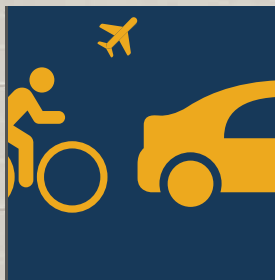




# 2019 Engineering Excellence Awards



**ACEC**  
*Wisconsin*

Recognizing Exceptional Ideas &  
Innovations in Engineering

[www.acecwi.org](http://www.acecwi.org)





# ENGINEERING

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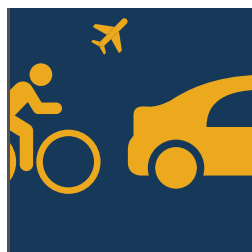
## American Council of Engineering Companies of Wisconsin

ACEC WI members develop innovative solutions that increase our state's economic growth. Facing a complex issue? They collaborate with stakeholders to successfully design our state's future.

## ENGINEERS PROMOTE WISCONSIN'S GROWTH



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The 2019 ACEC WI Engineering Excellence Awards is a publication of The Daily Reporter newspaper. The Daily Reporter Publishing Co. 225 E. Michigan St., Suite 300 Milwaukee, WI 53202 414-276-0273 or 800-508-3800

**THE DAILY  
REPORTER**

## LETTER FROM THE PRESIDENT OF ACEC WI

### A Closer Look at ACEC WI

The American Council of Engineering Companies of Wisconsin is the only organization in the state that represents the business side of the professional engineering industry. ACEC WI represents 85 premier engineering firms, employing 3,800 employees in 168 offices across the state.

Our primary mission is to strengthen the business environment of our member firms through advocacy, political action, and business education. ACEC WI helps its member firms achieve higher professional, business and economic standards, which results in a better professional engineering service for their clients.

As an organization, ACEC WI is dedicated to ensuring the public is aware of the crucial role professional

engineers play in serving Wisconsin communities through extraordinary and innovative design. ACEC WI members continually step up to the challenges inherent with each project, working with industry partners to successfully engineer the vision of their clients.

In addition to our member resources in Wisconsin, we are a member organization of ACEC – a national federation with more than 5,000 firms representing more than 500,000 employees throughout the country. ACEC works tirelessly to propel the nation’s economy and enhance and safeguard America’s quality of life. These efforts allow Americans to drink clean water, enjoy a healthy life, take advantage of new technologies, and travel safely and efficiently.



*Chris Klein*

**Chris Klein  
President/Executive Director**

## LETTER FROM THE CHAIR OF ACEC WI

### Engineering Excellence Awards Recognize Outstanding Professional Work



*Jan Zander*

**Jan Zander**  
Chair of the Board

Through the Engineering Excellence Awards, the American Council of Engineering Companies of Wisconsin showcases the engineering that keeps Wisconsin moving forward. It is truly impressive to see the work completed by ACEC WI member firms throughout the state.

These projects demonstrate the success of collaboration – between client and engineer, of course, but also within design teams. These diverse teams meld the innovative ideas of the newest graduate engineer with the proven experience of veteran project managers and designers to solve client challenges. Engineers design for the future, as shown by these award-winners. These forward-thinking projects will last for years, transforming communities, protecting the environment, and improving lives in ways that benefit all of us.

ACEC WI is proud to celebrate the achievements of the engineering

professionals who brought their clients' ideas to fruition. We also celebrate the owners and public officials who entrusted their projects to their engineering teams.

You'll see several projects highlighted with a red ribbon, indicating they were procured through Qualifications-Based Selection (QBS). QBS provides a competitive selection process while promoting innovative and cost-effective solutions. These projects illustrate how the QBS process results in projects that provide the best value to our clients and state residents alike.

On behalf of the ACEC WI Board of Directors, I would like to congratulate this year's award winners. I would also like to thank the sponsors of this publication for their support of our Engineering Excellence Awards program and ACEC WI. Their support helps spread the word of how engineers make our lives safer, easier, healthier and happier.

## ENGINEERING EXCELLENCE AWARDS

### Recognizing Exceptional Ideas & Innovations in Engineering

Like the Academy Awards for the film industry, the Engineering Excellence Awards highlight the best of the best in professional engineering. ACEC WI's Engineering Excellence Awards program recognizes and celebrates engineering achievements that demonstrate the highest degree of skill and ingenuity. Established in 1970, this statewide competition effectively ensures firms achieve the recognition they so richly deserve.

Through exceptional engineering design, these award-winning projects significantly contribute to the quality of life of the state's citizens. They also recognize the design professionals involved for their expertise and dedication to the profession. The 2019 winners strengthened our infrastructure, enhanced public safety and bolstered the economy.

The winning projects are as diverse as the firms involved. This year's projects come from across the state and beyond. Entries range greatly but one element each has in common is the value professional engineers provide their clients and communities.

From safe drinking water to getting us to and from work and school, engineers touch our daily lives in ways that often go unnoticed. The Engineering Excellence Awards program strives to increase the public's knowledge of what professional engineers really do and recognize professional engineering as a respected and essential profession.

An Engineering Excellence Award is a tribute not only to the winning project and design firm, but also to the clients, owners, subconsultants, contractors and everyone else who played a role in making these projects a reality.



## Judging & Awards

A panel of highly qualified judges from diverse backgrounds outside the association's membership reviewed this year's entries. Each entry was judged on its own merits and specifically on the role of the engineering firm submitting the project. The process involved a combination of individual review of entry materials, group discussion and deliberation.

The panel used the following criteria to evaluate each submission:

- Original or innovative application of new or existing techniques
- Future value to the engineering profession and perception by the public
- Social, economic and sustainable design considerations
- Complexity
- Exceeding client/owner needs

Each entry was truly an example of excellence in engineering, which made the judges' deliberation extremely difficult.

The award winning projects, firms and clients will be honored at the ACEC WI Awards Banquet. All are invited to celebrate these award-winning projects at the gala event on March 22, 2019, at The American Club in Kohler, Wisconsin.

Congratulations to all our award-winning firms and clients on your outstanding projects!

## The following 2019 Engineering Excellence Awards were presented:

### State Finalist Award

**State Finalist Awards** are presented to entries demonstrating a high degree of client satisfaction through quality, cost-effective solutions. This year, ACEC WI presented fourteen State Finalist Awards.

### Best of State Award

**Best of State Awards** are presented to entries representing the highest degree of technical innovation, client satisfaction and contributions to the engineering industry. Best of State winners are eligible to compete in the ACEC National Engineering Excellence Awards competition. This year, ACEC WI presented eight Best of State Awards.

