

the magazine of kiewit corporation

KIEWAYS





Kiewit is one of North America's largest and most respected construction and engineering organizations. With its roots dating back to 1884, the employee-owned organization operates through a network of subsidiaries in the United States, Canada and Australia. Kiewit offers construction and engineering services in a variety of markets including transportation; oil, gas and chemical; power; building; water/wastewater; and mining. Kiewit had 2015 revenues of \$9 billion and employs 22,000 staff and craft employees.

MANAGING EDITOR

Jessica Jensen

CREATIVE EDITOR

Shawn Vaughan

EDITORIAL DIRECTOR

Tammy Korgie

CONTRIBUTING WRITERS

Susan Houston Klaus, Angela Nemeth, Sara Rohner

CONTRIBUTING DESIGNERS

Ashley Wedeking

EDITORIAL TEAM

Carrie Chambers, Tom Janssen, Jessica Jensen, Tammy Korgie, Bob Kula, Amy Nussmeier, Toni Oestmann, Craig Olson, Gary Pietrok, Teresa Shada, Sarah Turpin, Shawn Vaughan, Ashley Wedeking

CONTRIBUTORS

Sharon Armstrong, Carrie Chambers, Karyn Domenic, Eric Grundke, Dan Krueger, Rand Magee, Megan Nelson, Adam Slechta, Tricia Todd

KIEWAYS

Kieways is a quarterly magazine issued by Kiewit Corporation. To subscribe, go to kiewit.com/kieways.

Copyright 2016 by Kiewit Corporation. All rights reserved.

Kiewit, the Kiewit logo and Kieways are service marks of Kiewit Corporation. An equal opportunity employer.

To contact us, visit kiewit.com.

**ENVIRONMENTAL IMPROVEMENTS**

The Woodbridge Energy Center will power more than 700,000 homes with clean, efficient power and help reinvigorate the area where an abandoned chemical plant once stood.



ADAPTING TO EVOLVING NEEDS

Construction certainly isn't an unchanging, one-size-fits-all business. Flexibility and foresight are crucial to a company's longevity, and much of Kiewit's success is thanks to our willingness to adapt and evolve with industry and client needs. You're going to see a lot of that in this issue — from progressive technologies and construction methods to pliable new contract models.

On Page 6, see how we replaced Music City's eight busiest, but aging, bridges in 10 weekends with the help of a robotic dozer and a construction technique that not only speeds up project time — it heightens safety for crews and drivers.

Safer and healthier communities are at the heart of a lot of the work we do. Kiewit approaches each project with the client's and end-user's perspectives in mind. That means getting design input from the nurses and doctors who will be working in new medical facilities (Page 12) and tapping into Kiewit's highest technical expertise to engineer, procure, construct and commission a clean power source that replaces a contaminated chemical plant in New Jersey (Page 20).

Our large-scale work extends across both sides of the U.S.-Canadian border and it continues to grow thanks to innovative public-private partnerships (P3). Learn about the advantages that P3 contracts offer on Page 18, and get a look at some of the high-profile projects they've led to.

History can teach us a lot of valuable lessons in this industry — one of which is to always keep an eye on the future. I'm proud of Kiewit's innovative spirit and look forward to sharing more stories like these in future issues of Kieways.

BRUCE GREWCOCK

Chairman and CEO



REACHING FOR A CURE

The Fred & Pamela Buffett Cancer Center will feature cutting-edge amenities for patients, doctors and researchers. Read more about Kiewit's work in healthcare construction on Page 12.

ON THE COVER

06 ABC MODEL HELPS NASHVILLE PROJECT SING

Accelerated bridge construction replaces eight bridges in Nashville's downtown corridor seven months ahead of schedule.

ALSO INSIDE

04 OUR MARKETS AND OUR VALUES

Learn how our market diversity and commitment to our core values drive Kiewit's success.

12 HEALING SPACES

Advances in medicine and patient care are changing the way healthcare facilities are designed and constructed.

18 PUBLIC-PRIVATE PARTNERSHIPS

Diverse market and geographic experience, operations expertise and vast resources make Kiewit a natural fit for the P3 market.

20 RENEWING, REVITALIZING AND RESHAPING WOODBRIDGE

A once contaminated site is rejuvenated to provide New Jersey residents with clean, efficient power.

OUR MARKETS

 BUILDING
  MINING
  OIL, GAS & CHEMICAL
  POWER
  TRANSPORTATION
  WATER/WASTEWATER

What began in 1884 with two hard-working brothers has grown into a Fortune 500 construction and engineering industry leader. As a multi-billion dollar organization, Kiewit can tackle projects of all sizes, in any market. Here are a few interesting facts about Kiewit.



FOLSOM MILESTONE

A milestone was reached in the **Folsom Dam** spillway project earlier this year. Pumps funneled water from Folsom Lake into the auxiliary channel to test the control structure. The project will allow water to be released earlier and more safely from the lake during a high-water event, ultimately protecting the Sacramento, Calif. region from 200-year flood levels.



BETTERING THE ENVIRONMENT

The **Cove Point LNG Expansion Project** in Lusby, Md., was challenged to design a water-treatment system that focused on the re-use and recycling of water to ensure no process water left the plant's boundaries. The team created a water-treatment system to produce ultra-pure water to support the plant's steam and LNG production. All wastewater is concentrated and crystallized as solid waste. Treated and recovered wastewater is recycled back into the plant.




RENEWING HUNTINGTON BEACH

In December 2015, Kiewit was awarded a contract to replace the existing **AES Southland's Huntington Beach plant** in California with a cleaner and more efficient natural gas power plant. The new 2x1 combined-cycle power plant will generate 650 megawatts of electricity and will use an air-cooled condenser in lieu of the existing plant's once-through ocean water cooling system.



TOP 20

Popular Mechanics has named three bridges that were built by Kiewit on its "World's 20 Most Impressive Bridges" list, published in late 2015. Included among some of the world's most iconic bridges are the **Bay Bridge** in Oakland, Calif., **SR 520 Floating Bridge** in Seattle, Wash., and **Tilikum Crossing** in Portland, Ore.



