Proposal for Services

DRAINAGE CAPITAL IMPROVEMENT STORMWATER STUDY:
PRAIRIE VIEW LANE AND LAKESHORE DRIVE

FRESHWATER ENGINEERING

June 24th, 2020

City of Mequon – Engineering Division
11333 N. Cedarburg Road
Mequon, WI 53092

RE: Request for Proposals for Drainage Capital Improvement Stormwater Study: Prairie View Lane and Lakeshore Drive

Dear City Selection Committee,

FreshWater Engineering is pleased to submit this proposal in response to the recent City of Mequon Engineering Division RFP Drainage Capital Improvement Stormwater Study for the Prairie View Lane and Lakeshore Drive axes in Mequon, Wisconsin.

FreshWater (FW) proposes to integrate field data collected throughout the basin to develop an accurate representation of existing conditions. This will allow the City to analyze the flood risks and identify potential areas of improvement to limit future flood damages, both in the short and long terms. The following pages provide information about our project team, our qualifications, and our experience with similar projects.

We specialize in hydrodynamic modeling, hydraulic design optimization, stormwater management, and scour and erosion analysis. As a locally owned and operated firm, we are excited about this opportunity to help improve our environment and the water resources that surround us. We have a passion for finding a balance between the natural world and the built, human environment and we look forward to putting our skills to use on this project.

For services related to sewer televising, we are proud to team with Visu-Sewer. Founded in 1975, they have a vast resume of experience investigating underground utility lines. FreshWater and Visu-Sewer are currently teaming together on a similar investigation at North Point in Milwaukee to improve site drainage and stormwater management at that site. We will put our successful teaming relationship to efficient use for this project.

We welcome the opportunity to discuss this proposal with you further should there be any need. Please feel free to contact me at the number listed below should you have any questions.

Sincerely and most respectfully,

Laura Rozumalski, P.E.
President and Principal Engineer
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Introduction and Project Understanding

Extreme rainfall events are becoming commonplace across the country and Mequon is no exception. In urbanized watersheds, current stormwater infrastructure cannot cope with the vast quantities of runoff, posing increased risks to water quality, man-made structures, and human health and safety. Localized flooding in certain areas of Mequon has been noticeably increasing and the City of Mequon (City) has proposed long term solutions to fix this.

In an effort to seek out short term improvements and to ensure the proposed solutions are feasible, the City is looking to survey the area of concern. The results of the survey will be combined with information found in existing documentation to present findings to staff in an accurate and comprehensive manner.

Project Approach

The project will begin with a kick-off meeting to establish lines of communication, discuss expectations, and schedule regular progress update meetings. Following the kick-off meeting, the team will begin working on the project as described in the RFP. Tasks will begin with data analysis and collection and finish with a summary report of the findings. FW proposes to follow the scope of work provided in the RFP to provide field data and design recommendations to the City.

Field campaign planning and execution is one of FreshWater's strengths. FreshWater staff is skilled with a variety of devices used for field surveys including Real-Time Kinematic Global Positioning System (RTK-GPS) equipment, hydrographic surveying tools, aerial image photogrammetry, and water depth measuring sensors. We have performed RTK-GPS surveys at hundreds of sites and water bodies throughout the Midwest and completed field campaigns across the country. The largest current project is monitoring a watershed in northeastern Oklahoma stretching across three large tributaries and approximately 80 river miles. In addition to topographic survey and water level monitoring, FW is also collecting water quality data and evaluating discharge throughout the hydrologic system; engineering staff use field data to develop large-scale and site specific hydrologic and hydraulic models.

With detailed field information, FW is able to develop effective stormwater management designs. Wherever possible, FW strives to incorporate green stormwater infrastructure and promote infiltration. These sustainable practices provide several distinct advantages over traditional "hard" engineering solutions including reducing peak flows, delaying maximum discharge, filtering pollutants, and enhancing local aesthetics. Step-pools on a porous sand media bed used in a Regenerative Stormwater Conveyance (RSC) system are excellent examples. An RSC combines elements of bioswales with high-capacity conveyance systems to filter out nutrients, sediment, and particulate pollutants; infiltrate stormwater; and provide habitat for wetland flora. Another example is the incorporation of microtopography to infrastructure designs, wherein small depressions and raised locations are purposely included. Studies suggest increased infiltration and decreased runoff as well as higher vegetative species diversity in areas with significant microtopography.

