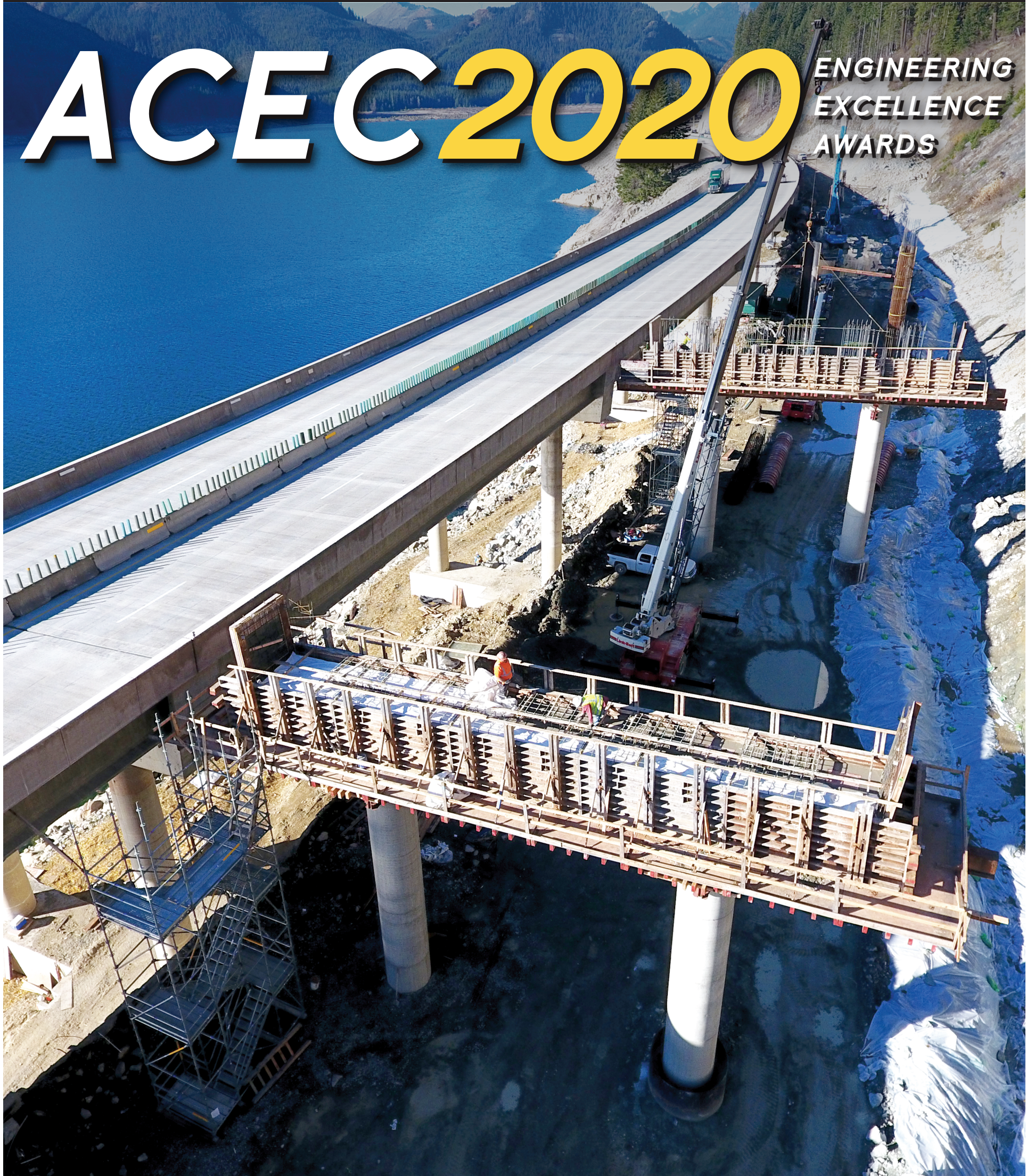


Seattle Daily Journal of Commerce

ACEC 2020

ENGINEERING
EXCELLENCE
AWARDS



January 27, 2020

TRANSPORTATION

NATIONAL FINALIST: PLATINUM AWARD

Jacobs Engineering Group

Project: Keechelus Lake avalanche bridges
Client: Washington State Department of Transportation

When the Washington State Department of Transportation was considering widening a portion of Interstate 90 along Keechelus Lake at Snoqualmie Pass, its advertised project design called for replacing the existing westbound snowshed with a longer structure that covered all lanes to protect drivers from avalanches. But the Atkinson/Jacobs design-build team had a better idea.

Once the Atkinson/Jacobs team was awarded the contract, it submitted a Cost Reduction Incentive Proposal (CRIP) to replace the contract snowshed with twin 1,200-foot-long bridges that span the avalanche hazard. Not only do the elevated bridges virtually eliminate road closures due to avalanches, rockfall and snow removal, but they remove millions in long-term operations and maintenance costs for the owner.

The Jacobs design team worked with nature — rather than against it — to design a span that would create a safe passage between a steep mountainside and a lake amidst winter snowfall and often

The new avalanche bridges were designed to allow snow and rock to travel underneath the spans and into the lake.



PHOTO PROVIDED BY GUY F. ATKINSON CONSTRUCTION

heavy traffic.

The horizontal and vertical alignment of the bridge superstructure was critical in making an avalanche bridge meet project goals for improved safety against avalanches and rock fall. The bridge had to be high enough to clear avalanches and snow accumulation, yet not so high that the grades would be dangerous during icy conditions. The horizontal location had to provide room for falling rock to miss the roadway, yet stay out of the lake, which was too deep to accommodate bridge

foundations.

A major step in the development of the avalanche bridges was development of design criteria for avalanches in the Cascade Mountains. The project team brought in world-renowned snow behavior experts to help develop an avalanche model that could predict conditions unique to the Cascade mountain range.

The result was two man-made structures that do not attempt to stop nature — avalanches pass under the highway and into the lake, just like they did before a

highway was constructed across the pass.

The new bridges allow for year-round use of the interstate without fear of closure due to rockfall or avalanches.

