

**TASK ORDER No. 39: Preliminary Engineering Study for  
Lotus Lake Watershed Water Quality Improvement Project  
Pursuant to Agreement for Engineering Services  
Riley Purgatory Bluff Creek Watershed District and BARR Engineering Company.  
July 7, 2022**

This Task Order is issued pursuant to Section 1 of the above-cited engineering services agreement between the Riley Purgatory Bluff Creek Watershed District (District) and BARR Engineering Company (Engineer) and incorporated as a part thereof.

1. Description of Services:

The 2017 Lotus, Silver, Duck, Round, Mitchell, Red Rock Use Attainability Analysis Update; Lake Idlewild and Staring Lake Use Attainability Analysis; and Lower Purgatory Creek Stabilization Study (Lotus Lake UAA Update) identified watershed best management practices (BMPs) within the Lotus Lake watershed to reduce the phosphorus loading and improve the water quality of Lotus Lake. Based on its project prioritization process that quantitatively considered project benefits and feasibility constraints using nine benefit categories and a total benefit, the District incorporated implementation of the BMPs identified in the Lotus Lake UAA Update into its 2018 Plan (Planning for the Next Ten Years: 2018-2028). This feasibility study has been budgeted for in 2022 under the Lotus Lake Watershed Improvement Project (LL\_1, LL\_3, LL\_7, LL\_8) line item .

The Lotus Lake UAA Update identified that the watershed contributes roughly 28% of the annual watershed phosphorus loading to Lotus Lake and thus suggested numerous BMPs within the upstream tributary area to reduce pollutant loads to the lake. The following BMPs were incorporated into the district's 10-year plan capital improvement program:

- LL\_1: New Wet Pond – on land owned by City of Chanhassen; just south of a baseball field and park on the east side of Pleasantview Road
- LL\_3: Infiltration Basin – on land owned by City of Chanhassen; replace the existing dry detention basin in subwatershed LL-8E1, located near the park just west of Kerber Boulevard and south of Pontiac Lane – the city is currently dredging the wet pond and replacing the outlet structure
- LL\_7: Iron Enhanced Sand Filter – on land owned by City of Chanhassen; converting an existing wet pond into an iron enhanced sand filter in subwatershed LL-8B just north of Bighorn Drive.
- LL\_8: New Wet Pond – on land owned by 3 private owners; the enhancement and enlargement of an existing wet pond

For each BMP location, the preliminary engineering study will evaluate the feasibility of the original proposed BMP type as identified in the UAA as well as other potential stormwater BMPs at each location, as appropriate based on site and conveyance characteristics. This could include practices such as wet ponds, infiltration, iron-enhanced sand (or other enhanced media) filtration, woodchip bioreactors, and other proprietary filtration BMPs. In addition, other BMPs recommended by District staff or City stakeholders at the kickoff meeting will be considered in the assessment. This assessment will include developing an estimated construction cost and conceptual schematics for up to two of the most feasible BMPs at each location.

Work under this task order would provide RPBCWD with an engineering report summarizing the development and comparison of concept-level BMP design options, including capital and maintenance cost, project benefits, and permitting requirements, to provide additional scientific information upon which the managers can make prudent decisions about proceeding to full project implementation. Future task orders would cover work through final design, followed by preparation of bid documents and construction support services.

RPBCWD's activity is divided into three phases:

- Phase 1: Preliminary Engineering Design (This Task Order 39a)
- Phase 2: Final Design and Permitting (Future Task Order 39b);
- Phase 3: Construction Administration Services (Future Task Order 39c).

2. Scope of Services:

Engineer's services under this task order shall include:

**Phase 1. Preliminary Engineering Study and Stakeholder Involvement**

The preliminary engineering study will include stormwater BMPs that are innovative methods to remove phosphorus as well as considering opportunities to improve and enhance the overall project site ecology conditions, habitat, soil health, and downstream discharges in areas where there may be erosion/stability concerns. Additionally, as we review each BMP locations, we will also review concepts that may help manage areas of adjacent flooding, as applicable based on the District modeling.

The following subtasks have been included as part of the preliminary engineering and stakeholder involvement phase.