DID YOU KNOW?

Engineering News-Record (ENR) currently ranks Kiewit as

NUMBER ONE

in mining, up from number two in 2014.



A LOOK BACK IN TIME

Kiewit has thrived on building work since 1884 when the company was known as Kiewit Brothers — the building business is by far the oldest operating unit of the company. In 1889, the company started the seven-story **Lincoln Hotel** in Lincoln, Neb. It was Kiewit Brothers' largest masonry contract. The hotel served as a landmark for 80 years.



OUR VALUES

PEOPLE | INTEGRITY | **EXCELLENCE** | STEWARDSHIP

For more than 130 years, Kiewit's culture has thrived on strong principles. From generation to generation, the torch has been passed down and carried by the hands of the company's leaders and workforce. Today, its core values — People, Integrity, Excellence and Stewardship — remain the company's cornerstone and are the way Kiewit runs its business.

KIEWIT PROJECTS HONORED FOR EXCELLENCE

Many of Kiewit's projects have received recognition and awards for a wide variety of accomplishments and innovations. Here are a few from the past year.

ACPA NATIONAL EXCELLENCE IN CONCRETE PAVEMENT AWARDS — DIVIDED HIGHWAYS — URBAN, DFW Connector — Quality concrete pavements constructed in the United States and Canada and encourages high-quality workmanship in every concrete pavement project

AGC-NEB. BUILDING CHAPTER PROJECT OF THE YEAR, Lauritzen Gardens Marjorie K. Daughtery Conservatory — Outstanding projects above \$15 million — judging criteria included innovation in methods and materials, project management, client services, challenge and sensitive treatment of the environment and surroundings

2015 DBIA DESIGN-BUILD NATIONAL AWARD OF MERIT, Safe & Sound Design-Build – MoDOT 554 – Highly successful design-build project that achieved best value, delivering the project to the Missouri Department of Transportation (MoDOT) 23 months ahead of the original schedule and under budget.

POWER ENGINEERING'S BEST COAL PROJECT FINALIST, Kansas City Power & Light's La Cygne Generating Station — Best power projects honored annually by *Power Engineering* and *Renewable Energy World* magazines

AGC-NEB. BUILDING CHAPTER PROJECT OF THE YEAR, Creighton University's The Championship Center — Outstanding new construction \$5-15 million — judging criteria included innovation in methods and materials, project management, client services, challenge and sensitive treatment of the environment and surroundings

ROADS AND BRIDGES MAGAZINE NO. 1 ROAD PROJECT, North Prince of Wales Road — Annual award to top projects in North America based on project challenges, impact to region and scope of work

For a look at more of Kiewit's successful projects, visit kiewit.com

KIEWIT NAMED AN INDEMAND EMPLOYER BY LINKEDIN

Kiewit is an inDemand Employer according to LinkedIn. The list of 100 companies is based on the behavior of LinkedIn's more than 380 million members, including interactions with employers' company pages and job postings.

Other companies that made the list include Google, Netflix, IBM and Ford, along with many other recognizable national and international brands. Several of Kiewit's clients made the cut too.

"Kiewit's recognition as one of LinkedIn's inDemand Employers is a direct reflection of our employees and the work they do," said Jane Pine, HR director at Kiewit. "People are interested in working here because they've seen what Kiewit has accomplished across North America and Australia. They want to be part of the culture we've built."

MOST
inDEMAND
EMPLOYERS




ABC MODEL

HELPS NASHVILLE PROJECT SING



Equipment in the south yard picks panels for the Herman Street westbound bridge replacement. From there, they're set on a self-propelled modular transport that carries them to the actual bridge location, 1 1/2 miles north of the prefabrication area.

By 1968, scores of country artists had crossed the stage to perform at Nashville's Ryman Auditorium, home of the Grand Ole Opry.

For more than 30 years the venue hosted legends, including Hank Williams, Johnny Cash, Loretta Lynn and Willie Nelson.

That same year, four twin bridges — over Herman Street, Clinton Street, Jo Johnston Avenue and Charlotte Avenue — made their debut on Interstate 40, on the original loop around downtown Nashville.

But by 2015, unlike the music of those Opry performers, the structures hadn't stood the test of time. They needed frequent maintenance, and patches and repairs were no longer an option. It was time to replace them.

MORE THAN A QUICK FIX

Dubbed Fast Fix 8, the \$62 million bridge rehabilitation project would be a high-profile job on a stretch of I-40 that sees 140,000 vehicles a day.

Figuring out how to replace all eight bridges without significantly disrupting the traffic flow was a top priority for

the Tennessee Department of Transportation (TDOT).

"Because there are so many moving parts to the areas around the site, we needed to be able to get in and out as quickly as possible and minimize the impact, but without sacrificing the quality of the job," said Will Reid, TDOT construction division director.

The job would require more than a quick fix; it also needed a team with experience, knowledge and the ability to think on its feet.

Kiewit was the right kind of seasoned performer for the project.

AN EARLY COLLABORATOR

Fast Fix 8 marked the first-ever CMGC project for TDOT and the State of Tennessee. Short for Construction Manager-General Contractor, the method helps increase the speed of delivery by involving the prospective contractor in the design process.

Early in the process, TDOT brought Kiewit in to collaborate.

"We showed up on day one and worked directly with TDOT



to give our input on how we thought the job should be built," Project Engineer Jake Heinz said.

Reid says he was impressed by Kiewit's approach to the project from the beginning.

"I think that they approached this not as 'you're the owner, we're the contractor,' but as 'we're all one team.' You could tell Kiewit made this project a priority and was invested in it. That was one of the reasons we selected them and it carried through the project."

AS EASY AS ABC

The foundation of the job was a construction method that's become especially popular when working in urban areas such as Nashville.

Accelerated Bridge Construction, or ABC, requires short-term, complete road closures that allow access to the jobsite so crews can work around the clock.

