



GRINNELL PARKS AND RECREATION BOARD SPECIAL
MEETING
FRIDAY, JUNE 27, 2025, AT 12:00 PM
ZOOM

Topic: Parks and Rec

Time: Jun 27, 2025 12:00 PM Central Time (US and Canada)

Join Zoom Meeting

<https://zoom.us/j/91468159275?pwd=OWjNpnTk0D8MmiMNIvVU0gcexPwJhf.1>

Meeting ID: 914 6815 9275

Passcode: 566943

TENTATIVE AGENDA

1. Roll Call:

Lindley__, Eyberg__, Crawford__, Jensen__, Coopriders__, Gant__, Moyer__

2. Approve Agenda:

3. Committee Business:

A. **Grinnell Lakes Restoration Engineering Proposal** – Staff recommendation to initiate negotiations with the top-ranked firm for engineering services related to watershed and in-lake restoration efforts at Arbor Lake and Lake Nyanza.

4. Notes:

5. Inquiries:

6. Adjourn:

Any person with a disability who requires a modification or accommodation in order to participate in the meeting, or any person with limited English proficiency (LEP) who requires language assistance to communicate with the City Council during the meeting, should contact the City Clerk, (641) 236-2600 or adevig@grinnelliowa.gov, no fewer than two business days prior to the meeting to enable the City of Grinnell to make reasonable arrangements to assure accessibility or language assistance for the meeting.



Proposal for

Design and Engineering Services - Arbor Lake and Lake Nyanza Restoration

VIA Email: JAllsup@grinnelliowa.gov

June 13, 2025

Jordan Allsup, Parks and Recreation Director
City of Grinnell
520 4th Avenue
Grinnell, IA 50112

Subject: Design and Engineering Services—Arbor Lake and Lake Nyanza Restoration

Dear Jordan:

Houston Engineering, Inc. (HEI) is excited to submit our proposal for the Arbor Lake and Lake Nyanza Restoration project. We look forward to partnering with the City of Grinnell and bringing the following:

Proven Success in Iowa Lake Restorations—HEI’s extensive lake restoration experience across Iowa—highlighted by projects like McKinley, Three Mile, and Otter Creek lakes—enables us to anticipate challenges and integrate 404 permitting into design, keeping schedules on track and maximizing funds for improvements rather than approvals.

Deep Understanding of Grinnell’s Lakes and Watersheds—Having completed the Grinnell Lakes Feasibility Study, we have a deep understanding of the project that enables us to quickly gather data, anticipate challenges, and efficiently develop designs aligned with each alternative’s goals and constraints. We also understand the importance of maximizing dissolved phosphorus removal and enhancing traditional stormwater best management practices (BMPs) for better performance.

Dam Rehabilitation and Dam Safety Experience—HEI has designed dam and outlet rehabilitations and incorporated low-level drawdowns for numerous Iowa dams. Additionally, we’ve completed statewide high hazard dam assessments for the Iowa Department of Natural Resources Dam Safety Program. This means we bring the latest knowledge of the rules and regulations to the project as well as successful collaboration with dam safety in the approval of permits to complete similar projects.

Integration with Parks and Recreation Master Plan through Subconsultant—Finally, the addition of RDG Planning and Design to our team brings the opportunity to integrate watershed BMPs and in-lake engineering with the City’s vision and plans for the adjacent parks and landscape, a perfect alignment of experience to maximize the project’s value for the City!

We look forward to the opportunity to work together on this plan. Please feel free to contact Charles if you have any questions pertaining to our submittal.

Sincerely,

HOUSTON ENGINEERING, INC.



Charles Ikenberry, PhD, PE, CFM
Project Manager
Direct: 515.444.5394
cikenberry@houstoneng.com



Drew Kessler, PhD
Principal-in-Charge
Direct: 763.493.6685
dkessler@houstoneng.com




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Statement of Qualifications

1. Introduction



Houston Engineering, Inc.

 100 Court Avenue
Suite 202
Des Moines, IA 50309

Charles Ikenberry, Project Manager

 515.444.5394
 cikenberry@houstoneng.com

Drew Kessler, Principal-in-Charge

 763.493.6685
 dkessler@houstoneng.com

Firm History

Houston Engineering, Inc. (HEI) is a multidisciplinary consulting firm that provides engineering, surveying, environmental, landscape architecture, and planning consulting services. Founded in 1968, HEI has offices throughout the Midwest. We offer a full range of services that cover water resources, environmental issues, water supply, municipal, transportation, surveying, land and site development, waste management, and GIS. We utilize the latest technology to provide innovative solutions that produce results now and continue to provide value well into the future.

As a firm, HEI also brings decades of experience tackling water resources management issues for clients across the Midwest. We regularly partner with conservation districts, watershed and lake improvement districts, and local lake associations to deliver innovative, science-based solutions for water quality and lake health. Our team understands the unique challenges faced by these organizations and provides comprehensive, cost-effective strategies that support both ecological integrity and community goals.

We offer a full suite of services under one roof, ensuring seamless project delivery from concept through implementation.

Our key relevant capabilities include:

- **Lake Management Planning:** Developing strategic, data-driven plans tailored to the specific needs of each lake and its watershed.
- **Watershed and Lake Modeling:** Using advanced modeling tools to simulate water quality scenarios and guide decision-making.
- **In-Lake Treatment Design:** Designing effective treatment systems to address nutrient loading, sedimentation, and aquatic invasive species.
- **Lake, Dam, Outlet, and Drawdown Design and Installation:** Engineering outlet structures that support water level management and ecological function.
- **Strategic Planning:** Supporting lake associations and improvement districts with long-term planning and governance strategies.
- **Grant Writing and Branding:** Helping clients secure funding and build public support through compelling communication and visual identity.

Our work is grounded in collaboration, innovation, and a deep commitment to improving water resources. Whether restoring impaired lakes or enhancing recreational opportunities, HEI delivers results that align with regulatory requirements, attract funding, and earn community trust.



Our team has in-depth knowledge of this project from our extensive work with you on the Grinnell Lakes Feasibility Study, bringing advantageous insight and collaboration to your project.

2. Services and Relevant Experience

HEI has led numerous lake and watershed restoration efforts across Iowa and the Midwest—delivering successful outcomes from feasibility studies through final design and permitting. We’ve designed dredging and shoreline stabilization projects, engineered low-level drawdown and rehabilitation of dams and outlet structures, and integrated water quality best management practices (BMPs) into both urban and rural landscapes.

2a. Houston Engineering, Inc.



For this project, HEI offers unmatched continuity: our team

authored the **Grinnell Lakes Restoration Feasibility Study**, giving us a deep understanding of site-specific constraints, hydrologic and hydraulic modeling, sediment dynamics, permitting considerations, and restoration opportunities.

2b. RDG Planning and Design



We are also joined by **RDG Planning and Design (RDG)**, the

authors of the City’s **Parks and Recreation**

Master Plan, ensuring that the engineering and ecological elements of this project align seamlessly with the City’s broader vision for public spaces and park enhancements.

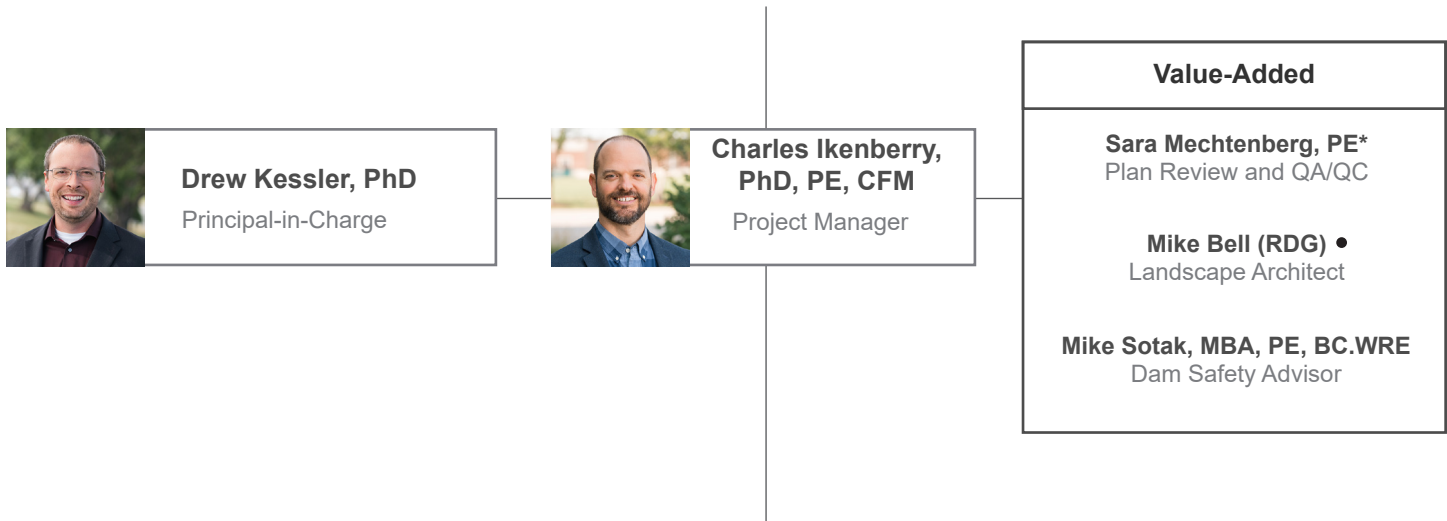
This experience means you will benefit not only from our technical expertise and regulatory familiarity, but also from a nuanced understanding of Grinnell’s priorities and stakeholder expectations. We bring the foresight needed to streamline coordination, minimize redesign, and position the project for funding success and long-term maintainability.

Just as important, we understand how to integrate landscape and public access improvements into engineering designs in ways that honor community input and recreational goals. The result is not only a better-functioning lake and watershed, but a more welcoming and enduring public asset. We have the capacity to begin work immediately upon contract execution and are ready to help move this important project forward. To view specific applications of our relevant experience, please see the experience matrix shown in section 7. Additional Information of our proposal.













Our team has experience rehabilitating dams, eroding outlet channels, and failing grade controls structures like those present in downstream of the Arbor Lake Dam.

3. Project Team Organizational Chart



Execution

| | | |
|--|--|--|
|  <p>Design Lead Carly Wagner, PE</p> |  <p>Watershed and Stream Best Management Practices Alex Schmidt, MS, PE*</p> |  <p>Production Tristan Balmer, EIT</p> |
|  <p>Permitting Lead ¹ Janel Kaufman, MS, PE*</p> |  <p>Watershed and Stream Best Mangement Practices Greg Pierce (RDG) •</p> |  <p>Production Ted Bridges, EIT</p> |
|  <p>Survey Lead Jim Schlieman, PLS</p> |  <p>Geotechnical Analysis ² Bob Gregalunas, PE*</p> |  <p>Production Will Gaskins, EIT (RDG) •</p> |
|  <p>Dam/Outlet Lead Mark Jacobs, PE, CFM</p> | | |

¹ Archaeology services provided by the Office of the State Archaeologist (if/as required)

² Geotechnical Field/Lab Testing provided by Terracon (if/as required)

• Subconsultants from RDG

Team Lead = Bold

* Registrations in other states

Ability to Perform Work

Our team was carefully assembled to align with the technical needs and schedule of this lake restoration project. Each member was selected for both their subject-matter expertise and their current availability to contribute meaningfully throughout the project. This structure provides strong project leadership, targeted quality assurance and value enhancement, and robust technical capacity to deliver results.

Key considerations supporting our team's ability to perform include:

- **Project Leadership.** Project Manager Charles Ikenberry is deeply familiar with the project's technical requirements and the City's goals. He will provide active leadership, combining strategic guidance with day-to-day involvement. This project will be at the very top of Charles' priorities through completion of final design and permitting deliverables. Principal-in-Charge Drew Kessler serves in an advisory role and will step in only if needed as a client advocate, ensuring alignment without duplicating management.
- **Advisory and QA/QC Support.** Sara Mechtenberg will lead quality assurance with a focus on constructability and practical implementation at key milestones. Mike Sotak will advise on dam safety as needed. Both bring highly relevant experience and are available to provide focused, high-value input.
- **Subconsultant Integration.** Mike Bell of RDG will contribute a landscape architect's perspective to enhance recreational features and aesthetics. Greg Pierce and Will Gaskin (RDG) will lead BMP 3 (Figure 1, page 38) design, leveraging their stream restoration expertise and prior collaboration with HEI. Their involvement increases team capacity and allows HEI staff to focus on other in-lake and watershed practices.
- **Technical Leadership.** Carly Wagner, Mark Jacobs, and Janel Kaufman have the availability and expertise to lead overall design, dam/drawdown renovation, and permitting, respectively. Alex Schmidt will lead dissolved phosphorus removal enhancements, applying proven approaches from his Minnesota work to improve water quality outcomes.
- **Design Production.** Ted Bridges and Tristan Balmer will support drawing production under senior guidance. As they conclude current commitments, both are prepared to dedicate the majority of their time to this project.

While we have not projected exact hours per role, this team is well-matched in availability, capability, and commitment to delivering the project on schedule and to a high standard.



Expertly assembled, purposefully aligned — our team brings the leadership, precision, and technical strength to restore Grinnell Lake with lasting impact.

Charles Ikenberry, PhD, PE, CFM

Project Manager



Education

PhD in Agricultural and Biosystems Engineering, Iowa State University

MS in Biological and Agricultural Engineering, Kansas State University

BS in Civil Engineering, University of Nebraska

Registration

Professional Engineer

Iowa—P22051

Certified Floodplain Manager

US-19-11463

Professional Experience

HEI: 2017-Present

Total Experience: 25 Years

Charles will bring his in-depth project understanding and experience managing previous lake restoration projects, providing strong leadership of the project team and proactive communication and collaboration with the City and DNR.

Charles Ikenberry serves clients in two major areas: leading the technical aspects of water quality projects and services and ensuring responsiveness and a high level of service to a growing list of clients. He has 25 years of experience in water resources engineering, including watershed and water quality planning, modeling, and design oversight. As our Des Moines Office Manager, he can ensure the proper resources are directed to your projects, so they receive high-priority attention and responsiveness from our team. Charles has worked to protect and improve Iowa's water resources as a Department of Natural Resources (DNR) employee, a researcher, and a consultant, and has a vested interest and commitment to important projects like this.

- **Grinnell Lakes Feasibility Study, City of Grinnell, IA.** Project Manager. HEI recently developed a lake restoration feasibility study for Arbor Lake and Lake Nyanza. Assessments included lake bathymetric survey and mapping, sediment profiling to estimate thickness and volume, and sediment geochemistry analysis to quantify sediment-phosphorus concentrations and the release rate of phosphorus to the water column. The study also involved stormwater, pollutant load, and lake response modeling to simulate baseline conditions, updating pollutant loads, and evaluating potential best management practices (BMPs). The last component of the plan was an alternatives analysis that evaluated the feasibility, costs, and benefits of a suite of watershed and in-lake improvement options, including new sediment/nutrient retention basins, stream stabilization, dam water level drawdown rehabilitation, shoreline improvements, dredging, and alum application to inactivate sediment phosphorus.
- **McKinley Lake Restoration Project, City of Creston Parks and Recreation Department, Creston, IA.** Project Manager responsible for a comprehensive lake restoration project spanning several years and phases of effort. In Phase 1, Charles led conceptual development, cost/benefit estimation, and priority ranking for watershed and in-lake water quality improvement alternatives. Concepts included a stormwater wetland in McKinley Park, shoreline improvements for aquatic habitat and recreational access, sediment removal (dredging), and a suite of complementary recreational features such as docks and jetties. In Phase 2, Charles conducted stakeholder engagement, oversaw the development of renderings public outreach, and facilitated the planning and coordination of technical and financial partner agencies to buy-in and momentum. Phase 3 included the development of engineering plans and specifications, estimated construction costs, required permits and clearances, and construction bidding and oversight. Construction began at the end of 2024 and will be completed in the spring of 2026. Two challenging aspects of the project were the replacement of an old, poorly functioning drawdown structure and finding adequate sediment spoils storage for 250,000 cubic yards of sediment removed from the lake.
- **Eastern Polk County Stream Restoration Project, Polk County Public Works, IA.** Project Manager for the assessment, permitting, and design of a large-scale stream restoration project that will stabilize and restore nearly 9 miles of rural and urban streams in the Fourmile and Camp Creek watersheds. Under Charles' leadership, the team assessed the stream and designed restoration practices using Iowa Stream Restoration Toolbox developed by the Iowa DNR. The project required permit coordination with multiple review agencies, including the US Army Corps of Engineers and the DNR and detailed hydrologic and hydraulic modeling for both design and permitting. As of June 2025, two sites have started construction and two more are in the bidding phase. All construction will be completed in 2025/2026.