The avalanche bridges provide a combined savings of approximately \$37 million over the life of the structures, a cost largely attributed to the difference in operations and maintenance costs between a snowshed (which requires upkeep of electrical, lighting, ventilation and other systems) and bridges (requiring routine inspections, plowing and de-icing).

WE'RE ON YOUR TEAM!

When you work with Star Rentals, you add powerful players to your project team—pros that are skilled, knowledgeable, and easy to work with.

Star Rentals employees are the most experienced in the industry. From our extensive training and safety programs to our equipment expertise, you can count on us to deliver the goods. We make sure you get fast, responsive service, and headache-free billing.

Do we think it's important to be a team player? Absolutely.

100+ Years of Outstanding Service.

Star Rentals is the oldest, largest and most reliable independent rental company in the Pacific Northwest.

STAR RENTALS
 Preferred Supplier  to the West's Best Contractors



www.starrentals.com

Bellevue • Bremerton • Eugene • Everett • Ferndale • Hillsboro • Kent • Longview • Olympia
 Pasco • Portland • Salem • Seattle • Spokane • Tacoma • Vancouver • Wenatchee • Yakima

JACOBS ENGINEERING WINS TOP PRIZE FOR TWIN BRIDGES

Jacobs Engineering is the top winner in the American Council of Engineering Companies of Washington's annual Engineering Excellence Awards program.

The firm took home the top honor — the Platinum Award — for its design of twin 1,200-foot-long bridges along Interstate 90 at Snoqualmie Pass.

Sponsored by ACEC's Washington state chapter, the awards program recognizes projects that represent a wide range of engineering achievements and which demonstrate the highest degree of skill and ingenuity.

Twenty-five projects were honored in this year's program. The top national awards will go on to compete in the ACEC national competition in Washington, D.C., in April.

Project entries were evaluated by a four-judge panel: Kathy Robertson, engineer emeritus at Pickets Engineering; Ken McGowan, engineer emeritus at HDR; Steve Johnston, engineer emeritus at Landau Associates; and Benjamin Minnick, construction editor at the Daily Journal of Commerce.

ACEC Washington is a professional trade association representing consulting engineering, land surveying and affiliated scientific and planning firms statewide.

ON THE COVER

Jacobs Engineering won ACEC Washington's platinum award for its design of twin avalanche bridges for Interstate 90. In the photo, crews construct columns and pier caps for the westbound bridge, located along Keechelus Lake at Snoqualmie Pass.

PHOTO PROVIDED BY GUY F. ATKINSON CONSTRUCTION



DJC SPECIAL SECTION TEAM

SECTION EDITOR: SAM BENNETT • SECTION DESIGN: JEFFREY MILLER
WEB DESIGN: LISA LANNIGAN • ADVERTISING: MATT BROWN

WASHINGTON'S PREMIER RIVERFRONT RESORT DESTINATION



For reservations:

Canyon River Lodge:
(509) 933-2100
lodge@canyonriver.net

Red's Fly Shop:
(509) 933-2300
redsflyshop.com

NATIONAL FINALISTS

PLATINUM AWARD

TRANSPORTATION

JACOBS ENGINEERING GROUP

Project: Keechelus Lake avalanche bridges

Client: Washington State Department of Transportation

GOLD AWARDS

WASTE AND STORMWATER

CAROLLO ENGINEERS

Project: Oak Harbor clean water facility

Client: City of Oak Harbor

TRANSPORTATION

GEENGINEERS

Project: South 224th Street expansion/SR 167 bridge project

Client: City of Kent

SPECIAL PROJECTS

HART CROWSER

Project: Rainier Square Tower shoring design

Client: University of Washington

STRUCTURAL SYSTEMS

MAGNUSSON KLEMENCIC ASSOCIATES

Project: Amazon Urban Neighborhood

Client: Amazon/NBBJ

BEST IN STATE

GOLD AWARDS

FUTURE VALUE TO THE ENGINEERING PROFESSION

HWA GEOSCIENCES

Project: Grand Avenue utility and pedestrian bridge

Client: City of Everett

SOCIAL, ECONOMIC AND SUSTAINABLE DESIGN

MEAD & HUNT

Project: Roslyn fish passage and culvert

Client: City of Roslyn

COMPLEXITY

OTAK

Project: Hayes Street regulator and CSO controls

Client: City of Everett

SUCCESSFUL FULFILLMENT OF CLIENT/OWNER NEEDS

OTAK

Project: Swift Green Line

Client: Community Transit

COMPLEXITY

REID MIDDLETON

Project: Paradise Inn Annex rehabilitation

Client: National Park Service

UNIQUE OR INNOVATIVE APPLICATIONS

SHANNON & WILSON

Project: Baker dams landslide inventory and susceptibility mapping

Client: Puget Sound Energy

SUCCESSFUL FULFILLMENT OF CLIENT/OWNER NEEDS

STANTEC CONSULTING SERVICES

Project: Bill & Melinda Gates Center for Computer Science and Engineering

Client: University of Washington

ENGINEER OF THE YEAR

DAN CAMPBELL

GeoEngineers

INCLUSION AWARDS

Midsize firms: KBA, Coughlin Porter Lundeen

Large firm: HTNB (Bellevue office)

WASTE AND STORMWATER

NATIONAL FINALIST: GOLD AWARD

Carollo Engineers

Project: Oak Harbor clean water facility

Client: City of Oak Harbor

In 2010, the city of Oak Harbor was facing big challenges. The 50-year-old plant where its wastewater was being treated had reached the end of its useful life. The outfall had failed, and all the city's wastewater was being pumped to a lagoon treatment plant east of town that the city shared with the Navy. This plant's lagoon treatment process did not accommodate future water quality standards or the city's projected growth. Changes needed to be made.

Carollo Engineers was hired by the city to lead a design process that would result in a new clean water facility as well as significant improvements to the immediately adjacent Windjammer Park. The project team reviewed more than 11 locations, oversaw numerous design workshops and overcame a number of technical challenges. The team delivered the project with a level of complexity not typi-

cally tackled by communities the size of Oak Harbor.

