the lagoon dredging activity in the 1930s, wet meadow and marsh wetlands were naturally present surrounding the creek within the Lagoon G area. The soil survey within Lagoon G and the surrounding area includes disturbed urban land and wet substratum soil map units along the fringe of the creek and lagoon. An area southwest of Lagoon G, including a portion of Wetland 2, is mapped as 100% hydric Muskego and Houghton muck soil. However, based on site documentation during the wetland delineation, the muck hydric soil is buried below at least 20 inches of fill material. In addition, the majority of the mapped hydric soil includes an active portion of the golf course. Wetland restoration in this area of mapped hydric soil would require significant excavation of fill and likely a re-design of the golf course and is therefore not practical (Figure 5-6).

Wetland restoration within the Udorthents, wet substratum mapped soil unit may be a more practical option. Removal of approximately 12” to 18” depth of accumulated silt and sediment along the northern portion of Lagoon G to expand the wetland boundary to the elevation 824’ contour extent (from Lidar) would re-establish a hydrologic connection between Wetlands 1, 5, and 6 and restore the northern portion of Lagoon G to the original wet meadow and shallow marsh habitat prior to dredging activity. Removing approximately 12” to 18” depth of accumulated silt and sediment north of Wetland 2 up to approximately the elevation 823’ contour extent would re-establish an additional area for hydrologic connection to Ȟaȟá Wakpádaŋ/Bassett Creek in Wetland 2. This would increase the size of Wetlands 2, 6, 5, and 1, resulting in a total of approximately 0.8 acres of additional wetland area.

In addition, strategic dredging within the shallow open water portions of Wetland 2 and Wetland 4 would provide backwater fish spawning habitat, and would remove contaminants, invasive plant species, and phosphorus in accumulated sediment.

### 5.3.2 Vegetation Establishment and Management Plan

#### 5.3.2.1 Existing Conditions

As characterized in the wetland delineation report completed by Barr in October 2025 (Appendix B), the existing wetlands within the project area are comprised of fresh wet meadow, shrub-carr, floodplain forest, shallow marsh, and shallow, open water communities. Across the majority of wetland types, invasive species dominance is the primary factor affecting ecological function. These wetlands and the surrounding upland and turf golf course areas provide a potential opportunity to integrate environmental soil management with ecological enhancement and habitat creation.

Invasive reed canary grass (*Phalaris arundinacea*) is the primary species covering a large portion of the project site in the fresh wet meadow, shrub-carr, and floodplain forest communities. Invasive narrow-leaf cattail (*Typha angustifolia*) is dominant in portions of the shallow marsh community. Existing native species in the wetland include river bulrush (*Bolboschoenus fluviatilis*), soft-stem bulrush (*Schoenoplectustabernaemontani*), water star-grass (*Heteranthera dubia*), giant goldenrod (*Solidago gigantea*), dwarf clearweed (*Pilea pumila*), orange jewelweed (*Impatiens capensis*), water plantain (*Alisma triviale*), broad-leaf arrowhead (*Sagittaria latifolia*), common duckweed (*Lemna minor*), nodding beggartick (*Bidens cernua*), sweet flag (*Acorus americanus*), sandbar willow (*Salix interior*), American black currant (*Ribes americanum*), boxelder (*Acer negundo*), and black willow (*Salix nigra*).

Vegetation management would occur in all existing and proposed wetland communities except for the shallow, open water portions of Wetland 2 and all of Wetland 4. In order to remove contaminants and improve fish spawning habitat, these portions of Wetland 2 and 4 would be dredged to a depth of 6'. The objective for restoring a diverse mix of native vegetation within wetlands 1, 2, 3, 5, and 6 is to meet the commission's goals of enhancing ecological function and wildlife habitat while improving the site's aesthetics. Accomplishing this will require removing invasive species, reintroducing native species, and a robust plan for managing invasive species pressure during the establishment periods. Due to the prolific spreading ability of both reed canary grass and narrow-leaf cattail located on the site, intentional, strategic efforts will be required to maintain a diverse, native wetland community. To promote native plant success, initial site preparations would include activities such as soil scraping, soil preparation, seeding, and live planting. This would be followed by an initial vegetation establishment period that would typically include restoration activities such as herbicide treatment, mowing, and burning, followed by the implementation of a long-term adaptive management plan.

#### 5.3.2.2 Removals

Invasive species management during the initial establishment period will play an important role in the success of this restoration. Both reed canary grass and narrow-leaf cattail form a dense thatch layer that promotes their dominance over other species in wetlands. Removing them will likely require a combination of manual removal techniques and targeted herbicide applications performed over the maintenance and establishment period. For example, burning alone will not control reed canary grass, but using a spring burn before applying a grass-specific herbicide has been shown as an effective control. Other invasive species in the wetlands and surrounding upland areas would similarly be managed with a combination of manual removal and herbicide application. Native plants would be avoided during herbicide application.

Soil scraping is another method that has been successfully used to manage narrow-leaf cattail; it is important to establish the existing root depth to determine the appropriate depth for scraping and to fully remove the tubers. Scraped soil should be either sufficiently buried to prevent regrowth or removed from the site completely. Strategically cutting or mowing prior to seasonal flooding is another useful method for controlling cattails. Inundation can prevent seedlings from germinating and cut off oxygen to rhizomes. Dredging the deposited sediment in Wetland 4 would also be an important control strategy, since the majority of the cattail population is located within this wetland; dredging to a depth of 6 feet would remove the tubers from the sediment as well as inundate the area with water. These strategies could also be used to control reed canary grass. Soil scraping of approximately 12-24 inches in depth would be conducted in Wetland 1 to restore the hydrologic connection to Wetland 5 and remove reed canary grass.

#### 5.3.2.3 Establishment

Native species establishment activities typically include multiple, well-timed herbicide applications and plowing or disking for seed bed preparation, followed by seeding and live planting. A diverse combination of seed mixes and live plugs, shrubs, and/or stakes would be selected based on anticipated growing conditions and to improve habitat value. Areas surrounding the wetland may remain dry enough to support native upland restoration and serve as an upland buffer to the wetland.

#### 5.3.2.4 Long-Term Maintenance

The wetlands surrounding Lagoon G are located within a highly urbanized landscape characterized by disturbed soils, altered hydrology, and the prevalence of non-native and invasive plant species. Following the initial establishment period, long-term management efforts would be necessary to promote continued native species' success. An extended management plan detailing adaptive management strategies for each wetland area should be considered to ensure the continued establishment of native species and suppression of invasive species. Long-term management activities may include periodic spot herbicide treatment, mowing, prescribed burning where feasible, and ongoing adaptive management based on changing conditions. Without ongoing management, invasive species are likely to reestablish and reduce long-term project success.

If this alternative is selected, further coordination is needed with MPRB and the City of Golden Valley to develop agreements for partner roles and responsibilities associated with long-term maintenance. Based on conversations during this feasibility study, MPRB indicated they could possibly fund or perform long-term maintenance; Golden Valley could consider including this site in their city-wide vegetation maintenance contract if funding were provided by others.

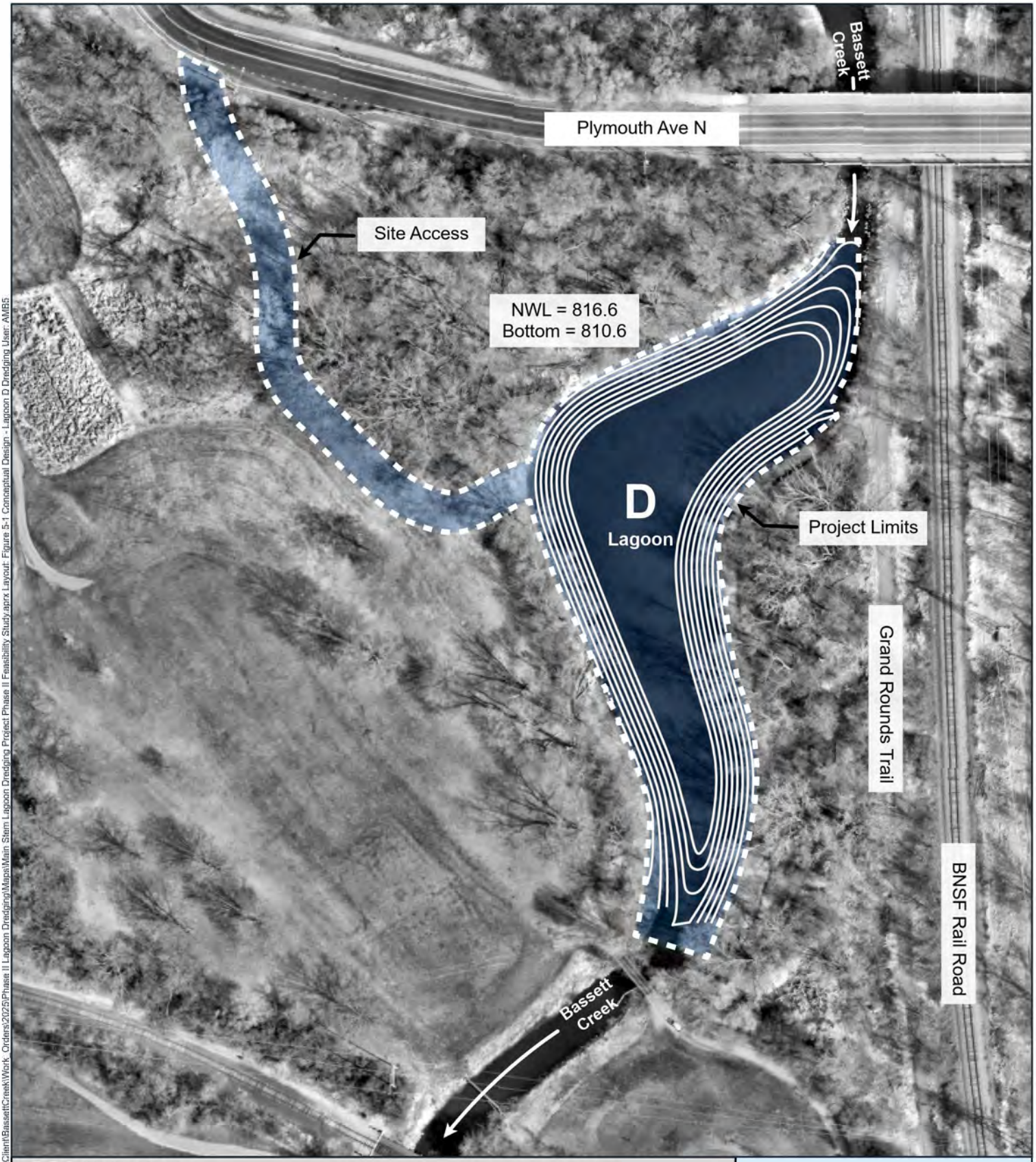
## 5.4 Phasing Alternatives

Alternatives 1, 2, and 3 offer the possibility to pick and choose which lagoons are dredged, in combination with dredging order (if phased over multiple years), depth, and whether restoration would occur in Lagoon G. For example, the BCWMC may elect to fund the dredging of a single lagoon (D, E, F, or G). If the BCWMC chooses to move forward with dredging of all four lagoons, possibly in combination with wetland restoration, we expect that bidding these as a single project would offer efficiencies from a design and permitting perspective, as well as an anticipated cost savings due to economies of scale (e.g., lower mobilization costs).