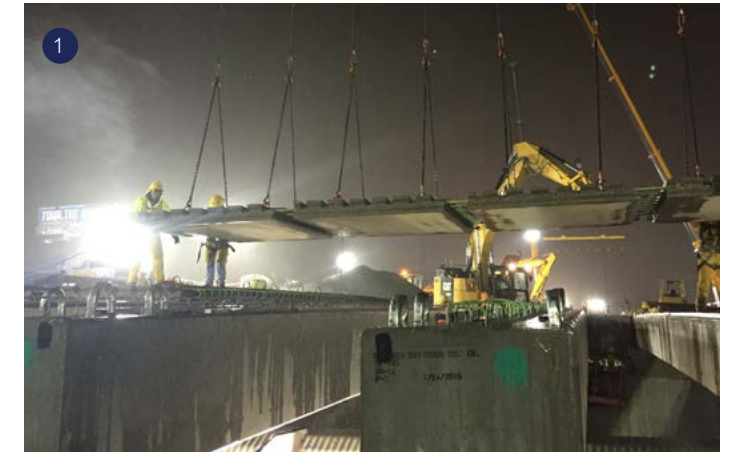
By elevating each construction activity to a higher priority, this method not only speeds the total project time, but it also heightens work-zone safety for travelers and the construction team.

While that kind of schedule does inconvenience commuters for a short while, the method also allows construction to be completed in months instead of years.

In a city that's home to popular tourist sites such as the Grand Ole Opry and the Ryman Auditorium, as well as the Tennessee Titans, the Predators, Sounds and Nashville Football Club, the need for speed was a given.

Initial plans set the number of weekend closures at 13 — each one compressed into 58-hour closures from 8 p.m. Friday to 6 a.m. Monday.

"We looked at our schedule and said, 'whatever it takes, we're going to make these dates,'" said Marc Rothwell, project manager. "Our team knew that, yeah, it's going to



1. Precast concrete deck panels are flown into place over the CSX railroad during a weekend closure. 2. After the bridge deck is demolished, existing steel girders are picked from the original structure. 3. Project Manager Marc Rothwell was recently awarded the 2016 Peter Kiewit Award for Excellence in Management, one of Kiewit's most prestigious awards.

be challenging. Yeah, there are going to be some rough weeks. But everybody was dedicated to making it happen."

To keep that thought central in everyone's mind, the project team used a well-known but appropriate slogan: "Failure is not an option."

A page from the Fast Fix 8 flip book, the project playbook

To keep the team on schedule with every task for the Fast Fix 8 project, Kiewit used a new kind of visual schedule that harkens back to a primitive kind of animation — one that dates to the 19th century.

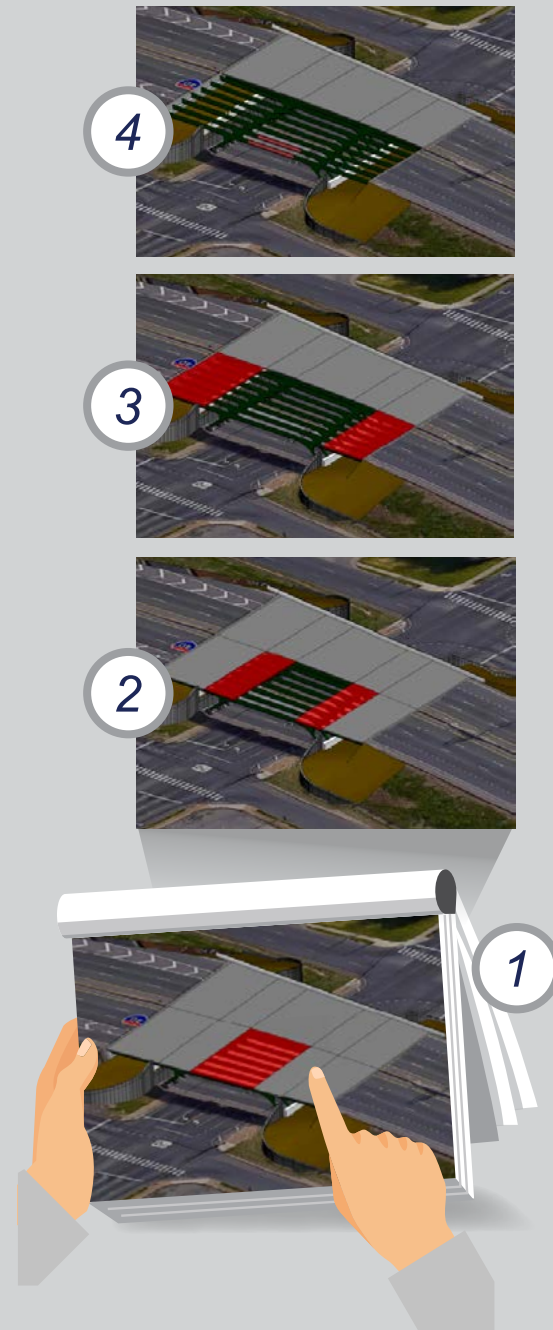
It's a flip book, made with the same idea behind the tiny ones that used to be buried in boxes of Cracker Jack. Today's virtual versions are available as downloadable apps.

The idea is simple: Each page of the book contains one image; consecutive pages advance the image slightly. When the pages are flipped, the images appear to be moving in sequence, creating a story.

Kiewit's version played an important role in meeting the ABC schedule for Fast Fix 8, said Jake Heinz, project engineer.