Drew Kessler, PhD Principal-in-Charge



Education

PhD Water Resources Science with an emphasis on Geospatial Technologies, University of Minnesota

MS in Natural Resource Science, Geospatial Information, University of Nebraska-Lincoln

BS in Natural Resource Management, Biotic Resources, North Dakota State University

Professional Experience

HEI: 2014-Present

Total Experience: 20 Years

Drew is skilled at solving complex water quality issues, and excels at client service. Drew will not bill significant hours to this project but will support Charles in bringing the resources necessary to deliver successful project outcomes.

Drew Kessler will serve as your Principal-in-Charge. Drew is a scientist and project manager with HEI who specializes in the areas of water resources management, surface water quality, wildlife ecology in aquatic systems, sediment source assessment, and the total maximum daily load (TMDL) process. His expertise is specifically related to using GIS for analyzing water resources and developing modeling systems that bring science into decision-making processes.

- **Hay Creek Watershed Management, Roseau River Watershed District, Roseau County, MN.** HEI Project Manager for the Hay Creek Watershed Management effort, provided direction and oversight for completion of the project. HEI prepared an implementation plan that identified locally supported conservation actions for improving water quality and quantity within the Hay Creek Watershed. Presentation materials engaged the public and stakeholders around priority issues in the form of public meetings. The feedback guided alternative assessments for improving the bed and bank stability of Hay Creek. HEI developed five different channel stabilization and restoration concept plans for Hay Creek, including the estimates of unit costs associated with the concepts. Following a second stakeholder meeting, HEI delivered a completed project report that can be used to pursue funding to implement practices.
- **Total Maximum Daily Load/Watershed Restoration and Protection Strategy Process, Minnesota Pollution Control Agency, Statewide Minnesota.** HEI Project Manager for the Minnesota Pollution Control Agency (MPCA) Master Contract, provided oversight to team members to prioritize, target, and measure precision conservation for water quality improvement projects throughout Minnesota. HEI developed unique methods to use the Hydrologic Simulation Program-FORTRAN model information to prioritize subwatersheds that are the largest source of nonpoint pollution and then use enhanced water quality products, derived from LiDAR data, to target field scale implementation based on the greatest return on investment for pollutant reduction. This level of detail allowed more accountability and documentation and has a better track record of obtaining funding to implement solutions on the ground.
- **Matejcek Dam Rehabilitation and Watershed Plan, Walsh County Water Resource District, ND.** Scientific Lead for the development of a watershed plan for the Matejcek Dam. It was determined in 2010 that the dam is a high-hazard potential structure and needed to be rehabilitated. HEI completed environmental reviews as well as design alternatives for the dam through a watershed rehabilitation plan, the result of which will lead to further federal funding for the subsequent projects. This is a high-hazard potential dam that requires work to maintain safety standards.
- **Hydrology and Flood Mitigation, Dubuque County, IA.** Technical Advisor supporting model use. HEI worked for the County to develop detailed geospatial data to better understand flooding and pollutant dynamics across the County. The data was used to identify the best potential practices to invest in for protecting and improving critical infrastructure and the natural environment for future generations. This project also included a public outreach component so that County residents understand, support, and assist county officials in working towards these improvements.

Sara Mechtenberg, PE

Plan Review; QA/QC



Education

BS in Biological Systems Engineering,
University of Nebraska-Lincoln

Registration

Professional Engineer

Nebraska—E14026

Professional Experience

HEI: 2012-Present

Total Experience: 19 Years

Sara brings 19 years of lake restoration experience to her role in quality assurance and internal review of deliverables.

Sara Mechtenberg has 19 years of professional experience in water resource consulting. She has been involved in a wide variety of projects, including dam design, reservoir/fishery design, lake restoration, community-based watershed management planning, water quality modeling, alternatives analysis, and stream/wetland restoration design. Her previous involvement with an environmental sciences group provided her experience with jurisdictional wetland evaluations and permitting procedures. Her current responsibilities include planning, design, and modeling for projects ranging from initial concept development to final design and construction management. Sara has successfully led numerous multimillion-dollar water resources projects through design, permitting, and construction.

- **Otter Creek Lake and Park Restoration Project, Tama County Conservation Board and Iowa Department of Natural Resources, Toledo, IA.** Design Engineer for the development of the final design, construction documents, and cost estimates to complete the improvements identified in the study phase. Improvements included watershed impoundments (ponds and wetlands) to reduce sediment and phosphorus loads to the lake, installation of a new drawdown pipe and outlet structure in the main dam, in-lake dredging to remove legacy sediment as well as improve water quality and fish habitat, shoreline improvements to improve habitat and angling opportunities, and park improvements throughout the campgrounds. Sara was responsible for design guidance, production of construction documents, and valuations of quantities and costs. She also provided support during construction for observation, contractor coordination, and assessing potential field changes.
- **Restoration of Three Mile Lake, Iowa Department of Natural Resources, Afton, IA.** Design Engineer for the planning and final design of watershed and in-lake improvements for Three Mile Lake. Improvements evaluated and designed included near-lake watershed impoundments (within the park property) and modifications to a large in-lake silt dike to reduce sediment and phosphorus loads to the lake. Sara was responsible for development of alternatives, led the design, coordination of permitting requirements, production of construction documents, and valuations of quantities and costs. She also provided support during construction oversight.
- **Standing Bear Boat Ramp Replacement and Lake Improvements, Nebraska Game and Parks Commission, Omaha, NE.** Design Engineer for the rehabilitation of Standing Bear Lake's recreational boat ramp, parking lot, trails, fishing access structures, and in-lake habitat improvements. Sara was responsible for coordinating with the Nebraska Game and Parks Commission and the City of Omaha to determine the design layout and comply with US Corps of Engineers permitting requirements. Sara designed earthwork grading, surfacing materials, required details, profiles, and cross sections for the site. She developed construction plans and specifications, calculated quantities, developed cost estimates, and managed construction oversight.
- **Restoration of the West Lake Complex (Lake of the Hills), Scott County Conservation Board/Iowa Department of Natural Resources, Davenport, IA.** Design Engineer for the water quality improvements identified in the study phase, including watershed impoundments (ponds and wetlands), in-lake dredging, and shoreline improvements to improve habitat and angling opportunities. Sara was responsible for design guidance, production of construction documents, and valuations of quantities and costs. She also provided support during construction oversight.

Mike Sotak, MBA, PE, BC.WRE

QA/QC; Dam Safety Advisor



Education

Master of Business Administration,
University of Nebraska-Lincoln
BS in Civil Engineering, University of
Nebraska-Lincoln

Registration

Professional Engineer

Iowa: P16681

Board-Certified Water Resources
Engineer

BC.WRE - 000760

Professional Experience

HEI: 2012-Present

Total Experience: 35 Years

Mike has more than 35 years of experience with dam design and rehabilitation projects—from dam safety review through construction—and will use his knowledge to advise, as needed, on dam safety design considerations.

Mike Sotak has more than 35 years of experience in water resources engineering, serving as a lead staff engineer and project manager for several projects. He has extensive experience on projects including watershed planning, economic analyses, river restoration/bank stabilization, and levee and dam design. Mike has personally been involved with the design and construction of more than 100 dams since 1990 and is actively involved with the Association of State Dam Safety Officials and sits on the State of Nebraska Dam Safety Consultant Review Council.

- **High Hazard Dam Assessments, Iowa Department of Natural Resources, Statewide Iowa.** Project Manager for the assessment of 85 high hazard dams across the state of Iowa, including overall risk assessment and development of mitigation alternatives.
- **Otter Creek Lake Drawdown Construction, Tama County Conservation Board and Iowa Department of Natural Resources, IA.** Civil Engineer of Record for the design, permitting, and construction of a new drawdown conduit and intake riser for a high hazard dam. The design required a phased staging plan to protect dam owner risk and not drain the entire reservoir during construction.
- **Restoration of the West Lake Complex (Lake of the Hills) Preliminary and Final Design, Scott County Conservation Board, Scott County, IA.** Quality Control Manager and Designer for the small dam impoundments (water quality basins) and dam riser/outlet modifications to facilitate drainage and dredging within the reservoir. Reviewer for all watershed and in-lake design components, construction specifications, and cost estimates. Review focused on proposed dredging and sediment storage operations, shoreline erosion and improvement alternatives, and assessment of feasibility/constructability of all design features.
- **Lake Manawa Water Quality Improvements Project, Iowa Department of Natural Resources, Council Bluffs, IA.** Principal Engineer responsible for project coordination, dredging design, and final implementation. Mike led the community-based planning component for the water quality improvements. He performed coordination with project stakeholders to determine feasible and preferred management alternatives.
- **Five Island Lake Restoration Watershed Management Plan and Preliminary Design, Emmetsburg, IA.** Lead Designer for lake outlet modification to facilitate improved hydraulic performance and lake drawdown for dredging and other water quality improvements.
- **Lake Mitchell Restoration Project, City of Mitchell, SD.** Project Engineer for employing the Seven Steps of Lake Management and developing the water quality management plan to improve the water quality at Lake Mitchell. The project included development of a water budget, nutrient mass balance model, lake response model, community-based planning efforts, and development of preferred management practices.

Carly Wagner, PE

Design Lead



Education

BS in Civil and Environmental Engineering, University of Iowa

Registration

Professional Engineer

Iowa—P28033

Professional Experience

HEI: 2019-Present

Total Experience: 9 Years

Carly is one of HEI's most talented designers and has relevant experience with key project components, including watershed BMPs, shoreline stabilization, access and habitat improvements, dredging and spoils containment, and other lake restoration alternatives.

Carly Wagner serves clients out of HEI's Maple Grove office. She earned a bachelor's degree in civil engineering at the University of Iowa and holds a Certificate of Sustainability. Carly has been involved in a variety of projects involving lake restoration and water quality, site design, stream restoration, dam design, hydrologic and hydraulic (H&H) analysis, and boat ramp design. Carly is proficient in HEC-RAS, HEC-HMS, HY-8, WIN TR-55, AutoCAD Civil 3D, ArcMaps, and Global Mapper.

- **Eastern Polk County Stream Restoration Project, Polk County Public Works, IA.** Design Lead for the assessment, permitting, and design of a large-scale stream restoration project that will stabilize and restore nearly 9 miles of rural and urban streams in the Fourmile and Camp Creek watersheds. The estimated construction cost of the projects total \$15 million, which includes rock riffles, step pools, and cross vanes for grade control, toe rock and toe wood for bank stabilization, and floodplain benching and bank shaping to improve stream function. The team assessed the stream and designed restoration practices using Iowa Stream Restoration Toolbox developed by Iowa Department of Natural Resources (DNR). The project required permit coordination with multiple review agencies, including the US Army Corps of Engineers and the DNR, and detailed H&H modeling for both design and permitting. As of June 2025, two sites have started construction and two more are in the bidding phase. All construction will be completed in 2025/2026.
- **McKinley Lake Restoration Project: Phase 2 Stakeholder Engagement, City of Creston and Iowa Department of Natural Resources, IA.** Design Engineer responsible for developing a lake drawdown plan to remove 200,000 cubic yards of sediment from lake and designed a spoils grading plan. She also developed a plan for fishing jetties, fish habitats, and 2,000 linear feet of shoreline stabilization and deepening. Carly designed an ADA parking stall and access to a courtesy dock and ADA kayak launch. She designed a controlled dam breach and replacement of the existing low flow drawdown structure to keep the dam in compliance with dam safety. She also designed in-lake best management practices (BMPs) to improve the water quality and decrease sediment and phosphorus accumulation.
- **Otter Creek Lake and Park Restoration Project, Tama County Conservation Board and Iowa Department of Natural Resources, Tama County, IA.** Engineer responsible for developing preliminary and final design concepts for lake sediment removal (dredging), water quality BMPs, dam rehabilitation, and shoreline improvements. She designed a controlled dam breach and installation of a new low flow drawdown structure to keep the dam in compliance with dam safety. She developed preliminary cost analysis so client and project sponsors could identify and align funds for future design and construction of improvement alternatives. Carly conducted stakeholder engagement through public meetings and developing lake restoration concepts for public viewing.
- **Restoration of Three Mile Lake (Phase 1 and Phase 2), Iowa Department of Natural Resources, Union County, IA.** As a Design Engineer, Carly analyzed multiple locations and developed preliminary and final design concepts for water quality impoundment to determine the most cost-effective sites. She was responsible for sizing new and rehabilitating existing water quality impoundments using H&H modeling. She also developed dredging plan to remove sediment from various existing ponds and designed a site for dredged material to be stored. Carly performed a wind fetch analysis to help determine lengths and heights of jetties and a windbreak structure.

Janel Kaufman, MS, PE

Permitting Lead



Education

MS in Civil and Environmental Engineering, University of California-Berkley

BS in Civil Engineering, University of Nebraska-Omaha

Registration

Professional Engineer

South Carolina—28225

Professional Experience

HEI: 2016-Present

Total Experience: 18 Years

Janel's approach expedites permit approval and saves significant potential mitigation costs, freeing up more dollars for construction of alternatives that directly impact lake restoration.

Janel Kaufman has more than 18 years of experience in environmental permitting and civil engineering design across the country. She has worked on a wide variety of projects involved with every level of government, including federal, state, and local, and has worked on projects ranging from watershed plans to water rights determinations. Janel is knowledgeable of the National Environmental Policy Act process and has been involved with projects in all aspects of permitting and design, including site and watershed investigations, report writing, data collection and analysis, application development, and public involvement. She also brings a great rapport with Iowa regulatory review personnel and a proven track record assisting clients and design teams in the integration of design with permitting considerations.

- **Eastern Polk County Stream Restoration Project, Polk County Public Works, IA.** Permitting Lead for the assessment, permitting, and design of a large-scale stream restoration project that will stabilize and restore nearly 9 miles of rural and urban streams in the Fourmile and Camp Creek watersheds. The estimated construction cost of the projects total \$15 million, which includes rock riffles, step pools, and cross vanes for grade control, toe rock and toe wood for bank stabilization, and floodplain benching and bank shaping to improve stream function. The project required design and permitting coordination with multiple communities, landowners, and review agencies, including the US Army Corps of Engineers, US Fish and Wildlife Service, and the Iowa Department of Natural Resources. As of June 2025, two sites have started construction and two more are in the bidding phase. All construction will be completed in 2025/2026.
- **Lake of the Hills Lake Restoration Project, Iowa Department of Natural Resources, Davenport, IA.** Permitting Lead for nine nationwide and one individual Clean Water Act Section 404 permits, including wetland and other jurisdictional waters of the US determination, identifying stream mitigation requirements using the Iowa Stream Mitigation Method, agency coordination, and wetland and stream mitigation plan. Janel was responsible for permitting oversight, client and agency coordination, leading field analysis, assisting with design decisions related to minimizing wetland and stream impacts and other permitting obstacles, and 404 document preparation and review.
- **Three Mile Lake Restoration Program, Iowa Department of Natural Resources, Afton, IA.** Permitting Lead for two nationwide and one individual Clean Water Act Section 404 permits including wetland and other jurisdictional waters of the US determination, identifying stream mitigation requirements using the Iowa Stream Mitigation Method, agency coordination, and wetland and stream mitigation plan. Janel was responsible for permitting oversight, client and agency coordination, leading field analysis, assisting with design decisions related to minimizing wetland and stream impacts and other permitting obstacles, and 404 document preparation and review. Also developed stream mitigation monitoring report templates and performance monitoring criteria.
- **Sand Draw Creek Grade Stabilization Projects, Middle Niobrara Natural Resources District, Brown County, NE.** Project Manager and Permitting Lead for the assessment, permitting, and design of grade stabilization projects at two reaches of Sand Draw Creek to protect the stream from future head cut migration. The project included an analysis of existing and future conditions, hydrologic and hydraulic analysis, and an alternatives analysis guided by stream stability and permitting implications. Final design and constructed resulted in rock riffles, bank stabilization, and floodplain benching. Coordination with US Army Corps of Engineers resulted in issuance of a nationwide permit

Jim Schlieman, PLS

Survey Lead



Education

BS in Land Surveying/Mapping
Science, St. Cloud State University

Registration

Professional Land Surveyor

Iowa—P28025

Professional Experience

HEI: 2002-Present

Total Experience: 23 Years

Jim is a veteran surveyor and survey project manager who will ensure that all deliverables efficiently meet project needs and state requirements.

Jim Schlieman is a Principal at HEI and serves as the corporate Survey Manager. Jim is a registered Professional Land Surveyor in Iowa, North Dakota, South Dakota, Minnesota, and Nebraska. His responsibilities at HEI include project management of survey projects and supervision of survey staff. His extensive experience includes, but is not limited to, topographical surveys, boundary surveys, ALTA/ACSeadM land title surveys, GIS and aerial photography control surveys, right-of-way and alignment surveys, plats and other boundary and topographic subdivision platting, right-of-way platting, wetland mitigation and litigation surveys, and easement acquisition surveys.