### Grand Award

**Grand Award** is selected from the Best of State winners. It is the entry the judges felt best represented the spirit and criteria of the competition. The Grand Award will be announced for the first time at the March 22 Awards Banquet.

## Qualifications-Based Selection Projects



A number of the award-winning projects were procured using Qualifications-Based Selection (QBS). On the following pages, a QBS label indicates projects that were procured using QBS. QBS is a proven process to help owners find the highest-qualified engineering or architectural firm or team for a project. Page 26 of this magazine provides information on the QBS process. Additional Information is available at [www.qbswi.org](http://www.qbswi.org).

## 2019 Engineering Excellence Awards Judging Panel

### Brandon Braithwaite

Wisconsin Department  
of Natural Resources

### Tom Buchholz, PE

Wisconsin Department  
of Transportation

### Jerry Deschane

League of Wisconsin Municipalities

### Jacob Ehmke, PE

Wisconsin Department  
of Administration

### Mark Kruser, AIA

OPN Architects

### Matt Spiel, PE

FHWA Wisconsin Division

### Dan Talarczyk, PLS, PE

Milwaukee Metropolitan  
Sewerage District

### Errin Welty, CEcD

Wisconsin Economic  
Development Corporation

## ALEXANDER AIRPORT PARK

**BECHER-HOPPE ASSOCIATES INC.** Client: Southeast Side Neighborhood Group | Owner: Wausau and Marathon County Parks Department | Category: Special Projects



**TOP:** The design of the park sidewalks mimic the airport runways and provide access to multiple park attractions. **BOTTOM:** The new park equipment is designed to look like elements of an airport including a control tower and metallic-looking play structures.

Alexander Airport Park is a small park in Wausau near the city's airport. The city planned for a small remodeling effort to modernize the play structure but the community had a bigger vision to integrate the park with the neighborhood and to pair thematically with the airport.

Becher-Hoppe worked with the neighborhood group spearheading the effort to implement the new vision for the park. A local fundraising effort raised all of the funds needed for the improvements beyond the city's small remodeling plan. The design elements were all-encompassing with the sidewalks laid out to match the same bearings as the runways at the airport. A small park shelter was designed to look like an airplane hangar and incorporates design elements from a historical hangar at Wausau's airport.

The community and design team also came together to deliver a Vietnam-era fighter jet from the local VFW hall to the park and establish the plane on a specially designed pedestal. This required collaboration from multiple stakeholders. First, the plane had to be transferred from the stewardship of the VFW to the city for inclusion in the park. Then, the plane could only be moved by a special unit of the Air National Guard and the plane would require road closures during the move. Finally, the plane had to be carefully lowered onto the pedestal and secured. The plane is now

established as the keystone element of the aviation-themed park.

Awards judge Jerry Deschane said, "The overwhelming level of community support for this project really struck me. I was very impressed by the large and small ways the 'airport' theme carried through the entire project."

The neighborhood group and entire community of Wausau started with a vision to transform a small park into a central attraction. The small park became a big project for the public. Through careful collaboration, innovative thinking and a devotion to an overarching theme, Becher-Hoppe transformed the vision into an aviation-themed reality.





## EAU CLAIRE GRAND AVENUE HALF MOON LAKE BRIDGE REPLACEMENT

**AYRES ASSOCIATES**

**Client:** City of Eau Claire | **Category:** Structural Systems



**TOP:** The new structure has dedicated fishing areas along with bike/pedestrian paths and viewing spots for public use. **BOTTOM:** The wider footprint of the bridge required removal of old, contaminated sediment from the lake bed and installation of new material for the wider base.

The Grand Avenue Half Moon Lake Bridge is a keystone bridge for the community because it was the only way to access Carson Park. Carson Park is the city's most popular park and the structurally deficient bridge was an eyesore and major point of concern for the community.

Ayres Associates took the redesign opportunity as a chance to totally transform the bridge. A tri-lingual website and flyer were created, multiple public information meetings were held and "fly-through" animations helped visualize the finished product. Buy-in from the public was earned by paying attention to the aesthetic qualities of the bridge and adding modern amenities like dedicated bike/pedestrian paths and ADA fishing spots. Natural plantings and bridge artwork integrate the corridor into its surroundings. These changes required the design team to triple the footprint of the bridge which led to additional coordination challenges. New permits were obtained from the Department of Natural Resources requiring the team to remove nearly 11,000 cubic yards of contaminated sediment and replace it with nearly 30,000 cubic yards of new material to accommodate the expanded footprint. Ayres minimized cost and time by quickly determining the cheapest and closest options for disposal of the old material. Removing the material allowed for creation of fish habitat near the bridge and addressed some of the issues with water quality in the

lake. Finally, extra culvert pipes were added to facilitate water flow in the lake and further improve water quality.

Awards judge Brandon Braithwaite said about the project: "For me, the project jumped out as transformative. Rather than replacing the bridge that leads to a destination, the bridge and related amenities became a destination itself. This project dreamed big and they were able to achieve their dreams!"

Ayres designed a bridge that provides room for bicycles, pedestrians, anglers and motorists. The bridge has become more than a transit point. It is now a proper gateway for the park and a recreational resource in its own right.





## LOWER YAHARA RIVER TRAIL CONSTRUCTION SHORT ELLIOTT HENDRICKSON INC.

Client: Dane County | Category: Special Projects



**TOP:** The final product incorporates viewing areas and an ADA accessible fishing area for all to enjoy. **RIGHT:** The prefabricated elements could be assembled in any season and greatly facilitated a speedy construction schedule..

Madison and its suburbs sit around extensive natural resources that attract visitors and benefit residents. To facilitate access to lakes and parks, a large bike/pedestrian trail system of over 150 miles has been established. The Lower Yahara River Trail extends this trail system to Madison's southwest side and beyond but required extensive engineering to turn the idea into reality.

Short Elliott Hendrickson was faced with a host of issues on the 2.5 miles of new trail. The trail runs next to Lake Waubesa, through wetlands, soft soils, Native American burial grounds and is adjacent to an active rail line. The core of the project is a boardwalk/bridge that incorporates prefab spans, helical pile boardwalk and a floating boardwalk. This nearly one mile stretch is the longest boardwalk in Wisconsin and one of the longest elevated bike/pedestrian structures in the US. Three different structure types help the path traverse the wide variety of conditions in that stretch. The design team worked closely with the Ho-Chunk Nation to preserve artifacts and burial grounds. The tribe now sees the trail as a resource to access these culturally important locations and benefits from being connected to additional trails in the Madison area. The team also encountered environmental issues during construction.