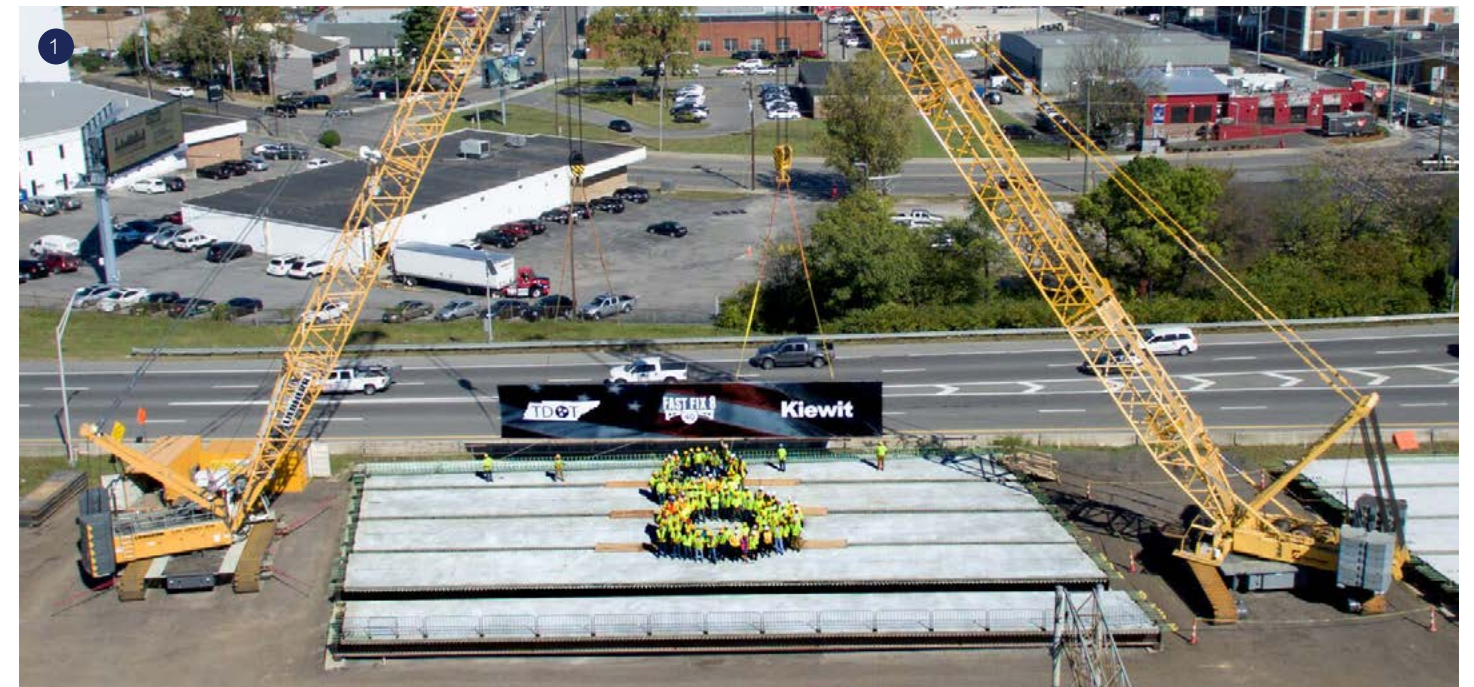
"We had the entire job modeled in a printed piece that phased each bridge's timeline, hour by hour. Each subcontractor, inspector, foreman, superintendent and client carried a copy. Every moment was accounted for, so the team could see where we needed to be at any given time."

The document, Heinz said, was key in keeping every team member in sync and the entire project on schedule.



Easy access

Fast Fix 8 marked the first time a robotic dozer had been used on a Kiewit job. When building the MSE walls, it provided easy access in low-clearance areas. The dozer's small size enabled it to push material to the bottom of the girder, eliminating a considerable amount of backfill work that otherwise would have been necessary on the weekends.



1. Kiewit's Fast Fix 8 team poses in the south yard on top of the Charlotte Avenue westbound structure.
2. Aerial view of the Clinton Street/CSX location. Innovative construction design turns an existing six-span structure into two simple span bridges.

in and left their job titles at the door — it was all hands on deck during the weekend closures."

NOTHING BUT COMPLIMENTS

The team wrapped up its last bridge closure, Charlotte Avenue, in November 2015. The project was completed utilizing work during 10 weekends and was delivered seven months ahead of the anticipated deadline. With final paving and finishing done by the end of the year, the Kiewit team accomplished a feat that left commuters pleased and the client singing their praises.

"Some folks here want to know why we can't do every project this fast," Reid said with a chuckle. "There was a lot of homework done that led us to be able to deliver it using CMGC and on an accelerated schedule.

"We were truly working together toward a positive solution. I'm very impressed at the way Kiewit molded a team together to approach this job and I'm happy to be part of it."

"The amount of planning and effort that went into each weekend was overwhelming," added Red Jordan, TDOT district operations assistant and TDOT Fast Fix 8 project manager. "Kiewit came in with a game plan and followed it to the letter. I have nothing but compliments for them."

This year, thousands of fans will make the trip to Music City to see the newest generation of performers. They may not notice the work that's been done to improve their experience, but for the Kiewit team, Fast Fix 8 has a place in its own project hall of fame. **K**

ALL HANDS ON DECK

Rothwell says working with the ABC model made for an inclusive and immersive experience for both veteran Kiewit employees and relatively new team members.

"We talk about building builders in our company. On this job, we needed an average of 200 people on the team every weekend. Many of our young engineers were working side-by-side with the crews. Our young engineers gaining experience by working with seasoned builders was one of the greatest aspects of this job."

"Without the work of a lot of the staff, the project's tight timelines wouldn't have been met," he added. "It was a phenomenal job by the entire team. Everybody jumped



HEALING SPACES:

TRENDS IN HEALTHCARE CONSTRUCTION

By 2030, the over-65 population will nearly triple in size. More than 60 percent of these baby boomers will need treatment for multiple chronic conditions, such as diabetes, heart disease and cancer.

Across all age groups, the number of physician visits has increased by 34 percent over the last decade.¹

The U.S. is facing a shortage of between 46,000 to 90,000 physicians in the next 10 years.²

Patient satisfaction surveys now account for up to 30 percent of a hospital's Medicare reimbursement, putting approximately \$500,000 to \$850 million at risk annually.³

What does this mean for healthcare construction? It means it will become even more complex and competitive.