- **Eastern Polk County Stream Restoration Project, Polk County Public Works, IA.** Project Survey Lead for the assessment, permitting, and design of a large-scale stream restoration project that will stabilize and restore nearly 9 miles of rural and urban streams in the Fourmile and Camp Creek watersheds. The estimated construction cost of the projects total \$15 million, which includes rock riffles, step pools, and cross vanes for grade control, toe rock and toe wood for bank stabilization, and floodplain benching and bank shaping to improve stream function. The project required permit coordination with multiple review agencies, including the US Army Corps of Engineers and the Iowa Department of Natural Resources, and detailed hydrologic and hydraulic modeling for both design and permitting. As of June 2025, two sites have started construction and two more are in the bidding phase. All construction will be completed in 2025/2026.
- **System-Wide Improvement Framework Capital Improvement Projects, Souris River Joint Board and City of Minot, ND.** Project Surveyor. Researched and created temporary and permanent easement documents for properties on each phase of the project. Provided a final plat to the City for approval and recording. Following the Souris River flood in 2011, many areas along the river were in need of repairs and upgrades, which would become the Souris Basin System-Wide Improvement Framework. HEI assisted in developing a plan to resolve those deficiencies, developing capital improvement projects (CIPs) geared towards resolving or managing the risks of unacceptable system deficiencies. Implementation to correct and prevent deficiencies includes design and management of the CIPs. Phased over several years, work includes storm sewer outfall repairs, bank stabilization, and levee repair and construction. These improvements will benefit basin-wide drainage and the overall flood protection plan.
- **Mouse River Enhanced Flood Protection Project – Phase MI-4, Maple River Diversion, Souris River Joint Board, Minot, ND.** Project Surveyor. The Souris River Joint Board retained HEI to provide design services where this project will tie several other flood protection projects together. HEI's design consists of both reinforced concrete floodwalls and earthen levee segments which tied into previous Mouse River Enhanced Flood Protection projects to provide flood protection for events equal in magnitude to the devastating flood of 2011. Once completed, river closure gates will be closed during high flows, sending water through a new Maple Diversion channel to bypass flows through the Ramstad Loop. Removable closure structures will be featured at 6th Street Southwest as well as at the Canadian Pacific Railway crossing. Large-scale private utility relocation is required and will be completed prior to construction. Jim's tasks include reviewing right-of-way drawings and exhibits as well as writing legal descriptions.

Mark Jacobs, PE , CFM

Dam/Outlet Lead



Education

BS in Agricultural Engineering, Iowa State University

Registration

Professional Engineer

Iowa—P28272

Certified Floodplain Manager

US-21-12128

Professional Experience

HEI: 2018-Present

Total Experience: 7 Years

Mark is an excellent hydrologic/hydraulic modeler who brings recent and relevant experience in designing and implementing dam, outlet, and drawdown improvements.

Mark Jacobs earned a bachelor of science degree in agricultural engineering in 2019 with an emphasis in land and water resources from Iowa State University. Mark is involved in a variety of projects that include flood mitigation, floodplain permitting, hydrology and hydraulics, watershed analysis, lake restoration, dam design, and stream investigation. He is experienced in water quality modeling and design of best management practices (BMPs) for nutrient reduction. Mark also has a collaborative relationship with Iowa DNR's Dam Safety Program from his work in dam improvement projects. He is also proficient in 1D and 2D HEC-RAS and has completed multiple floodplain studies and designs.

- **High Hazard Dams Risk Review, Iowa Department of Natural Resources, Statewide, IA.** Project Engineer involved with screening-level risk assessment for 27 high hazard dams (later expanded to 85 dams), which includes Iowa's entire portfolio of non-federally regulated high hazard dams. Mark's duties included summarizing detailed inspection reports, reviewing as-built construction plans for deficiencies, and categorizing risk by analyzing key components. Mark also analyzed the consequences of failure from these dams and summarized them into different categories of population at risk, critical facilities, and environmental impacts. With the combined risk and consequences, Mark helped to develop a report to assist the client in prioritizing dams in need of further analysis and rehabilitation, and to open avenues for the Iowa Department of Natural Resources for potential funding through FEMA's High Hazard Dams Program.
- **McKinley Lake Restoration Project, City of Creston and Iowa Department of Natural Resources, IA.** Project Engineer. McKinley Lake's water quality has decreased as sediment and phosphorus have accumulated in the lake over time. Mark assessed the hydrology/hydraulics and detailed design of replacing the low-level drawdown tower with a phased approach to safely dewater the lake for future dredging and provide a long-lasting solution that complies with dam safety standards. Mark also performed the CAD drafting of construction plans, quantities/cost estimating, and construction oversight. He completed the floodplain permitting to show a no-rise in 100-year water surface elevations with proposed recreation jetties placed in the FEMA mapped floodway of the lake.
- **Otter Creek Lake, Tama County Conservation Board and Iowa Department of Natural Resources, Toledo, IA.** Engineer in Phase II of the project, responsible for hydrology and hydraulics design of multiple new and existing sediment ponds in the Otter Creek Watershed. Other duties included analysis of sediment and load reduction throughout the lifetime of the structures. Mark served as a resident project representative for installation of a new drawdown structure on the main significant hazard dam. This sequence included a controlled breach of the dam, new pipe placement, and backfilling of the dam. He also performed routine soil density tests to make sure the contractor was placing backfill in accordance with the design specifications.
- **West Lake (Lake of the Hills), Scott County Conservation Board and Iowa Department of Natural Resources, Davenport, IA.** Engineer Intern in Phase I of the project, responsible for the analysis and design of watershed structures such as impoundments (ponds and wetlands) to reduce the amount of sediment and phosphorus loads to the lake, water quality quantification, detailed cost-benefit analysis, hydrology and hydraulics to size impoundments, and alternatives analysis in the preliminary design for the structures. Mark assisted with wetland and stream mitigation design, as well as the design of a bio-infiltration structure to reduce erosion and improve water quality.

Alex Schmidt, MS, PE

Watershed Best Management Practices



Education

MS in Civil Engineering, University of Minnesota

BS in Manufacturing Engineering, University of Wisconsin-Stout

Registration

Professional Engineer

Minnesota—53741

Design of Construction SWPPP, University of Minnesota

Professional Experience

HEI: 2015-Present

Total Experience: 13 Years

Advisor Roles

City Engineers Association of Minnesota (CEAM) – Water Resources Committee

Alex led conceptual analysis of dissolved phosphorus removal enhancements to stormwater BMPs as part of his work on the Grinnell Lakes Feasibility Study, and is excited to move forward with design enhancements to meet water quality objectives.

Alex Schmidt serves as civil engineer, providing engineering services focused on urban water resources across the midwest. Alex specializes in the latest technology for stormwater management through up-to-date research and collaboration. He has provided numerous successful studies in planning, prioritizing, and implementing urban stormwater best management practices (BMPs). He is well versed in modeling stormwater from water quality to flood control. He is passionate about using GIS, technology, automation, and innovative practices to achieve cost-effective solutions.

- **Como Golf Course Best Management Practices Feasibility Study and Final Design, Capitol Region Watershed District, Saint Paul, MN.** As Design Engineer, led the design process from feasibility to construction of large (5.5 acre-feet treatment) stormwater BMPs in the Como Lake's urban watershed. **Alex led the developed the design of iron-enhanced sand filters (IESF), including automated IESF benches, due to their ability to remove dissolved phosphorous.** HEI provided recommended BMPs and treatment trains based on their cost-effectiveness and their ability to meet the goals outlined in the Stormwater Management Plan. Alex used a P8 water quality model to develop cost-effective water quality treatment practices. Alex ensured the hydraulic function of the BMPs with XPSWMM modeling and final construction plans for an IESF and a regional infiltration basin and undergrounds BMP. The design features continuous monitoring and adaptive control through OptiRTC's cloud-based software. Construction was completed in 2020.
- **Lebanon Hills Iron-Enhanced Sand Filter Practices, Dakota County, MN.** Alex was the Project Manager for implementing two regional IESFs to remove dissolved phosphorus inputs to Jensen and Schulze lakes. HEI provided construction plans, technical specifications, treatment estimates, Operation and Maintenance Manual, and cost estimates for the engineering and design to implement the IESFs. **These two IESF systems feature automated control to ensure the proper filter dosing and rest times required for the treatment of phosphorus.** One system uses a pump-and-treat method which was originally developed by HEI. The second is a novel system that is gravity fed, with flow directed by automated valves to three separate IESF beds to maximize the treatment of dissolved phosphorus.
- **Penn Lake Feasibility Study, City of Bloomington, MN.** As Project Manager, Alex detailed numerous concepts for stormwater treatment infrastructure within a highly urban setting. HEI worked with the City to identify both cost-effective and innovative projects to manage stormwater ponds. This assessment featured GIS targeting of optimal BMPs, alum treatment facility concept, IESFs, and BMPs managed by real-time control to provide both improved water quality and reduced flooding.
- **Sylvan Hills Park Design and Stormwater Control, City of Fridley, MN.** As Project Manager, Alex assisted the City and the Mississippi Watershed Management Organization to develop stormwater treatment and natural habitat in an opportune location. HEI assessed the feasibility of providing flood control through XPSWMM hydraulic modeling and developed effective concepts to both manage stormwater and fit the function of the park. The selected design incorporated ephemeral streams through the park and a large (1.1 acre-feet) stormwater infiltration gallery.

Bob Gregalunas, PE Geotechnical Analysis



Education

BS in Civil Engineering,
University of Nebraska-Lincoln

Registration

Professional Engineer

Nebraska—E-13416

Minnesota—61291

Professional Experience

HEI: 2012-Present

Total Experience: 20 Years

Bob has extensive experience providing geotechnical evaluations and guidance for many dam and levee assessments and design projects

Bob Gregalunas has more than 20 years of experience on watershed development projects, hydrologic and hydraulic investigations, joint probability assessments, dam design, canal inspections, levee design, and stormwater management. Bob is a Nebraska approved High Hazard Dam Geotechnical Engineer and has designed several high profile dams in the Omaha area. Bob's other geotechnical experience has been centered around water resources projects, including levee rehabilitation, stream stabilization, and lake restoration.

- **Sundown Lake Hydraulic Dredging, Sundown Lake Rural Improvement Zone, Moravia, IA.** Bob provided hydraulics and geotechnical review and guidance related to water handling and sediment consolidation/dewatering components of a hydraulic dredging project to remove and store between 125,000 and 175,000 cubic yards of consolidated sediment from Sundown Lake, a private lake in Southern Iowa. He also developed dewatering pump specifications, reviewed sediment underdrain design, and performed benchtop/laboratory study of sediment to estimate consolidation and dewatering rate of dredged slurry material.
- **Weigand Marina Improvements, Nebraska Game and Parks Commission, Lewis and Clark Lake, NE.** Bob served as Project Engineer for the design of the Weigand Marina at Lewis and Clark Lake. As part of a large design team, his responsibilities included marina dredging, probabilistic lake fetch analysis, in-lake embankment, geotechnical design of dredge basins, and boat ramp facilities.
- **Brown's Lake and Snyder Bend Water Balance Study, Mid-American Energy Company, Salix, IA.** Project Engineer working on the design and implementation of a stochastic, surface water to groundwater coupled water balance assessment for two oxbow lakes off the Missouri River. The project created a stochastic model within GoldSim for not only decision support, but also stochastic meteorology for future forecasting. Specifically, Mid-American Energy Company (MEC) provides supplemental flows to assist in lake level management. Recent droughts and decreased outflow from MEC's plants have lowered lake levels. MEC desired a tool to assess mitigation alternatives and the ability to forecast water needs based on long-term drought conditions.
- **Papillion Creek Watershed Regional Detention Site WP 2 Final Design, Papio-Missouri River Natural Resources District, Sarpy County, NE.** Project Engineer for the preliminary design and final geotechnical design of a regional detention structure within the Papillion Creek watershed. The project included hydrologic and hydraulic analysis using the latest meteorological guidance developed during the Papillion Creek digital flood insurance rate map remapping project to establish design elevations and structure sizing. Geotechnical investigation included a full-site study of a unique site with a large-scale glacial sand deposit beneath the dam foundation.
- **Storm Lake Dredging Enhancement, City of Storm Lake, IA.** Project Engineer performing water balance modeling and alternative modeling for Riverside Lakes. Water balance modeling was constructed utilizing stochastic techniques to understand the uncertainty associated with the limited information available. Several alternatives were investigated and simulated to understand their impact on long-term water balance of the lake.

Tristan Balmer, EIT Production



Education

BS in Biosystems Engineering,
Iowa State University

Registration

Engineer-in-Training: 01009

Professional Experience

HEI: 2023-Present

Total Experience: 2 Years

Tristan developed stormwater and watershed models as part of the Grinnell Lakes Feasibility Study. This gave him valuable insight to the lakes' BMP concepts, and is ready and available to help turn concepts into real world improvements through the design process.

Tristan Balmer serves clients as a civil engineer out of HEI's Des Moines office. Tristan is skilled in AutoDesk Inventor, AutoCAD, Civil 3D, HEC-RAS, PCSWMM, HydroCAD, GoldSIM, GIS mapping, and Microsoft Office Suite.

- **Grinnell Lakes Restoration Feasibility Study, City of Grinnell, IA.** Modeler and Plan Writer. As a part of this study, Tristan has been involved in building a hydrology model with the use of ArcGIS Pro and PCSWMM. This was performed in order to determine pollutant loading at various outlets into the lakes and streams.
- **Eastern Polk County Stream Restoration Project, Polk County Public Works, IA.** Production for the assessment, permitting, and design of a large-scale stream restoration project that will stabilize and restore nearly 9 miles of rural and urban streams in the Fourmile and Camp Creek watersheds. The estimated construction cost of the projects total \$15 million, which includes rock riffles, step pools, and cross vanes for grade control, toe rock and toe wood for bank stabilization, and floodplain benching and bank shaping to improve stream function. The project required permit coordination with multiple review agencies, including the US Army Corps of Engineers and the Department of Natural Resources, and detailed hydrologic and hydraulic modeling for both design and permitting. As of June 2025, two sites have started construction and two more are in the bidding phase. All construction will be completed in 2025/2026.
- **Little Sioux Headwaters Coalition – Comprehensive Water Quality Management Planning Services, Dickinson County Clean Water Alliance, IA.** GIS Analyst for a HUC-8 watershed plan in northwest Iowa that estimated sediment, nitrogen, and phosphorus loads to the Iowa Great Lakes and Little Sioux Headwaters; identified and prioritized potential conservation strategies and management practices and resulting pollutant load reductions; captured flood storage benefits; and developed three targeted implementation action plans to protect and improve water quality and increase flood storage in this HUC-8 watershed. Tristan processed GIS data and used the Prioritize, Target, and Measure Application to create detailed maps that prioritize areas within the watershed to target and manage implementation efforts.
- **Belcourt Lake and Ox Creek Watershed Based Plan, Turtle Mountain Band of Chippewa, Belcourt, ND.** Plan Writer. Tristan was responsible for writing a significant portion of the plan. This included using previous watershed modelling data and current information to write an Environmental Protection Agency 319 watershed plan. This was written to help inform future decisions and plans on best management practices and other nutrient reduction strategies.

Ted Bridges, EIT Production



Education

BS in Environmental Engineering,
University of Wisconsin-Platteville

Registration

Engineer Intern

EI-00992

Professional Experience

HEI: 2023-Present

Total Experience: 2 Years

Ted is proficient using Civil 3D (CAD) to produce high quality construction plan sets, and he has a knack for design and brings a high level of diligence and practicality to design production.

Ted Bridges serves clients as a civil engineer out of HEI's Des Moines office. He has a knack for design, is a skilled communicator, and possesses a high level of intuition and practicality. These traits will make Ted an effective advocate for your project during construction. Ted also has valuable, hands-on experience with bathymetric mapping and sediment assessment for dredging design projects.