Local topographic information will be important for the design process. FW engineers will evaluate local low points for use as infiltration basins, retention ponds, or detention facilities. Topographic data will be collected using RTK-GPS equipment on land, with support of aerial imagery collected with a drone for use in photogrammetric analysis as needed. Potential sites for vegetated ditches to more efficiently convey surface runoff may be indicated by topographic information. Additionally, any need for channel modifications such as drop structures can be evaluated by analyzing surveyed thalweg slopes in surface channels.

Conceptual designs for at least 3 recommendations will be developed for City review. Planview sketches, engineer's probable construction and permitting costs, and an estimated implementation schedule will be submitted to City staff.

All project information will be compiled into a summary report. The report will include survey data, televising reports for draintile, highlighted areas in need of repairs, and a detailed comparison to the 1999 Stormwater Report. Where current systems are undersized, silted, or damaged, FW will provide recommendations for repair or replacement.

Statement of Qualifications

FreshWater Engineering will evaluate the current and planned long-term stormwater management solutions and make recommendations for short-term modifications to mitigate current flooding concerns. FW staff bring extensive experience with stormwater system modeling and design to this project, with experience working in Wisconsin, the Upper Midwest region, and coast to coast. Tasks have ranged from small-scale rain garden design and installation to modeling and designing management systems in heavily-developed urban areas. The dedicated engineering team is capable of handling a wide variety of project scales and is committed to working with clients to ensure their goals are met with every project.

FW brings a dedicated team to the project. Laura Rozumalski, PE will perform the role of Project Manager and be actively involved with the many facets of this project. She will coordinate team efforts, offer insight during the survey planning phase, help interpret survey data, and communicate findings to City staff throughout the duration of the project. Brent Teske will lead planning efforts, process survey results, and maintain field notes. Ellen Feigl and Tyler Kapla will serve as supporting project engineers with responsibilities of data collection and processing.

FreshWater's Unique Abilities

FW has deep roots in Wisconsin and its vibrant communities. We have extensive experience in hydrologic and hydraulic data collection, watershed modeling and analysis, and community-based stormwater management design.

FW is a certified Woman-Owned Small Business Enterprise headquartered in Madison, with a local office in Milwaukee, Wisconsin. FreshWater staff specialize in hydrologic and hydraulic data collection, analysis, combined with modeling, watershed studies, and sustainable stormwater management. Our work includes extensive field data collection planning and implementation, analysis and interpretation of data, H&H analyses, engineering design for water resources, and coordination of multi-disciplinary teams.

Visu-Sewer's Unique Abilities

Visu-Sewer, Inc. is a second generation family owned company located in Pewaukee, WI. Founded in 1975 by Ernest Alexander, Visu-Sewer was started with a core group of employees dedicated to providing the highest quality sewer inspection and maintenance services in the industry. During the first few years, the company focused primarily on sewer cleaning and inspection work. These were the formative years for techniques such as hydro-jet flushing & CCTV Inspection.

Visu-Sewer was instrumental in the refinement of these techniques and was a founding member of the National Association of Sewer Service Companies.

Storm sewer CCTV inspection and obstruction removal can be a daunting task. Specialized equipment and data collection methods need to be used on each project. Visu-Sewer is well versed in the challenges of these types of projects. Whether the desire is to remove all debris and obstructions prior to televising or just to get through the pipe with as little cleaning and possible, we have the experience, equipment and personnel to complete any pipe inspection and cleaning project. In order to keep up with the demands of changing technologies in our industry, Visu-Sewer has a full time IT Manager on staff. This allows us to provide in-house immediate support to both field and office personnel. We have six offices throughout the central United States. Additional information about our company can be found at www.visu-sewer.com.

Similar Project Experience

Sewershed Modeling for Prioritization of Implementing Grey and Green Infrastructure CSO Mitigation Solutions, Green Cities, Clean Waters Program, Philadelphia Water Department, PA

FreshWater Engineering's Principal Engineer, Laura Rozumalski, PE, served as project manager and lead water resources engineer on various teams of engineers and landscape architects tasked with designing green stormwater infrastructure in order to meet ambitious targets to remediate Combined Sewage Overflows (CSOs) using decentralized storage and infiltration. As Project Manager for dozens of site-specific green stormwater infrastructure projects, she led the design of various facilities including bumpouts, tree trenches, rain gardens, stormwater wetlands, and other bio-infiltration areas.