The engineering team faced significant geotechnical issues and a saltwater challenge from Puget Sound. A slough that had been filled with dredged soils passed through the project site, creating significant groundwater issues.

The project's location in a seismically active region complicated issues further. A significant portion of the secondary treatment and headworks buildings needed to be located in a deep excavation site that was subject to significant uplift forced from tidally influenced brackish groundwater.

The team responded with the use of micropiles to mitigate seismic-induced settlement and flotation forces. In addition, stone column ground improvements were recommended and installed for the slab-on-grade structures.

Still, the risk of liquefaction of unconsolidated materials in the event of an earthquake remained. A French drain piping system coupled with geotextile fabrics was installed to mitigate this, along with drainage blankets, gravel layers and pressure-relief valves to allow excess pore



Geotechnical issues added complexity to Oak Harbor's clean water facility project.

PHOTO BY ERIK HOLSATHER/SKYSOLUTIONS NW

water to exit the areas without damaging equipment.

To cut off tidally influenced groundwater that could potentially threaten the lower gallery of the Secondary Treatment

Building, the team researched and employed special concrete admixtures for leakage and corrosion in addition to the use of traditional PVC waterstop.

The clean water facility was

delivered to the city of Oak Harbor in a dedication ceremony in November 2018, fulfilling a journey that had begun nine years earlier. Windjammer Park opened on June 29.

TRANSPORTATION

NATIONAL FINALIST: GOLD AWARD

GeoEngineers

Project: South 224th Street expansion/SR 167 bridge project

Client: City of Kent

East-west travel through the city of Kent — particularly to and from Kent's East Hill neighborhood — has long been a challenge. State Route 167, a limited access highway and major north-south artery, runs along the east side of the valley, funneling East Hill residents onto just two primary east-west routes into downtown.

Because neither of these two roads could handle the area's growing traffic load, the city of Kent began a multiphased effort to complete a new corridor that would link the east and west hills through the valley and downtown Kent.

GeoEngineers was tapped to provide geotechnical subconsultant services along with environmental, hydraulic and geotechnical recommendations for the easternmost phase of the corridor. The work included a bridge across SR 167, an associated new road alignment, a stormwater detention pond and an improved culvert.

The GeoEngineers team encountered unforeseen challenges, but met them by expand-



The new South 224th Street bridge over state Route 167 adds an east-west route through Kent.

PHOTO PROVIDED BY GEOENGINEERS

ing its scope, including new services and pursuing creative solutions along the way.

GeoEngineers encountered significant differences between soils on either side of the South 224th Street bridge over SR 167. The site's proximity to the valley wall meant a transition between types of soil deposits on either side of the highway. The unexpected discovery of strong arte-

sian conditions beneath the bridge's east abutment further complicated site investigation and construction. GeoEngineers recommended a detailed and multifaceted strategy for effectively and safely drilling shafts in these artesian conditions, ultimately recommending slightly different foundation designs for either side of the bridge.

To accommodate improve-

ments to an associated roadway, the GeoEngineers team needed to replace an aging timber bridge over Garrison Creek. Though originally under contract for geotechnical services, GeoEngineers also provided hydrology and hydraulic analyses of the stream and the pile-supported arched culvert proposed as a replacement for the bridge. In the process of designing a

replacement culvert, GeoEngineers also improved upstream access for critical fish species.

GeoEngineers also stepped in to perform a document review after the city of Kent expressed concern about a stormwater detention pond that had formerly been used for steel slag disposal. Engineers provided the owner environmental recommendations so construction could continue.

SPECIAL PROJECTS

NATIONAL FINALIST: GOLD AWARD

Hart Crowser

Project: Rainier Square Tower shoring design
Client: University of Washington

The excavation for the new 850-foot Rainier Square Tower was immediately next to — and 50 feet deeper than — the foundation for the existing 41-story (similarly named) Rainier Tower, an iconic structure with an eye-catching tapered pedestal that has drawn attention since it was built in the 1970s.

The feat required advanced computer modeling — and creative thinking — to keep Rainier Tower from settling or leaning. Hart Crowser, the project's geotechnical engineer, designed a support system to meet stringent deflection criteria, and designed and implemented monitoring to prove performance during construction.

The excavation for the new Rainier Square Tower's parking garage had to extend more than 50 feet deeper than the existing tower's heavily loaded, shallow foundation — and was set back only 18 feet from its edge. A quarter of the Rainier Tower's soil support had to be replaced with a shoring system designed and built so the existing tower hardly settled and didn't lean into the new excavation. Hart Crowser monitored the soil and shoring wall and predicted Rainier Tower's behavior, testing the variables and different combina-

tions of structure and strength and how they affected the existing building's settlement and lean.

Hart Crowser's shoring solution was a concrete and steel secant pile wall supported by a closely spaced network of 242 tieback anchors separated by 4 feet vertically and 5 feet horizontally and installed at an angle of 20 degrees down from horizontal.

Each of these individual tiebacks had to maintain a zone of undisturbed soil around it. The tiebacks had to be long — some in excess of 120 feet — to resist a bearing capacity failure of the existing tower. Because of this, the emphasis on precision was much more important and harder to maintain.

Poor soil conditions complicated the effort. Prevalent at the site was a soil type called lacustrine. In areas where past glaciers passed over this soil, they became fractured and weak. A thick zone of this low-strength clay extended across the construction site, adding significantly to the load the shoring system would have to resist.

The scope of work and the challenges presented made the project "the most challenging excavation we have ever done," according to the contractor.

The end result is the second-tallest building in downtown Seattle, featuring 725,000 square feet of office space, 77,000 square feet of retail space, 191 luxury apartments and an 811-car below-grade parking garage.

Hart Crowser designed Rainier Square Tower's deep and complex excavation, located immediately adjacent to the iconic Rainier Tower.



PHOTO PROVIDED BY HART CROWSER

STRUCTURAL SYSTEMS

NATIONAL FINALIST: GOLD AWARD

Magnusson Klemencic Associates

Project: Amazon Urban Neighborhood
Client: Amazon/NBBJ

The Amazon Urban Neighborhood encompasses six buildings on three blocks in downtown Seattle, transforming a district previously dominated by surface parking lots and low-rise cinder-block buildings.