## 5.5 Site Access

Access to the lagoons for construction activities should be straightforward, as relatively few obstacles or infrastructure elements block access to the proposed work areas. In addition, the project is located on public property (Theodore Wirth Regional Park). The figures in Section 5 present the potential site access locations.

Access to the site is via Theodore Wirth Parkway, which has weight restrictions year-round; this will need to be considered in bidding and construction.




Project Area

Proposed 1' Contour

Imagery: NearMap 04/05/2025

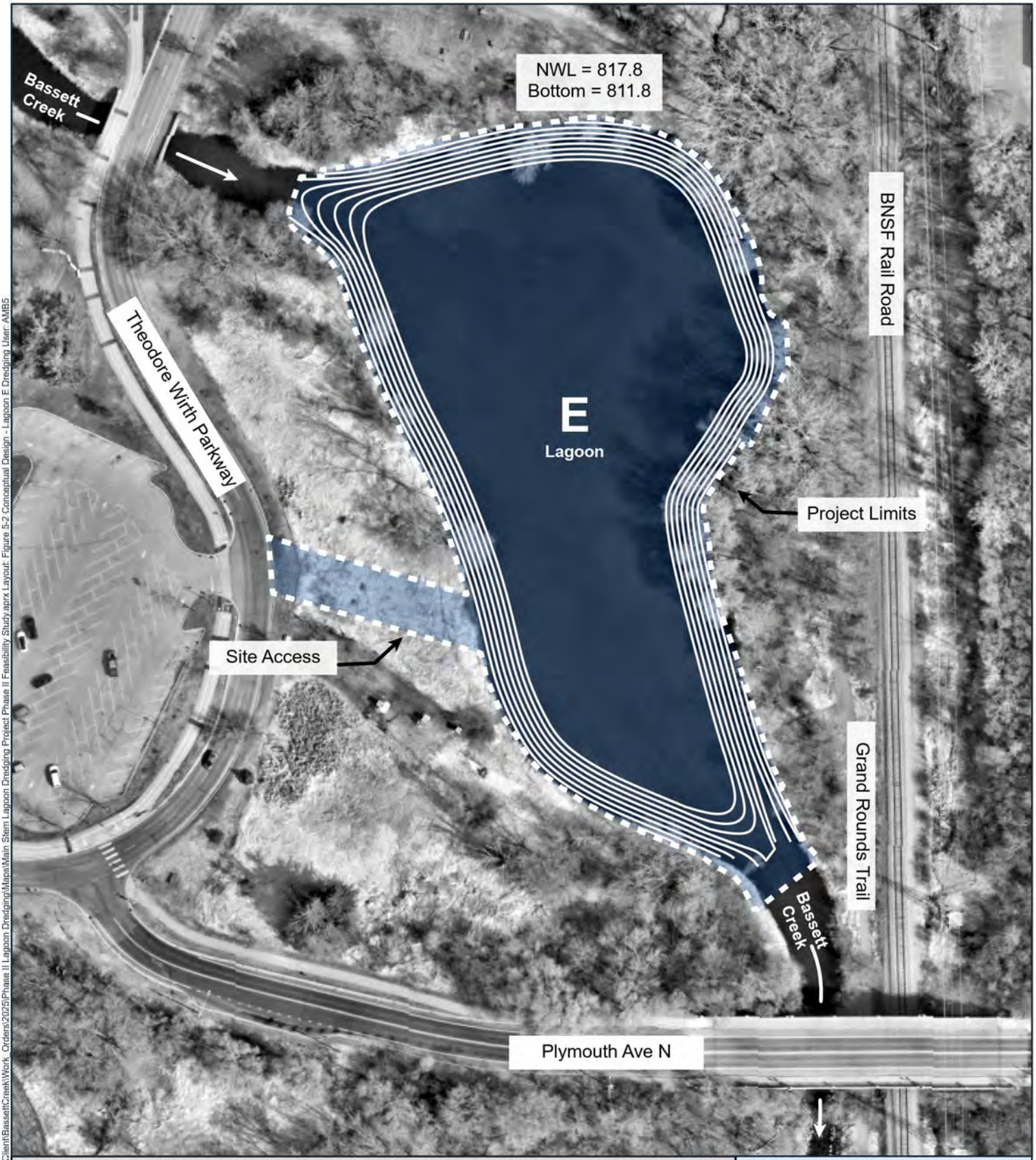
0 100 200

Feet

**Conceptual Design**
**Lagoon D Dredging**
Main Stem Lagoon Dredging
Phase II Feasibility Study
Golden Valley, Minnesota

FIGURE 5-1

BARR




Project Area

Proposed 1' Contour

Imagery: NearMap 04/05/2025

N

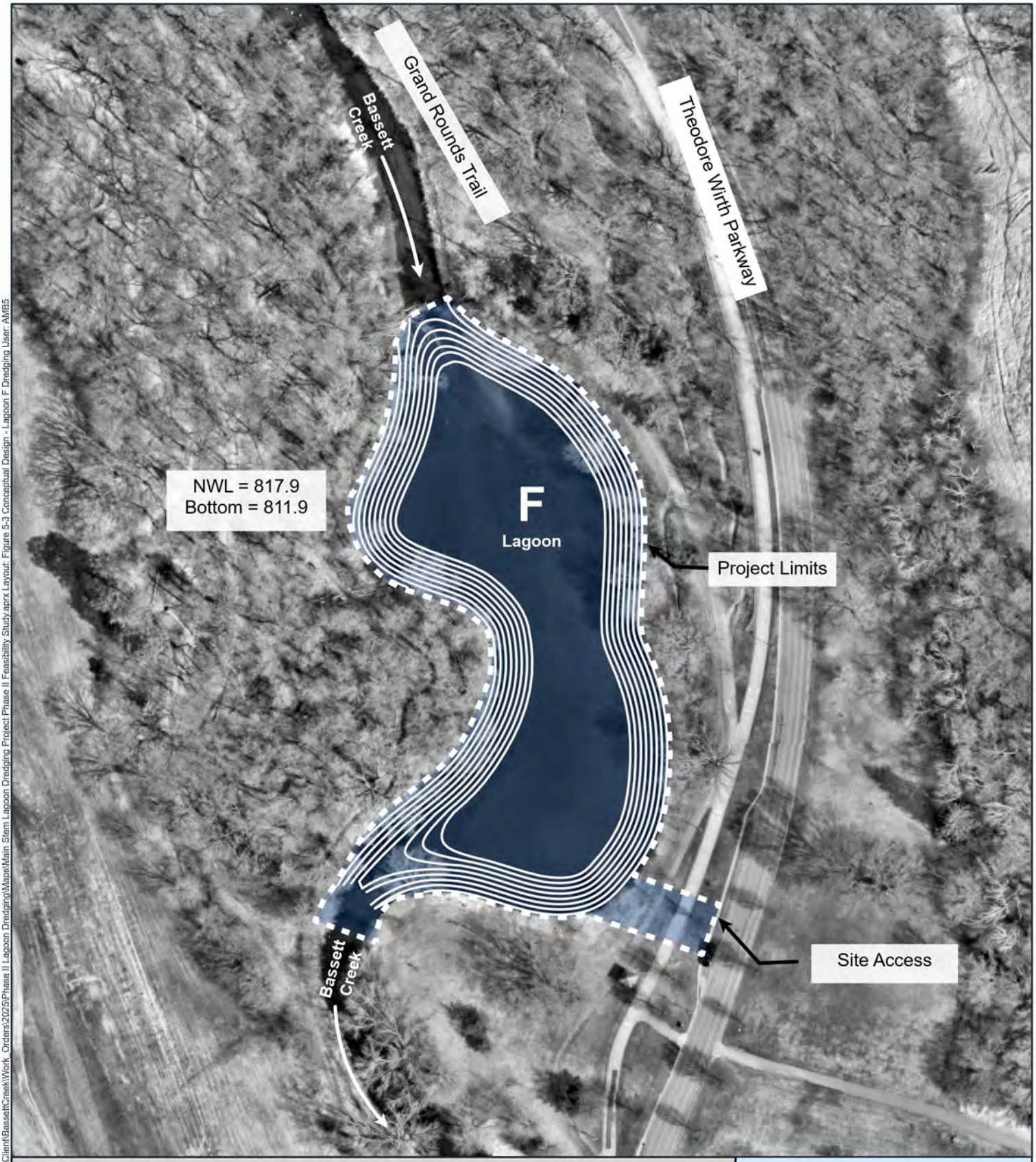
0 100 200

Feet

**Conceptual Design**
**Lagoon E Dredging**
Main Stem Lagoon Dredging
Phase II Feasibility Study
Golden Valley, Minnesota