**Task 1-1. Project Meetings**

1. **Project Kickoff:** A project kickoff meeting will be scheduled following authorization by the Board to proceed with the preliminary engineering study. An initial meeting will be held with RPBCWD and city of Chanhasen staff to define project roles and responsibilities, clarify expectations, scope, schedule, and administrative procedures. We will also discuss each stakeholder's respective goals for the project and to learn about any key items that must or must not be considered during design. Each project site will be reviewed at a high-level and the goal will be to review the existing uses and current management and maintenance efforts and how stakeholders would like these areas to be used in the future.
2. **Preliminary Design:** Participate in one preliminary design meeting with city of Chanhasen, and RPBCWD staff, and any other identified key stakeholders. During the design meetings, Barr staff will present initial design concepts based on stakeholder feedback on project constraints (e.g., use, maintenance, wetland impacts, water level fluctuations, resident concerns, etc.) provided during the kickoff meeting. Barr staff will use stakeholder comments to refine the preliminary design of stormwater BMPs.
3. **Public Hearing and Presentation to RPBCWD Board:** Barr staff will work with RPBCWD's project manager to develop a presentation of the recommended preliminary designs to the Board of Managers, RPBCWD staff, and interested stakeholders, at their regularly scheduled meeting which is assumed to double as the public hearing for the project.

## Task 1-2. Site Characterization

Site characterization includes gathering information near the location of the proposed BMPs within the Lotus Lake watershed. This includes both desktop assessments as well as field data collection. We assume that District staff will coordinate authorization from all public and private landowners for District and Barr staff to access sites to perform any field data collection.

**Desktop Assessment:** Barr staff will perform the following desktop assessments will include compiling, reviewing, and summarizing the following GIS datasets:

1. Environmental Investigations: Barr will review of the Minnesota Pollution Control Agency's (MPCA) "What's in my Neighborhood?" database to determine if there is any expected concern for contamination in the area. Given the landuse of the area, there may be some debris in the fill used during development, but we do not anticipate widespread contamination that would impact the proposed projects. We have assumed that if there are any areas of concern identified, we will request and review the information in the MPCA's files for the site and completion of a Phase I environmental site assessment will be completed during a subsequent phase of design.
2. Wetland boundary review: Barr will perform a desktop review of the available National Wetlands Inventory (NWI) and any more local wetland data as available for the Lotus Lake watershed as part of the concept development to estimate wetland impacts and permitting needs.
3. Threatened and endangered species review: Barr will perform a desktop review of the available federal, state, and county databases to determine the potential for adverse impacts to state and federally listed species.
4. Environmentally sensitive features review: Barr will perform a desktop review of the available federal, state, and county databases to determine if any environmentally sensitive features or areas are located within the watershed as well as any critical or threatened habitat.
5. Cultural resources review: Barr will request review of the existing database from the State Historic Preservation Office (SHPO) for information related to known historic and archaeological resources in the project vicinity and will summarize any available information in the report.
6. Utility conflict review: Barr staff will request the most current public utility information from the City of Chanhassen (in GIS format) including storm sewer, sanitary sewer, and water main. A desktop review of this data in relation to the proposed project sites can be used to inform concept designs, minimize conflicts, and/or estimate costs to address anticipated utility conflicts.
7. Water Quality Monitoring Data: Barr will review available 2021 and 2022 flow and water quality monitoring data provided by the District for the monitoring stations that were located at upstream and downstream of proposed BMP LL\_7.

**Field Data Collection:** Site visits and field data collection will also be conducted as part of this preliminary engineering study. Although Barr staff will visit each proposed BMP site location, Barr will rely on District staff to assist in collection of site-specific data, as outlined below. However, Barr will coordinate this field data collection with District staff and provide data review for those tasks outlined below that we assume will be completed District staff.

1. **General Site Visit:** Following the review of the concepts and associated hydraulics and pollutant removals as developed for the UAA (see Task 1-3), two Barr staff will visit each site to confirm existing infrastructure, the proposed BMP siting, evaluate overall feasibility, review conditions at BMP site and downstream conditions of the anticipated discharge locations, and to document site area with photos. This will also include a qualitative review and summary of the existing ecological conditions of the general project area including condition of existing native habitat, turf, trees/forest, and other landscape features as well as potential opportunities for ecological improvement.
2. **Soil Health/Conditions:** Barr will work with District staff to collect representative soil samples at each BMP site to document pre-project soil health conditions, compaction and infiltration capacity. We estimated that hand augers may be used to review soils types/conditions and to collect the soil samples (assuming 1 samples per site). The district would send the samples to the Cornell Soil Lab (<http://soilhealth.cals.cornell.edu/testing-services/comprehensive-soil-health-assessment/>) for analysis of the following one of their established soil health analysis testing packages (note Cornell charges between \$100-\$140 per sample analyzed). This information will help inform elements of the restoration design. If district staff capacity is limited, Barr will request Administrator approval to conduct the investigation by either adjusting other scope items or adding these services on a time and material basis.