The Amazon Urban Neighborhood offers 5.2 million square feet of structured floor area and includes three 38-story towers, street level retail, outdoor park areas, and the centerpiece of the project: the iconic Amazon Spheres.

As the project's structural, wind and seismic engineering firm, Magnusson Klemencic Associates made a number of profession-leading structural engineering contributions.

Tackling the challenge of Seattle's high seismicity, MKA used new performance-based seismic design (PBSD) techniques with the design of the three towers, improving upon the standard

building code requirements and providing improved earthquake performance and better distribution of structural building materials throughout the building. The technique uses multiple "real" earthquake records (seven for the Amazon towers) instead of the simplified building-code-specified, single-design earthquake loading. This is the largest building project in the world to use PBSD.

Also for the three towers, MKA created a high-performance core that resists 100% of the wind and earthquake loads without requiring the participation of any exterior bracing, columns or spandrel beams. This allows for a near doubling of exterior column spacing (30 feet at the perimeter vs. 15-20 feet in comparable buildings in the region), allowing for better views and more space-planning freedom.

Perhaps most recognizable on the new Amazon campus are its Spheres, comprising three interlocking spherical structures. MKA invented a new structural sphere system, rejecting the repetitive straight-line geometry of traditional sphere structural systems.

MKA worked with architecture firm NBBJ to create a new sphere

Amazon's Spheres are the centerpiece of the 5.2 million-square-foot Amazon Urban Neighborhood project, which also includes three towers, retail and park space.



PHOTO PROVIDED BY MKA

structural system inspired by the design of the traditional soccer ball. The team explored more than 100 designs within a repeating pentagon shape, settling on the "catalan" for its aesthetics, structural abilities,

and constructability by the project team.

The resulting system is a self-supporting, 130-foot clear span with no interior columns that is completely independent from the interior concrete structure.

Highly detailed 3D computer models utilizing custom software shared by the entire design and construction team streamlined design, detailing and fabrication, resulting in fabrication tolerances of just 1/32 inch.

SOCIAL, ECONOMIC AND SUSTAINABLE DESIGN

BEST IN STATE: GOLD AWARD

Mead & Hunt

Project: Roslyn fish passage and culvert
Client: City of Roslyn

The city of Roslyn's fish passage and culvert project started primarily as a flood-control project, but new mandates from stakeholders for fish passage ended up driving much of the design and transitioning it into a successful habitat-restoration project.

Mead & Hunt oversaw engineering design and project management of the project, which not only alleviated flooding but also enabled fish passage upstream in Crystal Creek through what was previously a fish barrier.

The South A Street culvert had been identified as one of the highest-priority projects in the city of Roslyn's Stormwater Comprehensive Plan, and was also an identified project in the Kittitas County Hazard Mitigation Plan. Residents and businesses in Roslyn were tiring of repeated flooding at this location during high-intensity storm events.

A number of challenges arose during the design

phase of the project. Extremely poor bearing capacity in the soils required a detailed alternatives analysis to find a constructible option. The team considered six options — from metal free-span bridges to aluminum culverts — before deciding on a solution. Geometrically, the skewed box wall angle of the box culvert sections was a unique design consideration, but necessary due to the stream alignment and space constraints with adjacent utilities.

Low clearance between the stream bed and road grade as well as a tight in-water work window of just one-and-a-half months complicated the project even further.

Numerous stakeholders and review agencies were involved in the project, from city and state agencies to the Confederated Tribes and Bands of the Yakama Nation and the U.S. Army Corps of Engineers.

The completion of the flood-mitigation project not only brings stability to the city's stormwater infrastructure, reduces flooding and potentially reduces homeowners' flood insurance premiums in the long run, but it also provides habitat connectivity for fish and aquatic species within the Crystal Creek watershed.

The design team for Everett's Grand Avenue Bridge faced poor soils and a steep bluff.



PHOTO PROVIDED BY HWA GEOSCIENCES

FUTURE VALUE TO THE ENGINEERING PROFESSION

BEST IN STATE: GOLD AWARD

HWA GeoSciences

Project: Grand Avenue utility and pedestrian bridge
Client: City of Everett

The Northwest Everett neighborhood surrounding Grand Avenue Park sits along the brow of an 80-foot-high bluff with a commanding view of the Everett waterfront.

When it rains, however, residents' basements would often flood with raw sewage due to the lack of a combined sewer overflow outfall in the area. To fix the problem, a complex utility bridge would need to be built (which also included pedestrian access) to extend over the top of the bluff and railroad right-of-way below, ending on the west side of West Marine View Drive.

While designing a bridge to convey peak stormwater flows away from the neighborhood and still maintaining ADA requirements for the pedestrian element would be difficult, addressing the geotechnical issues involved would be equally challenging.

At the top of the design team's list of concerns was the unstable nature of the steep bluff near the eastern bridge abutment and the poor-quality fill — vestiges from land-modifying practices by operators of the area's historic timber mills long ago — in the vicinity of the proposed western abutment.

At the top of the slope, HWA's design of two drilled shaft foundation elements to support the eastern bridge abutment was critical. These 6-foot-diameter, 60-foot-deep drilled shafts were strategically spaced, at the top of the slope, to allow the two 36-inch CSO pipes to thread between massive elements and enter at the base of the bridge structure.

HWA designed the shafts to limit future slope instability that might reduce the foundations' vertical and lateral capacity. To further reduce the potential for slope instability, HWA specified the installation of a wire mesh retaining system across the slope. The wire mesh was anchored to the slope surface with 30-foot-long anchors to prevent the near-surface slope instability observed in the vicinity of the bridge.

The design for the western bridge abutment foundations possessed different challenges. Poor-quality fill and compressible soils required that the abutment be supported on deep foundations. However, the presence of potentially liquefiable soils that were expected to undergo lateral spreading as a result of an earthquake would exert sizable and damaging loads onto the proposed foundation elements.