- **Eastern Polk County Stream Restoration Project, Polk County Public Works, IA.** Production for the assessment, permitting, and design of a large-scale stream restoration project that will stabilize and restore nearly 9 miles of rural and urban streams in the Fourmile and Camp Creek watersheds. The estimated construction cost of the projects total \$15 million, which includes rock riffles, step pools, and cross vanes for grade control, toe rock and toe wood for bank stabilization, and floodplain benching and bank shaping to improve stream function. The project required permit coordination with multiple review agencies, including the US Army Corps of Engineers and the Department of Natural Resources (DNR), and detailed hydrologic and hydraulic modeling for both design and permitting. As of June 2025, two sites have started construction and two more are in the bidding phase. All construction will be completed in 2025/2026.
- **McKinley Lake Restoration Project, City of Creston and Iowa Department of Natural Resources, IA.** As part of this project, Ted played a significant role in the hydraulic analysis of the McKinley Lake dam. This included simulating various breach scenarios and the impacts of failure on downstream infrastructure. In addition to breach scenarios, Ted also simulated the hydraulic routing of stormwater runoff through the dam once it has been opened for construction. This was performed in order to understand peak flows from the watershed as well as local velocities at specific points of interest near the dam. These modeling efforts allowed the team to quantify risk probability and was necessary to understand before making crucial design decisions as the project progressed.
- **High Hazard Dams Risk Review, Iowa Department of Natural Resources, Statewide Iowa.** Analyst and report production. This analysis involved identifying and categorizing potential failure modes of 39 (later expanded to 85) high hazard dams across the state of Iowa. Ted was involved in analyzing the existing conditions of each dam and ranking the dams based on many factors that could lead to failure. Ted's work on this project also involved developing a standardized process to aid the DNR in future risk assessment of high hazard dams throughout their jurisdiction. He then helped to summarize the findings in easily interpretable figures and a report.
- **Thomas Mitchell Park Pond Water Quality Assessment, Polk County Conservation Board, Polk County, IA.** As a part of this study, Ted used sediment cores and sonar equipment to determine the type, depth, and breadth of the sediment within Thomas Mitchell Pond. Ted also prepared concept drawings to convey the differences between the existing condition in the pond and the proposed project work. This effort was to inform upstream best management practice installation and future dredging needs.

Mike Bell, PLA ASLA

RDG Partner, Landscape Architect



Education

BS in Landscape Architecture, Iowa State University

Registration

Professional Engineer: Iowa

Professional Experience

RDG: 2000-Present

Total Experience: 25 Years

Affiliations

Co-Chair: Healthy People, Healthy Places

Mike has worked at RDG for more than 25 years, and has served as a partner for the past 20 years. He has worked on a variety of Park and Recreation projects that span the Midwest including comprehensive planning, strategic planning and design. Mike has a great interest in how the built and natural environment impacts public health and wellbeing and how to measure the public benefits.

- **Grinnell Parks & Recreation Master Plan**, Grinnell, IA
- **City Park**, Bondurant, IA
- **Parks, Open Spaces and Trails Plan**, Norman, OK
- **The Landing Aquatic Center**, Bettendorf, IA
- **University of Connecticut - Athletic Village**, Storrs, CT
- **Polk County Conservation - Jester Park Master Plan**, Granger, IA
- **Arrowhead District**, Neenah, WI
- **ICON Water Trails - Scott Avenue**, Des Moines, IA
- **Forest Grove Park - Great Lawn**, Bettendorf, IA
- **LiveDSM - Comprehensive Parks and Recreation Plan**, Des Moines, IA
- **Iowa Parks Foundation - Strategic Planning**, Des Moines, IA
- **Iowa City Parks System Master Plan**, Iowa City, IA
- **Water Works Park - Master Plan**, Des Moines, IA
- **Comprehensive Parks & Recreation Plan**, Ankeny, IA
- **Prairie Trail Parks, Trail and Open Space Master Plan**, Ankeny, IA
- **Sheldon Parks & Recreation Master Plan**, Sheldon, IA
- **Sioux Center Parks & Recreation Strategic Plan**, Sioux Center, IA
- **Central Park Master Plan**, Moore, OK
- **Polk County Conservation - Easter Lake Lodge Master Plan**, Des Moines, IA
- **Southeast Des Moines School, Park and Library Campus Master Plan**, Des Moines, IA
- **Water Works Park - Lauridsen Amphitheater**, Des Moines, IA

Mike played an integral role in the development of the Grinnell Parks and Recreation Master Plan and brings his familiarity and experience integrating landscape architecture with engineering projects to maximize quality and project benefits.

Greg Pierce, PE, CPESC

Water Resource Engineer



Education

BS in Civil Engineering,
University of Iowa

Registration

Professional Engineer

KS, IA, MO, NE, WI, MN

Certified Professional in Erosion and
Sediment Control, #2824

Iowa River Restoration Toolbox
Training, Completed Level I and II

Professional Experience

RDG: Present

Total Experience: 25 Years

Greg is an accomplished stormwater and stream design professional and will be a valuable resource in the design of BMP3 and support of other watershed design components.

Greg is a water resource engineer for RDG. He has more than 25 years of experience in Civil Engineering—planning, designing and providing bid assistance/construction administration for both public and private projects. Planning efforts include comprehensive plans, large-scale master plans, watershed/city-scale stormwater management and neighborhood-scale design. Construction projects include water distribution, wastewater collection, stormwater quality and quantity best management practices, transportation facilities, urban streetscapes, sidewalks compliant with ADA accessibility, civil site design and stream corridor preservation and restoration. Greg has served on the Iowa Department of Natural Resources's Iowa Stormwater Management Manual Technical Committee since 2012.

- **Altoona On-Call Design and Engineering Services**, Altoona, IA
- **Ankeny Stormwater Management Study and Master Plan**, Ankeny, IA
- **Beaver Creek Watershed Plan**, Central Iowa
- **Clive Stormwater Review**, Clive, IA
- **Des Moines Glendale Pond Retrofit**, Des Moines, IA
- **Des Moines University - New Medical & Health Sciences Campus**, Des Moines, IA
- **Detention Basin Retrofit Study**, Des Moines, IA
- **Downtown Des Moines Water Trails**, Des Moines, IA
- **Fourmile Creek Stream Restoration**, Ankeny, IA
- **Gray's Station Wetland**, Des Moines, IA
- **Hannibal Regional Healthcare System - Kirksville Campus Master Plan**, Kirksville, MO
- **Hawkeye Community College - Health Science Building Renovation**, Waterloo, IA
- **Hawkeye Community College - First Impressions Courtyard**, Waterloo, IA
- **Jackson Stormwater Wetland**, Des Moines, IA
- **Mud, Camp, Spring Creek Watershed Management Plan**, Ankeny, IA
- **North Raccoon River Watershed Plan**, Storm Lake, IA
- **Southeast Polk Schools - District Pavement Improvements**, Pleasant Hill, IA
- **South Skunk River Stabilization**, Ames, IA
- **Sugar Creek Watershed Plan**, Waukee, IA
- **University of Iowa - Health Sciences Academic Building**, Iowa City, IA
- **Walnut Creek Management Plan**, Polk and Dallas Counties, IA

Will Gaskin

Water Resource Designer



Education

BS in Ecological Engineering, Oregon State University

Affiliation

Society for Ecological Restoration (SER)

Colorado Riparian Association (CRA)

American Planning Association (APA)

Partnership for River Restoration and Science in the Upper Midwest (PRRSUM)

Iowa Stormwater Education Partnership (ISWEP)

Professional Experience

RDG: Present

Will is passionate about stream restoration and designing projects that are sustainable, improve the environment, and improve people's quality of life.

Will enriches communities through stormwater enhancements, flood reduction, water quality improvements and the planning and design of recreational areas. Working alongside an interdisciplinary group of experienced design professionals, Will focuses on a variety of project types, contributing to work that enhances communities through ecological stewardship. The theme of human-centered design threads through Will's approach to his work and he is driven by his belief in the power and responsibility of engineering to improve people's quality of life.

- **Fourmile Creek and Tributary Restoration**, Ankeny, IA
- **Detention Basin Retrofit Study**, Des Moines, IA
- **Polk County Stream Restoration**, Polk County, IA
- **Des Moines University - New Medical & Health Sciences Campus**, Des Moines, IA
- **Hawkeye Community College - Campus Core Landscape**, Waterloo, IA
- **Swiss Valley Site Improvements**, Dubuque, IA
- **Iowa Amphitheater at Schmitt Island**, Dubuque, IA
- **Profiles in Conservation- Video Series**, Iowa Rivers Revival
- **Steindler Orthopedic - Site Planning for New Medical Office Park**, North Liberty, IA
- **Townsend Park Watershed Improvements**, Altoona, IA
- **Glendale Pond Retrofit**, Des Moines, IA
- **Valley View Park Phase 4**, West Des Moines, IA
- **Albia Community Schools - Lincoln Center Remodel & Addition**, Albia, IA
- **Iowa Stormwater Management Manual - Multiple Chapters**, State of Iowa
- **Bondurant City Park**, Bondurant, IA
- **Alleman Stormwater Wetland**, Polk County, IA
- **Veterans Memorial Building Renovation**, Grinnell, IA
- **On-Call Design & Engineering Services**, Altoona, IA
- **Engineers Without Borders**, Nicaragua* and Nepal
- **Americorps - American Conservation Experience (ACE)**, Arizona and New Mexico

*indicates work performed prior to joining RDG

4. Office Location

Houston Engineering, Inc.



100 Court Avenue
Suite 202
Des Moines, IA 50309



HEI Des Moines Office.

5. Local Familiarity

Our combined team brings extensive experience working with the **City of Grinnell**, the **Iowa Department of Natural Resources (DNR)**, and other key agencies involved in lake and watershed restoration throughout Iowa.

Our engineers and environmental specialists have successfully designed and permitted projects involving **dam rehabilitation, low-level outlet structures, mechanical dredging, shoreline stabilization, spoil containment, and stream restoration**. We have integrated **bio-swales, iron-enhanced sand filters**, and a variety of **urban and rural BMPs** into designs that meet both water quality and community goals.

We routinely coordinate with regulatory agencies, including the **DNR, the US Army Corps of Engineers (USACE), the United States Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), the Environmental Protection Agency (EPA)**, and are well-versed in the permitting expectations associated with 404/401, floodplain development, and dam safety review. This regulatory and technical familiarity enables us to anticipate review requirements, communicate effectively with agency staff, and incorporate regulatory considerations into the design process early—saving time, avoiding rework, and delivering more permittable and cost-effective outcomes.



McKinley Lake Restoration, Creston, IA.

6. References

Client References

Our team has worked with various clients on many similar projects to meet their needs, budgets, and timelines. We encourage you to contact these references.

Casey Welty, Dam Safety Engineer

Iowa Department of Natural Resources
6200 Park Avenue
Suite 200
Des Moines, IA 50321
515.725.8330
casey.welty@dnr.iowa.gov



High Hazard Dam Assessments Across Iowa

The Iowa DNR chose HEI to complete preliminary assessment of 39 dams (later changed to 89 dams) located statewide to develop a prioritized plan that categorizes their portfolio of high hazard dams.

John Swanson, Water Resources Supervisor

Polk County Public Works
5885 Northeast 14 Street
Des Moines, IA 50313
515.875.5880
jonathon.swanson@polkcountyiowa.gov



Eastern Polk County Stream Restoration Project

Polk County Public Works retained HEI to assess, design, permit, and support bidding and construction of what will be Iowa's largest comprehensive stream restoration project.

Mike Taylor, City Manager

City of Creston
116 West Adams Street
Creston, IA 50801
641.782.2000 ext. 202
mtaylor@crestoniowa.org



McKinley Lake Restoration Project

FYRA Engineering, now a part of HEI, was selected to develop a lake restoration feasibility plan for McKinley Lake in Creston, IA. The design was completed in 2024, and construction is currently underway.

7. Additional Information

Project Experience

The following is a list of relevant projects worked on by our HEI team members. Full project factsheets can be found on the following pages.

| General Project Task | Charles Ikenberry, PhD, PE, CFM | Drew Kessler, PhD | Sara Mechtenberg, PE | Janel Kaufman, PE | Alex Schmidt, PE | Mark Jacobs, PE | Carly Wagner, PE | Bob Gregalunas, PE | Jim Schlieman, PLS | Mike Sotak, PE, BC,WRE | RDG |
|--|---------------------------------|-------------------|------------------------|------------------------|------------------|------------------|------------------|--------------------|--------------------|------------------------|---------|
| Site Investigations and Survey | A,B,C, E,I | | | | K, L | A, B, C, E, F, I | C, D, F, I | | I, J | | |
| Stream Assessments/Wetland Delineations | A,I | | H | A, B, C, D, I, N | | | C, D, E, I | | | | |
| Hydrologic and Hydraulic Analysis | | | N | | A, K, L | | B, C, D, E | M, N | | | |
| Dam and Outlet Assessments and Rehabilitation | C, E | | | | | A,B,C, E, I, | C, E | | | B, C, E, M, N | |
| Geotechnical Analysis and Design | | | | | | | | H, M, N | | | |
| Park and Landscape Master Planning | C | | | | | | C | | | | I,Q |
| Watershed and Stream BMP Design | B, C, D, E, I | | B, C, D, N | | K, L | B,C,I | B, C, D, E, I | | | | I,R |
| In-Lake (Dredge/Spoils, Shoreline and Access Design) | B, C, D, E, F, | | B, C, D, E, G, H | | | B, C, F, I | B, C, D, E, G, I | | | | |
| 404 Permitting | | | H | B, C, D, E, G, I, M, N | | | | | | | |
| Construction Plans and Specifications | B, C, D, E, F, I | | B, C, D, E, G, H, M, N | | K, L | B, C, E, F, I | B, C, D, E, G, I | | | | |
| Bidding and Construction Phase Services | B, C, D, E, F, I | | B, C, D, E, G, H, M, N | | K, L | E, F, I | E, G | | | | |
| Project Management/ QA/QC | B, C, D, E, F, I | O,P | G, H | | K, L | | | | J | B, C, D, H, M, N | I, Q, R |

| | | | |
|---|--|---|---|
| A | Grinnell Lakes Feasibility Study | J | Lime Lake and Lake Sarah Dam Replacement |
| B | West Lake/Lake of the Hills Restoration Project | K | Oasis Pond |
| C | Otter Creek Lake and Park Restoration and Dam Drawdown | L | Como Golf Course |
| D | Restoration of Three Mile Lake and Stream Mitigation | M | Upper Salt 21 Aging Dam Rehabilitations |
| E | McKinley Lake Restoration and Dam Drawdown | N | Dam Sites WP-2/6/7 |
| F | Sundown Lake Dredging Project | O | Lake Osakis |
| G | Standing Bear Lake Boat Ramp and Lake Improvements | P | Locke Lake |
| H | Lake Manawa Dredging Project | Q | Grinnell Parks and Recreation Master Plan |
| I | Polk County Stream Restoration Project(s) | R | Catfish Creek Streams Restoration |

Arbor Lake and Lake Nyanza Restoration Feasibility Grinnell, Iowa



Background

The City of Grinnell contains two lakes, Arbor Lake and Lake Nyanza, that have experienced sediment accumulation and reduced water quality due to turbidity and an overabundance of algae.

In 2022, the City hired FYRA Engineering (now Houston Engineering, Inc. (HEI)) to summarize historical water quality, assess sediment thickness and volume present in both lakes, and assess existing water quality in Lake Nyanza and the inflow locations of Arbor Lake. In 2023, the City hired HEI again to perform a restoration feasibility study to prepare for planning, designing, permitting, and engineering of elements associated with lake restoration for both Arbor Lake and Lake Nyanza.

The Project

HEI reviewed, compiled, and summarized prior data, plans, and studies relevant to Arbor Lake and Lake Nyanza. This information included available water quality data, the 2005 watershed assessment, available GIS data/coverages, lake bathymetry and sediment data, and stormwater and stream projects implemented by the City.

HEI conducted desktop and field assessments to summarize watershed, stream, and lake conditions. We also developed stormwater, pollutant loading, and lake response models to simulate current conditions and potential improvement scenarios. To investigate drawdown feasibility, we performed in-field dam inspections and classified any safety concerns according to the Natural Resources Conservation Service (NRCS) PL-566 and Iowa DNR dam

inspection checklists and noted concerns with the existing Arbor Lake dam and outlet channel.

Finally, our team collected, processed, and shipped sediment samples to qualified laboratories to determine potential impact of sediment-phosphorus on internal loading, and evaluate potential phosphorus inactivation alternatives (e.g., alum treatment).

A final feasibility report was presented to the City that summarized findings, recommended watershed, stormwater, stream, in-lake improvement alternatives, described permitting pathways, and incorporated a timber stand assessment conducted by the DNR. HEI also included concept drawings, cost/benefit analysis, and planning-level opinion of probable construction cost estimates.

Location

Grinnell, Iowa

Client

City of Grinnell

Contact

Jordan Allsup
Parks and Recreation Director
641.236.2620

Project Highlights

- Conducted watershed and lake assessments to evaluate dams, spoils areas, stormwater BMPs, and other watershed and in-lake improvement strategies and alternatives.
- Collected and analysed sediment cores from both lakes to determine internal loading, bioavailability, and potential phosphorous inactivation alternatives such as alum application.
- HEI delivered a feasibility report that considered potential watershed and in-lakes concepts/alternatives which included a summary of benefits, probably construction costs, and strategic permitting pathways to implement each alternative.

