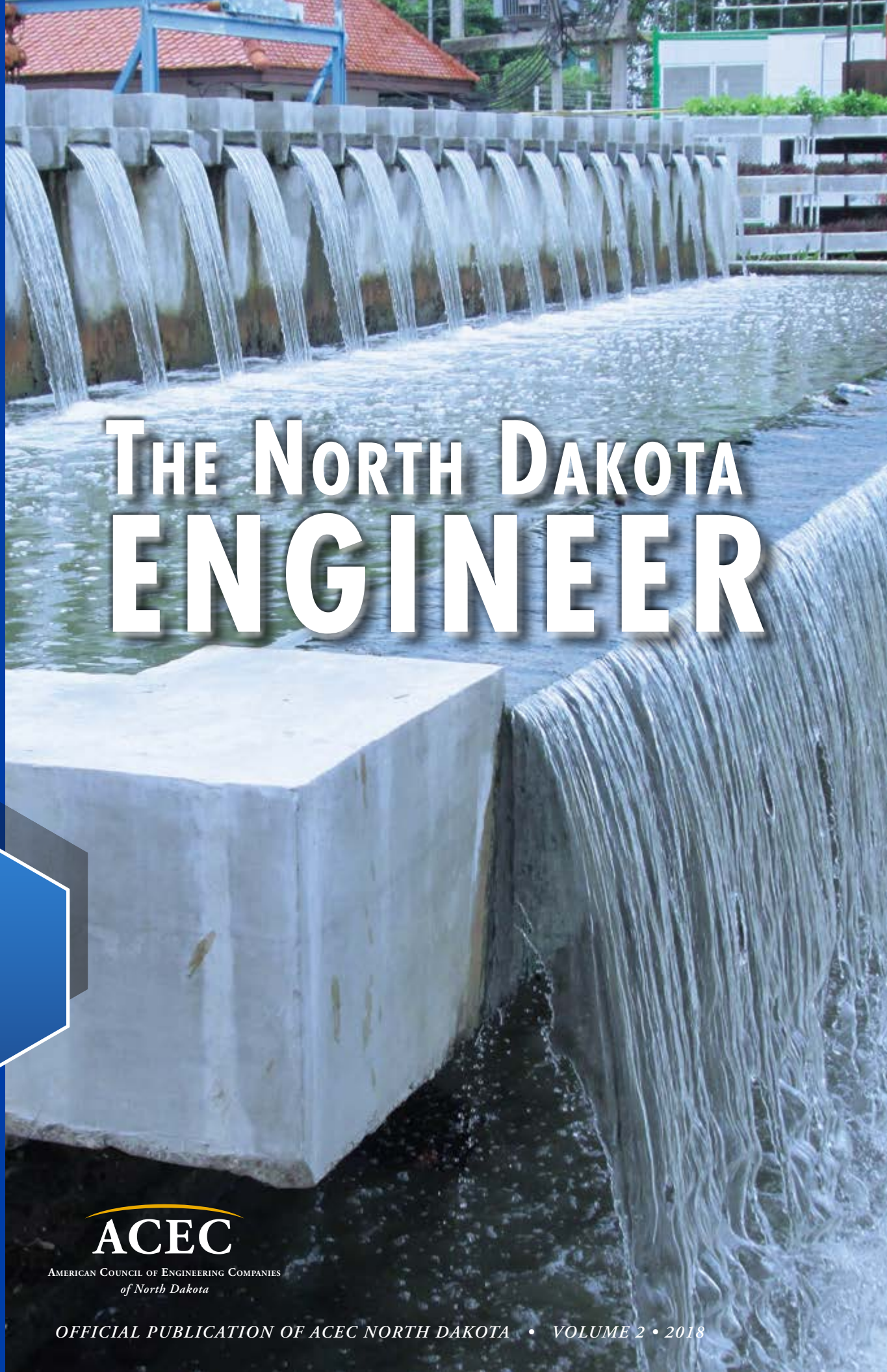

The North Dakota ENGINEER

ACEC
American Council of Engineering Companies
of North Dakota

OFFICIAL PUBLICATION OF ACEC NORTH DAKOTA • VOLUME 2 • 2018

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Table of Contents

Articles & Awards

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From The Executive Committee

by Past President Eric J. Michel, PE

Greetings!

The American Council of Engineering Companies, North Dakota (ACEC-ND) member organization is proud to publish the second year of the North Dakota Engineer magazine.

I do not recall hearing the word infrastructure more in the thirty some years I've been in the consulting engineering industry than I have in the past twelve months. It has made its way into dinner table conversation and is top of mind for decision makers from many walks of life. The need for new and improved infrastructure is great and growing rapidly.

The American Society of Civil Engineers (ASCE) 2017 Report Card for American Infrastructure indicates that at our current trends, extended out to 2025, our infrastructure needs will be underfunded by a little over $2 trillion dollars. This is estimated to be nearly half of the projected need. It's important to note that the majority of these dollars come from state and local funding, not federal monies.

We are proud that North Dakota has previously led the way (#1 in 2014) on infrastructure spending as a percent of total state spending to keep up with the needs of industrial growth. Those spending trends have changed recently with a reduction in the tax revenue and size of the state budget. While fiscal responsibility requires we do not spend more than we generate, let us not forget the impact infrastructure spend has on our state and communities affected by the investment; improves the quality of life, improves the environment and increases job growth for both construction and maintenance of newly constructed facilities.

There is hardly a thing you do in your life today that wasn't thought about ahead of time by an engineer.

- The clean water in your house to drink, wash or bathe
- Building a house in a well-designed and safe subdivision
- The smooth roads and safe bridges, rail and/or airport needed to get from home to work
- The school system and buildings required to educate our future
- The efficient building where work takes place
- The robust cellular phone system used to communicate with friends, family, coworkers and customers
- The high-speed information lines used to further commerce or the restaurant down the street where you meet colleagues for breakfast, lunch or dinner
- The reliable power system we use to heat and light the space and power the devices that allow us to work more efficiently than ever
- The energy pipelines carrying oil and gas to be refined and shipped to market
- The processing plants that add value to our natural resources and allow us to transport our goods to market

In this magazine, you will see examples of professional organizations end product. These companies are comprised of subject matter experts who dedicate themselves to making things work so you don't have to think about it, because we already did. There is information about companies, projects, and articles that will serve as a representative sample of what we have done or can do to fulfill our responsibility for efficient and effective commerce and public safety.

Diversity in Engineering

by Gayle Roberts – ACEC Regional Representative

As I reflect on my 37-year career, I can truly say my decision to become an engineer was pivotal. I never could have imagined the opportunities I would have to contribute to critically important projects around the world. I am grateful for the client and owner relationships I developed and the numerous project teams I worked with. The chance to collaborate with some of the greatest minds in the industry to help clients solve issues; then, to see these projects working for owners all over the world has simply been amazing.

At the time, my decision to become a chemical engineer was the road less travelled for women and I was discouraged from choosing the profession. Today, the story is much different. It is an established fact that workforce diversity improves the ability to attract and retain top talent and enhance collaboration. Diversity improves innovation and the ability to provide creative solutions and problem-solving through different perspectives. Owners, clients and engineers alike all reap the many benefits of a diversified workforce.

To continue to improve diversity and inclusion in the workforce, we all need to be aware of the bias that leads to subtle and often invisible barriers.

- Avoid the tendency to surround, promote, mentor and gravitate to people like yourself.
- Re-evaluate your definition and perceptions of an "ideal leader." Does it hold gender bias when using words such as "assertive" or "independent?"
- Review your training programs. Do they create a safe setting for leadership development and provide access to influential colleagues and networks? Is the leadership development aligned with a sense of purpose?

Question these assumptions in your day-to-day work, and as you give back through mentoring, coaching and encouraging talented emerging leaders. The best way we can give back to each of our sectors is by making the path forward - for women and men alike - a little easier. As a young engineer, I was fortunate to have several outstanding mentors and coaches who had an incredible impact on my career. As a result, I've made it a point to mentor and coach young engineers who are anxious to find their chosen path. Please take up the challenge and join me in making a difference in the varied careers of these emerging leaders.

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2018 – 2019 ACEC North Dakota Executive Committee

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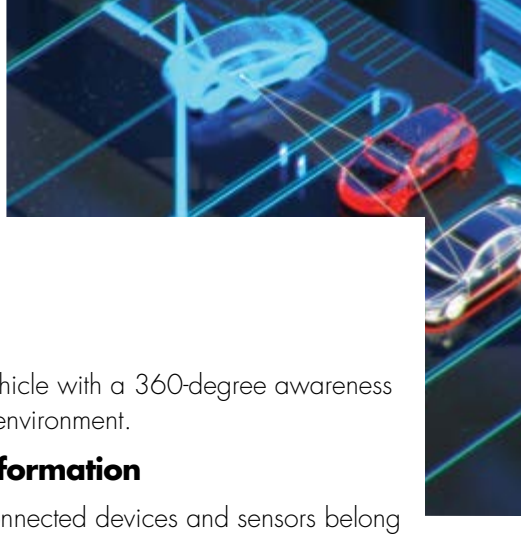
Intelligent Transportation System to Help Traffic Congestion

by Samuel Trotman, PE, CISSP, RCDD - KLJ



The use of Intelligent Transportation System (ITS) technologies on our nation's highway systems, transportation corridors, and local streets allows a better travel experience for both motorists and transit users. ITS helps accomplish this by mitigating traffic, increasing safety, and improving overall mobility throughout our transportation networks. This is done through the deployment of various ITS devices and sensors that collect real-time traffic information on travel conditions along roadways, as well as providing remote monitoring capabilities of the existing traffic environment. Traffic engineers and transportation professionals can then utilize this information to make more informed decisions on how to best modify traffic parameters, if needed, and distribute relevant information to motorists and transit users alike. The better informed and educated the traveling population is of both existing and upcoming traffic conditions the more likely they are to choose the best options available when making their travel plans and navigating roadways, which improves the overall travel experience.

Implementing Technology Solutions

ITS technology solutions can be implemented to help combat the increasing congestion issues faced on today's roadways. The option to expand existing roadways is not always available based on limited right-of-way or is simply not cost feasible. In such situations, ITS deployments, which incorporate innovative engineering designs, creates the opportunity to maximize the potential of the existing infrastructure through smarter interaction between the motorists and transit vehicles. The Bluetooth communication protocol enabled on our cellphones and vehicles can allow for Vehicle-to-Infrastructure (V2I) interaction to determine travel times from one point-of-interest (POI) to another designated POI. In addition, Vehicle-to-Roadside [V2R] technologies which utilize wireless communications can be used to facilitate the interaction between vehicles and traffic controllers to exchange information about the traffic signal intersection. Similar wireless communications can be utilized in Vehicle-to-Vehicle (V2V) technologies allowing vehicles to "talk" to one another which improves traffic management by providing each vehicle with a 360-degree awareness of its surrounding environment.

Connecting Information

All of these interconnected devices and sensors belong to a group of technologies that are a subset of what is commonly known as the Internet of Things (IoT). This subset refers to a network of internet-connected devices and sensors deployed along the roadways that are used to collect vast amounts of information pertaining to traffic network conditions and the surrounding environment. Once gathered, this information is then filtered and linked to extract those portions of the data that pertain to each specific traffic application being utilized. A great deal of the collected data can be used across several different platforms so there exists a "connectivity" associated with the information which brings an additional value when it is correctly structured and properly distributed. This "connectivity" forms the basis of the informational framework associated with the "Smart Mobility" component of the "Smart Cities/Smart Communities" concept. Within this framework, data gathered is made readily accessible to all approved interested parties. This data is no longer solely designated for use by the generating agency, but is also distributable to any number of authorized agencies or platforms for their intended use.