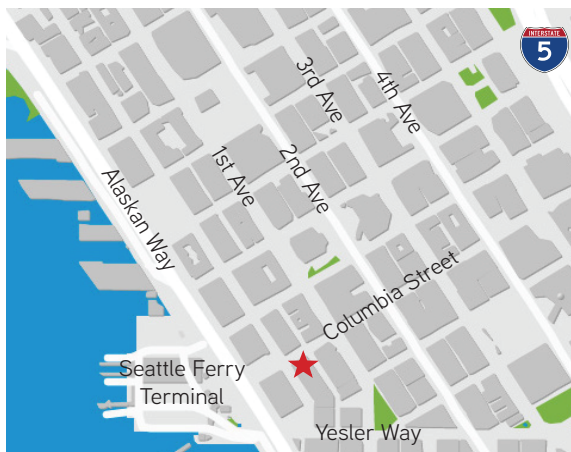
Rather than trying to resist these large lateral spreading loads with the structure or mitigate the onset of liquefaction with the use of expensive ground improvement, HWA recommended an innovative cofferdam structure that would result in the removal of potentially liquefiable soils.

With the new bridge structure now in place, peak stormwater flows are directed away from the neighborhood.

FOR
LEASE

JOURNAL OF COMMERCE BUILDING

83 Columbia Street, Seattle, WA 98104



Property Details:

- Approximately 9,630 SF available
- Rental rate: \$39.00/SF/Yr, full service
- Entire 4th floor with air conditioning
- Abundant natural light
- One block away from Seattle waterfront & Ferry Terminals
- Quiet open tech space
- High ceilings with exposed brick and wood beams

CONTACT

STEVE PELLUER
+1 425 453 3149
steve.pelluer@colliers.com

COLLIERS INTERNATIONAL
+1 425 453 4545
www.colliers.com/bellevue



COMPLEXITY

BEST IN STATE: GOLD AWARD

Otak

Project: Hayes Street regulator and CSO controls
Client: City of Everett

The Hayes Street regulator and CSO controls project was designed to address the number of combined sewer overflow events the city of Everett was experiencing at specific outfall pipes that direct CSOs to the Snohomish River. The Hayes Street project involved extensive modifications to existing pipes and structures composed of large flow-control structures and a new network of large-diameter sewer pipes.

Otak, serving as the project's prime consultant, oversaw a complex hydraulic analysis that involved modeling flow characteristics of multiple pipes and control appurtenances using both single event and continuous time series event storms. Components used included two existing flow-regulator structures, flows from an existing lift station, an existing siphon headworks structure, and three independent outfalls to the Snohomish River.

Adding complexity to Otak's effort was the project's relatively small site. The siphon headworks facility lies 12 to 15 feet below East Marine View Drive (the main road), with only a steep, one-lane access drive down to the facility.

Hayes Street extends from this main road down to a dead-end alley that abuts the city's siphon headworks site. Hayes Street was the only public road access in and out of the site, but using it as the main construction accessway for the duration of the project would have significantly impacted adjacent businesses,



PHOTO PROVIDED BY OTAK

presented added public safety risks and increased the contractor's traffic control costs.

To minimize these impacts, the Otak team designed a temporary access road across a city-owned parcel that was used as the principal construction access road.

While construction was under-

way, normal dry-weather flows had to be maintained and provisions had to be made to handle high flows that occur during heavy rains. Otak's team designed a complex sequencing plan that allowed building the improvements while bypassing or transferring flows to already-

constructed and accepted improvement elements. Additionally, Otak's design specified high-flow requirements for the contractor to provide additional standby pump capabilities when the forecast threatened rain and during critical portions of construction to avoid spills and

construction-related CSO events. The project design enhanced the performance of the existing network and achieved the city's goal of reducing CSO events to fewer than one per year.

Searching spec books has never been easier. **PlanCenter** covers the Great Northwest with projects located in **Washington, Idaho, Oregon and Alaska.**

PlanCenter.com Send us your plans, we'll post them.

PUBLIC AGENCIES POST FOR FREE

NATIONAL SILVER AWARDS

TRANSPORTATION

GEOENGINEERS

Project: Little Pilchuck Creek fish passage project
Client: Washington State Department of Transportation

STRUCTURAL SYSTEMS

HDR

Project: Northeast 45th Street east approach seismic retrofit
Client: Seattle Department of Transportation

SPECIAL PROJECTS

HDR, OTAK AND KPFF

Project: Fish passage enhancement program
Client: Thurston County Public Works

SUCCESSFUL FULFILLMENT OF CLIENT/OWNER NEEDS

BEST IN STATE: GOLD AWARD

Otak

Project: Swift Green Line
Client: Community Transit

The new Swift Green Line bus rapid transit service serves a customer base that was previously untapped. It is the first high-capacity, east-west crossing of Interstate 5 in Snohomish County, and connects Paine Field/Boeing Manufacturing and Industrial Center to the Canyon Park Regional Growth Center.

As prime consultant, Otak led the team that completed design and permitting and provided construction engineering support for Community Transit's newest bus line. Work included construction of 33 bus shelters, and roadway and queue-jump improvements.

Due to the project's location within a highly congested urban corridor, one challenge was minimizing the impacts of construction requirements for night work immediately adjacent to residential zones. From the beginning, Community Transit and the Otak team worked closely with the jurisdictions along the corridor to build strong support for the project and develop interagency agreements. The team worked with each jurisdiction to identify any construction work items that could occur

during daytime hours while minimizing traffic impacts and avoiding peak travel times.

In addition, the owner and the Otak team developed a noise-mitigation program for the project. This program included regular visits to adjacent properties throughout construction to provide detailed construction information to business owners, tenants and residents, and to offer mitigation measures such as white noise machines.

Throughout the design process, the Otak team closely monitored the estimated construction costs for the project to ensure the proposed improvements could be completed within the project budget. Project funding availability and the implementation schedule also did not allow for construction of dedicated transit lanes throughout the entire corridor.

In order to honor the need for transit speed and reliability throughout the corridor, the project team worked with the owner and the permitting jurisdictions to find cost-effective solutions to move Swift vehicles effectively through the corridor. These improvements included eastbound and westbound approach widening and queue-jump improvements at the 128th Street overcrossing of Interstate 5, and the addition of queue-bypass lanes at three other key congested intersections.