Disruption to the wetlands and lake were minimized by careful staging and the use of the boardwalk to go above the disturbed areas. Extreme cold created an ice wave from the lake that almost ruined the project. The design team quickly addressed the issue with repairs and a revetment wall that would prevent similar damage in the future.

Awards judge Jake Ehmke said, "The Lower Yahara River Trail project was not only impressive from an engineering standpoint, but also from its constructibility challenges and the social impacts to the southeast Madison and McFarland area. This project was well worth the wait!"

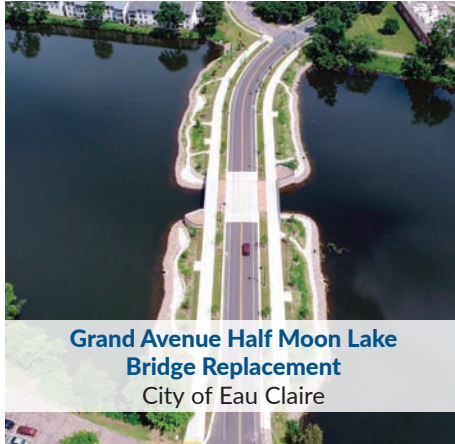
Designing and completing such a complex project was a challenge. The final result demonstrates the importance of planning and adaptability during design and construction and the new path allows trail users to experience more of south-central Wisconsin's natural beauty.



# Congratulations! And thank you for giving us the opportunity to transform your communities!



**USH 53/STH 35 Interchange at IH 90**  
WisDOT Southwest Region



**Grand Avenue Half Moon Lake Bridge Replacement**  
City of Eau Claire



**River Prairie Planning, Design, and Construction**  
City of Altoona



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Eau Claire

Green Bay

Madison

River Falls

Waukesha

## A W A R D W I N N I N G | Excellence in Engineering Since 1946.



### Meister Cheese Company

Reducing Environmental Impact with Onsite Treatment

Because of Meister Cheese Company's rapid growth, it quickly became necessary to expand the existing wastewater treatment plant (WWTP) to handle the increased output of waste. Meister also desired to reduce its need to haul and land-apply wastes from the aerobic process at its WWTP (approximately six truckloads-a-day).

The solution was to construct an anaerobic pretreatment lagoon system to treat daily wastewater, high-strength waste, and waste-sludge ahead of the existing aerobic facilities. The anaerobic system also produces a methane biogas that is used to generate

electricity, offsetting the WWTP's power requirements. The aerobic facilities were also modified to improve energy efficiency and increase total nitrogen removal capacity.

The end result is an environmentally conscious and self-sustaining WWTP. Not only does the updated plant remove 96 percent (or more) of organic material, it also meets discharge requirements; therefore, leaving a smaller carbon footprint.

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## MEISTER CHEESE COMPANY WASTEWATER TREATMENT PLANT ENERGY IMPROVEMENTS

**STRAND ASSOCIATES INC.**

**Client:** Meister Cheese Company | **Category:** Energy



**TOP:** With a small footprint, the new plant delivers large results by dealing with all of the waste generated by the cheese company. **BOTTOM:** The new anaerobic lagoons produce biogas that is immediately funneled into a generator for the facility.

Meister Cheese Company was looking to expand its operations and reduce costs; it identified its wastewater treatment plant (WWTP) as a bottleneck. The high strength waste generated could not be processed by the facility and was instead being hauled away. This increased costs and was not environmentally sustainable.

Strand Associates designed a solution to eliminate hauling of the waste sludge and update the WWTP to accommodate future growth. The old design only used aerobic treatment which could not handle the high strength waste. The new design incorporates anaerobic treatment lagoons that pre-treat the wastewater. This allows the aerobic treatment to successfully deal with all types of waste and eliminates the need to haul away waste sludge. The anaerobic process also produces biogas. Originally perceived as a downside, the design team developed a method for using that biogas in a generator to produce electricity for the facility. This generates enough electricity to power the full WWTP and produces heat for the building. The heat generation increases the efficiency of the anaerobic lagoons which reduces operating costs. This is an innovation that has not seen much use in industrial systems before but is now shown to be very successful. Overall, the new WWTP can potentially save the client \$210,000 a year in electricity costs and reduce the carbon footprint by approximately 1,000 tons a year.

Awards judge Dan Talarczyk said, "The Meister Cheese Company WWTP Energy Improvements project exemplifies how an innovative approach to water treatment processes can have broad and

lasting benefits with energy conservation, sustainability and overall environmental stewardship. The timing of this project is apropos, given the current challenges facing agro-industrial operations in rural Wisconsin."

Meister's new WWTP saves money, reduces emissions and opens the door to further production expansion. The design is a blueprint for future industrial plants on integrating waste treatment with environmental sustainability. The project shows how design solutions have major real world impacts.





**PARK FALLS STATE HIGHWAY 182 BRIDGE**

**MSA PROFESSIONAL SERVICES INC.** Client: Wisconsin Department of Transportation | Category: Structural Systems



**TOP:** The new bridge design expands the roadway and provides ample shoulder and sidewalk space. **LEFT:** The design team navigated close constraints with the paper mill only 10 feet away from the bridge structure and the overhead walkway on one end.

The City of Park Falls strives to balance the natural resources with industry. In particular, paper mills drive the city's economy and directly benefit from the Flambeau River running through the city. The State Highway 182 bridge is the main thoroughfare and a critical corridor for industry, visitors and residents. The bridge was in dire need of repair due to its age and serious deterioration.

This nearly 70-year-old bridge was located in a narrow city corridor alongside an active paper mill and ran over a fast-flowing river. The MSA design team determined a full replacement was necessary and the new bridge should be dramatically expanded. The expansion allowed for wider road width and larger sidewalks for bike/pedestrian traffic. The concrete girder bridge design needed new piers for support over the river so the team drilled shaft pier foundations that provide extra stability for the new

structure. The placement of the foundations reduced the number of piers to minimize effects on the river. These foundations also overcame deep, fast-flowing water and minimized vibration from construction. The vibrations were a major concern because the bridge is right next to an operating paper mill. The equipment inside is very sensitive to vibrations so the team had to be extremely conscious of this during construction. Vibration monitoring helped keep disturbances to a minimum and innovative construction techniques like the drilled shaft pier foundations helped. The design team also accommodated an overhead walkway for the mill at one end of the bridge.

Awards judge Tom Buchholz said, "MSA did an excellent job in designing the Highway 182 Bridge over the Flambeau River. MSA coordinated closely with the City of Park Falls to ensure its design minimized impacts to the city and nearby paper mill which was 10 feet from the bridge."