ITS deployments are designed to implement technology solutions that integrate intelligence into our roadways in an effort to improve the overall travel experience and safety of motorists and transit users. With the vast number of existing ITS devices and sensors already deployed the importance of correctly structuring the collected data is of increased importance. In order to accomplish this, a comprehensive solution must be designed that incorporates this concept of a "connective platform" in order to ensure that the ITS solution facilitates "Smart Mobility" and improved travel across our transportation networks.

Who Needs Commissioning?

by Jim Stocke, Senior Mechanical Designer/Commissioning Agent
EAPC Architects Engineers

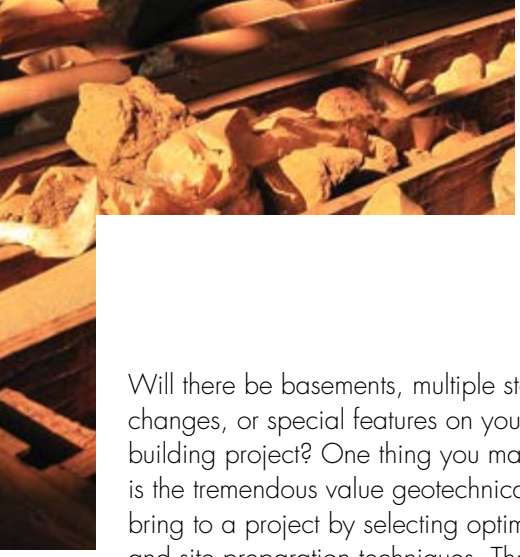
Do you work in an older office building where the air is either too hot, too cold, or even stuffy? Perhaps you work in a brand-new premises where you experience the same thing or perhaps a whole different set of problems with the building systems such as lighting controls and exhaust systems. Chances are that the older office building needs retrocommissioning and the new one needs commissioning. There is even recommissioning for structures 5-8 years old. What is all this about, and who needs it? Below is an explanation of what it is and why it should be seriously considered.

Commissioning is a process that involves reviewing a building design (by a third-party commissioning agent) that has been produced by architects, engineers, owner and the commissioning agent. The commissioning process verifies that the building design achieves its owner's requirements and goals, that the building is designed to operate the way it is supposed to, and that it will operate as efficiently as possible. This process can also extend into the construction of the building. After a facility has been designed and the building process begins, commissioning confirms that equipment and systems are installed according to the intended design. When a structure is properly commissioned, the money spent for this service pays for itself in cost reductions down the road.

Recommissioning is a methodical process of testing an existing facility's systems and equipment (5-8 years old) to make sure they are still functioning according to the original design intent or to adjust any deviation from the original design. Schedules are inspected, and the building equipment is tested to make sure everything is still operating properly and to code. Recommissioning will show how to keep the existing control system of the building operating efficiently and will also indicate if any equipment upgrades are necessary to potentially increase energy savings.

Retrocommissioning identifies areas for performance improvement in existing facilities' equipment and systems and adjusts this performance to improve efficiency. Retrocommissioning is applied to older buildings that were never commissioned, resulting most likely in higher operating cost per square foot than buildings of the same stature that have been upgraded. There is significant savings associated with retrocommissioning and it will provide a quick pay back! The buildings that have been retrocommissioned, and have had the equipment and controls upgraded, will provide better indoor air quality and less occupant complaints.

In all cases, the answer to the question, "Who needs commissioning," is ALL building owners who don't already have a plan like this in place. It is important to understand the value of it, the savings it can generate, and the avoidance of unexpected big maintenance issues in the future. Hiring a commissioning agent who understands buildings and their intricate systems should be part of each owner's overall plan in building design.



What Value Can a Geotechnical Engineering Consultant Bring?

by Wes Dickut, PE - Braun Intertec

Will there be basements, multiple stories, grade changes, or special features on your proposed building project? One thing you may not be aware of is the tremendous value geotechnical engineers can bring to a project by selecting optimum foundations and site preparation techniques. They collect soil samples at critical depths for laboratory testing and explore various locations on the site to identify the greatest efficiency and can also provide guidance and recommendations to confirm a building or structure is compatible with the underlying soil. Earth is not a very sympathetic negotiator, so it is prudent to select a site improvement or foundation method that will be reliable at the lowest practical cost.

There is an art to supporting heavy loads on spread foundations and potential savings can be very high. With the right approach, a geotechnical consultant could justify bearing pressures that are three-to-four times higher than the typical values recommended in a conservative report. Ironically, the cost of sampling or in-situ testing required to justify higher bearing pressures is probably less than one deep foundation element.

Could the site be underlain by fat clays? The potential heave that a floor slab or foundation will experience is related to several factors, including current soil moisture content, soil plasticity, and the specific type of clayey soil. Currently, many consultants automatically recommend a correction of five feet below floors and foundations. The appropriate depth of overexcavation can be evaluated based on some simple tests that could add a few hundred dollars to the report. But reducing the overexcavation and replacement volume by one or two feet across the entire building while leaving the foundations on native soil can mean cost savings starting in the thousands for even a small building.

Project teams are usually led by an architect who selects trusted designers for the structural, civil, mechanical, and electrical systems. It's a good idea to consider including the geotechnical engineer as part of that team at the beginning and throughout the design and construction of the project. During the design progress, a geotechnical consultant can guide the other designers as the details of the project are finalized. Frequently, designers struggle to implement the recommendations that are provided for several reasons. Maybe the original report was written for a previous building configuration and changes make those recommendations no longer appropriate. Another example is that the owner often directs the designer to choose a low bearing pressure that will be confirmed during construction, and to forego the geotechnical evaluation. Since the project is designed and practically constructed, any problems encountered will cost extra and cause a delay. The cost of the geotechnical report would have been about the same as performing the work during the design phase.

Having clear and coordinated specifications prepared by the geotechnical, civil, structural, and mechanical engineer creates clarity and reduces confusion. Confusion affects project schedules, and contractors will bid conservatively if they are not certain what to do. The geotechnical engineer frequently does not participate in the preparation of the specifications and plan notes, but could quickly confirm that they conform to the geotechnical recommendations for a project. Consistent terms, definitions, and direction are key.

A current trend is to solicit three bids from geotechnical consultants based on a provided scope, and only select a consultant based on the lowest price. The trend of selecting a geotechnical consultant solely based on the lowest price has resulted in keeping bearing pressures very conservative, requiring massive overexcavation and replacement at the sign of potential trouble. To be competitive solely on price, the number of borings, laboratory testing, and engineering efforts are cut dangerously low to win projects. Additional unexpected construction costs and schedule delays based on these conservative recommendations often outweigh the cost of a thoughtful subsurface exploration and engineering evaluation conducted at the beginning of the project.

Hiring the geotechnical engineer with the design team to review the final building layout may result in changes that will improve constructability and efficiency. Value engineering ideas are often realized when a geotechnical consultant is engaged throughout the design and bid process. When selecting a member of the project team, include the geotechnical engineer and strive for quality with the understanding that their expertise can add value to your final project.

ACEC North Dakota Engineering Excellence Awards

The American Council of Engineering Companies (ACEC) of North Dakota's annual Engineering Excellence Awards (EEA) competition recognizes engineering firms for projects that demonstrate an exceptional degree of innovation, complexity, achievement, and value.

EEA entries are accepted into one of 12 project categories which follow the ACEC National awards program guidelines including: Studies, Research and Consulting Engineering Services; Building/ Technology Systems; Structural Systems; Surveying and Mapping Technology; Environmental; Waste and Storm Water; Water Resources; Transportation; Special Projects; Small Projects; Energy; and Industrial and Manufacturing Processes and Facilities. Firms submitting at the state level have the option to submit at the ACEC National level.

The jury scored projects on the following rating guidelines: uniqueness and/or innovative application of new or existing techniques; future value to the engineering profession and perception by the public; social, economic, and sustainable development considerations; complexity; and successful fulfillment of client and owner's needs, including schedule and budget.

This year's awards jury was comprised of Lon Drevecky, Roger Fenstad, Gerry Floden, and Francis Ziegler. Their thoughtful and deliberate consideration of the exemplary submissions is appreciated.

Thank you to all the firms who submitted projects this year. The submissions represented a diverse group of excellent projects. On behalf of ACEC North Dakota and this year's awards jury, we would like to congratulate you!

Award Winners

Category A:
Studies, Research and Consulting

Winning Firm: KLJ

Jury Comments

Sheyenne Street was identified as the top priority for the entire Fargo-Moorhead metropolitan area, in the last Fargo-Moorhead Long Range Transportation Plan. Continued Community and Regional growth, increased traffic congestion and crash susceptibility and lack of multimodal facilities required that something needed to be done to improve the corridor.

The study team consisted of KLJ, city staff, MPO members and the NDDOT. This team under KLJ's leadership studied, analyzed and developed a corridor plan to meet the needs of the community in a way that moved directly into the Project Development and Construction Phases.

Project Name:
Sheyenne Street Corridor Study
West Fargo, ND

Sheyenne Street, a vibrant corridor in the Red River Valley, begins in West Fargo's downtown, crosses Interstate 94, and extends through the heart of West Fargo's residential neighborhoods. It is just one of two north-south arterials in West Fargo that crosses I-94.

KLJ worked with the City of West Fargo, the Fargo-Moorhead Metropolitan Council of Governments, and the community to develop context-sensitive improvements to provide a multimodal corridor that stretches the entire length of the city. The Sheyenne Street corridor improvements include capacity and safety enhancements, pedestrian and bicycle improvements, traffic calming measures, and an innovative interchange solution.

KLJ interfaced between various modeling tools including travel demand models, microsimulation models, macroscopic models, and crash prediction models to provide detailed analysis of alternatives along the five-mile corridor.

The team also completed a value engineering process for the I-94 interchange that brought together 15 transportation experts from local, regional, and state government resulting in an innovative, first-of-its-kind, modified single point urban interchange that would mitigate 60 percent more delay than the next best alternative.

KLJ utilized context sensitive solutions to provide varied improvement strategies through downtown West Fargo, the interchange, residential areas, and areas designed to move traffic. The specific design of the corridor evolves four times in response to contextual factors and serve all modes of transportation.

> *"KLJ's efforts in the collaboration and coordination of all involved, provided the positive energy to move forward with the adoption of, the design of and ultimately the construction of, this award winning study."*

KLJ utilized innovative interfaced modeling tools, including various travel demand, microsimulation, macroscopic, and crash prediction models to develop various alternatives for review. They also completed a Value Engineering analysis, an intense public involvement and a Context Sensitive Solution as an integral part of the input. These modeling tools along with the intense public involvement strategy that used, educational 3D simulation videos, recorded bicycle audits and even a video game simulator of downtown West Fargo, provided the business owners and technical stakeholders with the necessary information to adopt the corridor study.

Another innovative design adopted as the preferred alternative is a Modified Single Point Urban Interchange (MSPUI). This MSPUI design come about from the melding together of the stakeholder priorities and an intense engineering technical analysis of interchange traffic movement. The MSPUI is unique and will be the first of its kind in the State of ND.

The culmination of any corridor study is to ultimately get the approval of all the stakeholders and to move forward with adopting the study, and the design and construction of the project. To accomplish this, KLJ along with the City of West Fargo, created a marketing video. This video identified the issues, the solutions, the benefits of this study proposal and the associated costs. Thousands of the video views of the improvements, by the public, resulted in a mostly positive perception of the overall project.

KLJ's efforts in the collaboration and coordination of all involved, provided the positive energy to move forward with the adoption of, the design of and ultimately the construction of, this award winning study. Construction is scheduled to begin in 2018!

Award Winners

Category B:
Building/Technology Systems
Winning Firm: Ackerman-Estvold

Project Name:
Tioga Fire Department/Ambulance Service
Tioga, ND

Oil-related industry gobbled up prime locations and demanded city services, forcing the City of Tioga to sell off their best parcels of land to help pay for the boom-fueled growth. The Tioga Fire Department could only afford the most challenge-filled site for its new ambulance building: four lots, buried in six to nine feet of debris-laden fill, sloping down below FEMA's Baseline Flood Elevation.