(000078-0001) 6-11-25

Lake of the Hills Lake Restoration Project

Scott County, Iowa



Background

The West Lake Complex, which features Lake of the Hills, is located in Scott County near Davenport, IA. FYRA Engineering, now part of Houston Engineering, Inc. (HEI), was hired by the Scott County Conservation Board to complete planning, design, engineering, and permitting services for a variety of projects associated with the restoration of West Lake Park (Lake of the Hills, Bluegrass Lake, Railroad Lake, and Lambach Lake). Overarching goals of this project included sediment and nutrient load reductions for water quality improvement, increased lake depth and fish habitat diversity, and improved shorelines to reduce erosion and increase angler access and success at the West Lake Complex. These restoration alternatives were made possible only through a

thorough plan for lake drawdown and design components that included improvements to existing outlet and dewatering infrastructure.

The Project

The first phase of the project included a comprehensive study that evaluated solutions put forth in the watershed improvement plan and prioritized them based on water quality benefits and costs. A major study component was the prioritization and design of potential watershed best management practices (BMPs) and in-lake improvements. HEI evaluated multiple dredging locations and techniques, considered sediment handling of each option, and developed a sediment storage site/basin to safely and efficiently store the dredged material. A cost-benefit analysis was used to determine which BMP locations and dredging options should be implemented in the final design.

During the design phase, HEI provided wetland delineation and permitting concurrent with development of construction plans and specifications.

This integrated approach helped expedite permit approval and minimize stream and wetland mitigation costs. HEI also provided detailed construction cost estimates for bidding and contractor selection and supported the Iowa Department of Natural Resources field representative during construction oversight.



Location

Scott County, Iowa

Client

Scott County Conservation Board

Contact

Roger Kean
563.328.3280

Project Highlights

- The project demonstrates our ability to handle design, cost-benefit, and permitting for all components of a comprehensive lake restoration project that included dam and dam outlet modification, lake dewatering, dam safety concerns, and our familiarity working on county-conservation owned lakes.

Otter Creek Lake and Park Restoration Project

Tama County, Iowa



Otter Creek Lake During Construction

Background

Otter Creek Lake and Park is in Tama County, IA. FYRA Engineering, now part of Houston Engineering, Inc., (HEI), was hired to complete Phase 1 planning, conceptual design, and construction cost estimation for a variety of alternatives to improve publicly owned land adjacent to the lake and restore Otter Creek Lake. Prioritization and selection of dredging methods, zones, and spoils containment sites were major elements of the Phase 1 plan.

The Project

The design phases (Phase 2 and Phase 3) each focused on specific elements identified and prioritized in the Phase 1 plan.

Phase 2

Phase 2 included design and construction of three low hazard sediment and phosphorus retention basins as well as a detailed cut and cover operation for the implementation of a low-level drawdown pipe in the main lake.

This included a time-sensitive sequencing plan to excavate the existing dam embankment, which includes a controlled dam breach to drawdown the water in the lake. Segments of the drawdown pipe were placed, and portions of the embankment were strategically backfilled to maintain the flood protection that the dam provides to reduce the risk of damage from a flood event to the embankment while under construction.

A 32-foot concrete outlet control structure that houses the knife gate valve used to manage future lake drawdown was constructed when the lake was drained. It was then backfilled around and above the new pipe as the rest of the embankment material was put back in place. This process required geotechnical evaluation and a thorough understanding of risk and construction sequencing. Construction started in mid-June 2021 and was completed in November 2021.

Phase 3

Phase 3 of the design includes the design of mechanical dredging and spoils containment, shoreline and jetty improvements, and a large sediment basin on the main tributary directly above the lake selected from the Phase 1 plan. This sediment retention structure is on the main stem directly upstream of the lake and is large enough to meet dam safety criteria. Through coordination with the Iowa Department of Natural Resources Dam Safety, the team was able to reduce the size of the structure to a low-hazard dam by performing breach modeling and designing downstream modifications to ensure the safety of the campground located downstream in the event of a dam breach. Due to space limitations, a large articulated concrete block weir outlet structure was designed to reduce the top of dam embankment elevation, eliminating the need for an off-site easement. Construction began in December 2021 and was completed in late 2023. Estimated construction cost: \$3,575,000.

Watch a video of the project here:

<https://bit.ly/3nel7TL>



Location

Tama County, Iowa

Client

Tama County Conservation Board

Contact

Curtis Behrens
641.484.2231

(145_19_01) 11-14-24

Project Highlights

- This project demonstrates our team's ability to develop a large project that involved in-lake and watershed work to investigate/rehabilitate old watershed dams, construct new watershed dams, and perform dam rehabilitation services on the four major dams that make up this lake complex.
- Coordinated with the Iowa Department of Natural Resource Dam Safety to ensure safety of the dam and develop a design that would avoid the need for an off-site easement.

Restoration of Three Mile Lake Union County, Iowa



Before

Background

FYRA Engineering, now part of Houston Engineering, Inc. (HEI), began work on the Three Mile Lake Restoration project in September of 2020, working with the Iowa Department of Natural Resources (DNR) officials to develop engineering design plans for watershed best management practices (BMPs) to retain sediment and nutrients, and in-lake improvements to enhance water quality. Three Mile Lake is a large, state-owned reservoir in southern Iowa that is a major recreational resource and drinking water supply for the City of Creston and the Southern Iowa Rural Water Association.

The Project

HEI performed field/topographic survey, design, permitting, wetland and stream mitigation, and

construction phase support. The project includes four watershed impoundments, stream mitigation, three new in-lake forebays, and the rehabilitation of the existing sediment forebay, which was largely silted in and no longer trapping new sediment from entering the main lake. Additionally, shoreline stabilization and in-lake habitat structures were included to improve the lake's water quality and fishery. Construction was performed in two phases and the project was complete in January of 2025 and the lake is intended to refill for full recreation and water supply.



After



After

Location

Union County, Iowa

Client

Iowa Department of Natural Resources

Contact

Michelle Balmer
Lake Restoration Program
515.238.2458

Project Highlights

- The project included design of watershed BMPs, development of quantities/costs, and quantification of sediment and phosphorus reductions.
- A creative design and permitting approach developed new alternatives that significantly reduced construction costs for the restoration of the existing silt dike. This required detailed environmental assessments, extensive US Army Corps of Engineers coordination during permitting, and mitigation planning.

(007-20-01) 4-24-25

McKinley Lake Restoration Project

Creston, Iowa

Background

FYRA Engineering, now a part of Houston Engineering, Inc. (HEI), was selected by the City of Creston to develop a lake restoration feasibility plan for McKinley Lake. The City adopted the plan in 2022 and used it to obtain funding to implement engineering design and construction of lake restoration alternatives. The design was completed in 2024 and construction is currently underway.

Restoration Feasibility Plan

HEI's lake restoration team developed the restoration plan by completing a preliminary investigation of environmental/permitting considerations, developing multiple watershed and in-lake improvement concepts, and prioritizing among alternatives based on potential permitting impacts, quantifying benefits of potential alternatives, and estimating construction costs of alternatives.

The alternatives analysis considered a stormwater wetland, shoreline access and aquatic habitat improvements, sediment removal (dredging), and a suite of complementary recreational features such as a public swimming beach, docks, jetties, and a marina for paddleboat, kayak, and canoe rentals.

HEI summarized findings and provided the City of Creston with a comprehensive plan used to secure funding and technical partnerships. The plan was also used to inform the public/stakeholders and enable next steps toward making the project a reality.



Restoration Design

Once funding was secured, the City of Creston, in partnership with the Iowa Department of Natural Resources Lake Restoration program, hired HEI to develop engineering design plans, obtain all required permits, and administer construction bidding and oversight of selected improvement alternatives to the lake and surrounding park. Major design features include replacement of the aging low level drawdown system, mechanical removal of 250,000 cubic yards of sediment, design of the sediment containment site, improved sediment retention in an in-lake forebay, aquatic habitat structures, and improved shoreline access and angling, including an ADA-compliant fishing dock and kayak launch.

Construction began in December of 2024 and is scheduled for completion in Spring 2026.

Location

Creston, Iowa

Client

City of Creston

Contact

Mike Taylor
City Administrator
641-782-2000

Project Highlights

- Project feasibility and alternatives analysis that includes permitting requirements, cost/benefit analysis, and stakeholder engagement that gained community support and the acquisition of technical and funding assistance.
- Replacement of an aging low-level drawdown structure that required a dam breach analysis, sequenced cut and cover operation, and resulted in overall improvements to dam safety and water level management.
- Engineering designs, specifications, and permits to implement a \$4 million restoration project with multiple benefits for residents of Creston and the surrounding area.

(124_19_01) 4-24-25

Standing Bear Boat Ramp Replacement Omaha, Nebraska



After

Background

At Standing Bear Lake in Omaha, NE, the existing boat ramp had one dock that the Nebraska Game and Parks Commission (NGPC) wanted renovated into two boat ramps. The NGPC retained FYRA Engineering, now part of Houston Engineering, Inc. (HEI) to help with this project.

The Project

The team designed the removal and replacement of the existing boat ramp. They also performed a wind fetch analysis to design two fishing jetties that will help protect the boat ramp while providing fishing access to deeper parts of the lake. This project also included bank stabilization, the design of a kayak launch, in-lake dredging, parking lot renovations, an ADA-compliant trail leading to the boat dock, and a borrow site that produces

an earth work balance so that no additional fill was added to the US Army Corps of Engineers (USACE) flood storage zone. We also developed a trail closure plan and tree mitigation plan.

Additional services were added to the project that included the design of nine fishing bump outs, three sets of concrete stairs, ADA-compliant trail access to a new fishing pier, shoreline protection, and in-lake fish habitat structures. A borrow site was also designed that provided earth fill material for the structures. HEI made sure that the earthwork balance within the flood storage zones met the USACE's 408 requirements, so as not to compromise the reservoir capacity and flood control provided by the dam.

Furthermore, 3D renderings were produced as well as project posters for

the client to use at public meetings and display around the park while the lake is closed.

A bathymetric survey, a topographic survey, and a wetland delineation were completed as part of this project.

Final construction documents and bid were developed in January of 2023. Our team began construction observation in February 2023, and construction was completed by May 2024.



After

Location

Omaha, Nebraska

Client

Nebraska Game and Parks Commission

Contact

Jeff Jackson
402.471.5583

Project Highlights

- This project highlights our design experience with boat ramps, developing construction documents, and providing bidding and construction oversight services.
- USACE 404 permitting and National Environmental Policy Act compliance were required to move this project into construction.

(008-19-01) 11-20-24

Eastern Polk County Stream Restoration Project

Polk County, Iowa



Background

Polk County hired Houston Engineering, Inc. (HEI) and RDG to assess, design, permit, and support bidding and construction of what will be Iowa's largest comprehensive stream restoration project. This project was conceptualized in the context of a National Resource Conservation Service's (NRCS) Watershed Plan and Environmental Assessment, and is being implemented through a combination of federal, state, and local funds.

The Projects

Throughout this project, our team has provided project management services, public engagement, client and project partner review meetings, and preparation of detailed monthly reports to keep the County up to date on the project's progress.

This project entails several particularly challenging characteristics, including an aggressive project schedule to ensure adherence to funding

requirements, work across multiple stream reaches and local jurisdictions (each with unique preferences regarding stream restoration practices), and a complex and uncertain permitting process that requires constant calibration of the design with floodplain and Section 404 requirements.

RDG conducted riparian assessments to evaluate existing conditions and inform the development of restoration strategies. A multitude of practices were proposed to restore floodplain connection and channel stability, create aquatic and terrestrial habitat, and integrate stormwater management systems.

HEI conducted stream assessments using Iowa River Restoration Toolbox protocols to collect data on the channel geometry, substrate, and vegetation, then processed the data for use in design and permitting. Additionally, our team fast-tracked field data collection to beat spring leaf

out conditions by completing drone-based LiDAR and imagery collection in tandem with manually collected stream channel geometry using hand-held GPS technology.

HEI's water resources engineers also developed hydrologic and hydraulic (H&H) models that informed the design and supported floodplain permit applications. To-date, nine of the 11 projects are beyond 60% complete, and floodplain and 404 permits have been submitted for four sites. Designs have incorporated client and partner feedback, and our opinion of probable construction costs have remained within the expected budget.

HEI will also support the County and its local partners during the bidding process. During construction, our team will assist the County's Resident Project Representative with review of submittals and construction oversight.

Construction started in the summer of 2025.

Location

Polk County, Iowa

Client

Polk County

Contact

John Swanson
Director of Operations
515.875.5880

Project Highlights

- Extensive and expedited surveys and assessments to gather high-quality data to inform the design.
- H&H models to evaluate the effectiveness of various concepts, satisfy permitting requirements, and guide stream restoration designs.
- Proactive coordination with permitting agencies and an integrated permitting/design process.
- Extensive project management and client support through regular meetings, responsive communication, and extensive coordination across multiple partnerships.

(000143_0009) 2-26-25

Oasis Pond Iron-Enhanced Sand Filter Roseville, Minnesota



Background

Oasis Pond is located in the City of Roseville's Oasis Park. The pond was created as a result of impoundment of Ramsey County Ditch (CD) 4. Stormwater runoff to the pond is generated from urbanized land that is mostly untreated. The outflow of the pond is subject to high concentrations of fine sediment and dissolved phosphorus, exposing Oasis Pond and flows downstream to impaired water quality.

The Rice Creek Watershed District (RCWD) hired Houston Engineering, Inc. (HEI) to complete a feasibility study to install an iron-enhanced sand filter (IESF) system as a best management practice (BMP) for Oasis Pond. Because of insufficient grade on the site, the system would require the use of a lift station. HEI supported the District to secure funding through a Clean Water Fund (CWF) grant from the Minnesota

Board of Water and Soil Resources (BWSR).

The Project

HEI began the project by developing preliminary design construction plans based on the feasibility study. These plans included a wetland delineation report, technical specifications, and a preliminary opinion of probable construction cost (POPCC). The system included an elaborate control system to facilitate pumping operations into two IESF infiltration beds.

Once the initial plans were developed, HEI solicited feedback from the RCWD and City of Roseville in a project review meeting. The feedback received was integrated into the final design plans and POPCC.

Once final designs were completed, HEI provided solicitation support services. Upon selection of a contractor, HEI performed construction observation activities to

ensure the IESF was constructed per the final design.

This project was completed and operational in the fall of 2018.



Location

Roseville, Minnesota

Client

Rice Creek Watershed District

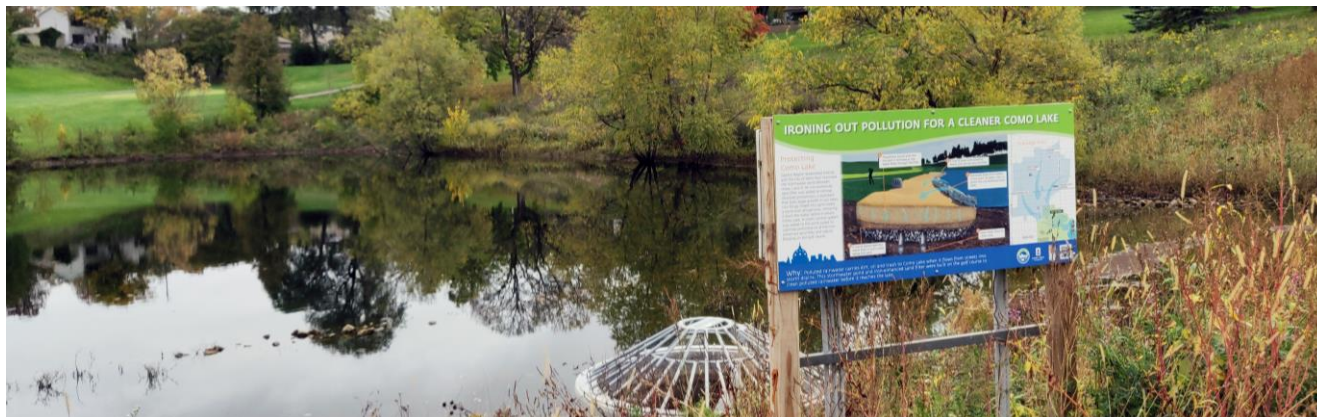
Contact

Nick Tomczik
Administrator
763.398.3079

Project Highlights

- A unique IESF to achieve water quality goals.
- Stakeholder engagement and coordination to ensure all voices were heard during the design process.
- Funding assistance.

Como Zoo and Golf Course Best Management Practices Final Design Saint Paul, Minnesota



Background

In 2016, the Capitol Region Watershed District (CRWD) and its many project partners hired Houston Engineering, Inc. (HEI) to complete a best management practice (BMP) feasibility study for six potential BMPs in Como Park. From this study, the project partners chose to build the Northwest Golf Pond iron-enhanced sand filter (IESF) bench along hole 3 and the Zoo Infiltration Basin and underground infiltration system along hole 7. To construct these BMPs, HEI was asked to complete final designs.

The Project

The team completed a geotechnical evaluation to ensure the soils were acceptable for the BMP designs. HEI also completed an existing conditions survey and topographic site survey to identify the location and elevation of storm sewer, utilities, slopes, trees,

and existing site features. This data helped determine if the existing ponds will provide adequate pretreatment before flows reach the IESFs.