FIGURE 5-2

BARR




Project Area

Proposed 1' Contour

Imagery: NearMap 04/05/2025

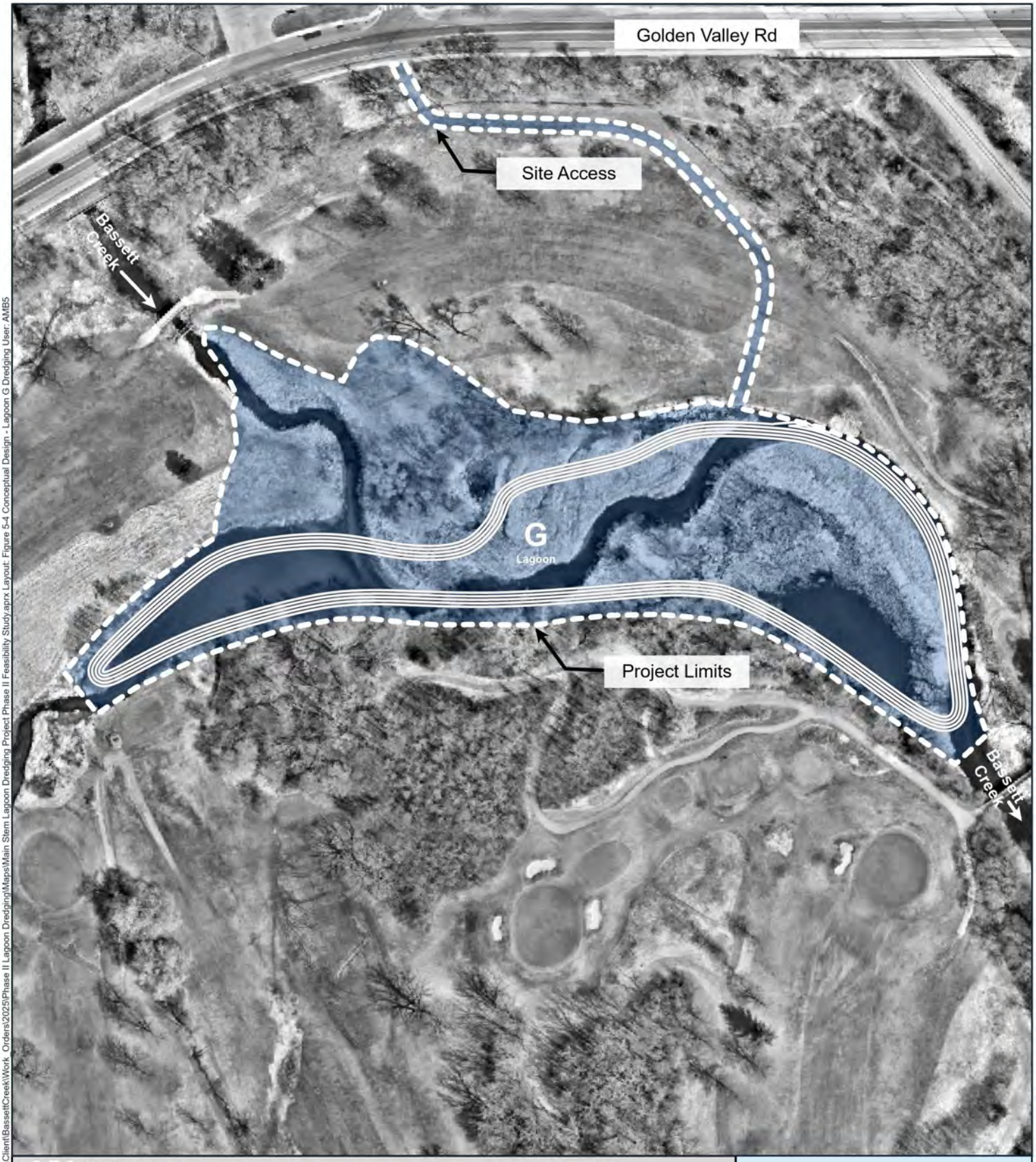
0 100 200

Feet

**Conceptual Design**
**Lagoon F Dredging**
Main Stem Lagoon Dredging
Phase II Feasibility Study
Golden Valley, Minnesota

FIGURE 5-3

BARR




Project Area

Proposed 1' Contour

Imagery: NearMap 04/05/2025

N

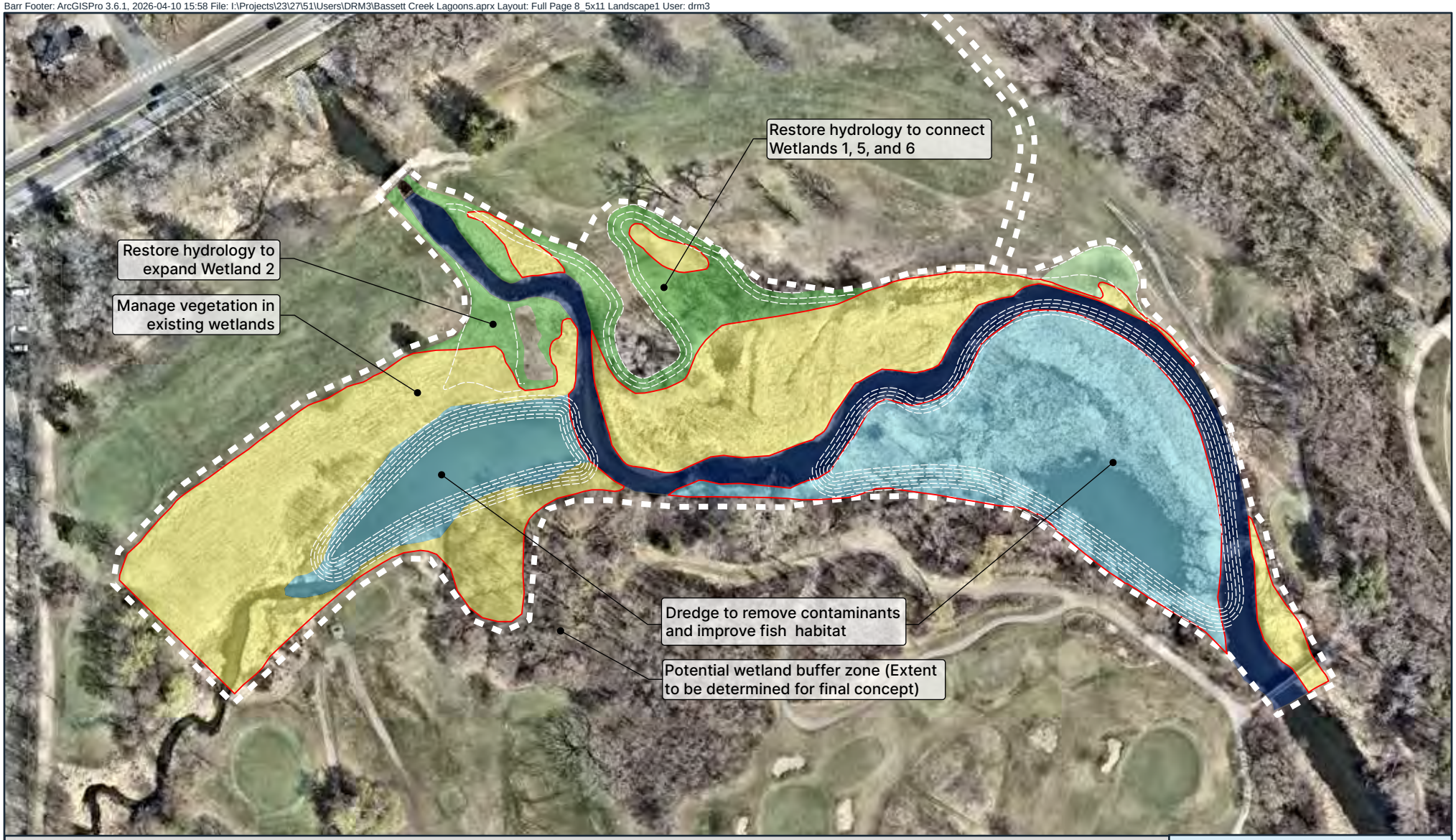
0 100 200

Feet

**Conceptual Design**
**Lagoon G Dredging**
Main Stem Lagoon Dredging
Phase II Feasibility Study
Golden Valley, Minnesota

FIGURE 5-4

BARR




Project Area
Proposed 1' Contour
Existing Wetland
Manage Existing Wetland
Expand Wetland
Shallow, Open Water

Note: Existing land use meets Golden Valley buffer requirements for Alternative 3