Safely removing the unsuitable soils to a depth of nine feet or more without disturbing the FEMA floodway was not possible. Rammed aggregate piers were used both to save cost and keep equipment and material out of the floodway. The buildable area on the site was raised above the 500-year flood plain without altering the FEMA flood way.

The Tioga Ambulance's architectural precast walls and roof structure are designed to protect to the same standards as a big city EMS while enhancing the downtown area's vibrancy and sense of permanence. The new building's mix of modern finishes and restrained, easily readable façade strongly appeals to the community's desire for a more orderly built environment.

The actual construction cost of $246.90 per square foot compares very favorably with recent new construction projects in Tioga. The building meets the community's aesthetic and economic comfort zone.

This energy efficient, durable and attractive building represents the department's willingness to invest in the long-term viability of the city's downtown vitality by keeping this essential service in the heart of Tioga. The fact that a commonly known rubble strewn "junk" site could be so transformed into a useful, beautiful public building at a fiscally responsible price has altered perception of what is possible in the Bakken's small towns.

> ***"The project excelled in meeting community social, economic and sustainable development goals and was a successful fulfillment of Tioga Fire Department needs."***

Jury Comments

The recent oil boom caused an increased demand for ambulance, Fire and Police service. To address this shortcoming The Tioga Fire Department procured funding for a new Ambulance/Training/Tanker facility through a 1% city sales tax. The oil boom also caused buildable lots to skyrocket in price and be rapidly purchased. The lots that were large enough, reasonably close to downtown and affordable, had construction challenges. The four lots purchased had a 14 ½ foot elevation differential from NW to SE corners, grade sloping below FEMA's Baseline Flood Elevation and poor soils consisting of 6-9 feet of rubble and debris laden, uncompacted fill, over five feet of top soil. Safely removing nine feet or more fill without disturbing the FEMA floodway was not possible. Rammed aggregate piers were used to save costs and avoid the floodway. The A-E team designed a very durable building with architectural precast concrete walls and concrete double tee roof system. The building features 5 ambulance bays, wash bay, fire department tanker bay, training room with serving kitchen, three offices, medical records, gear storage, bathrooms with showers and utility room. To provide character the building had an easily identifiable modern façade that makes it a more appealing, durable structure than the multitude of utilitarian metal buildings recently constructed in Tioga. The all concrete building with standby power also makes it a suitable emergency operations center and the total project cost came in $50,000 under budget. The project excelled in meeting community social, economic and sustainable development goals and was a successful fulfillment of Tioga Fire Department needs.

Award Winners

Category C:
Structural Systems
Winning Firm: KLJ

Project Name:
Sorlie Bridge Rehabilitation
Grand Forks, ND and East Grand Forks, MN

The Sorlie Memorial Bridge has been an iconic landmark in North Dakota and Minnesota since 1929. When originally constructed, it was the only vehicular river crossing in the immediate area and served as an important river crossing on a major transcontinental highway route. In 2008, an inspection revealed that time and increasing traffic had taken its toll on the bridge. The load rating was reduced, causing concern that extensive rehabilitation was needed, or a new bridge would have to be built to replace the historic structure. After an extensive hands-on inspection and thorough analysis, it was determined the bridge could be rehabilitated rather than replaced. This solution would not only save money, but decrease the amount of time the bridge was under construction.

In 2012, the North Dakota Department of Transportation hired a team, led by KLJ, to help address issues associated with the deteriorating bridge and increased traffic, as the population of the cities connected by the Sorlie Memorial Bridge, Grand Forks and East Grand Forks, continued to grow. Over the course of the project, KLJ overcame various challenges to preserve the historical aspects of the bridge, all while keeping the bridge open to traffic. Through meticulous analysis, inter-agency collaboration and community outreach, officials with the North Dakota and Minnesota Department of Transportation's saved tax payers $24 million by rehabilitating the critical bridge and adding several safety and aesthetic features, such as LED lighting to preserve its rich history.

Although original construction was slated for 2018, the bridge rehabilitation was accelerated to 2015 and was completed in one construction season. The updated, cost-effective, well-lit bridge was open November 2015, creating a safer crossing for both vehicles and pedestrians alike.

> ***"In the end, the team determined, much to the excitement of the historic preservation folks, that the existing bridge could be saved and rehabilitated."***

Jury Comments

This bridge, built in 1929, was placed on the "National Register of Historic Places" in 1999. As with all infrastructure the bridge had deteriorated such that it had to be repaired or replaced after 85 years of service.

KLJ was hired to lead a multidisciplinary team that would determine the best options for this river crossing. The key to the environmental documentation was the coordination with many agencies, including the States of North Dakota and Minnesota's State Historic Preservation Offices (SHPO), and the Grand Forks Historic Preservation Commission.

Given the historic aspect of the bridge, a significant effort was placed in determining the condition of the bridge to define the replacement vs. rehab option. In the end, the team determined, much to the excitement of the historic preservation folks, that the existing bridge could be saved and rehabilitated.

Both historic and local accommodations had to be made in the design. These accommodations required that the bridge or at least a portion of the bridge be open to traffic during reconstruction and that new lighting would not detract from the historic value.

Innovative LED lighting was used and placed within the truss to hide the lights from view during the day. Additionally, the paint on both the steel and concrete components had to match the historic components of the bridge.

Through innovative engineering practices, the design team developed a project that met all the requirements and saved the taxpayers over $24 million.

Award Winners

Category E: Environmental

Winning Firm: Moore Engineering, Inc.

Project Name: Finley Water Tower Finley, ND

A city's water tower is often the first impression for visitors, and hopefully a source of civic pride for residents. Finley's new tower reflects the spirit of its people and sends a signal to visitors that this is a city looking to the future.

The new single-pedestal, 100,000 gallon elevated water tower replaced a four-legged, leaking tower with half the capacity of the new structure. It uses an 8-inch riser pipe to connect the bowl to the distribution system. The internal building at the base houses controls for the tank mixer, alarm system, recirculation pump, sampling points and shut-off valve.

The tower is coated with an organic zinc/aliphatic urethane/fluorourethane system designed to provide a longer life expectancy than more traditional coatings, and is fitted with a tank mixer to ensure the water doesn't freeze in the winter months.

Moore Engineering partnered with the city from concept to completion, organizing public meetings, collecting residents' input and helping complete the paperwork so the city could secure a USDA Rural Development grant that covered nearly 45 percent of the new tower's cost. In addition to the design and construction engineering work, Moore also worked with the city to develop the logo that would announce the Finley identity from two sides of the tower.

Finley Mayor Larry Amundson says it best: "The city water tower is an emblem of identity in all North Dakota small towns. When we replaced our aged, leaking water tower with the new, beautiful and modern tower we now enjoy, it was a needed boost to our physical infrastructure, as well as our community pride. It's a beautiful tower serving as a beacon of a beautiful city."

> *"Finley Mayor Larry Amundson says "It's a beautiful tower serving as a beacon of a beautiful city."*

Jury Comments

Water towers are not only a necessity but also an identity issue for most communities. By having strong public input including schools, city leaders, and public participation in the project along with a great funding package, the engineering firm was able to successfully fulfill the City's needs and expectations. The new tower design will enhance the community by providing a reliable, low maintenance and secure water storage facility for many decades to come.

Award Winners

Category F:
Water and Wastewater
Winning Firm: Houston Engineering, Inc.

Jury Comments

The Minot Infrastructure project included 26 square blocks of the downtown area with infrastructure dating back 75 years or more. In the aftermath of the 2011 Mouse River Flood, a large watershed area which drained through the downtown area was rerouted through an innovative pipe network to a new outfall location. Nearly every component including storm and sanitary sewers, water mains, streets, sidewalks and street lighting were replaced. The City desired improvements to the streetscape design including benches, flower, shrub, and flower planters, decorative lighting, bicycle racks and other

Project Name:
Minot Downtown Infrastructure Improvements
Minot, ND

The Minot Downtown Infrastructure Improvements project was one of both necessity and ambition. The existing public infrastructure within the 26-square-block project area dated back to 75 years or more, and it had long outlived its useful design life. Nearly every component of public infrastructure was replaced as part of this project, including sanitary and storm sewers, water mains, roadways, curb and gutter, sidewalks with streetscape elements, and LED streetlights with new feedpoints, electrical wiring and conduit.

In addition to replacing the infrastructure, the City desired to develop its downtown back into a destination of choice for both residents and visitors. This meant making extensive efforts in developing the streetscape design component of the project, which included Main Street bump-out intersections, metal strap benches, flower, shrub, and tree planters, decorative street lighting and traffic signage, bicycle racks, and metal strap litter receptacles. More importantly, downtown had to remain open during construction to minimize business and institutional impacts. The project team contacted businesses and residents very early in the project to forge lines of communication and coordinate efforts throughout the project.

Access to businesses was preserved as much as possible throughout the three-year construction period.

This project was completed in the aftermath of the devastating 2011 Mouse River flood that displaced thousands within Minot. Minot's downtown lies in close proximity to the river and portions were affected by the flood. This project is, in many ways, a symbol of the Magic City moving forward after the flood, no longer just recovering but growing and improving.

> ***"This project is, in many ways, a symbol of the Magic City moving forward after the flood, no longer just recovering but growing and improving."***

New Storm Sewers; Inset is Aged Infrastructure.

amenities making the downtown area a destination of choice. The public was engaged early to mitigate impact to businesses and keep the public informed with a public website. This was the largest urban reconstruction project ever undertaken by the City of Minot was completed within the planned three-year construction window. The City envisioned this project not just as an opportunity to replace infrastructure, but to convert its downtown area into a true destination for residents and visitors.

Award Winners

Category G:
Water Resources
Winning Firm: Houston Engineering Inc.

Project Name:
2nd Street/ Downtown Flood Protection
Fargo, ND

Floods have had a significant impact on residents in the Upper Midwest in recent years. In some cases, river levels exceeded established protection levels and caused devastation within the communities. The City of Fargo has narrowly avoided the same devastation by constructing miles of emergency levees. While these emergency measures protected the community at the time, they are not reliable for flood protection. Fighting floods is a costly and time-consuming effort. The repetitive act of constructing emergency levees every decade since the 1960s has taken a toll on the City and its residents.

The ongoing Fargo-Moorhead (F-M) Diversion Project being planned and constructed through the F-M Diversion Authority (FMDA) and the US Army Corps of Engineers (USACE) is a means of providing long-term regional flood protection. Until the F-M Diversion Project is complete—and during larger flood events even after it is complete—permanent flood protection is needed for the 2nd Street/Downtown area. This area is the home to City Hall, historic buildings, established businesses, and residents.

To achieve long-term flood protection, the City and the FMDA chose to construct a floodwall as a permanent line of protection between the City's iconic downtown and the flood-prone Red River. The floodwall stretching for approximately 2,172 feet with a maximum height of 15 feet and averaging at 8 feet will eliminate the need for emergency levees in the 2nd Street/Downtown area during flood events. The project also includes new levees, infrastructure improvements, and pump stations that now provide permanent protection to this area. These projects allow the City to focus on other areas during a future flood fight until the F-M Diversion Project is in place.

"The work on this project improves the health, safety, and welfare of the downtown businesses. The general public and downtown businesses will have the peace of mind knowing there is adequate flood protection in this area and citywide."

Wet side of Floodwall – Dry side of Floodwall

Jury Comments

The 2nd Street/ Downtown Flood Protection project in Fargo was part of the Fargo-Moorhead Diversion project, built to provide flood protection for the region. This portion of the project consisted of 2,172 feet of flood walls, had many unique challenges, and an opportunity for innovative solutions. This project took place in the downtown area of Fargo which presented coordination of utility relocation for nearly a dozen different utility companies as well as relocation of City infrastructure. All relocations had to meet USACE and FEMA Standards and involved enormous coordination. The work on this project improves the health, safety, and welfare of the downtown businesses. The general public and downtown businesses will have the peace of mind knowing there is adequate flood protection in this area and citywide.