Work for the Swift Green Line included construction of 33 bus shelters, and roadway and queue-jump improvements.

PHOTO PROVIDED BY OTAK

SUCCESSFUL FULFILLMENT OF CLIENT/OWNER NEEDS

BEST IN STATE: GOLD AWARD

Reid Middleton

Project: Paradise Inn Annex rehabilitation
Client: National Park Service

The Paradise Inn had served Mount Rainier National Park visitors for 100 years, but time had taken its toll. The lodge's annex building was particularly affected, as it had not received the same upgrades in the past as the main building.

Winters brought snow deep enough to reach the building's third floor, causing crushing damage to the exterior wood wall and signs of wear to the exterior stone foundation. Additionally, the 97-room annex lacked a modern structural system to resist wind and earthquake forces and there wasn't a way to circulate fresh air, a necessity for modern facilities.

As the project's structural engineer for the seismic upgrade and repair, Reid Middleton designed a plan that would allow the building to meet modern building codes while retaining the historic materials and appearance of the national landmark.

The historic nature of the annex made performing upgrades particularly challenging. To address stringent historic criteria governing the appearance of the building's exterior, the team cataloged and removed each above-grade original stone that made up the foundation wall system.



The 97-room Paradise Inn Annex lacked a modern structural system to resist wind and earthquake forces.

PHOTO BY JEFF CAVEN

The failing system was replaced with modern reinforced concrete foundation walls, then the stones were later reinstalled at the same locations to precisely preserve the wall's original appearance. By all outside appearances, nothing about the stone wall has changed.

The design team got creative when faced with the placement of a mechanical penthouse over an existing stair tower — work that would need to be performed without changing the appearance of the historic structure. To pass the scrutiny of the historic architect, Reid Middleton inves-

tigated the existing attic on site and found a historic attic access opening that had been covered during a previous renovation project.

The location still included framing suitable for an access opening and was proposed for the new mechanical access location.

This option was accepted for the final design direction, providing a simple strategy that the park's historic architect approved.

Reid Middleton's detailed investigation work and careful design and planning of construction resulted in completion of the renovation work on schedule.

UNIQUE OR INNOVATIVE APPLICATIONS

BEST IN STATE: GOLD AWARD

Shannon & Wilson

Project: Baker dams landslide inventory and susceptibility mapping
Client: Puget Sound Energy

The Baker River Hydroelectric Project was constructed within the steep-walled canyon that carries meltwater and runoff from the flanks of Mount Baker and North Cascades to the Skagit River. The nature of the surrounding topography means there is significant potential for landslides that impose multiple hazards on the dams, reservoirs, facilities, on-site Puget Sound Energy personnel, and the inhabitants of Concrete who live below the dams.

Shannon & Wilson was hired by Puget Sound Energy to develop an inventory of landslides and debris flow fans. It then used this inventory to assess which slopes

are potentially the most vulnerable to failure.

Since the dams were constructed, slope failures have damaged or destroyed facilities, including the Lower Baker Dam powerhouse that was demolished by a landslide in 1965. In addition to direct impacts, landslides that fall into the reservoirs can trigger impulse waves that overtop the dams and cause dam damage or failure. Consequently, understanding the potential for reservoir slopes to fail is an important aspect of dam safety.

Shannon & Wilson's study examined areas where slopes have failed in the past — an indicator of areas where slopes may fail again. To effectively examine more than 300 miles of largely uninhabited, heavily forested terrain, the team used remote sensing data — high-resolution LIDAR — to map landslide and debris flows. From the LIDAR, digital terrain models were created to examine certain features

of these past flows.

The team was able to differentiate between different types of past flows — some more damaging than others. The team then divided the landslide susceptibility into high, moderate and low zones, and translated that information into a color-coded susceptibility map of the entire watershed area.

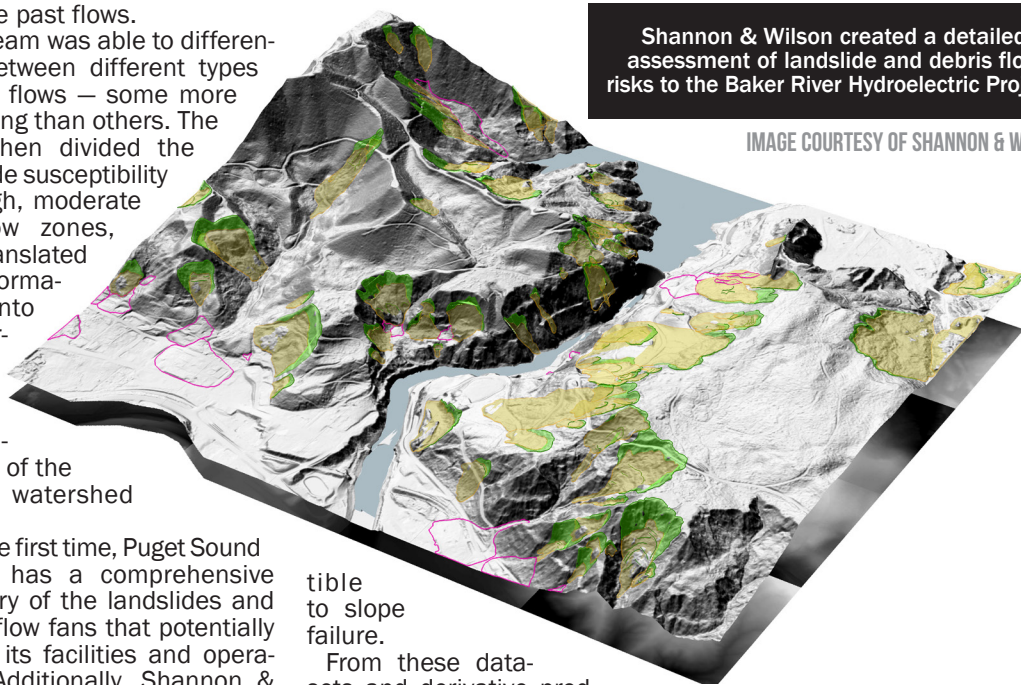
For the first time, Puget Sound Energy has a comprehensive inventory of the landslides and debris flow fans that potentially impact its facilities and operations. Additionally, Shannon & Wilson provided maps of most of the watershed areas where slopes are potentially suscep-

tible to slope failure.