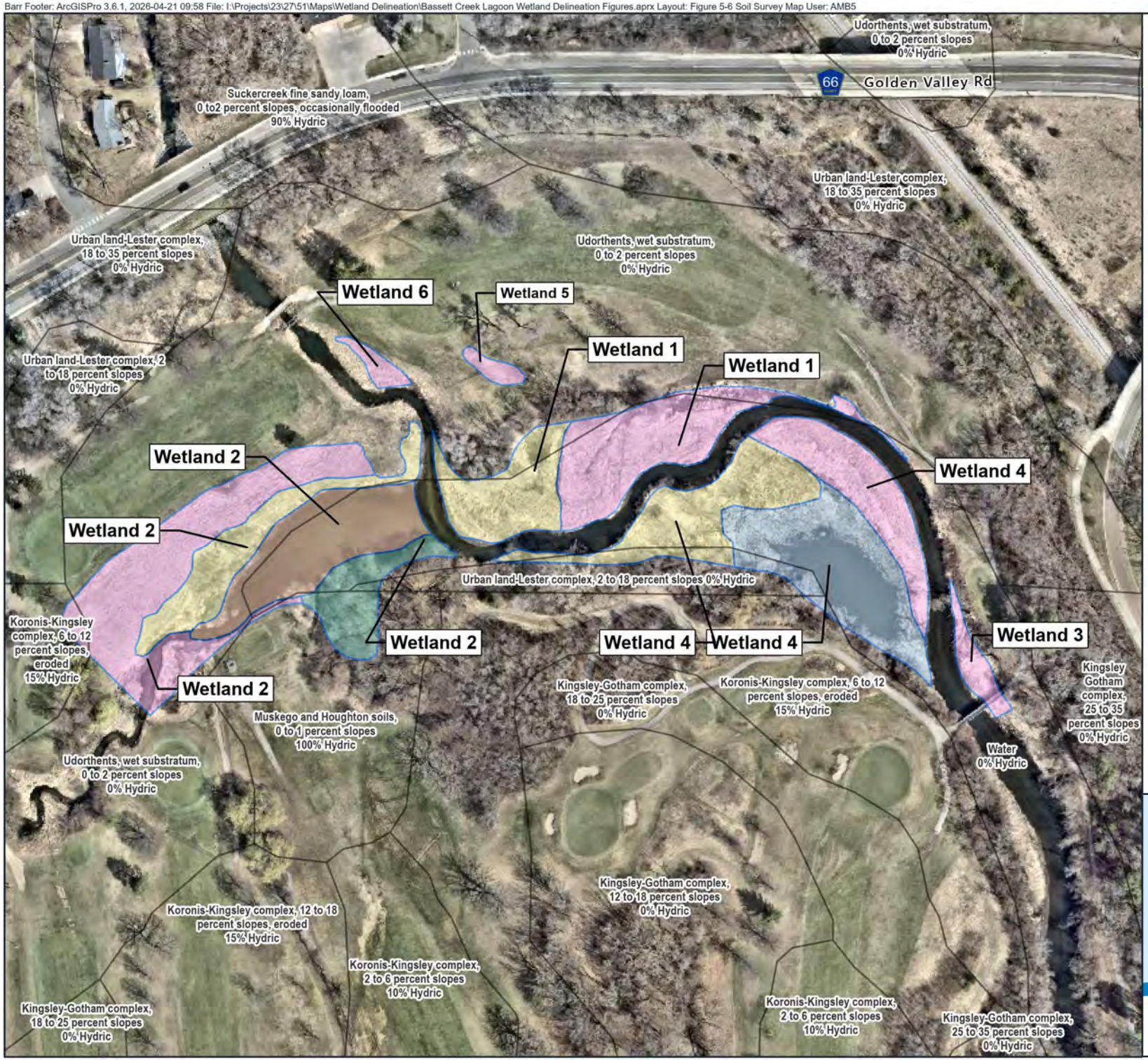
N

0 60 120
Feet

**Conceptual Design**
**Lagoon G**
**Wetland Restoration**
Main Stem Lagoon Dredging
Phase II Feasibility Study
Golden Valley, Minnesota

FIGURE 5-5

BARR




SSURGO Soils

Delineated Wetlands

Eggers

- Floodplain forest
- Fresh wet meadow
- Shallow marsh
- Shallow, open water
- Shrub carr

N

0 75 150

Feet

Imagery: NearMap 04/05/2025

**Soil Survey Map**

Main Stem Lagoon Dredging Project Phase II Feasibility Study

Golden Valley, MN

FIGURE 5-6

BARR

# 6 Evaluating Project Benefits and Potential Impacts

This section discusses the results of the hydrologic, hydraulic, and water quality modeling and provides information on potential project impacts of each concept, including permitting requirements.

## 6.1 Hydrologic, Hydraulic, and Water Quality Modeling

The purpose of this analysis was to analyze the potential flood reduction impact (restore flood conveyance) and to estimate the water quality benefits from dredging the lagoons to remove accumulated sediment and vegetation from above the normal water level within the floodplain. Hydrologic and hydraulic information for the project area is available in the form of an XP-SWMM model. The BCWMC updated the model in 2021 (adopted 2022) for Ȟaȟá Wakpádaŋ/Bassett Creek and its contributing watersheds. This model was used to evaluate the impact of each concept.

Water quality information is available for the project area in the form of water quality monitoring data from the Metropolitan Council Environmental Services (MCES) Watershed Outlet Monitoring Program (WOMP) station, located at Irving Ave in Minneapolis (River Mile 1.9). The MCES WOMP station data for Ȟaȟá Wakpádaŋ/Bassett Creek provides total suspended solids (TSS), total phosphorus (TP), and flow data in addition to other water quality monitoring parameters. MCES routinely uses the available monitoring data to calculate pollutant loadings that are reported on a monthly and yearly basis.

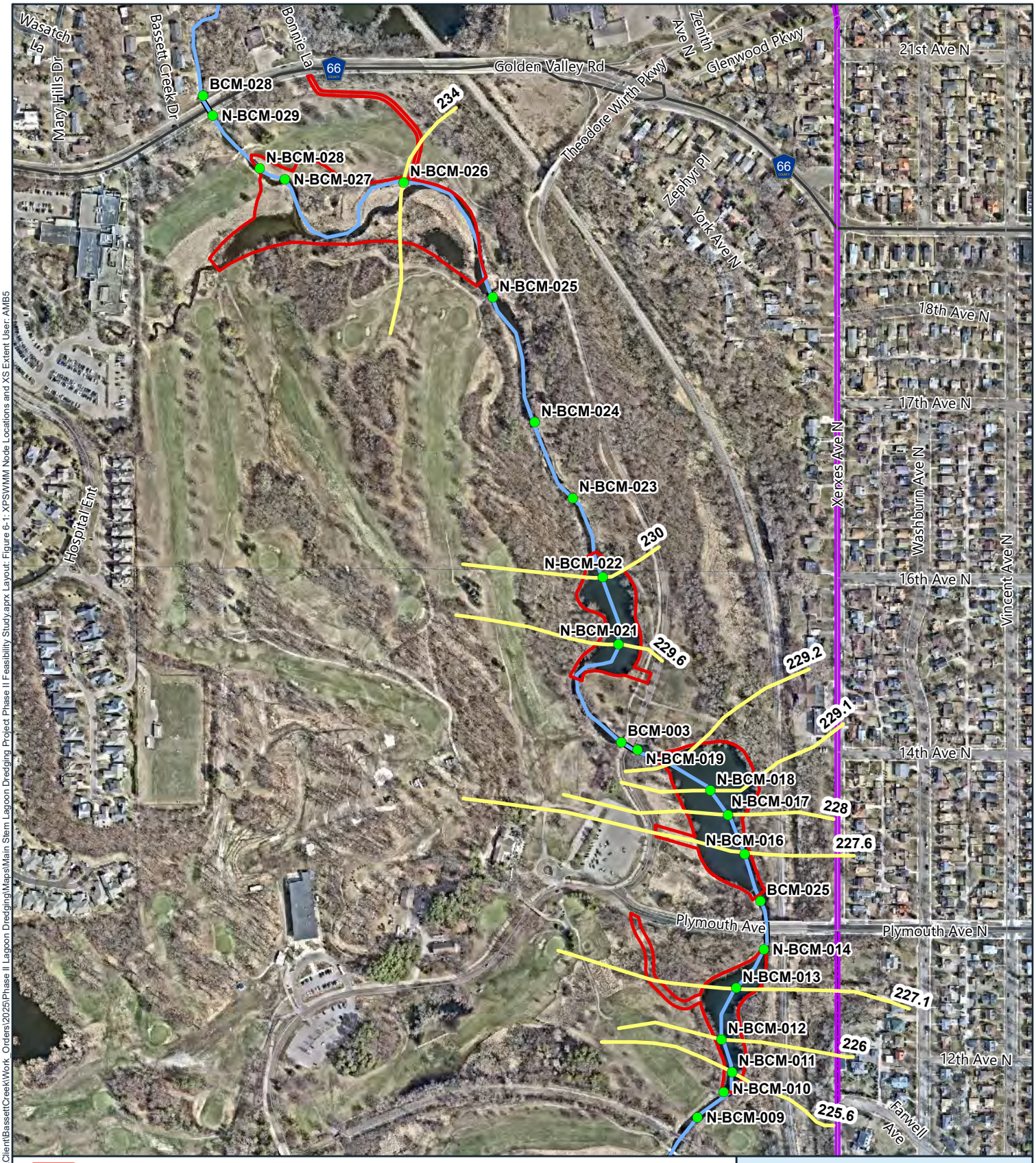
Final design efforts should include refinements to the XP-SWMM and water quality evaluations. Water quality evaluations were based on estimated removal from a Walker 1987 (reference (2)) relationship applied to average annual TP load from MCES WOMP monitoring, as it allowed us to account for actual (flow and water quality) monitoring data and the treatment efficiency differences associated with in-line lagoon volumes more accurately than the P8 watershed modeling. Any constructed improvements should be incorporated into the BCWMC XP-SWMM model upon project completion.

### 6.1.1 Hydrologic and Hydraulic Modeling Results

The existing 2022 BCWMC XP-SWMM model cross sections (Figure 6-1) were updated with surveyed data collected for Lagoons D, E, and F (April 2023) and Lagoon G (May 2026) to reflect the current conditions in the lagoons as existing conditions. The updated existing condition BCWMC XP-SWMM model was hydraulically modified to model Alternatives 1 and 2 within the study area. Storage was modeled as natural cross-sections. Proposed conditions modeling analysis applies only to cross-sections within the project's extents of Lagoons D, E, F, and G. The cross-sections were revised based on the proposed design to represent the proposed bathymetric contours for the two alternatives. Maximum flood elevations for the Atlas 14 1-, 2-, 10-, and 100-year recurrence intervals were analyzed and compared for existing and proposed conditions. Results are tabulated in Appendix M.