Award Winners

Category H:
Transportation
Winning Firm: Apex Engineering Group

Project Name:
32nd Avenue South Widening/Reconstruction
Fargo, ND

32nd Avenue South in Fargo was facing future deficiencies and delays that would impact both the thoroughfare and I-29 interchange. The corridor needed to be expanded to three lanes in each direction to ensure future capacity requirements would be met. In addition, intersections along the corridor have some of the highest crash statistics in the state, signaling necessary improvements. Finally, the eastern portion of the project was originally constructed in 1987. With 30 years of use, the roadway was ready to be revitalized.

The City of Fargo, North Dakota Department of Transportation, and Apex Engineering Group worked together on the planning, design, and reconstruction of 32nd Avenue South. The project's goal was to maximize the investment of the existing roadway and bridge over I-29, while improving safety, mobility, and access for both vehicles and pedestrians.

The team worked diligently to ensure the project deadlines were met. The aggressive project schedule and tight deadlines required strong project management and the ability to quickly identify potential "schedule busters."

Coordination of public and private utilities, as well as right of way, easements, traffic control plans, and communication strategies with the project partners and key stakeholders were imperative to the success of the project.

Maintaining traffic through the work zone was critical, due to the presence of multiple businesses and two large truck stops on the corridor. Because of this, traffic control design required additional coordination to accommodate heavy truck traffic.

32nd Avenue South was one of the highest profile projects in the state last year. The project was a popular topic for the local media. Apex teamed with Flint Group to handle communications, social media, press releases, and website updates. Apex assisted with interviews as media requests were made.

The $19.3 million project started in March and was substantially completed in October 2017.

> *"To date this is the largest sanitary sewer pipe on which the City of Fargo has used the cured-in-place lining process."*

Jury Comments

Early in the process, Apex identified, in collaboration with the stakeholders, potential "schedule busters." This collaboration was critical to meet the complexity, aggressive schedule and tight deadlines on this approximately $22 million project.

More complex issues involved the control of the heavy traffic, the large number of public and private utilities, the constrained right-of-way limits and the necessary communication with the current users. In addition, traffic control on the reconstruction of a major urban corridor posed unique engineering issues. The Apex team used the existing median to provide added space for the successful flow of the contractors traffic. This kept the construction traffic away from the area needed for the movement of the public traffic.

Apex identified the exact right-of-way needs and limits very early in the design process. This was done so that the right-of-way negotiations could begin early and so that the information provided to the property owners was complete and accurate.

One of the Apex Engineering Groups, more innovative applications was the use of trenchless cured-in-place pipe to extend the use of the existing sewer pipe. This process saved valuable time and money, by preventing the excavation of the existing pipe which was 20' underground. To date this is the largest sanitary sewer pipe on which the City of Fargo has used the cured-in-place lining process.

Apex's efforts on this project provided the obvious long-term benefits to the transportation users and the adjacent business and property owners along this corridor.

Award Winners

Category I:
Special Projects
Winning Firm: Brosz Engineering, Inc.

Jury Comments

Often smaller counties and cities with tight budget constraints have small projects that have difficulty attracting competitive bids due to high mobilization costs for the contractors. By recognizing that multiple clients had similar infrastructure projects, Brosz arranged a cooperative effort to tie multiple improvements together under a single contract to attract more interest and lower costs to each local government entity. Bowman County was approached to be the lead sponsoring entity to include road and street projects located in Slope County, City of Rhame, City of Bowman as well as Bowman County. As the sponsoring entity, Bowman County entered into the agreement with the contractor, made

Project Name:
Multiple Tied Improvements
Bowman, ND

Brosz Engineering works with a number of local government entities and is well aware of the tight budget constraints that they often have to work with. Brosz Engineering (Brosz) is continually looking for ways to save their clients time and money through innovative designs and methods. Brosz discovered that a few of them had infrastructure improvement needs in the same vicinity. As such, Brosz arranged a cooperative effort to tie multiple improvements together for their clients to combine the improvements into a single larger contract.

Bowman County served in the role of the sponsoring entity of the construction contract. They entered into an agreement with the contractor, made the payments to the contractor and billed the other political subdivisions for their project costs. Each of the governmental bodies was responsible for the engineering expense associated with their project improvements. The other political subdivisions that participated in the tied project improvements were the City of Bowman, the City of Rhame and Slope County.

The multiple tied improvements consisted of the following schedules:

1. Sunset Butte Road Asphalt Overlay (Bowman County)
2. Camp Crook Road Asphalt Overlay (Slope County)
3. Main Street Improvements (City of Rhame)
4. Divide Street Water Main (City of Bowman)
5. 11th Avenue Reconstruction (City of Bowman)

Cost savings were experienced by price reductions resulting from the quantity of scale for the various work items, as it attracted more bidders. There was also a substantial reduction in mobilization costs. Cost savings were also realized in engineering services, as a result of the reduction in the construction administration and inspection needed for the project due to only administering one contract and the efficiencies of the staff that were created by combining the project improvements. Overall, the total cost savings that were shared amongst the various entities was estimated at more than $2 million.

> ***"The thinking outside of the box saved an estimated $2 million on the $6.7 million total projects and can be an example of future value to other public works projects."***

payments and then billed the other government bodies for their share of the project. The complexity was the coordinating between multiple entities by working with the County and City Auditors and States and City Attorneys to formulate Joint Powers Agreements between the entities to make the project possible. Brosz also kept each entity involved by attending all monthly City Council and County Commission meetings to keep the owners informed as to what was going on with their project. The thinking outside of the box saved an estimated more than $2 million on the $6.7 million total projects and can be an example of future value to other public works projects.

Award Winners

Category J:
Small Projects
Winning Firm: Ulteig Engineers

Jury Comments

The Medina Rest Area located on I-94 was constructed in 1966. The original waste water treatment consisted of a two cell lagoon system. Rising water in nearby Stink Lake inundated the lower lagoon, causing the rest area to be closed. Ulteig Engineers was retained by the NDDOT to provide design and construction phase services to renovate the rest area. In addition to solving the wastewater treatment problem, the project scope was expanded to bring the rest area into compliance with current ADA standards. Ulteig evaluated waste water treatment options that were suitable to handle the high strength waste generated at the Rest Area

Project Name:
Medina Rest Area Improvement
Medina, ND

Ulteig was awarded the engineering and design work for the Medina Rest Area Improvements. The facility had been closed since July 2014 due to high water levels of Stink Lake flooding the lower lagoon. This project consisted of two key aspects – the restoration of the site's waste water treatment and a facility update to meet ADA accessibility requirements.

NDDOT reviewed the life cycle cost and the environmental impact of several solutions and selected a waste pre-treatment system with a drain field disbursement system. Ulteig designed the dispersal trenches and inspection ports at the end of each trench in the drain field. Ulteig also designed magnet locators on the inspection ports and locator signs in line with the end of the trenches. One challenge was the discovery of an irrigation line within the drain field. Ulteig worked with the contractor and NDDOT to approve the relocation of the pipeline and develop an acceptable cost.

The waste water treatment system Ulteig designed consists of a 3,000-gallon septic settling tank followed by an aeration treatment system. Finished water from the aeration system is held in a 1,500-gallon pumping tank and then pumped through forcemain, which discharges into a gravity feed drain field. Finally, the finished water infiltrates into the ground and recharges the groundwater.

Ulteig's improvements to the sidewalk and pedestrian ramp provide access to all aspects of the rest area and from the parking lot to the building. Ulteig's design incorporated a new ADA accessible picnic table. Pedestrian "turnout" ramps are positioned at two locations along the sidewalk, which provide a location for wheel chairs to turn around.

Ulteig designed the full waste water treatment system and the ADA improvements, which were completed within six weeks. The rest area was re-opened to public use on October 14, 2017, meeting the contract completion date.

"This is the first wastewater treatment facility of this type used at a NDDOT Rest Area."

and presented five options to NDDOT. NDDOT reviewed the lifecycle cost and environmental impact and selected the waste pre-treatment system with drain field disbursement system. Additional benefits of this system include the elimination of the need for a North Dakota Department of Health (NDDOH) licensed operator to run the system or a NDDOH National Pollutant Discharge Elimination System permit for the discharge into Stink Lake. The waste water treatment system consisted of a 3,000 gallon septic/settling tank coupled with an aeration treatment system. Finished water from the aeration system is held in a 1,500 gallon pumping tank and then pumped into a gravity feed drain field system. This is the first wastewater treatment facility of this type used at a NDDOT Rest Area.

ADA improvements include replacement of non-compliant sidewalks and ramps, New doors and closers at the entrances, new water fountains, updates to changing stations, updated toilets and urinals, new signage of correct height for the visually impaired and new ADA picnic table.

ACEC/ND Introduces Simplified QBS Implementation Guidelines

by Gregory Wald

When you take price out of a competitive selection process for architecture and engineering (A/E) services, what do you have left? Quality. Experience. Expertise. Service.

This is the goal of Qualifications-Based Selection (QBS), to remove price – or, more specifically, the consulting fees associated with successfully completing the project – from the selection process so that the project is awarded to the consultant that can best serve the project's requirements and the client's needs.

And now, ACEC/ND has created new guidelines for governmental units to use to ensure they are following applicable QBS standards.

Why is QBS so important?

Government entities that use QBS realize what A/E firms instinctively know – that not all consultants are alike. There are distinctions to be made based on their experience with different project types, their expertise in certain specialties and their overall track record of service, including their adoption and adherence to a sound quality assurance/quality control (QA/QC) process or policy.

QBS takes price and cost out of the equation until a judgment is made based on a consultant's ability to get the job done right.

Does price matter? Absolutely. And it should. But a realistic price can only be determined after the client and consultant have taken the time to discuss the client's expectations regarding scope and level of service. The consultant needs an opportunity to determine the tasks and level of effort required to meet those expectations before an appropriate price can be given.

The client evaluates the consultant's proposed fee in light of their budget and expectations, and negotiations follow to achieve the right balance of scope, level of effort and fee. If an acceptable agreement cannot be reached, the client can move on to the next most qualified consultant to develop scope and negotiate fees with them.

To understand the importance of QBS and the theory underlying it, we must remember that pricing consulting services is not like pricing goods. In the world of goods, all widgets are equal. Each piece is the same.

Consultants, on the other hand, must customize their proposed services based on a detailed, predetermined scope of work, with all expectations clearly defined. Only after they thoroughly understand the project can they determine the fees they will need to complete it to specifications. Without a scope of work that compares apples to apples, valid price comparisons are impossible.

Clients/owners and consultants must work hard during the negotiation period to ensure there is full clarity and understanding on both sides, so the client/owner clearly understands what is being priced.

A full and complete scope of work is not adequately defined in the published request for proposal (RFP) or request for qualifications (RFQ). It is only through the negotiation phase of the selection process that all the details of what is being requested and what is being offered are fully understood by both sides.

Pricing a project with only the information in an RFP or RFQ is unfair to all parties because a full understanding has not been reached. When QBS is properly implemented, the consultant fully understands project expectations and can submit a valid and proper fee proposal.

Without QBS, the potential exists for A/E firms to use their fee structure as a manipulative market force that steers projects to consultants that are not always optimally equipped to successfully complete a given project. The industry has the potential to become a race to the bottom, with the firm most willing to cut costs and profits – and perhaps shave quality in the process – receiving a disproportionate share of government work.

This type of environment is not in anyone's best interest. Both architecture and engineering firms are beholden to codes of conduct that require them to make public welfare their primary concern.

From the American Institute of Architecture's Code of Ethics, E.S.1.5:

Design for Human Dignity and the Health, Safety, and Welfare of the Public:

> Members should employ their professional knowledge and skill to design buildings and space that will enhance and facilitate human dignity and the health, safety, and welfare of the individual and the public.