Based on project developments, HEI also performed a wetland delineation and additional ecological analysis of the site to understand its complex makeup.

Once the additional information was collected, HEI updated an existing hydrologic and hydraulic model to ensure the proposed BMPs would have no negative impacts to the existing pipe hydraulics in the complex hydraulics surrounding the BMPs.

To ensure stakeholder goals were included in the designs, HEI submitted the designs at 30%, 60%, and 90% completion. After all feedback was collected, HEI submitted the final

construction documents to be used for solicitation of bids.

These innovative BMPs are equipped with automated valves that will control water elevations in the ponds by lowering or raising storage based on water surface levels to promote water quality performance and flood mitigation. These valves can also be controlled remotely and include other smart features, such as weather forecasting.

The IESF benches were retrofitted into existing ponds in a treatment train to ensure the highest possible water quality improvements while maintaining playable area on the golf course.

Construction was completed in 2020.

Location

Saint Paul, Minnesota

Client

Capitol Region Watershed District

Contact

Forrest Kelley
Regulatory Division Manager
651.644.8888

Project Highlights

- Coordination and communication with a large stakeholder group.
- Stakeholder feedback collected at several check points in the design process.
- Innovative IESF benches retrofitted into the existing ponds.
- Automation, adaptive control, telemetry, and remote control of BMPs' functionality.
- An infiltration capacity of 1.9 acre-feet to protect Como Lake.

(006475_0020) 4-18-23

Rice Lake Wetland Restoration

Becker County, Minnesota



Background

Though it was originally a large, deep wetland complex, in 1915, the Rice Lake Wetland was ditched and drained by Becker County Ditch No. 13. The ditch kept the wetland artificially low and in a semi-drained condition. From the Pelican River Watershed District monitoring program, the District found that the upstream ditched Rice Lake Wetland was the highest source of phosphorus entering Detroit Lake. Studies showed that by restoring the wetland complex to pre-ditching conditions, Detroit Lake's declining water quality trend should stabilize and may even improve in the long-term future. The Pelican River Watershed District sought to restore the Rice Lake Wetland to its historic conditions.

The Project

Houston Engineering, Inc. (HEI) was contracted by the Pelican River

Watershed District to restore the Rice Lake Wetland. This project aligns with several water management plans created by local organizations, including:

- The Pelican River Watershed District's Revised Management Plan
- The Detroit Lake Clean Water Partnership Diagnostic Study and Implementation Plan
- The Upper Pelican River Watershed Plan and Environmental Assessment
- The Becker County Local Water Management Plan

Our team designed and recommended two water control structures that would restore the wetlands to their pre-ditching conditions: the Upper Rice Lake Structure and Lower Rice Lake Structure. The Upper Rice Lake Structure was constructed in 2021 under Phase 1. The Lower Rice Lake

Structure will be constructed during Phase 2 in 2024/2025. These structures will raise water levels to the wetland's size and ground saturation periods.

The wetland can be drawn down below the normal pool elevations when the structures need maintenance or for wildlife management purposes. Once maintenance is complete, the wetlands can be re-flooded.

As part of this project, HEI provided environmental permitting for project impacts to Minnesota Protected Waters and for impacts from the embankments, structures, and associated access roads.



Location

Becker County, Minnesota

Client

Pelican River Watershed District

Contact

Tera Guetter
Pelican River Watershed District Administrator
218.846.0436

Project Highlights

- Restored the Rice Lake Wetland to its pre-ditched conditions.
- Improved water quality for downstream Detroit Chain of Lakes.

High Hazard Dam Assessments Statewide Iowa



Background

The Iowa Department of Natural Resources (DNR) received funding through FEMA's Rehabilitation of High Hazard Potential Dams Grant Program (HHPD) and was seeking to develop a prioritized plan to categorize their portfolio of high hazard dams using a risk-based assessment process adopted by FEMA. To accomplish this, the Iowa DNR chose Houston Engineering, Inc. (HEI) to begin preliminary/assessment needs of 39 dams (later expanded to 85 dams) located statewide. Drawing from HEI's extensive history of dam projects and expertise, HEI helped the Iowa DNR document and develop an understanding of the high hazard dams' current state of shortcomings and/or deficiencies.

The Project

Our project team began the process by performing screen level assessments and taking an inventory of resources in accordance with FEMA's guidance. This way, FEMA can easily check for completeness and facilitate funding opportunities for these dams in the future.

Downstream impacts will also be assessed for each of the dams. HEI will utilize LiDAR and conduct an analysis of surrounding urban areas. These are of particular importance to include, as these areas usually have a greater population at risk (PAR). HEI plans to assess these PARs by using a variety of GIS-friendly tools and ground truth by structure counts and related assumptions. A scan of the entire breach inundation footprint, homes, infrastructures, and major

pipeline facilities will also be completed.

Potential risk reduction recommendations will also take place, in addition to development of mitigation alternatives. HEI will develop a report for each dam that addresses the scope, complexity, and magnitude of costs for the mitigation alternatives proposed.

By following the assessment protocol outlined in FEMA's Federal Guidelines for Dam Safety Risk Management, this effort hopes to open avenues for the Iowa DNR for potential funding through FEMA's HHPD. This in turn will bring about cost sharing opportunities across the state.

Location

Statewide Iowa

Client

Iowa Department of Natural Resources

Contact

Casey Welty
Senior Dam Safety Engineer
515.725.8330

Project Highlights

- HEI opened opportunities for future funding and cost sharing opportunities across the state for the Iowa DNR.
- The Iowa DNR can now build upon the inventory of assessments and improve future work.

(009341_0001) 10-8-24

Hanson Lake Sediment Collection, Analysis, and Alum Dosing Bellevue, Nebraska



The three sampling locations at Hanson Lake

Background

In May of 2023, Houston Engineering, Inc. (HEI) was hired by the Hanson Lake #3 Improvement Association, Inc. to collect and analyze sediment samples at the bottom of the lake and to evaluate the potential feasibility and cost of strategies to reduce release of phosphorus from the sediment into the water column.

The Project

HEI collected two sediment samples from the bottom of Hanson Lake at each of three locations. One sample was used to analyze the potential anoxic release rate of phosphorus from the sediment and the other was used to quantify the various forms of phosphorus present (fractionization). The release rates inform the need for phosphorus inactivation by quantifying internal loading potential.

The phosphorus fractionations determine the applicability of alum application and help quantify the required alum dosing rates and costs.

The sediment samples were collected through the ice using an ice auger. Cores were obtained via a piston sampler lowered to the bottom of the lake to pull up intact sediment cores. Sediment cores were then placed in Styrofoam coolers, packed in ice, and shipped to the Center for Limnological Research and Rehabilitation at the University of Wisconsin-Stout (UW-Stout) for analysis.

UW-Stout received the sediment samples in good condition and prepared the material for the phosphorus release and fractionization analyses. Upon obtaining the results, HEI calculated

the phosphorus released and required alum dosing rates, expected treatment longevity, and planning-level cost estimates to limit phosphorus release and resulting eutrophication.

Our team compiled a technical document that summarizes the analysis, calculations for phosphorus release and alum dosing, the cost of alum dosing, and whether this is a feasible solution for improving water quality at Hanson Lake.



Location

Bellevue, Nebraska

Client

Hanson Lake #3 Improvement Association, Inc.

Contact

Tom Howard
President
402.670.3263

Project Highlights

- Successful collection of sediment cores from the bottom of a deep lake (deepest sample point was in 35-feet of water).
- Calculation of internal phosphorus release, required alum dosing, and estimated alum application costs.
- Collaborated with Dr. William James for QA/QC of HEI-developed application rates and strategies.
- Our feasibility study determined that alum dosing is a feasible option for reducing phosphorus release at Hanson Lake and offered solutions for moving forward.

(011958_0001) 05-30-25

Grinnell Parks and Recreation Master Plan

Grinnell, Iowa



Background

The Grinnell Parks and Recreation Master Plan is intended to serve as a comprehensive, strategic guide for the future development, enhancement, and management of the City's parks, recreational facilities, and open spaces. Its purpose is to ensure that these community assets continue to meet the evolving needs and preferences of residents by incorporating broad public input and expert analysis. The plan helps City leaders prioritize investments and allocate resources effectively, providing a clear roadmap for capital improvements, facility maintenance, and new program offerings. It supports efforts to enhance residents' quality of life by promoting accessible, safe, and diverse recreational opportunities.

Discovery

- Public Engagement
- Data Collection
- Community Profile and Demographic
- Inventory and Analysis
- Needs Assessment

Metrics

Completed: 2025

Design Cost: \$700,000

The Plan

- Guiding Principles, Policies and Goals
- Park Systems and Park by Park Master Plans
- Trail, Greenways and Connectivity
- Sustainability and Community Health

Implementation

- Funding and Implementation Strategies
- Partnerships and Collaboration
- Implementation and Action Plan



Location

Grinnell, Iowa

Client

City of Grinnell

Contact

Jordan Allsup

Director of Park and Recreation

641.236.2620

jallsup@grinnelliowa.gov

Catfish Creek Stream Restoration

Dubuque County, Iowa



The Project

Dubuque County Conservation contracted with RDG Planning & Design to develop approaches to address streambank stability issues in Swiss Valley Park Campgrounds along the South Fork of Catfish Creek. One of the main challenges was redesign of a vehicular stream crossing which was directing stream flow towards a 20' tall exposed bluff along the edge of the stream. The design also addressed stability issues at a number of other locations along the reach, created an enhanced stream play area, established accessible fishing locations, enhanced in-stream habitat, created new native landscaping areas and a recreational trail which weaves along the stream. The project is expected to proceed through the Joint Permit application process this year, expected to be covered under a Nationwide Permit administered by the US Army Corps of Engineers.

Survey support for this project was provided by WHKS, through data collection in the field and by use of aerial imagery collected from a quadcopter. This project was partially funded by the State of Iowa's SRF program and required use of the Iowa River Restoration Toolbox for analysis design.

Services

- Preliminary Design
- Final Design
- Permitting and Bidding
- Construction Administration

Metrics

Schedule: Design January - August 2021; Construction September 2021 - March 2022

Size: One half mile



Location

Dubuque County, Iowa

Client

Dubuque County Conservation Board

Contact

Brian Preston
Executive Director
563.556.6745
brian.preston@dubuquecounty.us

Scope of Work

Project-Specific Understanding

The HEI Team includes RDG Planning and Design, and together we bring an unparalleled level of project-specific insight to this effort, grounded in both recent and relevant experience and direct involvement in the City's lake and park planning. Our understanding is built on the following key advantages of our team:

- + HEI has successfully planned, designed, and/or supported construction bidding and oversight on **more than five similar lake restoration projects in Iowa** within the past 5 years. Through this work, we have developed a strong command of the full scope of services, interrelated tasks, regulatory reviews, and milestone expectations associated with lake restoration efforts. We also bring practical experience in anticipating and resolving common challenges that arise.

- + **HEI authored the Grinnell Lakes Restoration Feasibility Study** (Appendix A of the Request for Proposal) in partnership with the City and DNR. That work provided our team with a detailed understanding of watershed dynamics, in-lake conditions, and stakeholder priorities. As a result, we are already deeply familiar with the project's physical constraints, opportunities, and technical requirements. Examples of the project-specific insight we bring include:

1. Our evaluation of the technical feasibility and long-term sustainability of managing Lake Nyanza as a deep, open-water lake. Converting the lake to a wetland amenity offers a more cost-effective and sustainable alternative that still provides ecological, aesthetic, and recreational benefits. Collaboration with the USACE regulatory team about the permitting path for a wetland conversion occurred throughout the feasibility study. The up-front communication with USACE will

help avoid permitting pitfalls as the project moves into design and construction.

2. **We understand the need to reduce not only sediment-attached phosphorus, but also dissolved, bioavailable phosphorus**—particularly in the tributary flowing from Lake Nyanza into Arbor Lake. Our team has evaluated enhancements to traditional BMPs (for example, iron-enhanced sand filters [IESFs]) and we bring design experience implementing such solutions that target dissolved phosphorus reductions.
3. Our preliminary assessment of the Arbor Lake dam and outlet channel highlighted specific safety and maintenance concerns. As a result, we've assembled a team with targeted expertise in dam safety and familiarity working with the Iowa DNR Dam Safety Program.
4. We've already evaluated potential sediment spoil containment options and identified four viable sites. Storing and stabilizing dredged material will require a thoughtful combination of these sites to meet permit conditions, minimize erosion risk, and align with long-term park use and management.

- + **Finally, the combination of HEI and RDG creates a partnership that unites the firms behind both the Grinnell Lakes Restoration Feasibility Study and the City's Parks and Recreation Master Plan.**

This collaboration enhances our ability to integrate restoration efforts into the broader park system and ensures that both visions align—maximizing opportunities for landscape aesthetics, recreational access, and long-term community benefit.

The Importance of Coordination and Sequencing

The City, with technical support from DNR partners, has selected a subset of the highest priority watershed BMPs for Phase 2 and in-lake

alternatives for Phase 3 engineering and implementation. We are well-versed with the selected alternatives, including the technical considerations, permitting pathways, and cost-benefits outlined in Section 4 of the feasibility study.

We understand the rationale behind sequencing Phase 2 (watershed) and Phase 3 (in-lake) construction separately. This approach not only minimizes disruption for lake users by shortening the period of lowered water levels but also opens the door to broader contractor participation, as firms with relevant expertise may differ between the two phases.

The timing and duration of lake drawdown is an important component of this project, as it impacts public opinion, fiscal considerations, and constructability. During design and permitting, we may identify potential benefits for shifting certain Phase 2 items—such as the dredging activities associated with BMPs 6 and 7—into Phase 3. This could allow the project to take advantage of economies of scale, reduced

mobilization of dredging equipment, lower water table levels during drawdown, permitting synergies, or other favorable site conditions during in-lake construction. We will assess and communicate any such opportunities early in the design process to support budget planning, park operations, and schedule coordination.

Project Alternatives

The approach to the Scope of Services that follows is based on completing the design, permitting, and supporting services listed in the Request for Proposal (RFP) for the following alternatives. By clearly identifying these selected practices below, we aim to ensure full alignment with the City’s expectations, avoid ambiguity regarding scope, and provide a transparent foundation for budgeting, scheduling, and implementation planning. Our team has direct experience from prior lake restoration projects designing and permitting the full list of structural alternatives and BMPs included in this RFP.

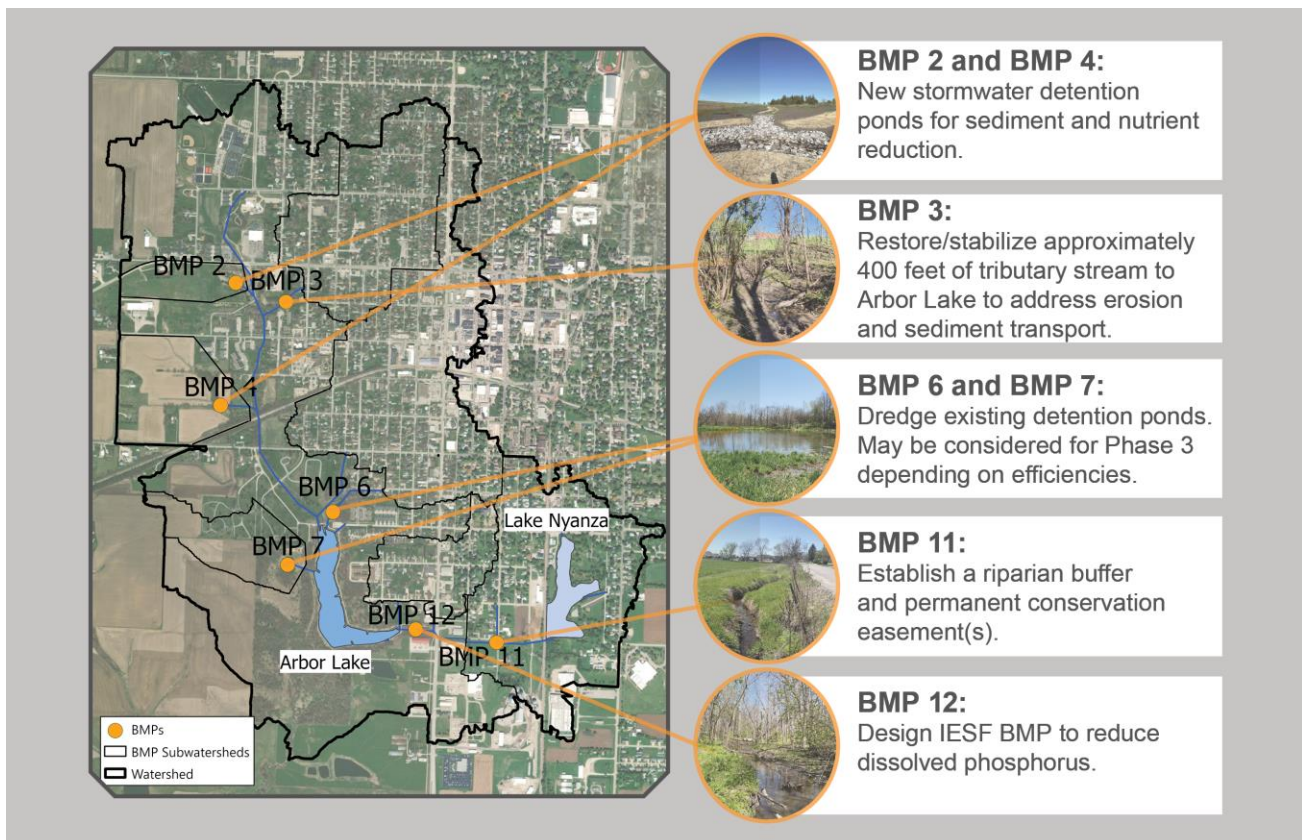


Figure 1—Arbor Lake Watershed BMPs.