Innovative design work by MSA turned a deteriorating bridge into a gateway for the city. The new design facilitates multi-modal travel and helps the city bridge the twin goals of natural beauty and industry.



## RIVER PRAIRIE PLANNING, DESIGN AND CONSTRUCTION

**AYRES ASSOCIATES**

Client: City of Altoona | Category: Special Project



**TOP:** The development features a massive amount of new space for businesses and the public, all located along the scenic river. **BOTTOM:** The park features live entertainment venues and an artificial stream to mirror the aesthetics of the river.

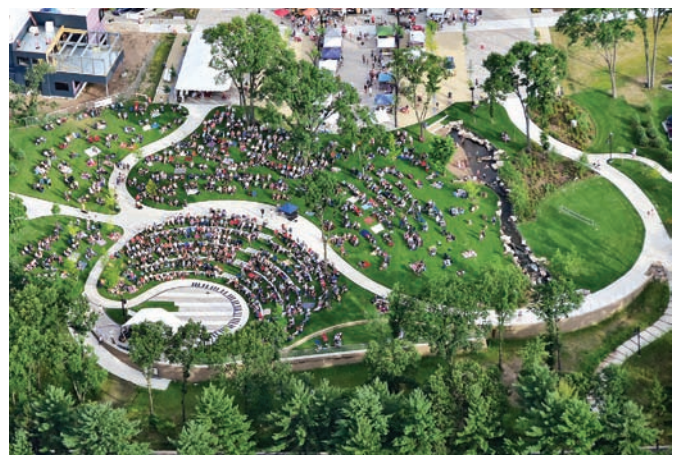
Like many cities in Wisconsin, the City of Altoona has substantial frontage on an amazing river. In this case, the land was underutilized because of a nearby highway interchange. Capitalizing on this area, the city decided to create a new "front porch" by the river on this land.

Ayres Associates worked extensively with the client and public to implement the vision for this dynamic new area of the city. The centerpiece of the development is a public park that includes multiple event staging areas, a splashpad and additional water features. Trees in the area were preserved and integrated into the development and water was diverted from the river for irrigation. These innovations extended to the whole concept of the project with the "Power of 10" idea: people are more likely to spend time in a space if it provides at least 10 things for them to do. The design team created a series of public amenities that would attract visitors to the area which would then benefit local businesses. Private development spaces within the "front porch" have been bought immediately because of the draw of the area and infrastructure supporting it. The design team did a major remodel on the nearby highway interchange in just nine months instead of the usual two years to accommodate the city's timeline.

Said awards judge Errin Welty: "The River Prairie project stood out for its creative approach to development of what would otherwise be a typical interchange development. Incorporating innovative amenities and engineering for multiple uses ultimately created a higher value

development that is embraced by the community."

The 40-acre redevelopment changes the entire face of the city. What was once unused space along the river has now become a vibrant neighborhood. Public parks and private businesses intertwine in the area and modern amenities are available for all. The use and development already exceed the community's projections by ten years and the area has been completely transformed by engineering design and planning.





## UNDERWOOD CREEK FLOOD CONTROL AND HABITAT RESTORATION

**INTER-FLUVE**

**Client:** Milwaukee Metropolitan Sewerage District | **Category:** Water Resources



**TOP:** The new design looks more like the original stream and fits naturally into the neighborhood. **RIGHT:** The riffle-pool design and meandering path break up the water flow to slow its velocity, increasing safety.

In the 1960s and 1970s, Underwood Creek was substantially altered from its natural state. The meandering river was diverted into a concrete ditch for flood management but this solution created its own problems. 50 years later those problems meant that a change was necessary.

Inter-Fluve identified the problems created by the concrete diversion ditch. First, it eliminated fish habitats through inadequate depth, wide variation in water flow speeds and additional barriers built into the ditch. It was a danger to people during rainstorms and was also an eyesore. It actually caused more flooding upstream because of new developments; this counteracted the reasons the ditch was constructed in the first place.

The design team decided to remove the concrete channel and associated structures. In its place, a natural-looking riffle-pool channel was constructed. The riffle-pool design utilizes rocks and differing water depths to slow down the water during storms. The new channel also varies in width and fits better with the natural environment resulting in water velocities well below the targeted maximum. This creates a safer environment and still controls flooding by dispersing the water's force. A huge benefit of the new channel is that it has restored the marine ecosystem from



the original creek. Large boulders in the new channel create quiet pockets of water for migrating fish and the ecosystem that supports them. This environmental sustainability was a big win for the client and the team. The new design also cuts down on maintenance costs that were required of the old concrete channel.

Awards judge Matt Spiel said, "The Underwood Creek project is a great example of how thoughtful planning and engineering can benefit the human and natural landscape. Despite challenging constraints, the project team developed a solution that improved flood control, while restoring the stream to a natural-looking and functioning stream that provides several environmental benefits."

The new Underwood Creek points to the ability of engineering to achieve ecological friendly solutions without sacrificing functionality. A more holistic view of engineering created a design that achieves multiple objectives.



## ZOO INTERCHANGE CORE AND ADJACENT ARTERIALS RECONSTRUCTION

**FORWARD 45 LLC**

**Client:** Wisconsin Department of Transportation | **Category:** Transportation



**TOP:** The final design covers nine miles of interstate and gives Milwaukee a modern infrastructure gateway. **BOTTOM:** The new design uses longer turning lanes and more right turns to minimize crashes and to keep traffic flowing during rush hour.

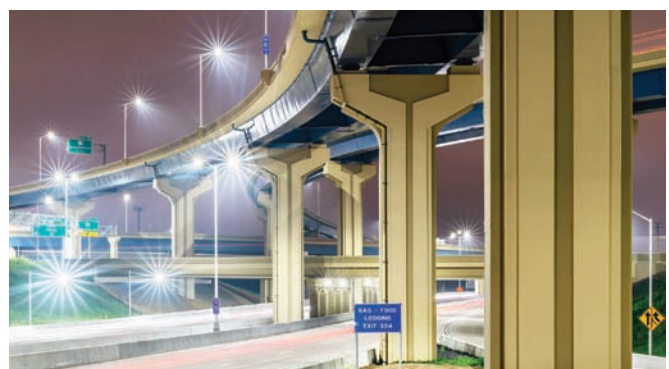
The Zoo Interchange is a key component of Milwaukee's transportation network and is one of the busiest corridors in the state. The outdated design was dangerous and could not accommodate the 350,000 vehicles per day that travel on it.