And from the ACEC Professional and Ethical Conduct Guidelines and Rules of Practice:

> Code II.1.: Hold paramount the safety, health and welfare of the public in the performance of their professional duties.
>
> Code II.1.a.: Engineers shall at all times recognize that their primary obligation is to protect the safety, health, property and welfare of the public.

So, engaging in a selection process that prioritizes cost over quality and public welfare would be contradictory to the ethics guiding these professionals' behavior, and detract from the common good.

What are QBS's advantages?

According to ACEC, QBS does four specific things for project owners:

1. QBS protects the public welfare by allowing the owner to choose the most qualified consultant for the project. Highly specialized and technically proficient professionals – doctors, lawyers, engineers, architects – are not judged first by the prices they charge. They are primarily evaluated by the quality of their work, their expertise in their fields and the comfort clients feel in knowing the job is being performed by the professional with the highest level of occupational proficiency.

2. QBS protects the taxpayer by delivering projects that improve lives and communities. Citizens rely on infrastructure – roads, buildings, clean drinking water, flood protection – so they can spend their time and energy on economic and personal activities that grow the economy and lead to their own personal enjoyment. Most Americans take infrastructure for granted, and, from a professional pride perspective, architects and engineers kind of like it that way.

3. QBS benefits small firms by providing a forum for them to demonstrate their unique capabilities. This is especially true for niche firms that may be perfect for a specific type of project, but not necessarily for a wide range of projects.

4. QBS promotes technical innovation by making skills and expertise the differentiating factor in awarding a contract. If price is driving the decision, firms will be rewarded for winning a race to the bottom, possibly taking shortcuts to save money, and spurning technical innovation for efficiency and cost controls. Rewards drive decision making, and the architecture and engineering industries, along with their clients, are best served when firms compete to be the best, not the least expensive.

How did the QBS movement start?

So, how did QBS get started? When and why did Congress decide that quality, not cost, would drive how projects are awarded?

The push for QBS to become the standard in government procurement methods for A/E services began in 1972 when Congress passed the Brooks Act. It required the use of QBS for federal agencies and, since then, 46 states and many local forms of government have adopted QBS as their standard, as well.

Policy makers wanted projects completed correctly, on time and on budget. QBS drives those types of results, and the federal government encouraged all subunits – state, county, municipal, school boards, water districts, etc. – to use QBS, as well.

The State of North Dakota codified the QBS process in procuring architecture, engineering and land surveying services in Chapter 54-44.7 of North Dakota's Century Code, which states in part, "… all North Dakota state agencies shall negotiate contracts for services on the basis of demonstrated competence and qualification for the particular type of services required."

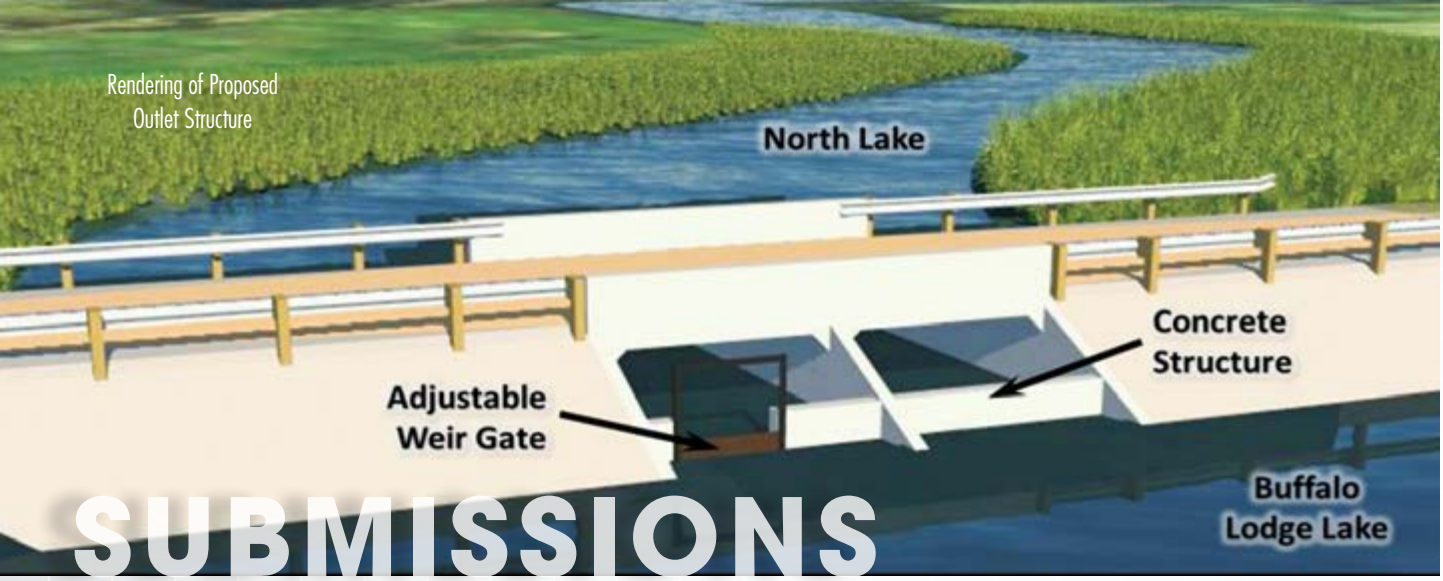
ACEC/ND rolls out simplified implementation guidelines

While the QBS concept is relatively simple – select a consultant based on quality, not price – the laws governing it at the state and national levels are relatively complex. Governmental units that don't frequently award projects are not always accustomed to navigating the intricacies of QBS.

To encourage all governmental units to use QBS, ACEC/ND developed a set of simplified guidelines to help governmental units appropriately apply QBS.

The guidelines break down the process into simple, easy to follow steps and descriptions to make it easier for decision makers to properly and fairly use QBS.

You can find the new guidelines, along with more information on the QBS process, on the ACEC/ND website, or contact them at [email address].

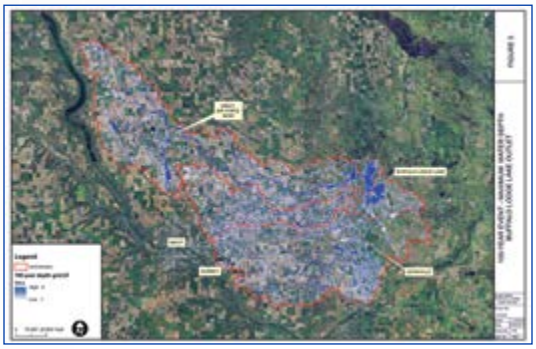


Rendering of Proposed Outlet Structure

SUBMISSIONS

Buffalo Lodge Lake Outlet Structure McHenery County, ND

Ackerman-Estvold



Storm Water Retained / Detained on Watershed during 100-year Storm Event

Buffalo Lodge Lake is a 1400-acre prairie pothole lake northeast of Granville, ND. The existing outlet structure that controls the lake pool is dilapidated and needs to be replaced. Design of the replacement structure required the determination of a design discharge from the 230 square mile contributing watershed which consists of rural prairie, pasture, agricultural land and numerous prairie potholes. Ordinary hydrologic methodologies for large watersheds are inadequate, since these methodologies do not consider the attenuation of the flood hydrograph within Buffalo Lodge Lake, the detention and retention in the many prairie potholes within the contributing watershed, and the backwater effects of downstream conditions.

Two-dimensional, rain-on-grid hydrologic analysis was used to size and design the Buffalo Lodge Lake outlet structure replacement. This hydrologic/hydraulic method considers land cover, soil type, and detention within the lake, prairie potholes, and other depressions within the watershed. In addition, the backwater effects of downstream conditions are considered.

The advanced hydrologic analysis produced a smaller design discharge than that computed using ordinary hydrologic methods, allowing for a more economical structure to be planned. The proposed structure consists of twin 12-foot by 7-foot box culverts with a concrete weir cast into the inlet section. The proposed structure will provide an economical, stable outlet for Buffalo Lodge Lake.

Existing Buffalo Lodge Lake Outlet Structure

SUBMISSIONS

Fargo Wastewater Treatment Facility
Fargo, ND
Apex Engineering Group

The City of Fargo retained Apex Engineering Group to plan, design and oversee the construction of a $13 million dollar wastewater treatment facility (WWTF) improvements project. This Phase I Improvements project focused on replacement or upgrades of aging equipment identified by Apex and City Staff during an asset inventory, condition assessment and risk management process.

Phase I items were identified by categorizing and ranking existing facility components due to equipment age, condition, workers' safety and capacity. The improvements were critical from a vulnerability standpoint: to allow the City to adequately and safely treat/convey wastewater through the existing WWTF, to reduce the probability of permit violations and to protect the public and the environment.

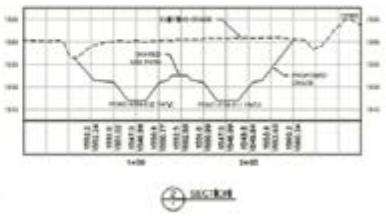
Some of the oldest infrastructure upgraded included replacement of 1934 and 1984 influent pumps, the repair and coating of corroded 1934 clarifier walls, and the removal and replacement of a collapsed 1959 clarifier mechanism. Other improvements completed included electrical equipment, instrumentation and controls, and updating the Administration Building.

These updates were all completed without disrupting the daily flow of 12 to 13 million gallons of wastewater through the plant. Nearly every process at the facility was impacted by construction while simultaneously treating wastewater for over 125,000 people.

SUBMISSIONS

Rendering of planned project

Perkett Ditch Improvements Project Minot ND Ackerman-Estvold



As part of the interior drainage analysis for the Mouse River Enhanced Flood Protection Project (MREFPP), it was determined that additional storm water storage capacity, a larger interior drainage pump station, or a combination of both was needed to provide 1%-annual flood protection concurrent with a river flooding event for the Perkett neighborhood in Minot.

Through an alternatives analysis, the opportunity to convert Centennial Forest into an off-line detention pond, creating storm water storage capacity and therefore reducing the required pump station size, was identified. Ackerman-Estvold saw this conversion of underused land as an opportunity to not only serve as a detention/retention pond, but also create an amenity.

During large rain events, runoff will backflow into the ponding area. The 45-acre-foot pond will attenuate the runoff peak and slowly release the runoff over time. This allows for a substantially smaller interior drainage pump station to be installed.

The project also includes a pedestrian connection between the adjacent neighborhood and the existing trail system, as well as native plantings which will create a wet meadow attracting wildlife and improving water quality. In total, the $3 million construction of Centennial Pond as a part of the Perkett Ditch Improvements project saved several million dollars in project costs relating to the overall MREFPP.

SUBMISSIONS

Bugs Access Road and Creek Crossing
Fort Berthold Indian Reservation near Mandaree, ND
Braun Intertec

Braun Intertec was selected by Enerplus Resources to provide geotechnical engineering evaluations and recommendations for a proposed access road through the Badlands terrain to a well pad site on the Fort Berthold Indian Reservation near Mandaree, North Dakota. The proposed alignment required excavations as deep as 45 feet and fills up to 100 feet at a creek crossing where a culvert was to be installed.

Braun Intertec reviewed the plans to identify where the large cuts and fills were proposed on the site and then performed the strategic subsurface exploration to identify areas of existing instability. Slope stability analyses for the proposed roadway were performed by utilizing the water level observations, subsurface conditions encountered, and laboratory strength measurements.

Recommendations included flattening the slope inclination in a few areas, installing drainage where wet spots were encountered, and raising the roadway to reduce cut slopes to obtain stable fill slopes.

The flatter slopes required additional right-of-way, which, unfortunately, could not be obtained within the construction timeframe, so the temporary slopes became steeper than initially designed. One year later, a series of slides had occurred that required excessive maintenance. Braun also designed a soldier pile retaining wall that alleviated the problems.