For Alternative 1 (Lagoons D, E, and F), changes to the cross-sections are entirely below the normal water level (dead storage volume), and therefore, there is no noticeable change to flood elevations as compared to existing conditions. For Alternative 2 (Lagoon G dredging only), the results show a maximum reduction of 0.44 feet (approximately 5 inches) in peak water surface elevation (WSE) for the 1-year event, and smaller reductions for all other events. This reduction in WSE is only within Lagoon extents, and just upstream or downstream of Lagoon G, there is no change in WSE. Under proposed conditions, Alternative 2 has a larger cross-sectional area than Alternative 3 (Lagoon G dredging and wetland restoration), so the anticipated impact on flood levels of Alternative 3 would be less. After confirming that

Alternative 2 has essentially no impact on flood elevations outside of the immediate project extent, modeling for Alternative 3 was determined to not be needed.




Project Area

Cross Section

XP-SWMM Node

Imagery: NearMap 04/05/2025

N

0 200 400

Feet

**XP-SWMM Node Locations and Cross-sections Extent**

Main Stem Lagoon Dredging
Phase II Feasibility Study
Golden Valley, Minnesota

FIGURE 6-1

BARR

## 6.2 Anticipated Pollutant Removal

The pollutant (TP and TSS) removals for each alternative were calculated based on the excavated depth, TP removal percentages as provided in a Walker 1987 (reference (2)) relationship, and MCES WOMP monitoring data. To calculate the TP load reductions, we used the relative change in basin volume and the Walker 1987 (reference (2)) relationship to estimate the TP removal percentage. This removal rate was applied to the average annual TP load, which we obtained from MCES WOMP monitoring data. The relationship was first updated to reflect existing conditions, using the bathymetric survey data collected during this study. The relationship was further updated to reflect the additional permanent pool volume provided by each of the alternatives. We calculated the TSS removals for each alternative based on a NURP-published piece (Walker, 1990) (reference (23)) and Athayede et al., 1983 (reference (24)) relationship and as-built surveys from Phase I, combined with the TP reduction estimates. The time to refill the sediment volume dredged from each lagoon area was calculated based on the amount of sediment removed and an assumed sediment density of 100 pounds/cubic foot.

### 6.2.1 Alternative 1 - Deepen Lagoons D, E, and F to 6 Feet

Alternative 1 involves deepening Lagoons D, E, and F to 6 feet to provide additional permanent pool volume. Table 6-1 shows that upon construction of Alternative 1, the pollutant load reduction relationships estimate that the combined effect in all three lagoons would result in 66,400 pounds of TSS removal per year and 254 pounds of TP removal per year. The time to refill the sediment volume dredged from all three lagoon areas is estimated to be 45 years with this alternative (see Table 6-1).

### 6.2.2 Alternative 2 - Deepen Lagoon G to 6 Feet

Alternative 2 involves deepening Lagoon G to 6 feet to provide additional permanent pool volume. Table 6-1 shows that upon construction of Alternative 2, the pollutant load reduction relationships estimate that dredging Lagoon G would result in 132,000 pounds of TSS removal per year and 510 pounds of TP removal per year. The time to refill the Lagoon G area is estimated to be 64 years with this alternative (see Table 6-1). It should be noted that the area in Lagoon G west of where the creek currently enters the lagoon is considered an ineffective flow area (outside of the typical creek flow path), and that the estimated water quality benefits could potentially be an overestimate.

### 6.2.3 Alternative 3 – Wetland Restoration and Dredging of Lagoon G

Alternative 3 involves restoring Wetlands 1, 3, 5, 6, and portions of Wetland 2, as well as dredging the entirety of Wetland 4 due to this wetland having the highest concentrations of contaminated sediment in Lagoon G, and dredging the shallow, open water portion of Wetland 2. The estimated pollutant removal from this alternative is 94,000 pounds of TSS removal per year and 363 pounds of TP removal per year. Water quality benefits for this alternative were computed based only on estimated removals from the dredged areas; benefits do not include any removals that might be achieved from the restored wetland areas. The time to refill the sediment volume dredged is estimated to be 45 years with this alternative.

**Table 6-1 Water Quality Benefits Summary**

| Alternative | Lagoon | Dredged Volume (cy) | TSS Removal (lbs/yr) [1] | Phosphorus Removal (lb/yr) [2] | Time to Refill w/ Sediment (years) [3,4] |
|---|---|---|---|---|---|
| 1 | D | 2,100 | 9,400 | 39 | 6 |
| | E | 7,650 | 35,500 | 135 | 25 |
| | F | 4,200 | 21,500 | 80 | 14 |
| | ALL | 13,950 | 66,400 | 254 | 45 |
| 2 | G | 33,700 | 132,000 | 510 | 64 |
| 3 | G | 23,000 | 94,000 | 363 | 45 |

[1] Long-term average based on ratio of TP and TSS load reduction
[2] Based on estimated removal from Walker, 1987 (reference (2)) relationship applied to avg annual TP load from MCES WOMP monitoring
[3] Longevity equates sediment volume dredged with sediment removal with assumed sediment density of 100 lbs/cubic foot
[4] Time to re-fill is based on the additional 2-foot dredging depth proposed in these alternatives - Lagoon D, E, and F have additional capacity / longevity from the previous Phase I dredging that is not shown here

## 6.3 Wetland/Habitat Assessment – Lagoon G

Wetland habitat monitoring was completed in May 2026 within the wetlands located within or near Lagoon G to establish baseline conditions and assess the ecological benefits of wetland restoration.

### 6.3.1.1 Existing Site Conditions Assessment

**Wetland Functional Assessment (MN – WI Wetland Rapid Assessment Method (RAM) and Floristic Quality Assessment (FQA))**

The MN-WI Wetland RAM assessment evaluates wetland water quality, hydrologic, ecological, climate, and anthropogenic functional groups and ranks the wetland's effectiveness to perform and maintain each of these functions. Outcomes of the assessment result in a ranking of lower, moderate, or higher for each of the functional groups and also assign an Opportunity Value. These results provide an assessment of a wetland's ability to perform a specific function (Table 6-2, Table 6-3).

**Table 6-2 Ecological and Anthropogenic Functional Group Rankings**

| Tier | Description |
|---|---|
| Higher | Functional capacity or opportunity-value to provide a function is at a higher level relative to other wetlands for a specific function. |
| Moderate | Functional capacity or opportunity-value to provide a function is at a moderate level relative to other wetlands for a specific function. |
| Lower | Functional capacity or opportunity-value to provide a function is at a lower level relative to other wetlands for a specific function. |

**Table 6-3 Carbon, Hydrologic, and Water Quality Functional Group Rankings**

| Function Rank | Score Criteria |
|---|---|
| Higher | ≥70 |
| Moderate | 70>x>30 |
| Lower | ≤30 |

The Floristic Quality Assessment (FQA) is a method used in Minnesota to evaluate wetland condition based on the types of plants growing there. Each plant species is given a score that reflects how sensitive it is to disturbance, and these scores are combined to describe the overall plant community. Wetlands with more native, disturbance-sensitive species receive higher scores and are considered to be in better condition, while wetlands dominated by tolerant or invasive species score lower. In this way, FQA provides a straightforward way to judge wetland quality based on how natural and intact the observed vegetation is.

Both RAM and FQA assessments were performed for this study on Lagoon G to assess the existing functional capacity and biological integrity of the wetland areas and to consider which functions a proposed wetland restoration project could enhance or improve.

**RAM and FQA Existing Conditions Results**

Results of the RAM assessment show the majority of functional capacity rankings for the Lagoon G wetland areas as being moderate or lower in their current condition, indicating that there are opportunities to increase wetland function through a restoration effort. Opportunity-value rankings were generally listed as higher in the hydrology and water quality functional groups and lower or not applicable in the ecological, climate, and anthropogenic functional groups (Table 6-5). Overall rankings generally followed the same trends as opportunity-value rankings for each of the functional groups. Overall FQA conditions for the wetlands were generally poor, with Wetland 5 having a fair overall condition (Table 6-4). A more detailed breakdown of full results of the RAM and FQA assessment for the six wetland areas is contained in Appendix H and Appendix O.

**Table 6-4 FQA Results**

| Lagoon G FQA Results | | |
|---|---|---|
| Overall Wetland Assessment | | |
| **Wetland ID** | **Weighted Average Numerical Category** | **Overall Condition** |
| Wetland 5 | 3.0 | Fair |
| Wetland 6 | 4.0 | Poor |
| Wetland 1 | 4.0 | Poor |
| Wetland 3 | 4.0 | Poor |
| Wetland 4 | 4.0 | Poor |
| Wetland 2 | 4.0 | Poor |

### 6.3.1.2 Proposed Site Conditions Assessment, Comparison, and Evaluation

The wetland conceptual plan paired with results from the existing conditions assessments were used to evaluate potential proposed site conditions for the Lagoon G restoration. Proposed site conditions were assessed using the RAM, FQA, and Habitat Equivalency Analysis (HEA) assessments.

#### *RAM and FQA Estimated Results*

**Alternative 2 – Dredging Lagoon G**
Results of the RAM assessment show that functional capacity rankings remain the same under this condition as compared to existing conditions for Wetlands 3, 5, and 6, as these wetlands reside beyond the proposed sediment removal limits, and restoration activities would not take place under full sediment removal within Lagoon G (Appendix H).

In Wetlands 1, 2, and 4, the surface water supply function in the hydrology functional group increased from a moderate to higher functional capacity rank with the proposed sediment removal. In general, the phosphorus retention function in the water quality function group had no change or improved in the functional capacity rank, although in Wetland 4, the phosphorus retention function capacity rank changed from moderate to lower. In Wetlands 1 and 4, the wildlife habitat function in the ecological function group decreased from higher to lower, and the fish habitat function in the ecological function group increased from lower to moderate with full removal of contaminated sediment (Appendix I). Table 6-5 illustrates the functional capacity rankings for the hydrology, water quality, and ecological functional groups compared to the other alternatives.

**Alternative 3 – Wetland Restoration and Partial Dredging**
In Wetlands 1, 2, 3, 5, and 6, functional capacity, opportunity-value, and overall rankings for the native plant function in the ecological functional group increased from lower and moderate to higher with vegetation restoration implemented. The functional capacity and overall ranks for the wildlife habitat function in the ecological functional group increased from lower and moderate to higher (Appendix L). Table 6-5 illustrates the functional capacity rankings for the hydrology, water quality, and ecological functional groups compared to the other alternatives.