To minimize project expenditures at the feasibility stage of analysis, we assumed the following field data collection efforts will be completed during a subsequent phase of design for the project, should the Managers order the recommended projects, as outlined in this preliminary engineering study:

- We will rely on the 2011 MnDNR LiDAR data for the preliminary design related to the various BMPs as part of this study. However, if specific spot elevations are determined to be needed for specific locations as concepts are further developed, we assume that District staff will be able to collect this data as needed. We assume final design topographic and utility survey, soil borings and associated geotechnical data collection, and detailed tree surveys would be completed during a subsequent phase of design.
- Wetland delineations, wetland functions and values assessment (i.e., a Minnesota Rapid Assessment Method, or MNRAM, analysis), Wetland Type and Boundary Approval from the Local Government Unit (LGU), and review by the Technical Evaluation Panel (TEP) for concurrence on the delineation boundary will be completed during a subsequent phase of design.

### **Task 1-3. Preliminary Design**

Before site visits and designs are further developed, Barr staff will review each of the proposed BMP concepts as developed through the UAA process, the RPBCWD PC-SWMM model results, and the P8 water quality modeling for each BMP to inform and focus the site visits.

Once the site visits and field data collection has been completed, Barr will perform a high level screening of BMP options and more fully develop up to two conceptual designs and layouts for each BMP location. Although improving water quality is the primary goal of these practices, we will also consider opportunities to enhance the landscape by improving habitat (e.g. more native, pollinator species), ecological function, soil health, climate resiliency (considerations

during extreme events as well as periods of drought), and downstream flow conditions as these concepts are developed. We will also review the ability to help manage adjacent flooding in the watershed, as applicable.

The hydraulics of any of the proposed stormwater BMP will require careful consideration and design. The design goal will be treatment of lower flows to meet the phosphorus removal goals, while maintaining sufficient or expanding capacity for high flows to prevent or reduce impacts to existing structures. Therefore, the applicable portion of the RPBCWD's PC-SWMM hydrologic and hydraulic model will be updated to evaluate each stormwater BMP concept. At LL\_7, we will also consider the continuous flow data previously collected by the District to inform flow conditions at the BMP site. Additionally, we will evaluate the impact of proposed projects on reductions in peak discharges, velocities, and shear stresses, and summarized the impact on channel stability, especially in areas where there are known stability concerns or potential for erosion in downstream channels.

Barr will utilize the existing P8 model used in the Lotus Lake UAA update to evaluate potential pollutant removals for each of the proposed BMP concepts. The water quality modeling will form the basis for the estimated phosphorus removal from conceptual designs.

A schematic (i.e., one for each BMP) will be prepared for each concept. The concept drawings will be GIS based and primarily present a conceptual design to address the issues present and meet overall goals. The concepts will visualize the components of the BMPs itself as well as identification of opportunities to improve the ecological conditions of the project area. In addition, an engineer's opinion of probable cost will be developed for each option to aid in assessing the cost effectiveness of the various alternatives. Recommendations for future monitoring of the recommended treatment system will also be made in the preliminary engineering report to evaluate actual pollutant removal effectiveness post-construction.

For each of the up to eight design concepts (i.e., two concepts at 4 different sites), Barr has allotted 40 hours to screen potential BMP types, develop the two detailed concepts, conduct the necessary hydrologic and water quality modeling, estimate the OPC, assess benefits (e.g., pollutant and ecological), and identify implementation challenges.

#### **Task 1-4. Preliminary Engineering Report**

A summary report will be prepared to document the recommended conceptual design, alternative design concepts considered, estimated costs, design constraints, design assumptions, and anticipated phosphorus removals for each BMP location. The report will also highlight the other benefits of the concepts including the opportunity to expand or enhance habitat, ecological conditions, and soil health. A comparison of estimated construction costs for each of the BMP concepts in comparison to the costs originally estimated in the Lotus Lake UAA update will be included. The report will also include a summary of the recommendations from the Kerber Pond Ravine Feasibility Study completed by the RPBCWD in 2020. Ultimately the report will provide a comparison of opportunities to improve water quality to Lotus Lake along with the recommended projects. Barr staff assume one meeting and round of comments from RPBCWD and City of Chanhassen staff before finalizing the report.

#### **Task 1-5. Project Management**

Project Management will be required in all phases as careful project management will help to ensure the work meets the expectations of District staff and other stakeholders, and that it is

completed in a satisfactory manner, within the project timeline and within the agreed-upon budget.