SUBMISSIONS

Water Main Cured-In-Place-Pipe (CIPP) Renovation
Ray, ND
Interstate Engineering

The City of Ray, North Dakota, replaced the highest priority cast iron water mains from 2012 to 2014 to address poor chlorine residuals, rust colored water, and dependability. However, problems persisted in the remaining pipes. The city hired Interstate Engineering to devise a plan to improve the water system with minimal disruptions. After extensive research, Interstate Engineering presented water main cured-in-place pipe (CIPP) technology as a viable option. CIPP offers many advantages, specifically when the water main is the only utility in need of repair. When a water main is located in a paved and congested utility corridor with multiple service connections, CIPP requires less excavation and restoration than traditional methods with minimal impact on adjacent utilities. It also holds a 50 year design life, meeting ASTM standards.

The city renovated over 7,100 linear feet of water mains using CIPP. The project included 110 water service connections, each one being reconnected internally using robotic equipment. The process left the street surface undisturbed, a distinct difference to a pipe bursting technology where the main needs to be dug to reconnect each service. Interstate Engineering assisted the city in securing Drinking Water State Revolving Fund loans for the project. Sixty percent of the water loans were loan forgiveness.

The CIPP renovation was completed within budget and schedule with minimal public inconvenience. The city saw an estimated 20% to 25% cost savings.

SUBMISSIONS

Valley City Permanent Flood Protection
Valley City, ND
KLJ

With record-breaking rains and other weather-related events, flooding was a major issue for the community of Valley City in 2009 and 2011. KLJ is working with the City to implement flood protection in eight different phases for the neighborhoods throughout the community. By implementing flood protection in multiple phases, they could establish a comprehensive solution to the flooding challenges faced in the community. This first phase was focused on the area near Valley City State University (VCSU) as one of the highest risks for flooding to the community was determined to be in this area.

This initial project phase included permanent structures such as concrete floodwalls, clay levees, as well as removable floodwall closure to serve as protection from flood waters. In addition to the structural developments, the KLJ team worked to reroute utilities in the area, relocating two storm water pumping stations. In addition to the infrastructure, the team facilitated tests where necessary to ensure structural stability. The KLJ team also served as the sole engineer for securing funding from the ND State Water Commission. Because of the work being completed in Valley City, the community will be safe when the waters in the area start to rise.

SUBMISSIONS

City of Crosby Scrub Seal Street Improvements Crosby, ND Interstate Engineering

After the City of Crosby, North Dakota, paved major corridors in anticipation of the Centennial Celebration, there were an estimated 80% of the remaining corridors and side streets in need of pavement maintenance.

Interstate Engineering investigated the streets, noting many of the surfaces had transverse, longitudinal, and block cracks. After reviewing costs and timelines, the city chose to utilize a scrub seal process.

The scrub seal process is a melding of the crack seal and seal coat process. This innovative method uses a "scrub" broom system that effectively fills pavement cracks and voids, rejuvenates the pavement, and reduces chip loss. A scrub seal is a good option for roadways that are in relatively good condition with some cracking and without rutting or pavement failures. The expected lifespan of the product is four to eight years.

The preliminary estimate for the scrub seal was lower than the crack seal/chip seal operation. It also included a fog-seal of all scrubbed streets, which would assist with chip retention. The elimination of the crack seal operation saved time, making it possible for the city to meet the August 4th deadline.

The streamlined process ultimately saved the City of Crosby money and time, as well as delaying ongoing maintenance of cracks for the next several years. The entire 120-block project was completed five days before the contractor's deadline and $117,000 under the bid price.

SUBMISSIONS

Starion Sports Complex
Mandan, ND
KLJ

Mandan Park District was struggling to overcome a lack of sporting facilities to accommodate youth and adults. The Park District hired KLJ to search site options and plat the property to build an 84,000-square foot sports complex. JLG, an architectural firm, hired KLJ to create a site design for the Starion Sports Complex. KLJ's design allowed maximum utilization of space and incorporated several sporting events. Underground utilities and stormwater runoff was also addressed when creating the final design, by redesigning and rerouting the large water main and allowing for stormwater detention ponds. The City of Mandan also commissioned KLJ to complete the roadway design for Old Red Trail, in front of the new complex to allow for larger amounts of incoming and outgoing traffic.

The site for the new complex was chosen in June 2015, with the design process taking place from July to December. Construction began in April 2016, and the project was completed, under budget, in September 2017. The new Starion Sports Complex is now home to Mandan hockey, gymnastics, football, and track and field.

SUBMISSIONS

Chahinkapa Zoo Levee Certification Project
Wahpeton, ND
Interstate Engineering

After the 1997 flooding of the Red River, the cities of Wahpeton, North Dakota and Breckenridge, Minnesota, constructed a levee to help mitigate future flooding. In order for the Army Corps of Engineers and FEMA to certify the levee, Wahpeton was required to remove all encroachments within the levee right-of-way. These included trees, structures, monuments, and fencing. Additional requirements of the Army Corps of Engineers included a new trench drain and manholes along the toe of the levee.

One of the main areas impacted by this project was the Chahinkapa Park area, including the Chahinkapa Zoo. Some of the zoo's existing animal habitats were encroaching the levee right-of-way and needed to be relocated.

To make the existing levee system compliant with Corps requirements, Interstate Engineering was hired by the city to design a two-phase project to correct the identified issues. Phase I of the project included removing all encroachments from the levee system and installing a new trench drain along the toe of the levee through Chahinkapa Park. Animal habitats were also eliminated or relocated. Phase II of the project included the construction of a new zebra building and habitat, as well as the remodeling of the existing primate building to accommodate the new primate habitat and exhibit layout.

In addition to designing the two-phase project, Interstate Engineering was contracted to complete the construction inspection for the City of Wahpeton.

SUBMISSIONS

River's Bend Park
West Fargo, ND
Moore Engineering, Inc.

With unprecedented growth in the City of West Fargo, quality-of-life amenities are becoming increasingly important for the city's residents.

The 3.5-acre main park at River's Bend Park at The Preserve is the centerpiece of a 35-acre area that provides a recreational component to one of West Fargo's newest developments.

The main park is designed with four-season functionality in mind, enabling both cold and warm weather activities.

Modern aesthetic and usability features highlight the design of the entire park, including LED lighting, a drinking fountain for pedestrians and their pets, convenient trash receptacles, over two miles of paved sidewalks and multi-use paths, and ADA-accessible parking lots.

Private areas on the bank of the retention pond provide opportunities for quiet reflection. The Sheyenne River's natural tree canopy shelters users from the wind and provides a natural setting desired in today's new neighborhoods.

The park connects to a larger trail network that encompasses the entire residential development, and serves as one of many hubs to the city's overall trail network, which meanders through vast open green spaces and natural tree cover for the entire community to enjoy.

SUBMISSIONS

Upper Maple River Dam
Steele County (near Hope), ND
Moore Engineering, Inc.

After years of discussion, negotiation and problem solving, the $9.2 million Upper Maple River Dam in Steele County protects over 22,000 acres of productive farmland, miles of roads and the livelihoods of North Dakotans who depend on reliable water conditions.

Moore Engineering guided the project from conception to completion. As the engineer for the Maple-Steele Joint Water Resource District, Moore planned and conducted public input sessions, addressed landowner concerns, provided design and location options, facilitated decision making, managed construction and even hosted the dedication ceremony.

The Upper Maple River Dam is a dry dam featuring an earthen dam embankment with a principal spillway, accompanied by a concrete emergency spillway and tie-off levee construction. The embankment is 35 feet tall, 20 feet wide and 5,000 feet long.

The dam can store 9,950 acre-feet of water in a 925 acre pool. Its average peak flood risk reduction is 86 percent for a 100-year, 24-hour rainfall and 58 percent for a 100-year snowmelt. The project also raised flood-prone roadways, improved culverts and removed an existing dam.

SUBMISSIONS

US Highway 52 near Carrington
Carrington, ND
Sambatek, Inc.

US Highway 52 provides a high degree of mobility and support of national and statewide economic activity. Significant increases in truck traffic had accelerated the asphalt pavement distress, as well as reduced operational efficiency of the intersection with US 281 and ND 200 in Carrington. A rehabilitation project was needed to fulfill NDDOT's mission to 'Safely move people and goods.'

In June 2014, NDDOT made an executive decision to increase the rehabilitation scope of the project due to the availability of federal highway funds. The revision to a Major Rehabilitation required improved shoulder width and intersection level of service. These desired improvements created several significant challenges, from minimizing wetland impacts to the Pipestem Creek, to intersection improvements in Carrington.

Sambatek prepared a Documented CATEX (DCE) environmental document including roadway width and intersection improvement alternatives. NDDOT approved the project DCE and the Carrington roundabout on September 9, 2015 and successfully bid the project in April 2016. The roadway construction was completed and fully opened to the travelling public in October 2017. The efficiency in this project's development and delivery is another great example of NDDOT and their engineering consultant's abilities to collaborate effectively and deliver a world-class transportation system within the challenging transportation funding and meeting significant statewide needs.

Comprehensive Engineering Advances System Hardening

By Sarah Beckman, Market Director, Power at Ulteig

Preparing critical power systems for the next wave of extreme weather is an ongoing challenge utilities have worked their way through for the better part of a decade. While the amorphous "smart grid" and Internet of Everything nears omnipresence in the market, utilities have quietly repurposed, replaced, and reinforced substations, transmission lines, and other critical assets that power society.

Since the mid-2000s, increasingly stronger storms and other extreme weather events have threatened the reliability of electric systems around the world. Within the same period, consumers have grown less tolerant of outages, making prevention and recovery all the more critical. To cope, utilities have made significant strides in upgrading the capabilities and resilience of transmission and distribution systems in response. Their work to methodically replace vulnerable, outdated system elements with new, more robust, and carefully engineered systems is known as system hardening. System Hardening supports the reliability of electric infrastructure by making it less susceptible to failure.

Much of utilities' system hardening budgets has improved the health of high-value and high-cost equipment deemed too big to fail by regulators. These actions protect transmission lines and structures (115 kV or higher) from high impact, low frequency (HILF) events—that is rare events that have the potential to cause long-term and/or catastrophic damage to the bulk power system. In the last decade, utilities have developed and deployed comprehensive assessments that consider asset location, strength, and overall health to develop action plans designed to ensure the protection of these critical assets.

These improvements enable faster power restoration and grid flexibility that will only grow more indispensable in the future. Scott Finnesand, Technical Manager within Ulteig's Transmission, Distribution and Communications department, provides his insights on the next steps utilities must take to facilitate additional system hardening, "Integrating renewables, incorporating smart devices, and high profile extreme outages ask the grid to be more resilient than ever before. [We must] reinforce the existing grid to new standards as well as take what's been done at high voltage levels and bring it down to lower voltage systems so that we have a truly engineered solution that we can more accurately predict and count on being reliable."