Laura was integral to developing CSO mitigation alternatives for the City's Long-Term Control Plan Update. She modeled a wide range of alternative designs for the City's sewer system, using EPA's SWMM, including conveyance improvements, tank storage opportunities, tunnel options, wastewater treatment plant expansion options, inflow and infiltration controls, sewer separation, and more. Laura initiated and supervised a GIS-based project combining land use data with SWMM modeling results to analyze sewer overflow volumes on a watershed and sewershed basis and prioritize project locations that would result in the greatest CSO reduction.

As a part of the SWMM modeling, alternatives for meeting program objectives were developed and initially compared for their effectiveness in reducing combined sewer overflows. In selecting the best alternative for meeting the City's obligations for controlling CSO events, Laura and her teammates considered it critical to also consider the larger context of the various economic, social, and environmental challenges facing the City. The modeling objective of the analysis focused on significantly reducing CSOs, thereby making Philadelphia's creeks and rivers cleaner and healthier, but also allowed for the unique opportunity to be much more than just a water quality improvement program and reverse the decline in the physical infrastructure in the City. Each analysis was designed to provide additional benefits beyond the reduction of CSOs, so that every investment made provided a maximum return in benefits to the City.

At the conclusion of the study, the "Green Stormwater Infrastructure with Targeted Traditional Infrastructure" alternative was shown to be the most attractive alternative due to the many environmental, social, and economic benefits that can be realized and the fact that benefits begin accruing immediately—thereby producing benefits for City residents long before the solely traditional infrastructure approach would.

Cedarburg Stormwater Management

FreshWater consulted in the design of stormwater management for a development site located in the town of Cedarburg, Wisconsin. FreshWater was responsible for designing stormwater management techniques in accordance with town ordinances, comparing pre- and post-development conditions.

Design challenges included ensuring the changes to site hydrology did not negatively impact the function of nearby wetlands. A series of vegetated swales were proposed for the site to pre-treat the stormwater runoff. Flow was then directed to a bio-infiltration stormwater pond to further condition the water before it reached nearby wetland areas.

Sending the water through a chain of treatment swales ensures the wetlands are protected from harsh pollutants such as oil, salt, and other contaminants that would negatively impact the ecosystem services provided by healthy wetlands. This treatment train also helps mitigate the extreme flow events before they reach the wetland, potentially causing significant erosion and damage.

Glenwood Park Stormwater Management, Madison, WI

FreshWater worked with the City of Madison and the Friends of Lake Wingra to repair erosion damage at Glenwood Park in Madison, Wisconsin caused by a compromised stormwater outfall. A 53-acre area was directed to a stormwater outfall which failed, redirecting drainage of the flow to vulnerable areas of the park. Multiple design alternatives were considered to resolve the stormwater erosion problem in the park. Utilizing City of Madison GIS information and HydroCAD modeling, FreshWater designed a method to quantify water volumes, manage flows, and treat several typical stormwater pollutants with minimal erosion concerns.

The most promising alternative was the implementation of a Regenerative Stormwater Conveyance (RSC) system. This system provides a series of step-pools atop a porous sand media bed that is effective at conveying large flow events, managing storm volumes, and treating many typical stormwater pollutants. RSC systems are designed to convey

high flow rates without erosion, protecting bio-engineered slopes and habitat. This allows RSC systems to combine features and water quality benefits of swales, infiltration, filtration, and wetlands to protect water resources. Additionally, they are designed to convey flows associated with extreme floods (i.e. 100-year storm and higher) in a non-erosive manner, which results in a reduction of channel erosion impacts and flooding commonly encountered at conventional stormwater outfalls and headwater stream channels.

FreshWater Engineering was excited to be a part of this sustainable stormwater mitigation project at Glenwood Park. Through this project, FreshWater provided services to analyze the hydrology of the contributing drainage area, developed and assessed different design alternatives, worked with the local stakeholders to select a preferred alternative, and completed a 50% design of the selected design alternative. This project strengthened the collaboration and working relationship between the City and FreshWater Engineering.

Green Infrastructure Design for Monroe Street, Dudgeon Monroe Neighborhood Association
FreshWater Engineering was selected by the City of Madison to provide expertise on selection and implementation of various green infrastructure components along the Monroe Street Corridor Reconstruction. Additionally, FreshWater was identified as a key contributor by city staff and members of the Monroe Street Reconstruction Engagement Resource Team to provide insight on lessons learned regarding performance and maintenance requirements of a range of green infrastructure components.