In Wetland 4, the functional capacity rank for the wildlife habitat function in the ecological function group decreased from higher to lower with the proposed dredging, however, the functional capacity and opportunity-value ranks for fish habitat increased from lower and moderate to higher (Appendix L).

**Table 6-5 Functional Capacity Rankings for Existing Conditions, Alternative 2, and Alternative 3**

| Functional Capacity Rankings | | | | | | |
|---|---|---|---|---|---|---|
| **Existing Conditions** | | | | | | |
| **Functional Group** | **Wetland 1** | **Wetland 2** | **Wetland 3** | **Wetland 4** | **Wetland 5** | **Wetland 6** |
| Hydrology | moderate | lower - moderate | moderate | lower - moderate | lower - higher | moderate |
| Water Quality | lower - moderate | lower - moderate | lower - higher | moderate | higher | moderate - higher |
| Ecological | lower - higher | lower - moderate | lower | lower - higher | lower - moderate | lower |
| **Alternative 2 – Lagoon G Dredging** | | | | | | |
| **Functional Group** | **Wetland 1** | **Wetland 2** | **Wetland 3** | **Wetland 4** | **Wetland 5** | **Wetland 6** |
| Hydrology | lower - higher | lower - moderate | moderate | lower - higher | lower - higher | moderate |
| Water Quality | lower - moderate | lower - moderate | lower - higher | lower - moderate | higher | lower - higher |
| Ecological | lower - moderate | lower - moderate | lower | lower - moderate | lower - moderate | lower - moderate |
| **Alternative 3 – Wetland Restoration and Partial Dredging** | | | | | | |
| **Functional Group** | **Wetland 1** | **Wetland 2** | **Wetland 3** | **Wetland 4** | **Wetland 5** | **Wetland 6** |
| Hydrology | moderate | lower - moderate | moderate | lower - higher | moderate | moderate |
| Water Quality | lower moderate | lower - higher | lower - higher | lower - moderate | lower - moderate | lower - higher |
| Ecological | lower - higher | lower - higher | lower - higher | lower - moderate | lower - higher | lower - higher |

#### 6.3.1.3 Habitat Equivalency Analysis

The Habitat Equivalency Analysis (HEA) is a method developed by the National Oceanographic and Atmospheric Administration that can be used to evaluate the current ecological function at a given project location (reference (25)) – typically at a degraded site – and then to estimate future ecological function following the remediation and/or restoration of the site. HEA is a flexible, adaptable approach to calculating the estimated change in ecological function due to restoration activities. The model is straightforward and can be scaled to address the scope and complexity of the evaluation (reference (26)).

The inputs of a HEA model include spatial extent, time, and percent ecological services of the site. For the Lagoon G HEA, three types of information were used to characterize the current percent ecological services model inputs: 1) the existing quality of the benthic community; 2) wetland functional assessment outcomes; and 3) impact from contaminants in the sediment. The quality of the benthic community and wetland functional assessment outcomes were averaged to represent the current ecological services of Lagoon G (referred to collectively as the habitat-based percent ecological services). When contaminants in the sediment were determined to have an impact on the ecological services of Lagoon G, the calculated percent impact was to represent degradation of ecological services from toxic effects of those contaminants.

Data on the quality of benthic community within Lagoon G was not available for this study. However, data collected upstream of the lagoon shows a degraded and impaired benthic community within Bassett Creek. Given this evidence and the degraded condition of Lagoon G, it was assumed that the benthic community at this location was also similarly degraded. Macroinvertebrate Index of Biotic Integrity (M-IBI) scores from monitoring locations upstream of the project area were used as a best available surrogate to represent anticipated conditions at the project location. The estimated toxicity and expected impacts of the contaminated sediments on the benthic community within the lagoon, both pre- and post-proposed project were also assessed as part of the HEA.

The qualitative designations (low, moderate, higher) for the functional value of each wetland from RAM for both the existing and proposed conditions of Lagoon G were used to calculate the habitat-based services of Lagoon G. The qualitative values were assigned numeric scores (low=1, moderate=2, and higher=3). These scores represent percent ecological service values as used in the HEA: 1=33%, 2=66%, and 3=100%. Tables summarizing the average values and associated percent services for both the unrestored and restored conditions of Lagoon G are provided in Table 6-6.

Appendix N includes a description of the data and analysis used to perform the HEA and calculate the percent ecological services of Lagoon G, in addition to a summary of the data sources used.

#### 6.3.1.4 HEA Estimated Results

Table 6-6 provides a summary of the RAM values and associated percent wetland-based services calculated for the HEA. When calculating the services provided by Wetland 4 and a portion of Wetland 2, which would be converted to shallow open water wetlands, a 3-year linear recovery of ecological services was assumed, where services were 0% during the implementation year due to disturbance of the benthic invertebrate community.

**Table 6-6 RAM Average Scores and Associated Percent Wetland-Based Ecological Services for Wetland Quality Line of Evidence**

| | Unrestored Condition | | | Restored Condition | | |
|---|---|---|---|---|---|---|
| | **RAM average score** | **Acres** | **Percent wetland-based ecological services** | **RAM average score** | **Acres** | **Percent wetland-based ecological services** |
| Wetland 1 | 2.0 | 1.06 | 62 | 2.4 | 1.69 | 71 |
| Wetland 2 | 1.6 | 2.30 | 55 | 2.0 | 1.68 | 64 |
| Wetland 3 | 1.7 | 0.12 | 56 | 2.1 | 0.12 | 66 |
| Wetland 4/Open water[a] | 1.6 | 1.77 | 55 | 1.6 | 2.39 | 58 |
| Wetland 5 | 2.8 | 0.05 | 75 | 2.0 | 0.05 | 65 |
| Wetland 6 | 1.7 | 0.06 | 56 | 2.1 | 0.06 | 59 |
| **Total** | | **5.36** | | | **5.99** | |

[a] Wetland 4 is removed and Wetland 2 partially removed under the evaluated partial removal scenario. These are evaluated jointly as open water in the Restored Condition evaluation.

Outcomes of the HEA show similar results to the RAM assessment, where the proposed wetland restoration at Lagoon G has the potential to increase the total wetland area in Lagoon G, to improve the overall ecological function (moving rankings from the lower-moderate to moderate range), and to improve ecological services.

## 6.4 Easement Acquisition

All of the proposed work is located on public property, so no additional easement acquisition is anticipated. Also, no temporary construction easements are anticipated to be needed, as it should be possible to provide all access to the site from the roadway or park area for construction staging and grading efforts. Therefore, the feasibility planning level opinions of cost do not include the estimated cost of permanent or temporary easement acquisition in the project area.

## 6.5 Permits required for the project

The proposed project may require the following permits, approvals, and certifications:

**Natural Heritage Review**

It is not anticipated that threatened and endangered species would be impacted by this project. The BCWMC Engineer conducted a review of the NHIS and IPaC databases for the proposed project (see Section 3.2.6) and submitted to the MDNR – Natural Heritage Review team for review on December 4, 2025. The Natural Heritage Review team provided their response to the NHIS review on February 12, 2026. The Natural Heritage review team indicated that an avoidance plan is required for Blanding's turtles, tree clearing should be avoided from June 1 to August 15 to minimize impacts to bats, and avoidance measures or a permit to take may be needed for rusty patched bumble bees if the project will impact more than 2 acres of suitable rusty patched bumble bee habitat. The project area is not within suitable rusty patched bumble bee habitat. The wetlands primarily consist of non-native invasive species that are not foraging species for the rusty patched bumble bee. The adjacent uplands that would be

disturbed by the project are part of the golf course and do not provide summer foraging or overwintering habitat.

**Clean Water Act Section 404 Permit and Section 401 Certification**

Under Section 404 of the Clean Water Act (CWA), the USACE regulates the discharge of dredge or fill material into waters of the United States. The USACE will regulate the work conducted within Bassett Creek and the adjacent wetlands. It is likely that the proposed project would fall under a USACE nationwide permit based on the current wetland impact assessment. A preconstruction notification should be submitted to the USACE detailing the anticipated wetland impacts and requesting coverage under a nationwide permit. The USACE decisions on nationwide permits typically happen within 60 – 90 days of submittal.

As part of its review of the proposed project under Section 404 of the Clean Water Act, the USACE will be required to complete interagency consultations under Section 7 of the Endangered Species Act (ESA) and Section 106 of the National Historic Preservation Act (NHPA). Section 7 consultation will evaluate whether the proposed activities may affect federally listed threatened or endangered species or designated critical habitat, and, if applicable, coordination will occur with the USFWS. Section 106 consultation will involve an assessment of potential effects on historic properties listed in or eligible for listing in the National Register of Historic Places (NRHP), including coordination with the Minnesota State Historic Preservation Office (SHPO) and interested Tribal Nations, as appropriate. These consultations are typically conducted concurrently with the USACE permit review and must be completed prior to issuance of a final permit decision.

The lagoons are part of the Minneapolis Grand Rounds System, deemed eligible for listing on the NRHP (once a site is deemed eligible, it is treated as being on the list). BCWMC will need to complete a review of the project to support USACE consultation with SHPO under Section 106 of the NHPA. Any determination by USACE would be subject to SHPO review and concurrence. Coordination with SHPO may delay the permitting process by 30 - 60 days.

Under Section 401 of the Clean Water Act, the MPCA is responsible for certifying that federally permitted activities comply with state water quality standards. The MPCA will review the project as part of the Section 401 Water Quality Certification (WQC) process and may apply Minnesota's water quality standards and antidegradation requirements (Minn. R. 7050). Based on the current impact assessment, it is anticipated that the MPCA Nationwide General 401 WQC would not apply, as the proposed project would impact more than 300 linear feet of stream. Therefore, an Individual Section 401 Water Quality Certification is required for the project. MPCA review and approval of an Individual Section 401 WQC generally requires several months and is typically completed within approximately 90 to 180 days following submittal of a complete application, depending on project complexity and agency coordination needs.