The increased demand for healthcare services coupled with a challenging economic climate is driving intense competition. In order to keep pace, healthcare providers need innovative, high-quality facilities that maximize capital investments.

“Through our work in building hospitals, outpatient clinics and rehabilitation facilities, we’ve uncovered a number of best practices and trends,” said Kevin Sladovnik, a manager for the Kiewit Building Group. “From strong collaboration in the early stages of a project, to protecting the safety and livelihood of patients and staff during renovations, there are a number of ways that we’re adding value to healthcare clients.”

THE SOONER, THE BETTER

The linear approach to healthcare construction, such as design-bid-build, has taken a back seat to more streamlined delivery methods that bring the entire project team together very early in the process. Whether it’s a



1. The Madonna Rehabilitation Hospital is a 110-bed facility that specializes in brain and spinal cord injuries. 2. A 10-story tower at the Fred and Pamela Buffett Cancer Center will feature nearly 100 state-of-the-art research laboratories.

design-assist project or a fully integrated project delivery, one thing is clear — the sooner, the better.

“I’ve been on projects where we’ve been at the table since the napkin sketch design,” said Phil Spencer, senior project manager for Kiewit Building Group. “From a constructability standpoint, it makes a huge difference in the success of a project. It’s absolutely necessary to get the owner, designer and contractors talking right away.”

“There is a ton of upside in getting involved in the early stages of a project,” said B.J. Gehrki, project manager at Kiewit Building Group. “We’re able to make recommendations on cost savings and update pricing incrementally, which means fewer surprises for the client as the project progresses.”

Early collaboration can also help clients maximize investments by looking beyond upfront costs. For example, a client planned to install an oil-based chiller at a new facility since they had successfully used the product in the past. Kiewit’s team took the initiative to evaluate a newer, more efficient alternative — a magnetic chiller. While the magnetic chiller required a higher upfront cost, it would last twice as long as an oil-based chiller. The magnetic chiller was also quieter and less expensive to operate and maintain, ultimately offering the best return on investment.

“While there’s extra work involved in finding and evaluating new solutions, we take a lot of pride in helping clients stretch their budgets,” Gehrki said. “Staying up to speed and keeping an open mind about new products and technologies always pays off.”

WHEN SOONER ISN’T POSSIBLE

Unfortunately, the “early is better” philosophy doesn’t always play out in reality, especially with the installation of specialized equipment. While coordination early in the project is beneficial, ongoing equipment model upgrades require a flexible approach.

Similar to computers and cell phones, new models of high-end imaging equipment, such as magnetic resonance imaging (MRI) and computed tomography (CT), are introduced into the marketplace at regular, ongoing intervals. On average, a hospital will have 20-30 pieces of equipment, many of which are selected near the end of a construction project.

“Most clients want to hold out as long as possible in selecting equipment,” said James Davis, construction manager at Kiewit Building Group. “Since each piece of

equipment has very specific mechanical and electrical requirements, we have to fast-track our work to complete the project on time.”

PRE-CONSTRUCTION DIAGNOSIS

Over the years, technology has changed the way buildings are designed and built. One of the biggest impacts has been the use of Building Information Modeling (BIM), in which project teams can leverage 3-D digital representations to plan and coordinate work. Think of it as a way to look at every minute aspect of a project under a microscope, test out how they will work together and diagnose problems before construction starts.

According to Matt Koenen, project manager at Kiewit Building Group, “Facilities are first built ‘virtually’ using BIM to make sure everything is aligned and works. It’s especially useful in coordinating mechanical and electrical work and reducing material waste.”

In healthcare settings, there are complex systems for electrical, plumbing, communications, medical gases and air handling — all of which need to be installed in the limited space behind walls and ceilings. These components can be built in BIM first to streamline installation. Project teams can also improve the accuracy of estimates, which can equate to fewer change orders.

“BIM allows us to proactively resolve issues that can be time, labor and cost intensive,” added Koenen. “For example, plumbing and HVAC contractors are equipped with detailed information in the field that reduces mistakes in cutting, shaping, assembly and joining of materials.”

“We’re able to identify any conflicts or issues well before our boots hit the ground,” Koenen said. “The insights from BIM allow us to work better, faster and cheaper.”

END USERS AT THE FOREFRONT

Whether it’s the nurses and doctors working at a facility or the patients receiving treatment, the experience of the end user is by far the most transformational shift in health care environments. Based on their unique perspective, these end users are becoming an integral part of the design process and their input is critical to project success.

For healthcare employees, functional spaces that are conducive to an efficient workflow are key. For example, many healthcare facilities are moving away from large, centralized nursing stations, opting for small work areas outside of each room that allow them to stay close to their patients.

Healthcare projects in queue

- **Fred and Pamela Buffett Cancer Center**
Omaha, Nebraska | 610,000 square feet
- **Lied Life Center Expansion**
Omaha, Nebraska | 11,500 square feet
- **Madonna Rehabilitation Hospital**
Omaha, Nebraska | 260,000 square feet
- **Replacement Medical Center Facility, Eastern Colorado Health Care System**
Aurora, Colorado | 1.2 million square feet
- **SCL Health Community Hospital**
Northglenn, Colorado | 60,000 square feet



Fred and Pamela Buffett Cancer Center



Replacement Medical Center Facility, Eastern Colorado Health Care System



SCL Health Community Hospital

“Based on input from nurses, patient floor design has changed to minimize travel distances to get to pharmaceutical supplies, linens, cleaning supplies, soiled rooms and equipment rooms,” said Steve Gollehon, healthcare principal at HDR Architecture, Inc. “The less time the nurses have to spend going to get whatever they need, the more time they have for patient care.”

These relatively small changes can add up to big benefits in terms of fewer steps and less redundant operations. With healthcare professionals’ heavy workloads, even small improvements in productivity can go a long way.

On the patient front, aesthetically pleasing interiors and hotel-like amenities have become the new normal. Easily accessible parking, attractive dining, homey accommodations, adequate space for visitors, access to natural lighting, and healing gardens are all important. As a result, the footprint of many hospitals has changed, allocating more space in private patient rooms versus public waiting room areas.