From these datasets and derivative products, Puget Sound Energy can target areas of concern, plan slope monitoring projects and

Shannon & Wilson created a detailed assessment of landslide and debris flow risks to the Baker River Hydroelectric Project.

IMAGE COURTESY OF SHANNON & WILSON



incorporate landslide parameters in future remedial construction projects.

SUCCESSFUL FULFILLMENT OF CLIENT/OWNER NEEDS

BEST IN STATE: GOLD AWARD

Stantec Consulting Services

Project: Bill & Melinda Gates Center for Computer Science and Engineering
Client: University of Washington

The focus of Stantec's design of a power system for the new Gates Center for Computer Science and Engineering was reliability and redundancy.

While the classrooms serve as traditional teaching spaces, the labs within the Gates Center hold the research of hundreds of students and require a higher level of reliability than a typical building. Stantec was challenged to provide an appropriate electrical service configuration that didn't quite fit within the University of Washington's prescriptive design standards.

To serve the goals of the project and provide the most economical, reliable and space-considerate power system, Stantec stepped outside the university's typical service configurations. The team pitched the owner the idea of a simple, two-source spot network solution that provided high

reliability and utilized existing nearby campus primary feeders instead of pulling an additional third feeder.

This reduced the electrical room size by approximately 600 square feet. This is equivalent to the size of the wet laboratory, three faculty offices or a small student workroom in the building. Being able to give that space back to the students and faculty was a big win.

The layout of the electrical room was a particular challenge for the design team. The building is not a traditional shape, and many of the rooms are atypical shapes, including the trapezoidal-shaped electrical room. Although the two-source spot network service reduced space requirements, the code-required clearances around electrical equipment needed to have a path for equipment removal.

Stantec had to carefully consider how the room would be laid out. Additionally, the room is located below a coffee shop and between a mechanical room and large classroom, resulting in piping and ductwork to route through the limited floor space where electrical equipment could be located. The use of 3D modeling facilitated a fully coordinated MEP design within the uniquely shaped space.

The layout of the Gates Center's trapezoidal-shaped electrical room was a challenge for the design team.



IMAGE COURTESY OF STANTEC

ENGINEER OF THE YEAR

Dan Campbell GeoEngineers

Dan Campbell, chief operating officer at GeoEngineers, is Engineer of the Year. Campbell joined GeoEngineers in 1989 and has spent nearly his entire career at the company. He has served in various roles, including geotechnical group leader, assistant office manager, transportation market sector leader and, most recently, chief operating officer.

Campbell has played a central role in the success of GeoEngineers, seeing the firm through some of the most challenging points in its history. He assumed the role of COO in 2009 in the depths of the Great Recession. GeoEngineers' revenue, staff and offices were reduced by nearly 25% as he stepped into the role, but under Campbell's operational guidance, the company returned to profitability in 2010 and has thrived ever since. In the past eight years, the company has diversified and become a truly national firm.

Campbell's leadership has been key to GeoEngineers' growth, and the disciplined approach he brings to projects and clients is a central part of the company's identity. During his tenure at GeoEngineers, the company has developed a number of successful programs, including performance-based engineering, construction design, trenchless design, and design-build. The company has played a pivotal role in the development of downtown Seattle: since 2016, GeoEngineers has completed or is working on 117 projects listed in the Downtown Seattle Association's annual list of major construction projects — more than half of all projects and nearly double the number of its closest competitor.

Campbell has modeled a long-term, values-oriented business philosophy at GeoEngineers, and his thoughtful, ethical approach is embedded in the company's culture.

Many colleagues value Campbell's mentorship. He has demonstrated a willingness to share his knowledge and experience about what has worked — both technically and in business — and he has mentored dozens of junior staff and future company leaders.

Campbell possesses a combination of technical skills and interests that have benefited clients throughout Washington, the country and the world. He is a senior principal geotechnical engineer and seismic engineering expert with extensive project experience in structures, dams and roadways. Campbell's vast experience with seismic engineering made him a key member of teams that completed reconnaissance after the Nisqually earthquake in 2001, the Taiwan earthquake in 1999 and the Northridge earthquake in 1994.

Campbell has been active in ACEC Washington for more than 20 years, serving most recently as board chair in the 2018-2019 fiscal year. In his various roles with the association, Campbell has addressed and led wide-ranging discussions on topics relevant to the engineering profession, helping build consensus and benefiting the industry.

Larry Swartz, CEO, president and principal at Notkin Mechanical Engineers, recalls some of Campbell's contributions.

"Dan is active in advocacy for the engineering community," said Swartz. "He reviews contract language and other legal documents that will have impacts on the engineering community, and is always there to assist in interpretations and opinions on how ACEC can fight the battle for the engineering companies they represent."



RED'S
F L Y S H O P
(509) 933-2300
14706 Hwy. 821
Mile Marker 15 -
Ellensburg, WA 98926

Fly Fishing
Sporting Clays Course
Canyon River Ranch Lodging
Cycling, Hiking, and More

Escape
Two Hours from Seattle

INCLUSION AWARDS

Three ACEC Washington firms have taken home the association's Excellence in Inclusion Award. The award honors ACEC member firms that are champions in advancing diversity and fostering a culture of inclusion within their workforce, their teams and the clients they serve.

Applicants were judged on corporate commitment, workforce diversity and business diversity.

MIDSIZE FIRMS

KBA

KBA actively practices a culture of inclusion and looks for opportunities to reach out and engage small and disadvantaged firms. The company's engagement practices include keeping an active roster of S/DBE subs and their services, attending industry events aimed at S/DBE inclusion, soliciting S/DBE subs on its website, and actively seeking out formal mentorship roles.

KBA seeks to include women and minorities into its recruiting, training and promotional practices. Both women and minorities are represented in firm leadership positions.

Another way KBA helps promote inclusion is by offering internships to college students and recent graduates. KBA had three such paid positions in 2019, two of which were filled by women/minorities.