Forward 45 first took stock of the incredibly complex nature of the project. The size of the project meant that coordination with stakeholders was a top priority. Staging construction on the actual interchange had to meet the needs of these adjacent landowners and businesses and these decisions flowed into the nearby road systems that feed into the interchange. The team implemented the state's first Integrated Corridor Management System which operated all these different systems as one authority. This cut down on confusion and created better staging options for traffic during construction. Additionally, the system used modern technology to keep the public informed and to gauge the effectiveness of different staging options.

The new interchange design uses modern highway design to increase capacity and occupy a smaller footprint. This also decreased the crash rate and overall emissions from traffic delays. It was the first project in the United States to test orange pavement markings in construction zones for increased visibility. The team also devoted resources to community sensitive solutions by working with neighborhoods on aesthetics and creating an overhead walkway for pedestrian traffic near the Milwaukee Medical Complex.

Awards judge Mark Kruser said about the project, "This project was very complex. In the case of the project, it resulted in design intensive solutions necessary to successfully incorporate this project into the adjacent and varying urban contexts of the connecting arterials. The result is a highly functioning transportation interchange fulfilling a sense of pride in ownership for the community and the region for many years to come."

The size and complexity of redesigning this interchange required exceptional engineering. The final design provides 63 bridges, three tunnels and miles of new roadway that meets the needs of the region for years to come.





**ELKHORN WATER TREATMENT PLANT**

**BAXTER & WOODMAN INC.**

**Client:** City of Elkhorn | **Category:** Water Resources



The new facility limits environmental impacts through erosion controls and backwash fresh water filtering.

The City of Elkhorn started looking at its water needs back in 2000. In cooperation with Baxter & Woodman, the city decided it needed three new wells and a new water treatment facility to cope with population growth. The design team saw an opportunity to go above and beyond for the city's water needs.

Baxter & Woodman first coordinated the siting of the new wells. These were separated to ensure that there was no hydraulic interference between each well and in a way that provided enough water for the city. After these preliminary steps, the team designed a new facility that could handle the flow from the new wells as well as contaminants in the water. The new facility was expanded and equipped with a backup diesel generator that preserves water use during power grid failure. Finally, the new plant can utilize biological ammonia removal to clean the water in the future. This method is only used in a few plants in Wisconsin but is very successful at cleaning the water and has the potential to save the plant significant money by cutting down the use of chemicals.

Through smart design and a long-term plan, the design team and the client saved money, improved the environment and provided for Elkhorn's water needs for years to come.

**ENGINEERS PROMOTE WISCONSIN'S GROWTH**



**Critical Functions**

Engineers design structurally sound buildings and bridges, help prevent large floods and keep vehicles efficiently moving on roads and highways



**Life Safety**

Engineers enhance public health and safety with quality design, including wastewater treatment facilities, floodgates and crosswalks



**Life Cycle Best Value Delivery**

Engineers' cost-effective solutions capitalize on available budgets and provide long-lasting benefits

## ESTABROOK DAM REMOVAL

**AECOM TECHNICAL SERVICES INC.**

**Client:** Milwaukee Metropolitan Sewerage District | **Category:** Water Resources

The Estabrook Dam in Milwaukee County was in desperate need of a change; it had to be removed completely or repaired to be usable. AECOM Technical Services helped local officials and the public navigate between these two options to the best outcome.

The public was very vocal on the proposals for the dam and was involved during the entire process. While the dam itself hadn't operated for almost a decade, the remaining structure impacted the neighborhood and polarized opinions on repair or removal. The design team assisted with public outreach to demonstrate that removing the dam would lead to better hydrological control, reduce flooding and improve the marine environment. By the time the dam was ready for removal, a public hearing process indicated that over 85 percent of the public comments favored dam removal. From there, AECOM Technical Services removed the dam and the assorted support pieces and redesigned the Milwaukee River in that spot to accommodate the new flow. A free-flowing environment promotes mussel population growth which are a building block for the full marine ecosystem.

The project truly demonstrates that a combination of political cooperation and will, combined with engineering diligence, can result in projects that simultaneously provide a public benefit with true cost savings. In this case, the solution met all expectations and significantly improved the aquatic quality of Milwaukee's biggest river.



Without the dam, the Milwaukee River attracts more residents to Estabrook Park and reduces flooding for nearby homes.

**AECOM**

# Imagine it. Delivered.

AECOM congratulates the Milwaukee Metropolitan Sewerage District on having its Estabrook Dam Removal project recognized with an Engineering Excellence Award by the American Council of Engineering Companies' Wisconsin chapter. We congratulate all of this year's award winners.

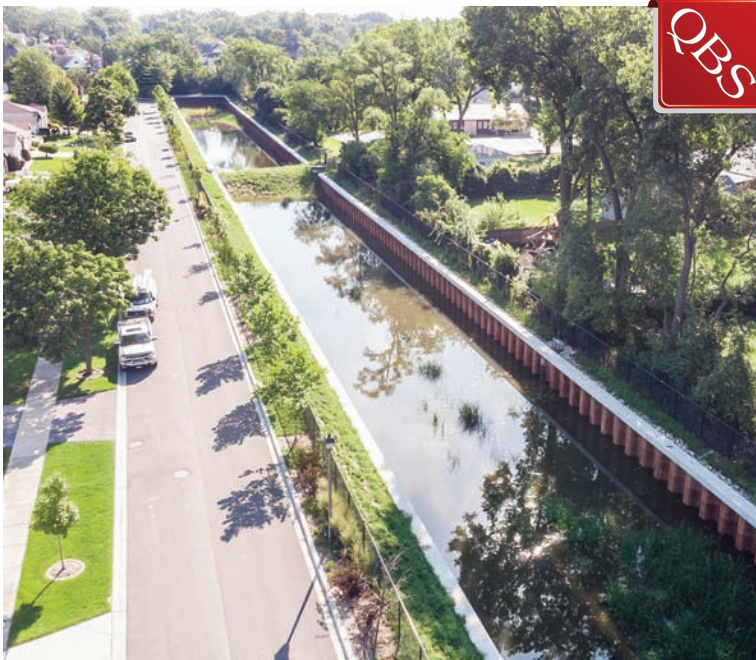
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**HARRISON STREET DETENTION IMPROVEMENTS**

**CLARK DIETZ INC.**

**Client:** City of Elmhurst | **Category:** Waste and Storm Water



The new storm water basin fits neatly into a dense neighborhood without disrupting backyards or other green spaces.

The City of Elmhurst was hit with significant flooding events multiple times in a short period and resolved to identify the most vulnerable areas. They found that the Yorkville subdivision was especially at risk and asked Clark Dietz to develop a solution.