“Keeping families close to patients enhances the overall care they receive and helps with the healing process,” said Gehrki. “There is a growing body of research to support the health benefits of larger, more comfortable patient rooms.”

Referred to as evidence-based design, this research examines how the physical environment can influence the well-being of patients. Specific studies have focused on exposure to natural daylight, the correlation between acoustics and adequate rest, and the potential for certain colors to increase or decrease patient stress. The goal is to eliminate any barriers to healing and help shorten the duration of hospital stays.

NAVIGATING COMPLEX RENOVATIONS SAFELY

The demand for renovated facilities is on par with new construction in today’s healthcare market. According to Health Facilities Management magazine, hospital capital budgets for 2015 allocated 34 percent to new construction and 34 percent to facility renovations, with remaining funds used for infrastructure upgrades.

For construction crews, renovations at existing healthcare facilities require a cautious approach, since dust, noise and vibration can have dire consequences for patients and staff.

“To maximize safety, we embrace an extremely patient-centric thought process,” said Wesley Woodward, project executive at Kiewit Building Group. “We spend time with staff to understand their operations and how they use the

existing space. This requires an ongoing dialogue to make sure expectations are proactively communicated throughout the project.”

There are a number of general protocols and best practices for interim life safety measures during renovations. Planning and coordination must be tailored to the type of facility and patients being treated in the area.

For example, an intensive care unit for newborns requires much more stringent acoustic control than other areas of a hospital. An area with immunosuppressed patients or an operating room are both extremely sensitive to dust, which can introduce harmful germs into otherwise sterile environments.

In regard to fire protection, contingency plans need to be established when sprinkler or smoke detection systems are temporarily shut down. If the renovation is compromising an exit, there needs to be a clearly defined and communicated alternative path.

“As construction professionals, we’re trained to be inherently schedule-focused, placing a strong emphasis on rigorous schedules and deadlines,” added Woodward. “In healthcare-related renovations, we have to spend significantly more time and effort to limit disruptions and protect the health and safety of patients and staff.”

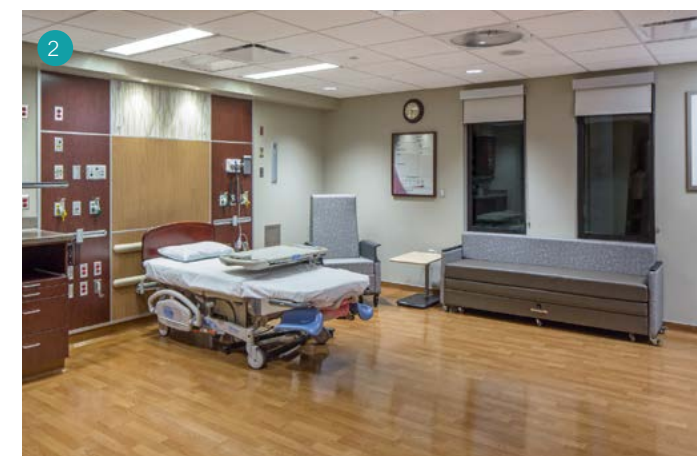
LEANING TO THE FUTURE

Early coordination, a patient-centered approach, safety and evidenced-based design will continue to play an integral role in healthcare construction. With the ever-tightening squeeze on capital budgets, a continued focus on efficiency is inevitable. As a result, new construction techniques, such as “lean construction” are capturing the attention of many project teams.

“We traditionally plan construction projects around meticulous schedules and budgets. The focus is on getting the work done,” said Woodward. “With lean construction, the primary goal is to identify instances where you can reduce the waste of materials and time, which helps reduce costs.”

While a comprehensive set of lean construction principles have not been adopted by the construction industry, similar concepts, such as off-site prefabrication are gaining traction.

If a hospital project calls for 150 patient rooms, the off-site prefabrication of bathrooms can be a viable alternative



to on-site construction. Standardized units can be assembled off-site, with roughed-in wiring and plumbing. To limit transportation costs, project teams might rent warehouse space near the construction site, offering a climate-controlled space where work can continue despite unpredictable or inclement weather.

“Whether it’s lean construction or off-site prefabrication, we are constantly looking for ways to bring the most value to our healthcare clients,” said Sladovnik. “Healthcare construction will continue to become more complex, stringent and demanding. But, we’re up for the challenge.” 

1. Vibrant colors and an open floor plan provide a welcoming atmosphere for patients and families at the Children’s Hospital Specialty Pediatric Center. 2. The women’s services department at the Nebraska Medical Center features larger rooms that keep patients and families close, which is important to the healing process. 3. Smart, functional spaces at SCL Community Hospital help staff work effectively and efficiently.

¹ How Boomers Will Change Health Care, American Hospital Association; ² The Complexities of Physician Supply and Demand: Projections from 2013 to 2025, Association of American Medical Colleges; ³ “The Problem with Satisfied Patients,” The Atlantic, Apr. 17, 2015

KIEWIT: Positioned to take on Public-Private Partnerships

PREPARING FOR P3

Public-private partnerships (P3) are an innovative solution for getting large-scale projects built efficiently, creatively and with sound financial backing. To seek out and pursue P3 opportunities, Kiewit brought together a dedicated team of P3 and finance experts, who together have more than 150 years of experience in the P3 arena with projects valued at over \$30 billion.

"It's an exciting time for us as we watch the P3 contract model really take off," said John McArthur, president of Kiewit Development Company. "Kiewit's strong balance sheet, combined with our diversity of market experience, our operations expertise and our resources, means that we are ready and capable to take on these jobs and be a great partner."

Compared to most other contractors, Kiewit has a strong geographical footprint on both sides of the U.S.-Canadian border.

According to Sam Chai, senior vice president of finance and development, this footprint will lead to the pursuit of a pipeline of close to \$20 billion over the next two years. "Our ability to pursue and execute on different contract models on both sides of the border is a definite asset."