Watershed BMPs

Our team has in-depth understanding of the BMPs identified in the RFP, gained through the analyses and field work conducted during the feasibility study. See Figure 1 for a summary. Because reduction of dissolved phosphorus is critical for Arbor Lake water quality, IESF components will be evaluated for possible implementation with BMPs 2, 4, and 11. IESF design will account for the critical need to manage base-flow and mitigate anoxic conditions which can cause the release of phosphorus. The goal will be to design and implement an IESF with at least one watershed BMP, most likely BMP 11 or 12, to the extent that construction budget allows.

In-Lake Restoration

Arbor Lake

- **Sediment Removal:** Mechanically dredge approximately 50,000 cubic yards of accumulated sediment from Arbor Lake to improve depth, water quality, and recreational value.
- **Sediment Spoils Containment and Grading:** Design and stabilize spoil containment areas for dredged sediment. Where feasible, grading will complement the landscape and support future park uses.
- **Shoreline and Jetty Stabilization:** Stabilize approximately 1,995 feet of shoreline and existing jetties to prevent erosion and improve access.
- **Access Enhancements:** Design ADA and non-ADA lake access infrastructure to improve usability for a diverse range of visitors.
- **Low-Level Drawdown:** Design new infrastructure capable of complete lake drawdown and preventing carp re-entry, while also improving and protecting the dam and outlet structure integrity and function.

Lake Nyanza

- **Shoreline Stabilization:** Stabilize approximately 1,150 feet of shoreline to

reduce erosion and protect adjacent park amenities.

- **Jetty Construction:** Construct a new jetty to support public access and recreational opportunities.
- **Conversion:** Transition Lake Nyanza from an open water lake to a functioning urban wetland that enhances aesthetics, habitat, and recreation with lower future maintenance needs.

Approach to Scope of Service

In alignment with the RFP, our approach follows the task framework and sequence outlined by the City, with deliverables and assumptions detailed for each major element.

Task 1. Meetings, Coordination, and Project Management

Task 1a. Initial Meeting

We will initiate the project with a kick-off meeting involving City staff, DNR partners, and other relevant stakeholders. This meeting will confirm expectations for each phase, identify critical coordination points, and establish communication protocols.

We will also discuss permitting pathways, public engagement strategy, and preliminary design sequencing. Within one week, HEI will provide a written summary of action items, agreed-upon roles, and project timeline refinements.

Task 1b. Public Open House Meeting

The HEI and RDG Team will lead a public open house to present selected alternatives for Phase 2 and Phase 3 restoration efforts. We will prepare clear, engaging materials—including RDG-produced visual renderings of watershed and in-lake features that match the branding of the Parks and Recreation Master Plan. These will help community members visualize outcomes, particularly around access enhancements, park aesthetics, and future recreational use. We will discuss the City's preferences for the timing of the open house relative to design status at the Initial Meeting.

Depending on the City’s preference, the open house may be scheduled soon after the 35% submittal—allowing community feedback to inform design refinements—or closer to 90%, enabling residents to more fully visualize specific improvements and park features.

Task 1c. Project Management and Administration

HEI will provide transparent project management throughout the duration of the contract to support timely delivery and strong coordination. Key responsibilities include:

- A designated Project Manager (Charles Ikenberry) as the primary point-of-contact for the City
- Collaborative coordination between HEI and RDG to align design, landscape architecture, and park planning
- An internal task tracking system to monitor deliverables and deadlines
- Submission of monthly invoices and progress reports that summarize work completed, upcoming deliverables, key decisions or risks, and schedule status

Task 1d. Other Meetings

In addition to the initial kick-off meeting, public open house, and formal milestone review meetings (35%, 60%, and 90%) included in Task 4, we anticipate the need for four 1-hour virtual coordination meetings between major submittals. These check-ins will include the City and DNR project managers, HEI’s project manager, and relevant task leads, and will:

- Maintain momentum and clarity between design milestones
- Troubleshoot design or permitting issues early
- Confirm scope, sequencing, or phasing adjustments proactively

These meetings will help avoid surprises at formal submittals and create space for real-time decision-making that keeps the project moving efficiently.

Task 1 Deliverables and Assumptions:

- Scheduling, agenda development, facilitation, and reporting of Initial Meeting.
- Scheduling, agenda development, facilitation, digital presentation, and up to six poster exhibits (three renderings) for the Public Open House.
- Detailed monthly progress reports submitted via email along with project invoices.
- Four, 1-hour, virtual check-in meetings, scheduled as needed, between project milestone reviews.



Charles, Carly, and other team members have an established approach and cadence for communication throughout a lake restoration project.

Task 2. Surveys and Site Analysis

Our team will complete the necessary surveys and site investigations to develop accurate and constructable designs. Survey work will be strategically scheduled to provide timely permitting support, accurate quantity estimation, and reduce rework.

Survey scope includes:

- Topographic and engineering survey of BMP sites, near-shore features, dam/outlet and drawdown design, and sediment spoils containment

- Surveys to define conservation easement boundaries (for example, BMPs 11a and 11b, and others on private lands)
- Utilities and relevant outlet and structure surveys

Our fieldwork will build on insights gained during the feasibility study, enabling a more efficient and targeted site analysis. As part of field surveys, we will also gather key data and photographs to support design discussions and permit coordination.

Task 2 Deliverables and Assumptions:

- Inclusion of field survey data into plan sheets.
- Upon request, raw survey data can be provided to the City in digital form (CAD point file or CSV).
- Conservation easement legal survey for BMP 11. If easements are needed for other BMPs, they can be provided as an Additional Service.
- Negotiations with private landowners regarding easements will be led by the City.



Ted Bridges and Mark Jacobs collecting sediment samples from Arbor Lake during the feasibility study.

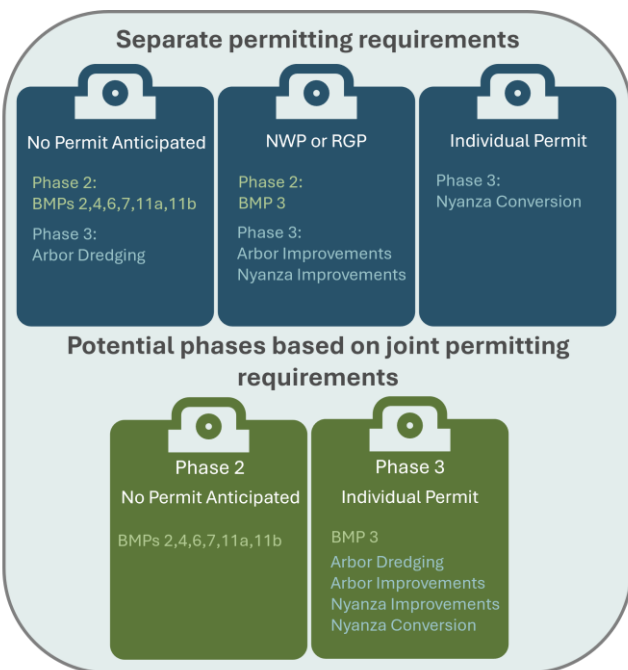
Task 3. Permits and Clearances

This task will build upon previously conducted site investigations, permitting considerations, and coordination with USACE performed during the feasibility study. All BMP locations have been walked and assessed for potential wetlands and other jurisdictional waters of the US by our permitting lead, which increases efficiency in the field and understanding design constraints up-front.

Conversations with USACE during the feasibility study resulted in a preferred permitting approach based on goals of the watershed BMPs and in-lake restoration practices, permit limitations, and impacts. Many of the BMPs identified for Phase 2 do not require a permit due to avoidance of impacts or they fit within nationwide permits (NWP) that do not have a pre-construction notification. These projects can be constructed prior to permit issuance of the other sites. Phase 3 includes components that could be permitted with a NWP or regional general permit (RGP) if strategically constructed in different, succinct phases. However, the USACE has indicated that inclusion of the Nyanza conversion will trigger the need for an individual permit (IP) for all project components. This is something our permitting lead would continue to challenge and present creative approaches to try to avoid an IP if possible. HEI has accomplished this in several past projects by developing strategic designs that fit within NWP while still meeting project goals. BMPs and in-lake practices have already been identified to reduce impacts and therefore obtaining an IP is not a concern; however, schedule impacts for USACE review of an IP must be considered. The deliverables and assumptions below go into more detail on what will be developed and submitted.

Dam safety coordination is critical for this project to ensure that the components to draw down the lake are designed and installed safely and per state regulations. HEI understands the current condition of the dam embankment and the

unregistered status of the structure. The construction required for installing a new drawdown pipe and control structure will be coordinated directly with Iowa Dam Safety as the project progresses. All permits required for both dam safety and potential floodplain impacts will be covered under this task. It is currently assumed that registering the structure with Iowa Dam Safety is not required to implement this project, but further communication with Iowa Dam Safety is included to determine the permitting requirements as this is a highly unique circumstance.



Task 3 Deliverables and Assumptions:

- Stream and wetland delineations and reporting.
- Continued coordination with USACE Regulatory to ensure permitting complications are avoided.
- Development of a 404(b)(1) alternatives analysis to provide sufficient information to USACE that the alternatives are the Least Environmentally Damaging Practicable Alternative (LEDPA). Analysis was performed during the feasibility study, along with USACE coordination, to provide confidence in this analysis. The cost proposal assumes all components of Phase

2 and Phase 3 that require a permit will be permitted together under one IP, as directed by USACE. If another permitting path is chosen and allowable—for example, BMP 3 being permitted separately under a RGP 40, the effort to include BMP 3 within the IP submittal will be shifted to a separate RGP submittal.

- A Phase 1 Archeological Assessment will be performed by the Office of the State Archeologist, as deemed necessary by USACE and Iowa State Historic Preservation Office.
- One IP permit submittal package will be developed for all project components that require a 404 permit. If it is determined during design that another permitting approach is favorable, effort will shift and will include up to two separate NWP or RGP submittals, in addition to the IP submittal. This task also includes a 401 individual water quality certification application to DNR.
- Floodplain permit applications will be complete along with all required documentation. There is no mapped floodway at this location so modeling efforts should be limited.

Dam safety permitting and coordination with DNR. Breach modeling to estimate downstream impacts from a breach will be included. It is assumed that geotechnical sampling and assessments will not be required. If DNR determines this a requirement, these services have been described in Task 5. Additional Services.

Task 4. Watershed BMPs and In-Lake Restoration Plans and Specifications

✓ Task 4.1a. 35% Watershed BMP Plans and Specifications

✓ Task 4.1b. 35% In-Lake Plans and Specifications

We will develop concepts and prepare preliminary design plans for watershed BMPs and in-lake practices so that each is a stand-alone set of plan and specifications. This will support preparation of separate bid packages for watershed and in-lake practices. As previously noted, it may also make sense to split Phase 2 and Phase 3 by permitting needs, but in either case, we will develop separate construction documents as needed. CAD plan sheets will be set up and organized to allow for easy shifting of watershed alternatives from Phase 2 to Phase 3 after 35% if survey, permitting, or design insights reveal benefits to shifting one or more alternatives.

HEI will schedule and host a 35% review meeting to discuss watershed and in-lake plans with the City and Technical Advisory Team (TAT). The meeting will be scheduled to take place within 1-2 weeks of submittal. One goal of the review meeting will be to confirm which alternatives and design variations are cost-effective priorities to advance to 60%. Additionally, the HEI team will get feedback from the TAT regarding design preferences, possible conflicts with private and public infrastructure, and value-adding opportunities or phasing adjustments.

Task 4.1 Deliverables and Assumptions:

- Preliminary design plans for Phase 2 and Phase 3 construction that include the following:
 - Project cover sheet
 - Site map
 - Plan view sheets

- Concept-level grading in the form of simple profiles and cross-sections, if/where applicable
- Proposed access routes, staging areas, and limits of construction
- Preliminary opinion of probable construction costs (OPCCs) with a 30% contingency.
- Technical specifications typical of watershed and lake restoration construction projects.
- 35% review meeting, including agenda, facilitation, and distribution of meeting notes.



Mark Jacobs collecting stream and channel data needed for design of grade control and bank stabilization measures.

✓ Task 4.2a. 60% Watershed BMP Plans and Specifications

✓ Task 4.2b. 60% In-Lake Plans and Specifications

Plans will be advanced to include more detailed grading, structural features (e.g., outlet modifications), and final determination of where/how to integrate IESF components for enhanced dissolved phosphorus reduction. Updates for 60% design will consider RDG's input on landscape architecture, including shoreline design elements and spoil area treatments that reflect the City's Park Master Plan goals.

Task 4.2 Deliverables and Assumptions:

- Updated design plans for Phase 2 and Phase 3 that incorporate feedback provided at 35% review and 60% level of detail.
- Updated OPCCs with 20% contingency.
- Technical specifications highlighting key products and materials.
- 60% review meeting, including agenda, facilitation, and distribution of meeting notes.

☑ Task 4.3a. 90% Watershed BMP Plans and Specifications

☑ Task 4.3b. 90% In-Lake Plans and Specifications

We will refine all drawings, specifications, and cost estimates based on 60% review feedback and increased level of design detail, including incorporation of landscape architectural design components to BMPs, near-lake practices, and spoils sites. Feedback from permitting agencies will also be incorporated into 90% designs for efficient permit approval. Landscape renderings will be created for the 90% submittal for watershed BMPs, Arbor Lake, and Lake Nyanza alternatives. A 90% review meeting will be held to get full alignment on any final design adjustments.



RDG's rendering for Arbor Lake Park from the City of Grinnell's Park Master Plan.

Task 4.3 Deliverables and Assumptions:

- Updated design plans for Phase 2 and Phase 3 that incorporate feedback provided at 60% review and 90% level of detail.
- Updated OPCCs with a 10% contingency.
- Complete list of technical specifications.
- 90% review meeting, including agenda, facilitation, and distribution of meeting notes.
- (Three) landscape architectural renderings that integrate engineering design plans with previous concepts created for the Parks and Recreation Master Plan for:
 - Watershed BMPs
 - Arbor Lake
 - Lake Nyanza

☑ Task 4.4a. Final Watershed BMPs Plans and Specifications

☑ Task 4.4b. Final In-Lake Plans and Specifications

The final design stage will incorporate comments received at the 90% milestone and provide a complete, sealed, and biddable plan set for each construction phase. Our team has a solid track-record of providing OPCC estimates that align with contractor bids, which reduces funding stress and last-minute cuts from desired alternatives.

Task 4.4 Deliverables and Assumptions:

- Sealed design plans for Phase 2 and Phase 3 construction.
- Sealed technical specifications for Phase 2 and Phase 3 construction.
- A final, updated OPCC without a contingency.

Task 5. Additional Services

While not part of the base scope, our team is available to provide additional services in support of implementation, as requested by the City. Should the City elect to pursue these services, HEI will coordinate with the City to develop a detailed scope and fee on a time-and-materials, not-to-exceed basis per the

personnel and hourly rate schedule included in our Cost Proposal.