FreshWater was asked to provide review and discussion with city staff ideas for on- and off-corridor green infrastructure implementation opportunities. This phase of the project included a community engagement process where FreshWater worked with the city to understand the community's perspective on issues and opportunities related to infrastructure design on Monroe Street.

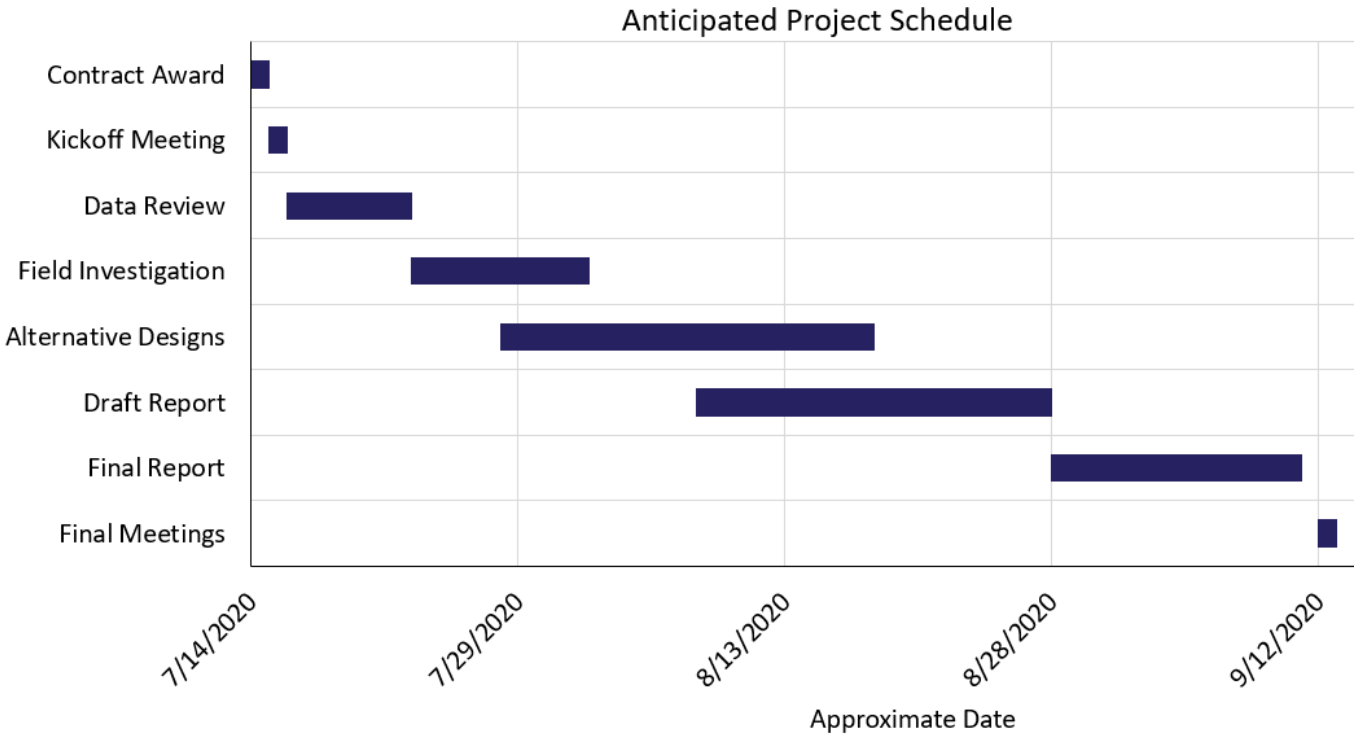
Methodology for Siting Green Infrastructure, Green Streets Initiative, Philadelphia
Developed site analysis protocol - once a parcel was selected for green infrastructure, developed methodology for streamlining placement of features. Method included an interactive GIS-based checklist that helped the user collect pertinent site information used to determine where green infrastructure features would be most beneficial and practical to construct.

Regent Street Rain Garden, City of Madison
Designed and constructed a rain garden along Regent St in Madison to manage stormwater from rooftop, sidewalk, and alleyway runoff. The design analyzed the area and 10 year event and used HydroCAD to design the fill amounts in the rain garden.

Stormwater Guidance - Standards Design Manual, Philadelphia Water Department
Assembled guidance documentation and design standards for stakeholders and developers presenting various types of green infrastructure including porous pavement, stormwater planters, bumpouts, bioswales, stormwater tree pits, rain gardens, and more.