WHAT IS A P3?

A public-private partnership (P3) is between a public organization and a private entity. The private entity assumes the responsibility to develop, design, construct, finance and operate facilities and transportation projects.

There are many advantages to this type of partnership, including making large-scale projects that can positively impact communities possible. Often, government entities are not able to fully fund these projects on their own. The P3 model offers solutions for financing these undertakings. Another advantage of this delivery model is the private sector's proven track record for delivering projects on time and on budget.

In a P3, the private sector assumes most of the construction and financial risks, far beyond the traditional responsibilities of design and build. This additional risk transfer can include operation, maintenance, short-term financing, long-term financing, gap financing, tolling and ownership in any component of the completed project.

Commonly used in Europe and Australia, P3s entered the North American marketplace in 2001 and use of the model continues to grow. All Canadian provinces allow P3 legislation; currently 35 U.S. states have it. Contract structures vary and are tailored to meet the needs of the client. **K**

Types of P3 delivery models

DESIGN-BUILD-FINANCE-OPERATE-MAINTAIN (Availability payment)*

The private sector designs, builds, finances operates and maintains a new facility for a specific term. The client pays the partner a pre-established payment subject to performance. At the end of the term, the facility is transferred to the public sector.

DESIGN-BUILD-FINANCE-OPERATE-MAINTAIN (Full concession/real user fee)*

The private sector designs, builds, finances, operates and maintains a new facility under a long-term lease. The private partner is paid through toll revenue. At the end of the lease term, the facility is transferred to the public sector.

DESIGN-BUILD-MAINTAIN

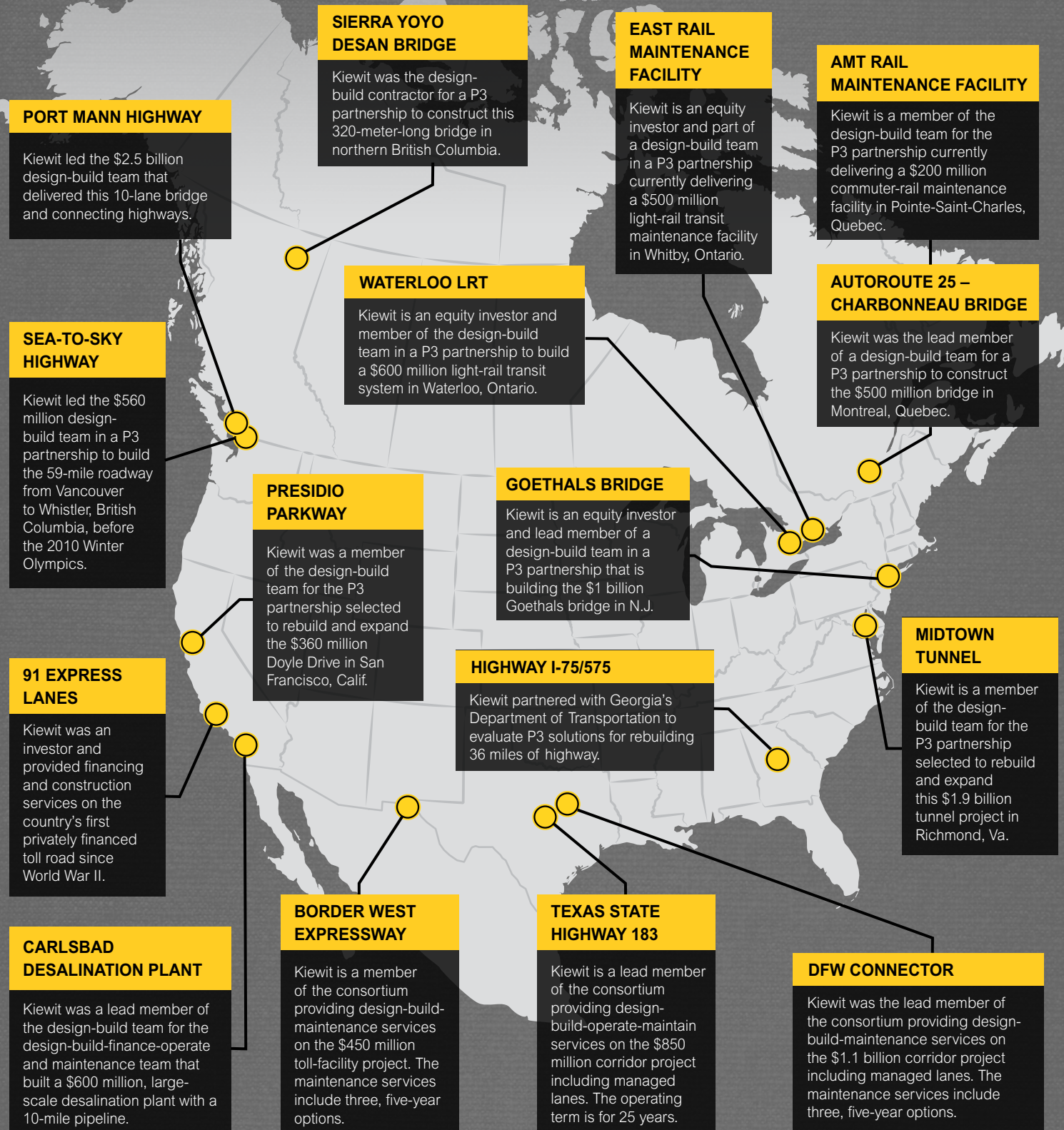
Similar to design-build, but the private partner also maintains the facility. After completion, the client assumes responsibility for operations.

DESIGN-BUILD-FINANCE

Also known as gap finance
Adds a finance component to the design-build model and typically has a requirement to provide financing for up to 5 years after construction completion, filling a 'gap' in the client's budget.

*Availability payment structure transfers no volume (ridership or user/traffic) risk to the private sector.