The design team started by looking at a wide variety of options for flood mitigation. They decided that a storm water storage facility would work best because of neighborhood density and sources of the flooding. This storage featured a large diameter storm sewer and expanded holding capacity to account for increased water flow. By working with the public and the city staff, Clark Dietz explained how this solution minimizes flooding into basements and yards. The aesthetics of the storage site were prioritized to fit in with the neighborhood. The decorations included native plants which created another green space in the city and gave the basin a natural feel when it was not being used for storm water overflow. These small improvements went a long way in getting full community buy-in for the project.

The City of Elmhurst took the initiative to reduce flooding and developed a plan for doing exactly that on a broad scale. By applying intelligent engineering and extensive public outreach, Clark Dietz demonstrated how that plan can be achieved with minimum disruption and neighborhood support.

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**CITY OF ELMHURST**

*Harrison Street Detention Improvements*

Clark Dietz is a proud partner to the City of Elmhurst in their resolute response to persistent flooding problems. This award-winning project expands an existing basin to extend flood protection to dozens of homes in the neighborhood.



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## HO-CHUNK NATION OLD 131 TRAIL BRIDGES REPLACEMENT AND REHABILITATION

**JEWELL ASSOCIATES ENGINEERS INC.**

**Client:** Ho-Chunk Nation | **Category:** Structural Systems

In order to preserve and enhance one of the most used trails in the Kickapoo Valley Reserve, the Ho-Chunk Nation decided to rehabilitate the Old 131 Trail. The trail connects tribal members with each other and facilitates public travel through the scenic area. However, redesign required a design plan sensitive to tribal concerns and local environmental conditions.

Jewell Associates knew that the heavily-used trail was in need of upgrades. The team reconditioned the trail to provide maintenance and EMS vehicles access but focused on pedestrian traffic. The redesign preserved local plants important for the cultural resources of the tribe and enhanced the native beauty of the area. In line with that goal, the design team also provided a traditional model for a bridge over the Kickapoo River: a covered bridge. A new take on this classic design integrated the design with local flair and provides a haven for trail users during storms. It also paid homage to the historical significance of the bridge for the tribe. While constructing the bridge, major flash flooding posed a threat so the entire superstructure was moved outside the floodplain. This kept workers safe, kept the project on time and avoided any environmental contamination.

Jewell's sensitive approach prioritized cultural and historical significance and delivered a new trail and covered bridge that met the needs of the community.



The new covered bridge recognizes the cultural heritage of the Ho-Chunk Nation and blends in with the natural environment.

***Congratulations to all 2019 ACEC Award Recipients!***



*Since 1993, Jewell Associates has been providing our clients with innovative engineering and architectural solutions by investing in our employees, relationships, and the communities in which we live and work. We are proud to be a leading regional provider of transportation, civil and structural engineering services and look forward to serving Wisconsin for many years to come.*

**JEWELL**  
associates engineers, inc.

We congratulate the Ho-Chunk Nation on the success of their project for the replacement and rehabilitation of structures on the Old 131 Trail in the Kickapoo Valley Reserve to provide a cost-effective, sustainable and functional solution for trail users and maintenance/EMS vehicles. We are honored to be recognized as part of their team.



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## I-39/90 & WIS 11/AVALON ROAD INTERCHANGE

**AECOM TECHNICAL SERVICES INC**

**Client:** Wisconsin Department of Transportation | **Category:** Transportation



The new interchange uses large curves and relatively straight paths to smooth the transit of OSOW vehicles.

The WIS 11 interchange between Janesville and Beloit is substantially more essential than a state highway in rural Wisconsin might seem. The highway is at the heart of many farming operations and is designated as a primary route in the Oversize/Overweight (OSOW) Freight Network. It was in dire need of reconstruction and presented a host of unique design challenges.

AECOM Technical Services delivered a unique solution with a diverging diamond interchange (DDI). This is the first of its kind in Wisconsin and was necessary because of the OSOW requirements. A DDI has long sweeping curves for turns which accommodate OSOW vehicles. It also reduces crossing points which improve safety and overall traffic flow. This specific interchange has customized curve design to integrate effectively with the surrounding roads. The design also decreased the footprint of the bridge which saved money and time. Because the interchange is the first in the state, the design team embarked on an aggressive public outreach campaign to educate people on how to use the design. An animated instructional video helped with digital outreach and at public meetings.

Additional diverging diamond interchanges are now being implemented in Wisconsin using the experiences of this project. The design team reached for a novel solution that met the needs of the interchange and preserved major OSOW access and meets the needs of all travelers.

## State Finalist Award

## LACY ROAD RURAL ROADWAY RECONSTRUCTION

**MEAD & HUNT INC.**

**Client:** City of Fitchburg | **Category:** Transportation

The City of Fitchburg's high population growth is good for the community but brings significant infrastructure issues. One of the primary challenges is its transportation system. As rural areas rapidly convert to urbanization, roadways like Lacy Road cannot handle the major increase in traffic and multi-modal needs.

Mead & Hunt started the reconstruction with an innovative public involvement plan. Meetings and surveys shaped what the roadway would finally become. This input helped develop a road that prioritizes safety and connectivity. Raised medians and a roundabout help control speeds in an area with a lot of traffic. Expanded bike lanes and connections to existing trails enhance the corridor with multi-modal options and reduce overall traffic congestion. A general face-lift related to the project addressed aging draining systems, utility lines and inefficient and below-grade lighting. In addition, mature trees were preserved to enhance the natural beauty of the area. The new look helped resident acceptance of the new roadway design and highlights this section of Lacy Road as a new urban corridor.

Through extensive collaboration with the public, the design team created a roadway that fits perfectly into the City of Fitchburg. Lacy Road is a symbol of how fast-growing communities can adapt existing infrastructure to new demands.



Extensive public discussions allowed residents to comment directly on proposed designs and list specific concerns and ideas for improvement.

## MADISON METRO TRANSIT MASTER PLAN

**MEAD & HUNT INC.**

**Client:** Madison Metropolitan Transit | **Category:** Studies, Research & Consulting Engineering Services



Madison Metropolitan Transit decided to redesign its core operation facility to accommodate future growth. The current facility was designed 40 years ago and with a maximum capacity of 140 buses. With no significant updates through the years, the facility currently services up to 223 buses and more are planned.

Mead & Hunt developed a master plan with a variety of alternatives and tweaks for the client to review. With a basic guideline, employee listening sessions discovered workplace safety concerns and determined how workers flowed through the building. With this information, the master plan incorporated reconfigured circulation patterns, enhanced facilities for employees and proposed a redesign that separated a significant source of pollution from the main facility. The existing service lanes can be repurposed for safety and maintenance. The master plan exceeds code requirements, lowers HVAC needs and meets goals set by the client for sustainability and energy efficiency. The current facility sits in the middle of Madison's urban environment and the renewed facility will have a beneficial effect on the entire neighborhood.