Project Schedule

Throughout the course of all project durations, our team remains committed to providing effective communication within our project teams and with our clients. We strongly commit to successfully managing our projects so that objectives are met and budget constraints are withheld. The anticipated schedule for this project is shown below with the Draft Report deliverable planned for August 28, 2020.



Project Fee

FreshWater Engineering will perform the described scope of work according to the following fee schedule.

Given the unknown site conditions for televising the draintile, this fee is estimated as time and materials for the foreseeable variations in condition, including no cleaning required, moderate cleaning required, or heavy cleaning required. If cleaning is required, excavation of inspection access points will be required every 500 feet or at pipe direction changes. Excavation fee is listed as a weekly expense, assuming 2 weeks to complete the work.

TASK	FEE
Survey and Site Investigation	
RTK topo survey combined with aerial imagery survey	$ 5,500
Televise Draintile	
No cleaning: $350/hr, approx. 40 hours	$ 14,000
Moderate cleaning: $485/hr, approx. 80 hours	$ 38,800
Heavy cleaning: $575/hr, approx 100 hours	$ 57,500
Excavation of access pits for cleaning: $5,000/week	$ 10,000
Review 1999 Stormwater Report	$ 2,000
Prepare Draft Report with 3 Design Solutions	$ 7,500
Final Report and Meetings	$ 3,800
Address Any Final Comments	$ 200

Staff Qualifications

FreshWater Engineering

Laura Rozumalski, PE

- Project Management
- Data Plan Development, Implementation, and Analysis
- Alternatives Analysis and Solutions Development

Laura is the founder and Principal Engineer of FreshWater Engineering. She has over 18 years of experience as a water resources engineer. During her academic career, Laura completed a double Master's degree at the University of Wisconsin studying under Professors Potter and Hoopes for hydrology, hydraulics, and open channel flow and Professor Wu for fluid mechanics. For her undergraduate degree, she studied geology and geomorphology under Professors Mickelson and Knox.

Throughout her professional career, Laura has developed a deep understanding of a diverse range of areas in the field of water resources during her time spent as a public employee and as a private consultant. While at the United States Geological Survey, she served as a hydrologic technician evaluating more than 30 watersheds throughout the Great Lakes Region as part of a study evaluating the effects of urbanization on stream ecosystems.

Using this collected field data, Laura developed representative models for the watersheds including HEC-RAS, MOD-FLOW, and SWMM models to assess the current condition of the hydrologic system and illustrate the effects different intensities of urbanization and agriculture had on each of the watershed basins. She conducted multivariate analyses to develop relationships between hydrologic conditions and the water quality and biologic response within the basins.

Laura's career has also included time working as a Water Resources Engineer for the City of Philadelphia. There she led a team developing combined sewer overflow (CSO) mitigation alternatives for the City. She modeled a wide range of alternatives, using EPA's SWMM, including conveyance improvements, tank storage opportunities, tunnel options, wastewater treatment plant expansion options, inflow and infiltration controls, sewer separation, and more. This SWMM modeling included running city-wide flow scenarios as well as smaller, sub-sewershed modeling of specific areas of concern.

During her career in consulting, Laura has worked on numerous watershed studies and has successfully developed and implemented studies in hydrologic and hydraulic modeling. For one project in particular, Laura provided a detailed review and data analysis of meteorological, surface water, groundwater level, and flow gage data to understand the physical conditions that had led to more frequent flooding of residential properties throughout a watershed. Final recommendations from the study included ways to better manage the functional hydrology of

the system and called out key locations where storage throughout the lake system could be increased in order to alleviate downstream flooding.

In addition to project engineering work, Laura has engaged public participation during stakeholder meetings for various projects. She has worked with numerous friends groups and neighborhood associations to brainstorm ideas for potentially acceptable design solutions that would be constructed. She has also presented design concepts to stakeholder groups and collected feedback from participants that were then fed back into the design process for further refinement and ultimate buy in from local stakeholders.

Lastly, Laura has also successfully managed a range of engineering project sizes from small task orders for private homeowners up to large multi-phase, multi-million dollar project budgets for the Federal government. She is excited for the opportunity to put all these skills to use for this proposed project opportunity.

Brent Teske, MS

- Plan Development, Implementation, and Analysis
- Alternatives Analysis and Solutions Development
- Model Development and Refinement

Brent has a range of experience in water resources engineering and field data collection. He provides extensive support throughout the life of a variety of projects, from initial investigations to planning and implementation to data analysis, modeling, and reporting. He holds a Master's degree from the University of Wisconsin-Madison in Water Resources Engineering and a Bachelor's degree from Iowa State University in Mechanical Engineering.