In 2018, KBA utilized 18 S/DBE firms for a total of more than \$1.2 million, representing 8.5% of the company's gross revenue.

KBA has a standard policy of offering one-on-one business leadership mentoring to the leadership of all its subconsultants. KBA makes this commitment in all teaming agreements and highlights it in its proposals.

Coughlin Porter Lundeen

This past year, Coughlin Porter Lundeen developed a program around bystander

intervention. Learning objectives include promoting a culture of shared responsibility for the well-being of the workplace, increasing awareness of questionable or unacceptable workplace behavior, and increasing knowledge and skills for employees to effectively intervene when they recognize behavior, language or interactions that are questionable or problematic.

The company encourages both formal and informal mentoring, and recently launched a program that supports this by introducing company-funded coffee cards that staff can use to invite their mentor or project manager to coffee. This provides staff a way to engage and take more ownership of their career progression through spontaneous conversation.

Nearly half of Coughlin Porter Lundeen's engineers with less than 10 years of experience are women. The company-endorsed Women's Leadership Group determines priorities, gathers feedback, and works to understand how to create a better workplace environment for this large group.

Coughlin Porter Lundeen offers an enhanced intern program that reaches far beyond errands and filing. The firm's goal is to give interns a realistic and comprehensive understanding of the architecture/engineering/construction industry while allowing them to explore the areas of engineering that interest them the most.

LARGE FIRM

HNTB (Bellevue office)

HNTB promotes diversity through its work with several partner organizations.

Once a month, a group of HNTB engineers from the Bellevue office shares their career experiences and presents on different topics to students from Franklin High School in Seattle and Sammamish High School in Bellevue. This group recently sponsored a WTS field trip that highlighted some of the firm's major projects to high school girls interested in pursuing this field as a career.

HNTB is active in other groups that advocate for employment diversity, including the Washington chapter of the Conference of Minority Transportation Officials, Tabor 100, and the Washington State Opportunity Scholarship organization.

HNTB is committed to diverse representation at all levels of its office in Washington state and throughout the firm. As part of this commitment, HNTB Bellevue has established a senior-level task force dedicated to promoting diversity and inclusion.

HNTB offers flexible work arrangements and creative benefits. For instance, several leaders within HNTB allow employees to work flexible or part-time hours with prorated benefits, including health insurance and the accrual of paid time off for vacation.

BEST IN STATE

SILVER AWARDS

FUTURE VALUE TO THE ENGINEERING PROFESSION

CARY KOPCZYNSKI & CO.

Project: Circa
Client: Circa 1200 LLC

COMPLEXITY

J-U-B ENGINEERS

Project: Felts Field Fuel Facility replacement project
Client: Spokane International Airport

SUCCESSFUL FULFILLMENT OF CLIENT/OWNER NEEDS

DOWL

Project: Runway 11/29 rehabilitation
Client: City of Arlington

SUCCESSFUL FULFILLMENT OF CLIENT/OWNER NEEDS

NOTKIN MECHANICAL ENGINEERS

Project: Concourse D Annex, Sea-Tac Airport
Client: Port of Seattle/HOK Architects

UNIQUE OR INNOVATIVE APPLICATIONS

HARMS ENGINEERING

Project: Alternative to IRC minimum footing size
Client: Home Builders Association of Tri-Cities

SOCIAL, ECONOMIC AND SUSTAINABLE DESIGN

NOTKIN MECHANICAL ENGINEERS

Project: Denny Substation
Client: Seattle City Light/Power Engineers

BRONZE AWARDS

FUTURE VALUE TO THE ENGINEERING PROFESSION

DOWL

Project: U.S. 2 roundabout
Client: Costco Wholesale

COMPLEXITY

NATURAL SYSTEMS DESIGN

Project: Clarks Creek channel and bank stabilization
Client: Puyallup Tribe of Indians

UNIQUE OR INNOVATIVE APPLICATION

RHC ENGINEERING

Project: Post Avenue Bridge removal
Client: Seattle Department of Transportation

SOCIAL, ECONOMIC AND SUSTAINABLE DESIGN

HDR

Project: McKittrick Street rebuild
Client: City of Wenatchee

ACEC

American Council of Engineering Companies
of Washington

Why should your firm be a member of the American Council of Engineering Companies of Washington?

**It's Simple.
Ask our Members!**

- ✓ ACEC Washington is the primary advocate for the protection and promotion of your business interests
- ✓ ACEC Washington is your primary resource for business practice information and education
- ✓ ACEC Washington is the voice of the consulting engineering industry in Washington State

ACEC

American Council of Engineering Companies
of Washington

1621 114TH AVENUE SE SUITE 115 BELLEVUE, WA 98004
425.453.6655 | ACEC-WA.ORG

**Improving the Business
of Engineering!**

One of the primary functions of ACEC of Washington is to lobby the Washington State legislature on behalf of the engineering community, with a view towards obtaining favorable outcomes to proposed new legislation affecting engineering firms throughout the state. Becoming a member of ACEC of Washington is definitely a good investment!



Barry S. Knight, PE, President/CEO, CTS Engineers



Our ACEC of Washington membership is a valuable, year-round resource worth much more than the annual membership fee. We've posted local openings on their job board, sent new managers to the Core Competencies for Professionals series, and brought contracting and funding concerns to their attention with positive results.

Kristen A. Betty, PE, Chairman of the Board, KBA, Inc.

Through the efforts of ACEC, we continue to build paths that help us collaborate more successfully with our clients and be more innovative on the projects we help develop for our communities. ACEC is the voice that represents our collective business interests.



Mike Clark, Transportation Group Manager, David Evans and Associates, Inc.



I am a member of ACEC of Washington because advocacy for small engineering firms has never been more important. ACEC provides invaluable tools, information and networking opportunities to help my business thrive in a highly competitive, rapidly evolving market.

Robin Kirschbaum, PE, LEED AP, ENV SP, President, Robin Kirschbaum, Inc.

ACEC provides advocacy to consulting engineering firms on issues that are of critical importance to our industry.



Roger W. Flint, President/Chief Operating Officer, Parametrix