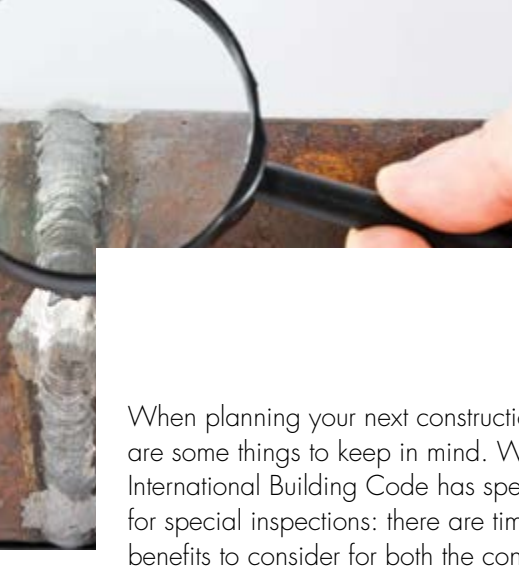
The widespread focus on HILF preparation and outage prevention has greatly improved resilience throughout the grid, though it has come at the detriment to more vigorous transmission line maintenance at various voltages. Critical assets between 44kV and 115

4 Ways Engineering Analysis Can Improve Transmission Lines Downstream:

1. New materials: In-depth line studies can reveal opportunities to incorporate different materials to improve each structure's resistance to high winds and ice loads, and improve the life expectancy of that line.
2. New locations: Analysis can determine how adjustments to pole location can reduce the potential impact of storms and other extreme weather events.
3. New processes: The completion of robust inspection, maintenance, and replacement programs at regular intervals can detect defects before they cause major system outages or create further system vulnerabilities.
4. New approach: Utilities partnering with engineers to develop more stringent designs that exceed minimum requirements can ensure that lines are ready to withstand extreme weather events and the ever increasing demands on the grid.
5. As utilities continue to increase the strength and resiliency of one of our nations' most critical infrastructures, it is essential that they put past experience to good use. Combining comprehensive engineering solutions based on historical data and material selection is a proven method to improve a structure's ability to withstand extreme, high impact weather events and protect customers from the potentially devastating effects of extreme storms and subsequent outages.

kV that have not been properly maintained increase system vulnerabilities and can ultimately cause outages. Finnesand recommends that utilities take a more comprehensive and long term approach to the maintenance of these structures. He says, "Often utilities want a low-cost solution so much that they lose sight of the impact. Taking a longer-term approach may cost more upfront but can lead to fewer outages down the road. Everybody wants a low-cost solution but a lot of times that strips away the system hardening part of the conversation."

Utilities can improve resilience at lower transmission voltages by commissioning engineers to conduct comprehensive analyses of transmission lines and structures. These studies can identify at-risk assets and provide unique engineering solutions to increase load capacity and individual assets' ability to withstand extreme weather and other environmental threats. Kristine Lombardi, Engineer at Ulteig, encourages utilities to apply the same best practices that guided major improvements of transmission assets along higher voltages to improve lines and structures at lower voltages. She says, "There are a lot of existing lines which do not stand up to the recommended changes in design requirements and improved analysis methods. Utilities have been actively implementing these changes to their Transmission (higher than 100 kV) design standards due to recent focus on structural design codes. Often lower voltage infrastructure is designed using standard configurations and materials without much consideration to modeling and checking specific loading and calculations on that line. Utilities must focus the same engineering efforts into lower voltage (44kV, 69kV and 115kV) transmission and distribution asset reliability and rebuilds."



Can Special Inspections Benefit Your Project?

by John A. Mercer, Jr., PE SECB - Mercer Engineering, PC

When planning your next construction project, there are some things to keep in mind. While the 2015 International Building Code has specific requirements for special inspections: there are time and financial benefits to consider for both the contractor and the owner. The code defines two types of special inspections, Continuous Special Inspection and Periodic Special Inspection. Special Inspections will require separate agreements with design professionals or qualified testing companies.

Specifically, Chapter 17 of the code addresses Special Inspections for "construction materials and systems that are alternative to materials and systems prescribed by the code," "unusual design applications of materials described by the code," or "materials and systems required to be installed in accordance with additional manufacturer's instructions that prescribe requirements not contained in the code or standards referenced in the code."

The code speaks to Special Inspection requirements for structural steel and cold-formed steel light-frame construction, concrete construction, masonry construction, wood construction, soils for site conditions, fill placement, and load bearing capacity, driven deep foundations, cast-in-place deep foundations, helical pile foundations, fabricated items, wind resistance, and seismic resistance.

Each building material industry seeks a competitive advantage over other material suppliers. Each construction material has its strengths and weaknesses based on a project's requirements.

We often see cold-formed steel light-frame construction competing with the structural steel and concrete construction projects. Cold-formed steel typically succeeds by using fewer pounds of steel for a specified load condition. The resulting project has lower cost for a specified load condition, but without any residual strength. Cold-formed steel manufacturer's typically use design loads that are seldom greater than the code absolute minimums.

For cold-formed projects to meet the design load capacity, each member, bolted connection, lateral brace must be installed exactly per the manufacturer's placement drawings. Mis-installation of members contribute to missing the mark in achieving the intended structural strength and performance criteria. Performance relates to member deflections or a system's sway.

Wood structures also offer economical solutions if they can support the design loads. This requires that they are assembled and connected correctly to meet the code's minimum load requirements or to meet a design professional's specified loads. Code minimum loads do not always meet a project's requirements.

Project costs can also be impacted significantly when the design requirements for a project are not met. Four examples are given below:

- If rebar size, placement spacing or location in a footing or foundation wall or elevated slab is not correct, the load capacity of the element in question is compromised. This often requires removal and replacement. Concrete removal is hard work! New concrete takes time to cure.
- If parallel-chord wood or steel open web joists are installed upside down or in a reverse direction, the load capacity of the joists may be compromised. Removal and reinstallation will be required. Repairing the joist in-place may be required if it cannot be removed. Other related construction materials may have to be removed to provide access.
- If structural steel framing members are not assembled correctly, e.g. bolted connections are not torqued properly, a steel member is installed at an incorrect location, the load capacity and structural performance of the structure is compromised.
- If cold-formed steel members are not installed correctly; missing bolts in connections, bolts mis-located, missing sag angles, missing sag angle braces or flange braces, missing X-bracing all contribute to lower load capacities, member performance or even to structural failure.

When the members or components noted above are accessible and haven't been covered with other construction materials, correction is reasonably low cost. Correction is necessary no matter what the cost!

Special Inspection can help catch these and other discrepancies in time to maintain the integrity of the project's load capacity, performance and perhaps most importantly, assist the contractor to maintain a project's schedule. "Time is money", for both a contractor and the project's owner.

The size of a project should be considered when deciding to add Special Inspections to a project. Commercial projects should use Special Inspection services: hotels, shopping malls, multi-family dwellings, manufacturing plants, churches or other structures, the failure of which could pose a substantial risk to human life.

Owners of buildings that store high value equipment should employ Special Inspection services. A $500k pole building that houses $1 million or more in equipment doesn't make sense. It might keep the rain off, but snow or wind loads causing an improperly assembled roof to collapse doesn't make sense when high value equipment is damaged.

Special Inspections provide an Owner with a high level of confidence that a structure has been assembled correctly to meet the intended strength and performance requirements specified by the code, design professionals or manufacturers' specialty engineers.

Consider Special Inspection services for your next project. See that your project is delivered on-time and on-budget!

ACEC
American Council of Engineering Companies

Young Professional of the Year

moore engineering, inc.

Kurt Lysne is one of five engineers nationwide to receive ACEC's 2018 Young Professional of the Year Award, which promotes the accomplishments of young engineers by highlighting their engineering contributions and the resulting impact on society.

Kurt uses his expertise as a water resources engineer to solve some of the region's most complex and publicly scrutinized projects. But for him, it's all about the people – those he leads and those whose lives are improved by his work.

"Engineering projects strengthen communities and the livelihoods of thousands, which is very satisfying," he says. "And the people sitting next to me ... what can I say ... they motivate me to give it my best every day."

KURT LYSNE, PE, CFM
Moore Engineering, Inc.

InfraWorks Visualizations

Drone Technology

Minot Downtown Infrastructure Improvements Project

Engineering Innovative Solutions
for 50 Years and Counting

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houstoneng.com

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Houston Engineering Inc.

Drone (sUAS) Technology Offers Better Land Surveying, GIS Solutions

by Chris Ambourn, LS – Geospatial Team Leader at Wenck

The land surveying profession has always relied upon the implementation of cutting edge technology and procedures to assist land surveyors with their work, from the earliest practical uses of trigonometry to the invention of precise measurement tools such as the solar compass, Vernier transits, Electronic Distance Measurement, high precision GPS, and Laser Scanning technology. Progressive land surveyors push technological boundaries to provide more accurate, efficient, and safer methods to find solutions to their client's needs.

The next step in this evolution is integrating aerial imagery obtained by small unmanned aircraft systems (sUAS), commonly referred to as drones. Drone photography provides high resolution aerial images of project sites, that, in the past, would require a photogrammetry company to fly the site with a full size fixed wing aircraft. The portability, ease of use, flexibility, and accessibility of drone hardware provides better imagery at a small fraction of the cost when compared to legacy photogrammetry methods.

The high-resolution imagery obtained by sUAS is used for detailed background mapping for projects such as water resources management, land/natural resources redevelopment, as well as various civil engineering projects. If properly conducted, aerial imagery collected by drone can replace conventional topographic survey on many sites. Other successful uses include topographic surveys via drone for open pit mines, material stockpile sites, landfills, large water main replacement projects, and other engineering design related tasks.

As with all tools, drones are not a one size fits all solution. It is important that the site conditions and end use of the data are taken into consideration when determining if it is the right tool for any project.

The ideal sites for drone surveys are:

- Outside controlled aeronautical airspace
- Away from populated areas
- On sites without heavy vegetation
- On sites that have ground survey safety issues

Environmental factors that prohibit drone surveys:

- High winds
- Precipitation
- Greater than 30% snow cover

Expected data accuracies (Bare Earth):

- +/- 0.3' Horizontal and Vertical

These factors, along with many others, need to be evaluated by FAA Part 107 certified pilots during flight planning and again on site to ensure that the safety of the public and final data integrity is maintained. In the office, technicians can then process the imagery and perform rigorous quality assurance protocols prior to exporting final data for use in CAD and GIS deliverable production.

An additional benefit of utilizing drones to collect site data is especially apparent on sites with unique safety considerations, such as mines and landfill sites where on-going operations would typically need to be monitored or halted to ensure the safety of the surveying staff as they complete a conventional topographic survey.

As developments in hardware and software related to this new tool progress, more features will continue to present themselves, like utilizing other types of drone mounted sensors, including thermal imaging cameras and LiDAR. These additions to current suites of measurement tools will provide multiple options for obtaining site data that clients need to make informed and timely decisions

Braun Intertec

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www.braunintertec.com

Established

1957

Firm Description

As an industry leader with a combined team of more than 900 engineers, scientists, managers and field personnel, Braun Intertec specializes in more than 50 technical disciplines that bring expertise, experience, passion, and commitment to our clients. We're the people you can rely on to be your partner and source of knowledge from start to finish.

Firm Personnel

Engineers (117)
Engineering Technicians (136)
CADD (5)
Other Professional Personnel (191)
Other Technical Personnel (379)

Total Personnel

828

Disciplines Offered

Civil - Transportation
Environmental
Structural
Geotechnical
Water/Wastewater

Projects

4 Bears Bridge - New Town, ND

Fargo-Moorhead Area Diversion Project, ND

Dakota Prairie Refinery - Dickinson, ND

Watford City Event Center & Watford City High School - Watford City, ND

Brosz Engineering, Inc.

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701.523.3340
701.523.5243 (fax)
garyb@broszengineering.com
www.broszengineering.com

Established

1982

Firm Description

Brosz Engineering operates a general consulting engineering practice that specializes in civil engineering, with offices located in Bowman, Stanley and Watford City, ND and Pierre, Sturgis and Sioux Falls, SD. Brosz Engineering serves a client base made up of government and private clients located throughout North and South Dakota and Eastern Montana. We provide a full range of professional services from planning and development, survey and design engineering to construction inspection, materials testing and administration.

Disciplines Offered

Architetural
Civil - General
Civil - Transportation
Construction Management
Petroleum
Environmental
Structural
Surveying/GIS/Mapping
Water/Wastewater
Hydrological

OUR ADVERTISERS

Holly Beck Surveying & Engineering, Inc.

Holly Beck
3120 E Broadway Avenue
Bismarck, ND 58501
701.223.3546
hollybeck@hollybecksurveying.com
www.hollybecksurveying.com

Established
2003

Firm Description
Holly Beck Surveying & Engineering is headquartered in Bismarck, ND and has grown from a one-person firm in 2004 to a staff of 10-15 permanent and seasonal employees during the construction season. We have the resources to staff 3 survey crews, as well as provide civil design, construction administration, inspection and material testing.