He has experience developing large- and small-scale stream monitoring, working with Computational Fluid Dynamics (CFD) models, creating SWMM models to analyze flood risks, and designing stabilization infrastructure to rehabilitate degraded wetland systems.

Brent has significant project experience in the development and implementation of watershed modeling projects. One watershed modeling project included approximately 70 miles of river and streams spread between several significant tributaries. This complex system is heavily influenced by the presence of urbanization. Brent has been working to provide calibration and validation data for a sediment transport model to determine the effects of the hydrology and hydraulics on sediment deposition and flood magnitudes within the basin. Model development required multi-year monitoring of the watershed for a variety of data including water surface elevations, streamflow volumes, sediment properties, sediment bedload transport rates, and suspended sediment concentrations. Brent has assessed data requirements for model parameterization, calibration, and validation; analyzed publicly available data; evaluated monitoring locations; and selected the equipment necessary for the data collection campaign.

Brent has also used H&H models to evaluate stream flows on several other projects. He provided floodplain mapping for the Kinnickinnic River in Milwaukee as part of a project with the Milwaukee Metropolitan Sewerage District, and he has worked on several additional flooding evaluations in his time at FreshWater. Brent was instrumental in developing a water intake manifold design for an industrial operation on the Wisconsin River, using H&H models to assess flow forces on the structure. He is well-versed in both 1- and 2D models and is experienced in developing floodplain maps, evaluating water velocities, and analyzing shear stress in streams.

As part of his graduate research, Brent worked extensively in Cherokee Marsh in Madison, Wisconsin. The project involved designing and constructing a system of floating breakwaters intended to reduce and reverse erosion along a fragile shoreline. The breakwaters were planted with native vegetation, providing food and cover for local fauna. Wind, fetch, and wave analyses were an integral component of design development, and he was able to show that the breakwaters limited wave impacts sufficiently to rebuild the shoreline. In addition, he developed a design that would trap sediment behind the breakwaters, effectively reversing the erosion.

Brent is excited for the opportunity to put his H&H modeling skills to use as part of this project. He is interested in work that will have a meaningful impact within his community and sees this as an excellent chance to provide invaluable information to the City.

Ellen Feigl

- Plan Development, Implementation, and Analysis
- Alternatives Analysis and Solutions Development

Ellen holds a degree in bioresource engineering. She has worked multiple positions in engineering and business development departments, gaining experience in data analysis. Her previous work has focused on development and maintenance of effective communications, and she enjoys translating high-level technical knowledge to improve client relations. An expert in customer satisfaction, she uses an engineering optimization mindset to guarantee results.

Ellen has experience in stormwater management, including water quality management and green infrastructure. During a project for a group of homeowners in Lake Waterloo in Quebec, Canada, she evaluated alternatives for runoff capture and filtration. Surrounded by lands with traditional agricultural use, the lake contained high phosphorus levels from runoff and within its sediment. The initial plan was to dredge the phosphorus contaminated sediment, this was evaluated and augmented with inflow treatment solutions. Quebec's climate, cost, and maintenance effort were the main criteria for choosing sustainable designs. Natural and nature-based infrastructure were preferred and the involvement of local stakeholders helped develop a successful design.

For a design project, her team was selected for the design of a rainfall catchment and storage technology system in downtown Montreal that would provide water for a public building. She

worked closely with university officials, professional engineers and other teams to ensure project success. She analyzed rainfall patterns and distribution and modeled water usage levels in parallel. Integrated management with the grey- and blackwater treatment and release teams proved essential to meet the Living Building Challenge's strict sustainability requirements.

Tyler Kapla

- Data Collection
- Alternatives Analysis and Solutions Development

Tyler has over 18 years of experience in the water resources and construction management field. He has demonstrated an ongoing ability to exceed client's expectations and deliver on project quality, while keeping projects on schedule. He has extensive experience developing construction documents for stream crossings, ecosystem restoration, and sustainable water resources management design projects.

Additionally, Tyler has managed surveys to collect bathymetric and topographic map data, establish right-of-way locations, analyze grading on various water projects, and assist with slope surveying for culvert alignment. He has led survey crews using aerial drones, single- and multi-beam echosounders, multiphase echosounders, side-scan sonar equipment, sub-bottom profilers, and real-time kinematic GPS units.