By utilizing the data gained from client and transit employee discussions, Mead & Hunt presented a plan to address the issues noted by employees. Madison Metropolitan Transit now has the jumping off point for a new bus facility that will keep pace with future expansion and serves as a model for urban renewal.

The new masterplan calls for expanded bus bays but separates them from offices and employee areas, reducing pollution in the facility and lowering the HVAC load.

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**MAIN AVENUE AND LAWRENCE DRIVE ROUNDABOUT**

**JT ENGINEERING INC.**

**Client:** City of De Pere | **Category:** Small Projects

With a busy stretch of road, a congested and dangerous intersection and a substantial amount of business interest, the City of De Pere knew that a change had to be made at Main Avenue and Lawrence Drive.

JT Engineering designed a roundabout to meet the city's needs. The new roundabout facilitates easier traffic flow through the corridor and reduces collisions. It works in conjunction with another roundabout down the road to keep traffic moving. With the old intersection, business access points created traffic jams and prevented the city from developing land nearby. Now that access has been refined, the new land is already creating new jobs and revenue for the city. The design team coordinated with those businesses to keep access open during construction and worked with them on the exact design of the roundabout to meet their needs. Overall, staging kept the corridor open for the surrounding areas and kept costs competitive. The final project was delivered on time and 20 percent under budget.

The design team created a roundabout that best met the needs of this busy intersection. The improved traffic flow and enhanced safety benefits commuters and the smart design helps businesses along the corridor. Because the time and cost savings benefit the client, the design team truly developed an award-winning project.



The two roundabouts flow into each other which provides a continuous stream of traffic and reduces the risk of serious accidents.

**State Finalist Award**

**MARQUETTE INTERCHANGE BRIDGE PRESERVATION**

**MICHAEL BAKER INTERNATIONAL INC.**

**Client:** Wisconsin Department of Transportation | **Category:** Transportation



The PPC overlay preserves the steel reinforcements in the concrete, preventing corrosion and extending the overall life of the project.

The Marquette Interchange is one of the most important transportation systems in Wisconsin and elongating its service life is extremely important. To properly preserve major interchanges, a maintenance schedule is planned years ahead of time. But any updates or maintenance must also keep traffic open on a system that carries over 300,000 vehicles a day.

Michael Baker worked with the Wisconsin Highway Research Program to determine which overlay would work best. An overlay prevents corrosion of steel reinforcements in the interchange and is critical to the overall lifespan of the project. The design team selected a polyester polymer concrete (PPC) overlay because its application would minimize disruption and best preserve the steel in the bridges. PPC overlays had only been used on one test project in Wisconsin before but through collaboration with the client and other projects the design team successfully implemented the new overlay. The experiences with this project opened the door to the use of PPC on other projects in Wisconsin. The PPC overlay allowed the design team to carefully manage disruptions on a very busy transportation corridor and across 30 bridges. These bridges will now reach their 75-year expected lifespan.

Michael Baker utilized a new product to meet the needs of one of the state's biggest interchanges. By using PPC overlay, the interchange is preserved for long-term future use.

## State Finalist Award

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### NEW WATER TREATMENT PLANT: PREPARING FOR THE FUTURE, PRESERVING THE PAST APPLIED TECHNOLOGIES INC.

Client: City of Watertown | Category: Water Resources

The City of Watertown was faced with a difficult dilemma: the city's central water treatment plant was originally designed in 1895 and, despite improvements, could not keep pace with current demands. However, because of the age of the plant, there were historical concerns with demolishing it.

Applied Technologies took on both issues in a holistic manner. By working with the city's historical society, the design team determined that historical elements of the plant could be preserved. Historically significant items were saved for curation and aesthetic elements pay homage to the treatment plant's original design. At the same time, the site was reviewed and the new facility was designed with sustainability in mind. The footprint of the site was constricted by nearby homes so the new plant incorporates new technology and reduces climate control costs with additional natural light, modern insulation and other features. Redundant pumping operations were also eliminated. With these changes, the plant costs less to operate now and is more efficient at removing iron, manganese and other pollutants in the water.

The design team honored the historic significance of the plant while pushing the new design forward in the future. This new plant incorporates the aesthetic elements of the 19th century but houses 21st century technology.



The new plant uses the same cream-colored brick as the original plant, integrating it into the City of Watertown's history.

## State Finalist Award

### NORTH FOURTH STREET RECONSTRUCTION SHORT ELLIOTT HENDRICKSON INC.

Client: City of New Richmond | Category: Small Projects



The new design prioritizes multimodal traffic with a large bike/pedestrian lane and digital street signs to reduce car speeds.

The City of New Richmond was faced with a road reconstruction project in an area that served residential, commercial and industrial traffic in a one-mile area. Meeting the expectations of all these different stakeholders meant that any design elements must be woven together carefully to hit all marks.

Short Elliott Hendrickson determined one of the main priorities for the project would be quieter, safer streets. The team utilized digital speed signs, pedestrian bump-outs and bike lanes to slow down traffic in the residential areas and to make the entire road friendlier to bike and pedestrian traffic. This also required moving the existing truck route to Lakeside Foods, a major employer in the area and the main source of truck traffic on the road. Alternative truck routes were found and designated so the redesigned street kept its neighborhood feel. The design minimized the removal of mature trees to keep the aesthetic feel of the previous road. The public was involved in the entire process and was invited to job site open houses during construction to see the progress and implementation of requested design changes.

The design team worked closely with a diverse group of stakeholders to deliver a redesigned roadway that integrates into the neighborhood while maintaining service for major commercial and industrial elements. The project is an excellent example of sustainable and cost-effective urban design.



**PUMP STATION 15 SUSTAINABLE IMPROVEMENTS**

**BAXTER & WOODMAN INC.**

**Client:** Madison Metropolitan Sewerage District | **Category:** Waste and Storm Water

Most water infrastructure goes unnoticed – the pipes, pumps and treatment plants that underpin the system are hidden from view and contained in nondescript buildings. In this case, Madison Metropolitan Sewerage District (MMSD) decided to make one of their pumps a forward-facing project that would engage the public while fulfilling its standard work.

Baxter & Woodman designed a pumping station to replace Pump 15, located next to one of Madison’s busiest boat launches. The new station is substantially more efficient than before and incorporates updated controls, better accessibility and improved electrical equipment. This allows the pump station to better service a growing area of the city and extends the pump’s overall life cycle. The station incorporates green infrastructure elements that increase sustainability. And because the launch is a public area, the new plant has public amenities to serve the users of the launch and an adjacent bike path. The plant has information that explains its purpose and highlights the importance of water infrastructure for everyday life.