Throughout the project, Barr will provide updates to the project team that document project progress and coordinate tasks. We will provide monthly progress reports and budget status updates. We will solicit feedback from you on an ongoing basis to ensure clear and timely communication.

### **Optional Tasks**

**Agency Meeting:** One (1) virtual Technical Stakeholder meeting with staff from RPBCWD, Chanhassen, USACE, MnDNR, and MPCA to discuss concept alternatives and review permit requirements for each project area prepare meeting minutes to confirm regulatory agencies' discussion results.

**Resident Engagement:** One (1) meeting with residents around LL\_8 once preliminary concepts are developed

### **Assumptions**

We have made several assumptions in preparing the scope of work for each task in this agreement. Assumptions relating to individual work tasks are listed along with the detailed description. However, additional assumptions that do not correspond with a single work task are listed below:

- Project kickoff and design meetings will be held virtually and last up to 1 hour.
- Site access on private property will be coordinated by District staff.
- The project site is free from contamination.
- Topographic and utility survey, soil borings and associated geotechnical data collection, and detailed tree surveys would be completed during a subsequent design phase for the project.
- Wetland delineation and associated reporting would be completed during a subsequent phase of design for the project.
- Soil health sampling and lab testing will be completed by District staff.
- The proposed budget includes costs for mileage reimbursement for site visits.
- Design concepts will be developed in GIS.
- No additional flow or water quality monitoring is required.
- No further calibration of existing PC-SWMM or P8 modeling will be completed.
- City of Chanhassen will provide drawings and supporting documentation related to the city project at LL-3
- For data collected around LL\_7, District staff have performed quality control and quality assurance on all monitoring data collected at the site, thus the monitoring data is adequate for use without additional QA/QC by Barr. If additional QA/QC of the data are needed, the data are revised during the analysis, or modeling or reporting changes are needed, this unanticipated cost will be invoiced on a time and expense basis.
- The draft and final report will only be provided in an electronic form. Printed copies would be provided at additional cost s invoices on a time and expense basis.

Deliverables:

The following deliverables will be prepared and provided to the RPBCWD for the preliminary engineering study and stakeholder involvement:

- Agenda and meeting notes for one kickoff meeting
- Agenda and meeting notes for one stakeholder/design meetings
- Draft and final preliminary engineering report, including conceptual schematics of potential BMPs
- Presentation to RPBCWD managers
- Monthly progress updates

3. Budget:

Services under this Task Order will be compensated for in accordance with the engineering services agreement and will not exceed \$89,600 without written authorization by the Administrator.

Barr understands the importance of working as efficiently as possible while providing the services described above. Therefore, we will look for cost saving during the entire preliminary design process. The following table provides a breakdown of the anticipated cost for major tasks associated with scope of services.

Task	Task Description	Anticipated Budget
1-1	Project Meetings	\$8,000
1-2	Site Characterization	\$18,700
1-3	Preliminary Design	\$42,200
1-4	Preliminary Design Memorandum	\$14,600
1-5	Project Management	\$6,100
<b>Task Order 39a Total</b>		<b>\$89,600</b>
Optional Tasks		
	Agency Meeting	\$2,100
	Resident Meeting	\$1,000
<i>Task Order 39a Total (including Optional Tasks)</i>		<i>\$92,700</i>

4. Schedule and Assumptions Upon Which Schedule is Based

The following proposed schedule has been developed assuming authorization in July 2022, and that the District would like construction start in later 2024. The tentative schedule is subject to change with changes to scope, completion of field investigations by District staff, review periods, and comments received during reviews. Barr's understands the District's desire to get projects in the ground as quickly and efficiently as possible. To that end Barr will work with District staff to expedite the timeline where possible.

- Project Kickoff Meeting – July 2022
- Design and Stakeholder Meeting – January 2022
- Draft Preliminary Design Memorandum – March 2022
- Final Preliminary Design Memorandum – April 2022
- Presentation to RPBCWD Board and public hearing – May 3, 2023

**IN WITNESS WHEREOF**, intending to be legally bound, the parties hereto execute and deliver this Agreement.

**CONSULTANT**

**RILEY PURGATORY BLUFF CREEK  
WATERSHED DISTRICT**

By \_\_\_\_\_

By \_\_\_\_\_

Its Vice President \_\_\_\_\_

Its \_\_\_\_\_

Date:

Date:

*APPROVED AS TO FORM & EXECUTION*

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