☑ **Task 5.1. Construction Bidding Services**

- Prepare bid documents
- Provide bid hosting services
- Facilitate a pre-bid meeting
- Answer bid questions; create addenda
- Review bids, make recommendation, draft Notice of Award

☑ **Task 5.2. Construction Administration and Observation Services**

- Facilitate pre-construction meeting
- Review shop drawings and submittals
- Perform construction observation
- Submit weekly construction reports for the City
- Drone surveys and sediment quantity verification
- Review pay requests, issue change orders
- Perform final inspection and punch list
- Prepare record drawings and submit digital files

☑ **Task 5.3. Geotechnical Testing and Analysis**

- Soil borings and sampling
- Geotechnical analysis and modeling (if required by Dam Safety)
- Reporting required for documentation of findings (if required by Dam Safety)

☑ **Task 5.4. Additional Dam Safety Analysis**

- Determine dam improvements required for registration of dam in DNR's official dam inventory
- Supplemental tasks based on feedback from Iowa Dam Safety
- Permit application and submittal

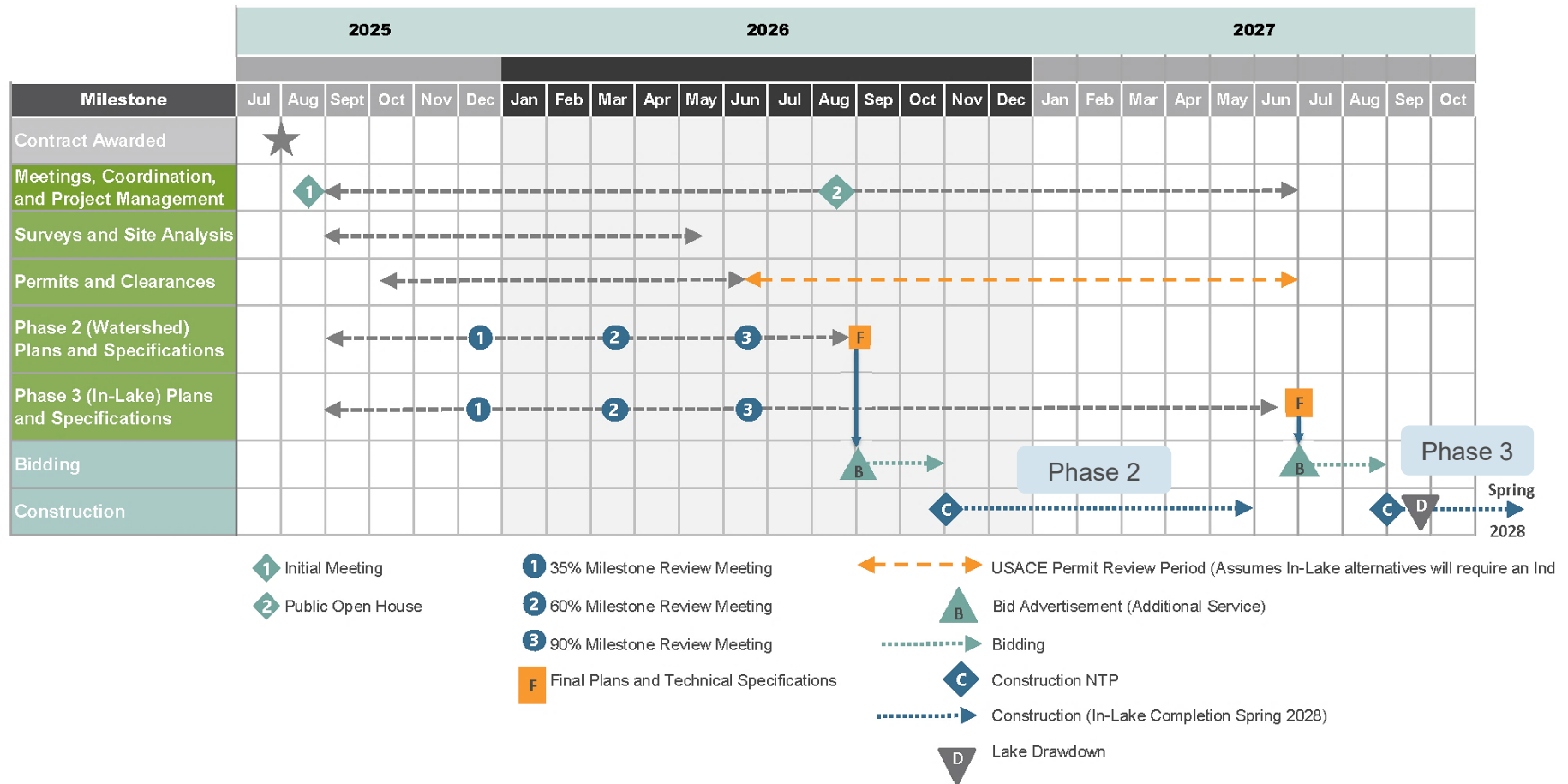
☑ **Task 5.5. Additional Landscape Architectural Services**

- Additional renderings
- Updates to Parks and Recreation Master Plan documents

☑ **Task 5.6. Internal Phosphorus Inactivation (Alum or Other Treatment)**

- Community outreach
- Develop alum application specifications and bid documents
- Administer alum application bidding process
- Provide application oversight, monitoring, and reporting
- Provide post-application follow-up monitoring

Project Schedule



This proposed project schedule meets the overall goal stated in the RFP to begin in-lake work in Arbor Lake after a late summer or fall of 2027 drawdown. Many variables affect lake restoration project schedules, including regulatory review and permit approvals. Please note:

1. Our proposed schedule aligns with the likely permitting path described in Task 3 - Permits and Clearances in the Approach to the Scope of Services. We anticipate that an IP will be needed for the Lake Nyanza wetland conversion, therefore it makes sense to include include all in-lake improvements in one IP, with a delayed Final Plan submittal date due to permit review and approval timeframe.
2. We prefer to sync 35%, 60%, and 90% review milestones as shown but are open to discussing this during contract negotiation and/or at the Initial Meeting.
3. Arbor Lake drawdown is projected to occur as part of Phase 3 construction since it appears unlikely that the existing drawdown mechanism is functional. We understand that drawdown prior to Phase 3 bidding is ideal and will explore pre-bidding drawdown potential as part of our work.

Cost Proposal

Listed below is our cost proposal with fixed fees, consultant fees, and additional services open to negotiation.

| Task | Description | Expenses | Totals |
|------------|---|-----------------|------------------|
| 1 | Meetings, Coordination, and Project Management | | |
| 1.1 | Initial Meeting | | |
| 1.2 | Public Open House Meeting | | |
| 1.3 | Project Administration and Monthly Progress Reports and Invoices | | |
| 1.4 | Project Updates and Q&A Meetings | | |
| | Task 1 Costs | \$1,740 | \$48,400 |
| 2 | Surveys and Site Analysis | | |
| 2.1 | Evaluate Dam, Drawdown, and Outlet Features | | |
| 2.2 | Develop Engineering/Topographic Survey | | |
| 2.3 | Site Assessment of Watershed BMPs | | |
| 2.4 | Site Assessment of In-Lake Features | | |
| 2.5 | Conservation easements for BMP 11 and other private lands | | |
| | Task 2 Costs | \$10,420 | \$79,300 |
| 3 | Permits and Clearances | | |
| 3.1 | Perform Stream/Wetland Delineations and Reports | | |
| 3.2 | Section 404 Permit Coordination with USACE | | |
| 3.3 | Develop 404(b)(1) Alternatives Analysis | | |
| 3.4 | Conduct Phase 1 Archaeological Assessment | | |
| 3.5 | Develop and Submit 404/401 Permit Application(s) | | |
| 3.6 | Dam Breach Analysis Modeling | | |
| 3.7 | Develop and Submit Floodplain and Dam Safety Permit Applications | | |
| | Task 3 Costs | \$23,162 | \$147,600 |
| 4.1 | Engineering Plans and Specifications -- 35% | | |
| 4.1.1 | Develop Preliminary Engineering Design Plans -- 35% | | |
| 4.1.2 | Simulate Hydrology/Hydraulics for Preliminary Design -- 35% | | |
| 4.1.3 | Develop Preliminary Opinion of Probable Construction Costs -- 35% | | |
| 4.1.4 | Provide Typical Technical Specifications from Similar Project | | |
| 4.1.5 | Facilitate Virtual Technical Advisory Committee Review Meeting -- 35% | | |
| | Task 4.1 Costs | \$ - | \$126,200 |
| 4.2 | Engineering Plans and Specifications -- 60% | | |
| 4.2.1 | Update Engineering Design Plans -- 60% | | |
| 4.2.2 | Simulate Hydrologic/Hydraulic Model -- 60% | | |
| 4.2.3 | Perform Geotechnical/Seepage Analysis -- 60% | | |
| 4.2.4 | Update Opinion of Probable Construction Costs -- 60% | | |
| 4.2.5 | Draft Technical Specifications -- 60% | | |
| 4.2.6 | Hold Virtual Technical Advisory Committee Review Meeting -- 60% | | |
| | Task 4.2 Costs | \$ - | \$164,600 |
| 4.3 | Engineering Plans and Specifications -- 90% | | |
| 4.3.1 | Update Engineering Design Plans -- 90% | | |
| 4.3.2 | Simulate Hydrologic/Hydraulic Model -- 90% | | |
| 4.3.3 | Perform Geotechnical/Seepage Analysis -- 90% | | |
| 4.3.4 | Update Opinion of Probable Construction Costs -- 90% | | |
| 4.3.5 | Update Technical Specifications -- 90% | | |
| 4.3.6 | Hold Virtual Technical Advisory Committee Review Meeting -- 90% | | |
| | Task 4.3 Costs | \$ - | \$156,300 |
| 4.4 | Engineering Plans and Specifications -- Final | | |
| 4.4.1 | Update Engineering Design Plans -- FINAL | | |
| 4.4.2 | Update Opinion of Probable Construction Costs -- FINAL | | |
| 4.4.3 | Update Technical Specifications -- FINAL | | |
| | Task 4.4 Costs | \$ - | \$78,000 |

Summary of Costs

Listed below is a short summary of our expenses, labor, and total costs for your project.

| | | | | |
|--|--|-----------------|------------------|------------------|
| | Total Hours through Final Plans and Specifications | | 3941 | |
| | Cost of Services through Final Plans and Specifications | \$35,322 | \$765,078 | \$800,400 |
| | | Expenses | Labor | TOTAL |

Additional Services

Below is a list of our additional services. Fees for these services are negotiable based on your selections.

5.1 Construction Bidding Services

- 5.1.1 Prepare Bid Documents
- 5.1.2 Bid Hosting Services
- 5.1.3 Pre-Bid Meeting
- 5.1.4 Contractor Coordination and Addendums
- 5.1.5 Review Bids, Make Recommendation, Draft Notice of Award

5.2 Construction Administration and Observation Services

- 5.2.1 Pre-Construction Meeting
- 5.2.2 Review Shop Drawings and Submittals
- 5.2.3 On-Site Construction Observation/Contractor Coordination
- 5.2.4 Review Pay Requests and Change Orders
- 5.2.5 Drone Survey and Measurement of Sediment Quantities
- 5.2.6 Prepare and Submit Weekly Project Reports
- 5.2.7 Final Inspections and Report (Punchlist)
- 5.2.8 Prepare Record Drawings and Submit Digital Files

5.3 Geotechnical Testing and Analysis

- 5.3.1 Soil Borings to Assess Existing Material and/or Identify Needs for Improvement
- 5.3.2 Cone Penetration Testing (CPT) to Evaluate Existing Dam Integrity
- 5.3.3 Seepage and Stability Analysis

5.4 Additional Dam Safety Analysis

- 5.4.1 Additional Coordination with Iowa DNR Dam Safety
- 5.4.2 Documentation and updates for Dam Inventory and Classification
- 5.4.3 Emergency Action Plan (EAP) development (if required by classification)

5.5 Additional Landscape Architectural Services

- 5.5.1 Additional Visual Renderings of Watershed and In-Lake Practices
- 5.5.2 Updates to Parks and Recreation Master Plan Graphics Based on Final Design
- 5.5.3 Signage and Interpretation Concepts for Restoration Features

5.6 Internal Phosphorus Inactivation (Alum or Other Treatment)

- 5.6.1 Follow-up Sediment Analysis for Phosphorus Release and Dose Quantification
- 5.6.2 Determination of Dosing, pH Buffering Requirements, and Application Logistics
- 5.6.3 Technical Memorandum Summarizing Dosing Strategy/Extents/Costs
- 5.6.4 Community Outreach/Engagement
- 5.6.5 Development of Dosing Plans and Specifications

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- 5.6.6 Dosing Project Bidding, Including Contractor Selection
 - 5.6.7 Application Oversight, Monitoring, and Reporting
 - 5.6.8 Follow-Up Monitoring and Reporting After Treatment

LABOR RATES

The following is a schedule of hourly rates and charges for services offered by Houston Engineering, Inc. These rates are subject to a modest increase on January 1st of each year (typically no more than 5%).

| Category | 2025 Rates | Category | 2025 Rates | Category | 2025 Rates |
|-------------------------|------------|--------------------------------|------------|-----------------------|------------|
| Engineering Assistant 1 | \$104 | Technician Assistant | \$107 | Project Assistant 1 | \$87 |
| Engineering Assistant 2 | 123 | Technician 1 | 123 | Project Assistant 2 | 101 |
| Engineer 1 | 149 | Technician 2 | 131 | Project Assistant 3 | 107 |
| Engineer 2 | 156 | Technician 3 | 140 | Project Assistant 4 | 112 |
| Engineer 3 | 164 | Technician 4 | 149 | Project Assistant 5 | 120 |
| Engineer 4 | 172 | Technician 5 | 156 | Project Assistant 6 | 125 |
| Engineer 5 | 183 | Technician 6 | 164 | Planner 1 | \$172 |
| Engineer 6 | 194 | Technician 7 | 173 | Planner 2 | 188 |
| Engineer 7 | 206 | Technician 8 | 182 | Planner 3 | 205 |
| Engineer 8 | 216 | Technician 9 | 190 | Planner 4 | 237 |
| Engineer 9 | 227 | Technician 10 | 200 | Planner 5 | 249 |
| Engineer 10 | 237 | Technician 11 | 208 | Land Surveyor 1 | \$156 |
| Engineer 11 | 248 | GIS Assistant | \$76 | Land Surveyor 2 | 179 |
| Engineer 12 | 260 | GIS Analyst 1 | 116 | Land Surveyor 3 | 198 |
| Engineer 13 | 269 | GIS Analyst 2 | 128 | Land Surveyor 4 | 211 |
| Scientist Assistant | \$107 | GIS Analyst 3 | 140 | Land Surveyor 5 | 237 |
| Scientist 1 | 145 | GIS Analyst 4 | 153 | Land Surveyor 6 | 260 |
| Scientist 2 | 156 | GIS Analyst 5 | 164 | CAD Technician 1 | \$109 |
| Scientist 3 | 172 | GIS Analyst 6 | 176 | CAD Technician 2 | 114 |
| Scientist 4 | 185 | Project Manager 1 – Technology | 179 | CAD Technician 3 | 123 |
| Scientist 5 | 197 | Project Manager 2 – Technology | 198 | CAD Technician 4 | 131 |
| Scientist 6 | 230 | Project Manager 3 – Technology | 230 | CAD Technician 5 | 140 |
| Scientist 7 | 260 | Software Engineer 1 | \$135 | CAD Technician 6 | 149 |
| Hydrogeologist 1 | \$156 | Software Engineer 2 | 152 | Drone Pilot | \$165 |
| Hydrogeologist 2 | 173 | Software Engineer 3 | 163 | Drone Visual Observer | 67 |
| Hydrogeologist 3 | 197 | Software Engineer 4 | 175 | Landscape Architect 1 | \$142 |
| Hydrogeologist 4 | 244 | Software Engineer 5 | 188 | Landscape Architect 2 | 154 |
| Hydrogeologist 5 | 260 | Software Engineer 6 | 200 | Landscape Architect 3 | 165 |
| Senior Consultant 1 | \$219 | Software Engineer 7 | 212 | Landscape Architect 4 | 178 |
| Senior Consultant 2 | 272 | Software Engineer 8 | 230 | Landscape Architect 5 | 189 |
| Senior Consultant 3 | 285 | Computer Technician | \$189 | | |
| Senior Consultant 4 | 296 | | | | |
| Senior Consultant 5 | 307 | | | | |

SURVEY CREWS & REIMBURSABLE EXPENSES

| Category | 2025 Rates | Category | 2025 Rates |
|--------------------------------|---|---|-------------------|
| Survey Crews: | | ATV/Snowmobile/ Boat | \$15/hour |
| 1-Person Crew (plus equipment) | \$190/hour | ATV w/Tracks | \$30/hour |
| 2-Person Crew (plus equipment) | \$231/hour | Hydrone RCV | \$50/hour |
| 3-Person Crew (plus equipment) | \$286/hour | Small UAS (Drone) | \$25/hour |
| 4-Person Crew (plus equipment) | \$320/hour | Large UAS (Drone) | \$50/hour |
| Meals | Actual Cost | Deliveries/Postage/Printing | Actual Cost |
| Hotel | Actual Cost | Surveying Materials: Lath, Hubs, Pipe, etc. | Actual Cost |
| Mileage – Vehicles: | | Special Equipment and Other Materials Required | Actual Cost |
| 2-Wheel Drive | IRS Standard Mileage Rate | Subconsultants | Actual Cost + 10% |
| 4-Wheel Drive | IRS Standard Mileage Rate + \$.20/Mile | | |
| GPS Equipment | \$25/hour/unit | | |
| Robotic Total Station | \$40/hour | | |