Kiewit's P3 Experience





RENEWING, REVITALIZING AND RESHAPING WOODBIDGE

*Building a clean energy plant on
previously contaminated grounds*

The Township of Woodbridge was the first township in New Jersey — King Charles II of England granted it a royal charter in 1669. Nearly 350 years later, the Woodbridge Energy Center (WEC) recently made another debut as the area's premier power generating facility.

For more than two years, Kiewit Power worked diligently on the natural-gas-fueled, combined-cycle power generation facility — a station that is expected to power more than 700,000 homes. Client Competitive Power Ventures (CPV) hired Kiewit in mid-2013 to engineer, procure, construct and commission the new 725 megawatt facility. Substantial completion was achieved ahead of schedule in January 2016.

“Coordination between all partners is a must if you're going to finish a project of this size and scope on time,”

said Kiewit Power Project Manager Tyler Nordquist. “Our involvement in the initial phases of the project and the teamwork we maintained with CPV and GE throughout enabled us to turn the plant over early.”

ENVIRONMENTAL IMPROVEMENTS

The WEC provides clean, efficient power and helps reinvigorate the area where an old, abandoned chemical plant once stood. In 2009, the New Jersey Legislature signed the Site Remediation Reform Act, setting forth sweeping changes to how site remediation is performed. According to the New Jersey Department of Environmental Protection, “The goal is to increase the pace of remediation, thus helping to decrease the threat of contamination to public health and safety and of the environment, and to quickly return underutilized properties to productive use.”

Only a handful of these contaminated sites have passed the stringent approval process to become designated development areas, and the WEC is one of them. As a result, all civil, concrete and underground utility work plans developed by Kiewit had to be reviewed and approved by a licensed professional from the New Jersey State Department of Environmental Protection.





1. The heat recovery steam generators (HRSG) and pipe rack are seen as construction approached completion 2. Night crews set the HRSG modules 3. One of two GE frame 7FA.05 combustion turbine generators (CTG) installed at Woodbridge 4. The GE D11 – seen here – along with the HRSG and the GE frame 7FA.05 CTG, are all part of a Rapid Response Package from General Electric



The WEC resides in the Keasbey Brownfield Development Area, which allows local municipalities and private developers to clean up contaminated sites. So far, it has created jobs and initiated thriving economic development.

“We are fortunate that Woodbridge is a very welcoming community and site. The Township staff visits monthly and raves about the progress and how nice the site looks,” said Dan Nugent with CPV. “This is a wonderful reuse of the property that combines industrial development with wetland rehabilitation being conducted by others.”

Additionally, as part of CPV’s mission to conserve natural resources and be eco-friendly, the WEC will predominantly use greywater to meet facility cooling needs. The greywater is a beneficial reuse of otherwise discharged, treated wastewater generated in households or office buildings.

Its use minimizes the plant’s impact on water resources and the environment for a cleaner, more sustainable facility.

TIGHT SCHEDULE, NEW TECHNOLOGY

Although the development area sits on more than 270 acres, the WEC occupies only 27 of those acres — making for a tight workspace for such a large plant.

To stay ahead of schedule and on budget, the project team planned every piece of equipment’s use down to the hour. Taking full advantage of ever-improving technology made scheduling happen right the first time.



Giving back to the community

Even at the peak of its busy construction schedule, the WEC project team found time to give back to the community. Check out some of the great ways Kiewit served Woodbridge:



Tooling around the Township: A program involving local volunteers who help improve the homes of senior citizens. Fifteen project team members and 30 residents built and painted a local senior citizen’s deck.



Principal-for-a-Day: Business leaders got to interact with Woodbridge students and principals. Kiewit WEC project employees educated children about the engineering and construction industries. They also introduced students to the drone and showed them how it works.



Other community service: Kiewit and its partners sponsored a local 5K race, donated to Toys for Tots and donated more than \$45,000 to local charities.

Woodbridge Energy Center by the numbers

- \$346 million** contract value
- 670 total** craft (560) and staff (110) employees at peak of construction
- 1.6 million** man-hours
- 65 thousand** cubic yards of contaminated material removed from 27 acres
- 24 thousand** cubic yards of concrete
- 2 thousand** tons of structural steel
- 117 thousand** linear feet of pipe
- 16 thousand** diameter inches of large bore pipe welds
- 50 thousand** electrical terminations
- 1.1 million** linear feet of electrical cable and wire

“Kiewit staffs its projects differently than most other contractors. Everyone marches to the same beat; they are a well-oiled machine. I look forward to working with this team again on upcoming projects.”

DAN NUGENT,
PROJECT SPONSOR,
CPV

CPV recognized Kiewit's unique approach as well.

“As far as constructability and planning, I think Kiewit's efforts are very effective and somewhat unique,” added Nugent. “From what I experienced from the outside, Kiewit spends a lot more time planning, and it shows.”


“We also used drone technology to see exactly where we could land materials, if we were storing too much material in a certain place or if we were able to consolidate materials,” said Construction Manager Rick Dotson. “Using technology to our advantage made a huge impact and helped keep us on schedule. These tools make our projects better and our people work smarter.”

ENERGY PROCESS

The scope encompassed building two GE frame 7FA.05 combustion turbine generators (CTGs), which will exhaust into two moderately duct-fired, triple-pressure CMI heat recovery steam generators (HRSGs). The steam produced from the HRSGs will power a reheat tandem compound double flow GE D11 steam turbine. This equipment is part of a Rapid Response Package from General Electric — one of the first applications of its kind.

“Building a 725-megawatt plant requires a huge effort,” confirmed Nordquist. “These projects require a high level of technical expertise and present logistical challenges, all while being constrained by a tight schedule and budget.”

And keeping the client happy is all in a day's work.

“Kiewit staffs its projects differently than most other contractors. Everyone marches to the same beat; they are a well-oiled machine,” added Nugent. “I look forward to working with this team again on upcoming projects.” 





Kiewit Corporation
3555 Farnam St.
Omaha, NE 68131

Subscribe online at kiewit.com/kieways

Kiewit core values:

People.
Integrity.
Excellence.
Stewardship.