**Minnesota Wetland Conservation Act**

The Minnesota WCA regulates the filling and draining of wetlands and excavation within Type 3, 4, and 5 wetlands—and may regulate any other wetland type if fill is proposed under WCA scope criteria 8420.10105. The WCA is administered by LGUs, which include cities, counties, watershed management organizations, soil and water conservation districts, and townships. The City of Golden Valley is the LGU for the project location. The Minnesota Board of Water and Soil Resources (BWSR) oversees administration of the WCA statewide. A permit related to wetland impacts will likely be required. Although it is also likely that the lagoons will be covered under WCA no-loss criteria 8420.0415 (E), the LGU will make the final determination.

**Construction Stormwater Permits**
Construction of the proposed project may require a National Pollutant Discharge Elimination System/ State Disposal System Construction Stormwater (CSW) General Permit issued by the MPCA. The CSW permit requires the preparation of a stormwater pollution prevention plan that explains how stormwater will be controlled within the project area during construction. This permit is required if the project will disturb 1 acre or more of upland soil, which is not anticipated for this project.

This project will need to comply with the MPCA's guidance for managing dredged materials.

**MDNR Public Waters Work Permit**
The MDNR regulates projects constructed below the ordinary high water (OHW) level of public waters, watercourses, or wetlands, which alter the course, current, or cross section of the water body under Minnesota Statutes Section 103G.245, Work In Public Waters, Subp. 1 (2). Public waters regulated by the MDNR are identified on published public waters inventory maps. Ȟaȟá Wakpádaŋ/Bassett Creek is a public watercourse, and Lagoon E and Lagoon G are public water basins and are under MDNR jurisdiction to the top of the bank, so the proposed work will require a MDNR public waters work permit. Typically, the MDNR public waters work permit includes a condition that "no activity affecting the bed of the protected water may be conducted between April 1 and June 1, to minimize impacts on fish spawning and migration. If work during this time is essential, it shall be done only upon written approval of the Area Fisheries Manager." Without such approval, work on this project would need to occur outside the fish spawning and migration dates. Public Waters Work permits typically take 60 -90 days to be issued after submittal.

**MDNR Aquatic Plant Management Permit**

The MDNR regulates planting of aquatic plants other than dogwood and willow below the ordinary high water (OHW) level of public waters, watercourses, and wetlands under Minnesota Statutes Section 6280.0250, Standards For Aquatic Plant Management Permit Issuance, Subp. 1a. If planting of aquatic species occurs, an Aquatic Plant Management Permit would need to be obtained.

**Environmental Assessment Worksheet (EAW)**
The Minnesota Environmental Review Program requires review of projects that could result in significant environmental impacts. The Minnesota Environmental Quality Board (EQB) administers the program, but a regional government unit (RGU) is assigned to conduct the review using a standardized public process to disclose information about environmental effects and methods to minimize or avoid them. This process is designed to help permitting authorities make better-informed decisions regarding the project and the level of environmental review required, either an EAW or an Environmental Impact Statement (EIS).

Minnesota Rules Section 4410.4300, Mandatory EAW Categories, Subp. 27A requires the preparation of an EAW for "projects that will change or diminish the course, current, or cross-section of 1 acre or more of any public water or public waters wetland." The rule further states that in this situation, "the local government unit shall be the RGU." Based on these requirements, an EAW is required for the Main Stem Lagoon Dredging Project Phase II, and the City of Golden Valley would be the RGU for preparing the EAW. It is recommended that BCWMC coordinate with the City of Golden Valley and the MDNR to determine if an EAW would be required for this project. EAWs generally take six months to complete.

Per the EQB, the EAW process includes the following general steps:

1. An EAW will be prepared by completing the standard EQB form. The RGU makes a completeness determination according to the EQB rules.

2. When complete, the EAW is made publicly available for a 30-day public comment period. This comment period affords the public and other governmental agencies the opportunity to review and comment on the project and any potential environmental effects.

3. Based on comments reviewed and information provided in the EAW, the RGU decides whether an EIS is required.

**MPRB Construction Permit**
MPRB Construction Permits are required for construction-related activities on parkland and are administered by the MPRB Planning Services Division. Permits may take several days to issue, or longer, depending upon the complexity and impacts of the work. MPRB permits are considered "denied" until a permit is issued.

**City of Golden Valley Stormwater Management Permit and Wetland Buffer Requirements**
The City of Golden Valley requires a Stormwater Management Permit for land-disturbing activities that remove soils or vegetation, including but not limited to clearing, digging, dredging, draining, or filling. Specific projects requiring a stormwater management permit include:

- Activities that disturb more than 4,000 square feet of soils or vegetation
- Cutting, filling, disposal, hauling in, or storage of more than 30 cubic yards of soil
- Construction, expansion, or modification of a stormwater quality treatment facility or stormwater best management practices (BMPs)
- Any land-disturbing activities within the 100-year floodplain or calculated high water level of any water body, or immediately adjacent to any wetland or public water body, including shoreline restoration and creek bank stabilization

The City of Golden Valley also maintains buffer requirements for areas immediately bordering delineated wetlands. During a meeting on June 2, 2026, City of Golden Valley staff indicated that the existing vegetated areas surrounding the delineated wetlands within Lagoon G would meet city requirements for wetland buffer standards as long as those areas are not planned for disturbance as part of construction.

**Indigenous Community Coordination**
No previously recorded archaeological sites associated with Native American or precontact occupation have been documented within the project area, although isolated lithic finds indicative of Indigenous presence and use of the broader landscape, together with regional context information, indicate that the project area lies within a landscape that was historically utilized by Native American communities. As part of future project coordination (during design) the BCWMC will reach out to request any additional information and seek their input regarding the undertaking, including traditional knowledge or cultural considerations relevant to project implementation.

# 7 Project Cost Considerations

This section presents the feasibility-level opinion of probable cost of the evaluated alternatives, discusses funding sources, and provides an approximate project schedule.

## 7.1 Opinion of Cost

The opinion of cost is a Class 4 feasibility-level cost estimate as defined by the American Association of Cost Engineers International (AACI International) and uses the assumptions listed below and detailed in the following sections.

1. The cost estimate assumes a 30% construction contingency.
2. Costs associated with design, permitting, and construction observation (collectively "engineering") are assumed to be 20% of the estimated construction costs for Alternatives 1 and 2, and 25% for Alternative 3.

Class 4 level cost estimates have an acceptable range of between -15% to -30% on the low range and +20% to +50% on the high range. Based on the development of concepts, it is not necessary to utilize the full range of the acceptable range for the cost estimate, and we assume the final project costs may be between -20% and +30% of the estimated project budget. Table 7-1 summarizes the feasibility-level construction cost estimates for each alternative. Appendix C provides the detailed cost-estimate tables for all concepts.

**Table 7-1 Main Stem Lagoon Dredging Project Phase II Alternative Cost Summary**

| Alternative | Lagoon | Construction Cost Estimate [1] | Construction Contingency [2] | Engineering [3] | Capital Cost Estimate [4] |
|---|---|---|---|---|---|
| 1 | D | $168,000 | $50,000 | $44,000 | $262,000 |
| | E | $508,000 | $152,000 | $132,000 | $792,000 |
| | F | $291,000 | $87,000 | $76,000 | $454,000 |
| | ALL | $958,000 | $287,000 | $249,000 | $1,345,000 |
| 2 | G | $2,104,000 | $631,000 | $547,000 | $3,282,000 |
| 3 | G | $1,570,000 | $471,000 | $510,000 | $2,551,000 |

[1] A Class 4 screening-level opinion of probable cost, as defined by the American Association of Cost Engineers International (AACI International), has been prepared for these alternatives. The opinion of probable construction cost provided in this table is made based on Barr's experience and qualifications and represents our best judgment as experienced and qualified professionals familiar with the project. The cost opinion is based on project-related information available to Barr at this time and includes a conceptual-level design of the project.
[2] Assumed 30% contingency on construction costs.
[3] Assumed costs for design, permitting, and administration are 20% of construction costs for Alternatives 1 and 2, and 25% for Alternative 3
[4] Includes estimated initial construction cost (with 30% contingency) and design/permitting/admin costs (20% of construction cost for Alternatives 1 and 2, and 25% for Alternative 3)

### 7.1.1 30-year Cost

The 30-year cost for each concept was calculated as the future worth of the initial capital cost (including contingency and engineering costs) plus the future worth of any anticipated significant maintenance at the end of the concept's estimated useful life, assuming a 3% rate of inflation. The annualized cost for each concept was calculated as the value of 30 equal, annual payments of the same future worth as the 30-year cost. Table 7-2 presents the 30-year annualized costs and the annualized costs per pound of total phosphorus (TP) and total suspended solids (TSS) removed for each alternative.

For dredging only alternatives, the analysis assumed that no annual maintenance would occur within a 30-year period because the combined lifespan of the lagoons (time to re-fill) is longer than 30 years, regardless of which lagoons receive additional dredging. Table 7-2 reports the estimated lifespan to be a minimum of 30-years so as not to overestimate the annualized cost of the maintenance.

### 7.1.2 Annualized Pollutant Reduction Cost

Section 6.2 provides the estimated annual total phosphorus loading reductions for each recommended conceptual design alternative. The total phosphorus load reductions were estimated by modifying the predicted phosphorus removal efficiency based on the relative change in volume, from the relationship published in Walker,1987(reference (2)) to include the proposed alternatives. The annualized pollutant-reduction cost for each alternative is the estimated annualized 30-year project cost divided by the annual load reduction. Table 7-2 summarizes the annualized pollutant reduction cost.