Firm Personnel
Engineers (3)
Surveyors (4)
Other Professional Personnel (1)

Total Personnel
8

Disciplines Offered
Civil - General
Civil - Transportation
Construction Management
Surveying/GIS/Mapping
Water/Wastewater

Projects
BNSF Grade Separation/Overpass Dickinson, ND

Keene Corner Roundabout, Intersection of ND Highway 23 & County Road 10

Civil Site Plan, Exxon Convenience Store, Bismarck, ND

Construction Management of Statewide Sign Replacement Project, ND

Runway and Taxiway Reconstruction, Bismarck Airport, ND

Houston Engineering, Inc. (HEI)

Heidi Schuer
1401 21st Avenue N
Fargo, ND 58102
701.237.5065
hschuer@houstoneng.com
www.houstoneng.com

Established
1968

Firm Description
Founded in 1968, Houston Engineering, Inc. (HEI) has forged lasting partnerships with cities, water boards, and developers throughout the upper Midwest for the past 50 years. HEI offers a full range of services that covers water resources, environmental issues, water supply, municipal, transportation, surveying, land and site development, waste management, GIS, and planning. HEI looks forward to providing you with intelligent and practical solutions while remaining humble enough to improve and change with the times.

Firm Personnel
Professional Personnel (180)

Total Personnel
180

Disciplines Offered
Civil - General
Civil - Transportation
Environmental
Structural
Surveying/GIS/Mapping
Water/Wastewater
Hydrological

Projects
Downtown Infrastructure Improvements, Minot, ND

2nd Street/downtown Flood Protection, Fargo, ND

Interstate 94 Reconstruction & Interchange Improvements, Medora, ND

KLJ

4585 Coleman Street
Bismarck, ND 58502
701.355.8400
www.kljeng.com

Established
1938

Firm Description
Since the 1930s, KLJ has worked alongside communities and clients of all sizes, partnering with cities, counties, and developers – just to name a few. At KLJ, we plan, design, and support infrastructure across the country such as roads, runways, pipelines, and parks. For more information about KLJ, visit www.kljeng.com.

Firm Personnel
Engineers (194)
Engineering Technicians (51)
CADD (42)
Surveyors (72)
Other Professional Personnel (107)
Other Technical Personnel (79)

Total Personnel
545

Disciplines Offered
Industrial
Civil - General
Civil - Transportation
Construction Management
Petroleum
Electrical
Power
Environmental
Process
Structural
Surveying/GIS/Mapping
Water/Wastewater
Hydrological

Projects

Minot Airport Expansion - Minot, ND

Sheyenne Street Corridor Study
West Fargo, ND

Sloulin Field International Airport
Environmental Assessment - Williston, ND

Sorlie Bridge - Grand Forks, ND

Mercer Engineering, PC

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engineer@minot.com
www.mercerusa.com

Established
1982

Firm Personnel
Engineers (1)
CADD (1)

Total Personnel
2

Disciplines Offered
Structural
Forensic

Structural Projects

Medical Park Mall - Grand Forks, ND

DeMers Avenue Store Front Renewal,
East Grand Forks, MN

Pedestrian Bridge - Minot, ND

MW Industries Overhead Cranes,
Kenmare, ND

Forensic & Expert Services:

Minard Hall Failure - NDSU - Fargo, ND

Eagle Rigid Span Farm Building Failure,
Reeder, ND

Farmers Elevator Tipping Failure,
Bottineau, ND

720,000 Bushel Grain Tank Failure,
Minot, ND

OUR ADVERTISERS

Moore Engineering, Inc.

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gwald@mooreengineeringinc.com
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Established
1960

Firm Description
Civil engineers improving lives by building strong communities. Cities, counties, water resource districts, private developers, state and federal agencies, and others count on us as trusted partners to successfully complete their municipal, transportation, water, land surveying, GIS and airport projects.

Firm Personnel
Engineers (74)
Engineering Technicians (25)
CADD (15)
Surveyors (19)
Other Professional Personnel (15)
Other Technical Personnel (12)

Total Personnel
150

Disciplines Offered
Civil - General
Civil - Transportation
Construction Management
Surveying/GIS/Mapping
Water/Wastewater
Hydrological

Projects

9th Street & 13th Avenue Reconstruction - West Fargo, ND

Lisbon Flood Control - Lisbon, ND

Finley Water Tower, Finley, ND

Rivers Bend Development - West Fargo, ND

Prairie Engineering, P.C.

Randy J. Axvig, P.E.
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701.852.6363
619 Riverwood Drive
Bismarck, ND 58504
701.258-3493
raxvig@prengrbis.net
www.prairieengineeringpc.com

Established
1983

Firm Description
Prairie Engineering, P.C. is a mechanical and electrical consulting engineering firm founded in 1983. Services are provided from offices in Minot and Bismarck, ND to meet the needs of area Architects and Facility Owners. Staff members have many years of design experience with institutional, commercial, educational, governmental and industrial facilities.

Firm Personnel
Engineers (13)
Engineering Technicians (7)
Other Technical Personnel (2)

Total Personnel
22

Disciplines Offered
Mechanical
Electrical

Projects

Bismarck Elementary and High School Expansions - Bismarck, ND

Mercer County Jail Addition - Stanton, ND

Basin Electrical Power Cooperative Maintenance Facility - Wheatland, WY

NISC Office Addition - Mandan, ND

GET TO KNOW OUR ADVERTISERS

Ulteig

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Fargo, ND 58104
701.280.8500
888.858.3440 (fax)
info@ulteig.com
www.ulteig.com

Established

1944

Firm Description

Ulteig Engineers, Inc. delivers comprehensive design engineering, program management and technical and field services that strengthen infrastructure vital to everyday life. Ulteig's footprint spans the nation and provides its expertise in multiple Lifeline Sectors®, including power, renewables, transportation, and water to a wide range of public and private clients.

Total Personnel

368

Disciplines Offered

Civil - General
Civil - Transportation
Construction Management
Electrical
Power
Environmental
Surveying/GIS/Mapping
Water/Wastewater

Wenck

Randy Hanson, Principal
3303 Fiechtner Drive, Suite 100
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701.297.9600
rhanson@wenck.com
www.wenck.com

Established

1985

Firm Description

Wenck, founded in 1985, provides environmental, engineering, construction, and response services to both public and private clients.

Firm Personnel

Engineers (73)
Engineering Technicians (10)
CADD (3)
Surveyors (4)
Other Professional Personnel (32)
Other Technical Personnel (140)

Total Personnel

262

Disciplines Offered

Agricultural/Biological Engineering
Industrial
Chemical Materials Handling
Civil - General
Mechanical
Civil - Transportation
Mining
Construction Management
Environmental
Process
Fire/Earthquake/Hazards/ Safety
Surveying/GIS/Mapping
Geotechnical
Water/Wastewater
Hydrological

Projects

South Dakota Oil Spill

City of Fargo Landfill Gas to CNG - Fargo, ND

Light House - West Fargo, ND

Twin Cities Army Ammunition Plant - TCAAP

ACEC North Dakota Member Firms

Ackerman-Estvold Engineering
1907 17th Street Southeast
Minot, ND 58701
701-857-9120
www.ackerman-estvold.com

American Engineering Testing, Inc.
99 26th St. East
Dickinson, ND 58602
701-483-4288
www.amengtest.com

Apex Engineering Group, Inc.
4733 Amber Valley Parkway South
Fargo, ND 58104
701-373-7980
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Barr Engineering Company
234 West Century Avenue
Bismarck, ND 58503
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www.barr.com

Bartlett & West Engineers, Inc.
3456 East Century Ave.
Bismarck, ND 58504
701-258-1110
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Bolton & Menk, Inc.
3168 41st Street South, Suite 2
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www.bolton-menk.com

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Brosz Engineering, Inc.

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Communication Network Engineering, Inc.

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HDR Engineering

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Bismarck, ND 58503
701-557-9701
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Houston Engineering, Inc.

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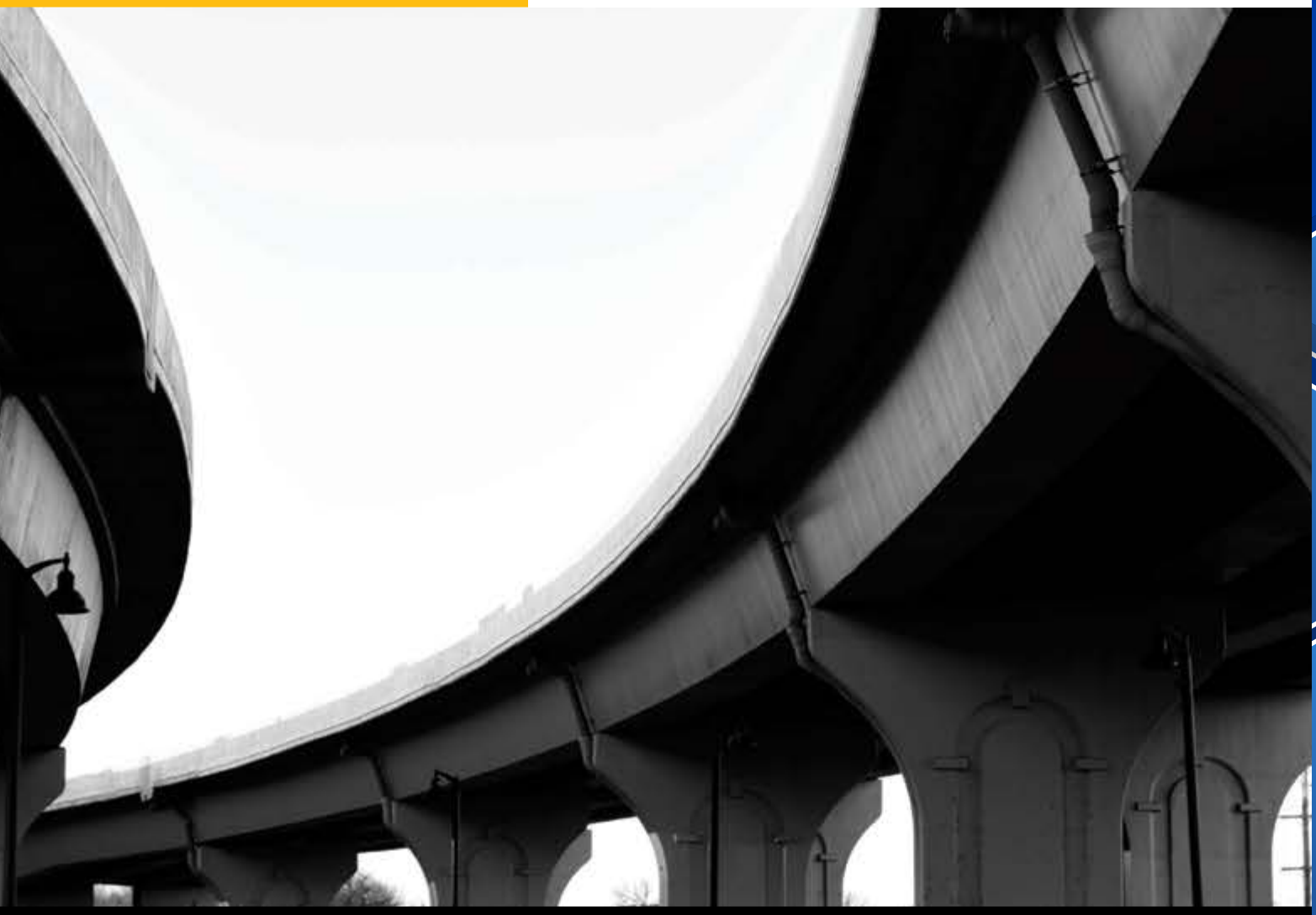

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