The team used a relatively mundane pump station improvement project to integrate the site into public life. The education provided, along with public-facing amenities, allows visitors to directly benefit and understand the importance of the pump station and provides MMSD with another opportunity to work with Madison residents.



The new design incorporates green elements that better locate it in the park and highlight the facility’s importance to the community.

**Baxter & Woodman** is proud to have the Madison Metropolitan Sewerage District Pump Station 15 Sustainable Improvements and the City of Elkhorn Water Treatment Plant recognized as **2019 ACEC Wisconsin Engineering Excellence Award** Recipients.

Congratulations to all of this year’s award recipients.



MMSD Pump Station 15



Elkhorn Water Treatment Plant



[baxterwoodman.com](http://baxterwoodman.com)

## State Finalist Award

2019 Engineering Excellence Awards

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Wisconsin

### REPAIR/RENOVATE B29, JEFFERSON BARRACKS ANGS

**MEAD & HUNT INC.**

**Client:** Jefferson Barracks Air National Guard Base | **Category:** Structural Systems



Steel supports were integrated aesthetically into the design of the building and provide anti-terrorism and anti-seismic activity support.

The Jefferson ANGB was looking to expand operations and decided to reuse some older buildings on the base. Unfortunately, these buildings did not meet current Department of Defense (DOD) codes and needed significant restructuring before the buildings could be used.

Mead & Hunt focused on renovating Building 29. Originally designed as a cavalry barracks in 1898, its most recent usage was as unheated storage. The primary challenge was installing a structural framework into the building while preserving the historical design and character. This was accomplished by placing a steel endoskeleton inside of the building using more than 2,000 rods. This provided significant structural support that met DOD guidelines and provided enhanced earthquake resistance in a tectonically-active area. The design team also implemented quality of life improvements to convert the building from storage to office, training and maintenance space. With modern amenities and substantial HVAC overhaul, the building now has 23,000 square feet of space for the base to use.

The historical significance of the building required smart design choices to preserve the exterior. Mead & Hunt installed a modern "skeleton" for the building which meets current standards and still preserved the outside. The expanded space for the base allows operations to continue.

## State Finalist Award

### USH 53/STH 35 INTERCHANGE AT IH 90

**AYRES ASSOCIATES**

**Client:** Wisconsin Department of Transportation | **Category:** Transportation

In southwestern Wisconsin, several major highways intersect in a major interchange with Interstate 90. This corridor is extremely important for residents and visitors in the region but the infrastructure has not kept up with demand. It was vitally important to update the interchange and to keep pace with population growth.

Ayres Associates crafted a design that would keep pace with growth and last for 50 years. Part of this effort involved moving the nearby highway system to be above a 100-year flood event. This update allowed the design team to create a multimodal system that facilitates movement between nearby parks on the river. The interstate itself received a facelift: a viewing area for bald eagles was incorporated and the bridge structure reflects the natural beauty of the river Mississippi below. The bridge deck uses fiber reinforcement polymer to reduce maintenance costs and extend the lifespan. All these changes were complicated by strict environmental standards and the complexity of working with a wide variety of stakeholders in the immediate vicinity.

The team delivered a new interchange and approaches that substantially improve the quality of life in southwestern Wisconsin. In addition to safe and efficient travel, the public can use the multimodal paths to enjoy the river and have easy access to nearby cities. The long lifespan of the new design ensures that these benefits will flow for many years.



The new design fits into a busy area for residents and businesses and highlights the importance of the river to the whole region.



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# QUALIFICATIONS-BASED SELECTION (QBS)

## When Quality and Value Matter

### Lifecycle Costs of a Typical Project

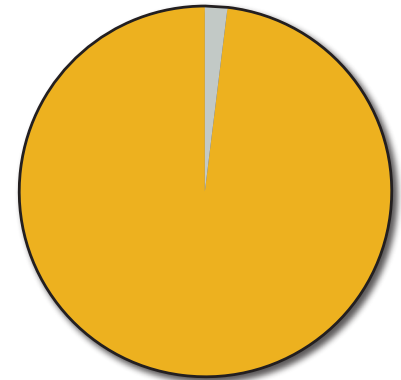
engineering vs construction & maintenance costs

# QBS FAQs

Hiring a professional engineer or architect for your project? Use Qualifications-Based Selection to get the best overall value for your project.

When anyone is faced with an engineering or architectural need, the most important decision for the project's success is the selection of a qualified professional engineering or architectural firm.

Why? Actual engineering costs make up a very small percentage of a project's total life cycle costs, yet this decision influences the level of success for every project element. These include site selection, design alternatives, budget, schedule, permits, aesthetics and operating costs, to name a few.



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Qualifications-Based Selection is a proven process to help owners find the highest qualified architectural or engineering firm for their projects. It is an objective, fair, defensible and competitive selection process based on qualifications related to your project. Experience by federal and state agencies and many municipalities has shown using QBS is more efficient, more effective and less costly in the long run than bidding the work.

### How does one select a design professional?

For information on the QBS selection process, frequently asked questions and the benefits of Qualifications-Based Selection visit [www.qbswi.org](http://www.qbswi.org). In addition, QBS Wisconsin will provide, at no charge, a facilitator to help owners learn about the QBS process.

### Which organizations use QBS?

- American Bar Association
- American Council of Engineering Companies
- American Institute of Architects
- American Public Works Association
- Federal Highway Administration
- National Society of Professional Engineers
- U.S. Army Corps of Engineers
- Wisconsin Association of School Boards
- Wisconsin Department of Natural Resources
- Wisconsin Department of Transportation
- Wisconsin Division of Facilities Development and Management
- Wisconsin League of Municipalities
- Wisconsin Rural Water Association
- Wisconsin Towns Association

### Does the bid law apply to the hiring of an architect or engineer?

The bid law for local units of government only applies to construction contracts. It does not apply when hiring engineers, architects and other professionals to work on municipal projects.

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For details, check out the QBS Manual on [www.qbswi.org](http://www.qbswi.org).



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interchange  
*core and adjacent arterials  
reconstruction*

CLIENT:



The Zoo Interchange Core and Adjacent Arterials Reconstruction project, designed by **Forward 45** for **WisDOT**, reconfigured Wisconsin's busiest interchange located at the junction of **I-41/I-94/I-894** in western **Milwaukee County**.

Through innovative design and outreach efforts, the team minimized impacts of construction on neighborhoods and businesses and provided a safe, efficient, and aesthetically pleasing interchange.



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