**Table 7-2 Pollutant Reduction Cost Summary**

| Alternative | Lagoon | Estimated Lifespan (years) [1] | 30-Year Annualized Cost [2] | TP Load Reduction (lb/yr) [3] | TP Reduction ($/lb/yr) [4] | TSS Load Reduction (lb/yr) [3] | TSS Reduction ($/lb/yr) [4] |
|---|---|---|---|---|---|---|---|
| 1 | D | 30 [6] | $13,400 | 80 | $170 | 9,900 | $1.40 |
| | E | 30 [6] | $40,500 | 135 | $300 | 52,000 | $0.80 |
| | F | 30 [6] | $23,200 | 39 | $600 | 39,000 | $0.60 |
| | ALL | 90 [6] | $68,700 | 254 | $280 | 101,000 | $0.70 |
| 2 | G | 63 | $167,500 | 510 | $330 | 132,000 | $1.27 |
| 3 | G | 45 | $130,200 | 363 | $360 | 94,000 | $1.39 |

[1] Lifespan equates sediment volume dredged with sediment removal, based on assumed sediment density of 100 lbs/cubic foot
[2] Annualized 30-year future worth, assumes 3% inflation rate. Costs for wetland restoration alternative do not include annual vegetation maintenance costs after the establishment period.
[3] TP and TSS load reductions from Table 6-1 Water quality benefits summary
[4] Annualized cost divided by estimated annual pollution load reduction
[5] TSS and TP removal benefits for wetland restoration were not included. Removals represent reductions solely from dredging for Phase II only.
[6] The estimated lifespan for Lagoons D, E, and F include a minimum time to refill of 30-years to represent the sum of Phase I and Phase II dredging and that the lagoons would fill in series, compounding the time to re-fill of each downstream lagoon

The cost per pound of phosphorus removed for this project is low when compared to other BCWMC CIP projects. There may also be opportunities to optimize the design during final design to reduce overall project costs.

### 7.1.3 Potential Options for Cost Reduction

Following the May 2026 BCWMC meeting, several modifications were proposed and evaluated for opportunities to reduce the cost of Alternative 3. A description of each option follows:

- 3A – Wetland restoration with dredging of east area only to 6’ depth (remove west dredging area)
- 3B – Wetland restoration with dredging of east area only to 4’ depth (remove west dredging area)
- 3C – Wetland restoration with dredging of both east and west areas to 4’ depth
- 3D – Wetland restoration only (no dredging)

Table 7-3 and Table 7-4 summarize the estimated costs and water quality benefits of these options.

**Table 7-3 Cost Summary – Additional Options for Alternative 3**

| Alt | Description | Construction Cost Estimate (1) | Construction Contingency (2) | Engineering (3) | Capital Cost Estimate (4) | Cost Reduction from Alt 3 |
|---|---|---|---|---|---|---|
| 3 | Wetland Restoration & Dredging | $1,570,000 | $471,000 | $510,000 | $2,551,000 | -- |
| 3A | Wetland Restoration & Dredge East Area Only to 6' Depth | $1,334,000 | $400,000 | $434,000 | $2,168,000 | -$383,000 |
| 3B | Restoration & Dredge East Area Only to 4' Depth | $1,038,000 | $311,000 | $337,000 | $1,686,000 | -$865,000 |
| 3C | Restoration & East/West Area Dredging to 4' Depth | $1,247,000 | $374,000 | $405,000 | $2,026,000 | -$525,000 |
| 3D | Wetland Restoration Only (No Dredging) | $195,000 | $58,000 | $63,000 | $316,000 | -$2,235,000 |

[1] A Class 4 screening-level opinion of probable cost, as defined by the American Association of Cost Engineers International (AACI International), has been prepared for these alternatives. The opinion of probable construction cost provided in this table is made based on Barr’s experience and qualifications and represents our best judgment as experienced and qualified professionals familiar with the project. The cost opinion is based on project-related information available to Barr at this time and includes a conceptual-level design of the project.
[2] Assumed 30% contingency on construction costs.
[3] Assumed costs for design, permitting, and administration are 25% of construction costs.
[4] Includes estimated initial construction cost (with 30% contingency) and design/permitting/admin costs (20% of construction cost).

**Table 7-4 Pollutant Reduction Cost Summary - Additional Options for Alternative 3**

| Alt | Estimated Lifespan (years) [1] | 30-Year Annualized Cost [2] | TP Load Reduction (lb/yr) [3] | TP Reduction ($/lb/yr) [4] | TSS Load Reduction (lb/yr) [3] | TSS Reduction ($/lb/yr) [4] |
|---|---|---|---|---|---|---|
| 3 | 45 | $130,200 | 363 | $360 | 94,000 | $1.39 |
| 3A | 34 | $110,700 | 275 | $410 | 71,000 | $1.60 |
| 3B | 26 | $197,900 | 212 | $940 | 55,000 | $3.60 |
| 3C | 33 | $103,400 | 284 | $370 | 74,000 | $1.40 |
| 3D[5] | -- | -- | -- | -- | -- | -- |

[1] Lifespan equates sediment volume dredged with sediment removal, based on assumed sediment density of 100 lbs/cubic foot
[2] Annualized 30-year future worth, assumes 3% inflation rate. Annualized costs for wetland restoration alternatives do not include annual vegetation maintenance costs after the establishment period.
[3] TP and TSS load reductions from Table 6-1 Water quality benefits summary
[4] Annualized cost divided by estimated annual pollution load reduction
[5] TSS and TP removal benefits for wetland restoration were not included.

## 7.2 Funding Sources

The planning level estimated cost for the recommended Alternative 3 is $2,551,000 (see Section 7.1), including administration, design, permitting, engineering, and construction. The first phase of this project left a budget balance of more than $1M. After the development of this feasibility study, the project balance will be approximately $1.08 M. The Commission's current CIP includes a placeholder of $800,000 collected over 2027 and 2028 for the next phase of this project. In order to fund Alternative 3, the Commission would need to increase that levied amount. Alternative 3 may also be a good candidate for grant funding, as related to the components associated with the wetland restoration. The BCWMC should continue conversations with MPRB to ensure funding for long-term vegetation maintenance.

## 7.3 Project Schedule

For project construction to occur in 2027/2028, project design should begin in 2026. The BCWMC will hold a public hearing on this project at its meeting on September 17, 2026. Pending the outcome of the hearing, the BCWMC will officially order the project, and the BCWMC will certify to Hennepin County a final 2027 tax levy for this project. Both the City of Golden Valley and MPRB have indicated their preference that BCWMC remain as the project owner to advance the design and construction of the project, similar to Phase I. The construction work would likely begin in the fall of 2027, with final restoration complete in 2028.

Because of northern long-eared bat concerns, tree removal (greater than 3 inches in diameter) should occur during the period from November 1 through April 15, outside of the northern long-eared bat's active season. Additionally, excavation during the winter would be appropriate to complete the major earthwork during periods with less frequent runoff events. The MDNR may require exclusionary fencing to prevent turtles from entering the lagoons. If so, it would have an impact on the timing of bidding so that the contractor could install the fencing. Other scheduling restraints that are not fully understood at this stage of this project, may also occur as the permitting process begins.

## 7.4 Temporary Easements

The entire project is located on public property owned by the MPRB or City of Golden Valley, and no temporary easements are anticipated for project construction.

# 8 Alternatives Assessment and Recommendations

In developing a recommendation, the BCWMC Engineer considered the implementation of the three Alternatives (i.e., the dredging only of Lagoons D, E, F, and G with or without wetland restoration) as individual projects or as a single combined project for all lagoons. The main considerations included an evaluation of whether the alternatives presented cost-effective TP and TSS loading reductions, offered habitat or ecological improvements, and appeared feasible from a permitting standpoint. Since the Lagoons D, E, and F were already designed, permitted, and partially constructed in Phase I, Alternative 1 may be the easiest path for implementation, although there are questions about the methods needed to remove sediment from the now deepened lagoons with steep side slopes.

## 8.1 Recommendation

The BCWMC Engineer recommends completing Alternative 3 - Wetland Restoration and Dredging of Lagoon G. As compared to Alternatives 1 and 2, the additional focus on habitat and ecological benefits that are attained with this alternative are more fully aligned with BCWMC goals. This recommendation is contingent upon a future agreement between the BCWMC and MPRB/Golden Valley for the long-term maintenance of the wetland vegetation. Staff with the city and with MPRB each expressed a desire to help facilitate long-term maintenance of the wetland in terms of including the work in existing contracts or potentially doing the work with in-house crews. MPRB was also open to further discussions on cost sharing the long-term maintenance work, understanding there would be benefit to golf course aesthetics. There is also a possibility of levying for maintenance activities through Hennepin County.

If such an agreement for long-term wetland vegetation maintenance cannot be achieved, the BCWMC Engineer recommends completing a dredging-only effort within Lagoon G. This recommendation would constitute a dredging effort that balances a project somewhere between Alternative 2 and the dredging only component of Alternative 3A (i.e., dredging of the east portion of Lagoon G to a 6-foot depth). The extent of dredging should be optimized to maximize water quality benefits from the dredging with the available funding.

Some additional considerations for the recommendation are as follows:

- Being that the project area lagoons are connected in series, the dredging in Lagoon G will inherently extend the life span of Lagoons D, E, and F downstream and extend the projected life span of improvements completed in Phase I
- Access to Lagoon G does not require use of the parkway, avoiding impacts to park users and risk of damage to the roadway (parkway is not designed for heavy truck traffic and presented challenges in Phase I)
- Alternative 3 has received the most interest and favorable comments from project stakeholders throughout the feasibility process
- The deeper water in Lagoons D, E, and F creates additional construction challenges for dredging
- The success of Alternative 3 – the Wetland Restoration component at Lagoon G will be dependent on a successful vegetation management strategy and long-term maintenance of the restored areas

- If wetland restoration is not included, dredging within Lagoon G – both Alternative 2 and the dredging only component of Alternative 3A – targets restoring a depth and open water aesthetic consistent with previous designs while removing contaminated sediment and extending the lifespan of Lagoons D, E, and F downstream.

The BCWMC Engineer recommends that the BCWMC use the opinions of cost identified in this study to develop a levy request for the selected project and that the project proceed to design and construction. Due to the high cost of this alternative, we anticipate that the BCWMC would likely need to spread the CIP funding over more than one year to construct the project.

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