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“Based on what I’ve seen over the past year from ARTBA’s volunteer leaders and other active members, we are well-positioned to manage the crisis while building the future.”

ARTBA Chairman Steve McGough, p. 6

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"Transportation Builder" (TB) is the official publication of the American Road & Transportation Builders Association (ARTBA). We bring together all facets of the transportation construction industry to responsibly advocate for infrastructure investment and policy that meet the nation’s need for safe and efficient travel. ARTBA also offers value-added programs and services providing its members with a competitive edge. TB is the primary source of business, legislative, regulatory, safety and economic news that matters most to transportation development professionals.

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Content & Advertising Support Welcome

This issue of Transportation Builder (TB) features a special 24-page pull out section: “Smart Design & Construction: Utilizing Innovation and Technology to Maximize Public Investment in America’s Transportation Network.”

Nearly two dozen transportation design and construction firms or public agencies, representing ARTBA’s diverse membership, contributed stories or advertising. We received more content than could fit in print, so some stories will be featured on our digital Washington Newline platform, newsline.artba.org, or will appear in future issues of TB.

We are always interested in content proposals from our members, especially about innovation, technology, and projects being designed and built to further ARTBA’s vision of “a dynamic transportation network that enriches American life.”

We also want to promote the great work of our industry through construction photos using the hashtag #transportationconstructioniscool across our social media platforms. These images also will be considered for the magazine’s annual “Through the Lens” feature, publishing this fall.

Email 300 dpi, jpg images to Carrie Halpern, ARTBA’s senior communications and marketing manager, at: chalpern@artba.org. Please:

- include some details about the project, such as the location and public agency partners; and
- check that workers and equipment reflect required safety measures.

We’ve begun to combine Newsline stories with these social media presentations, such as a July 28 post that featured the work of members Wagman Inc., WSP USA, and Modjeski and Masters.

We are also encouraging members to consider our “paid content” option, which can be seen in this special print issue and on the Newsline website. It combines narrative product and services descriptions with display advertising.

We also have improved the online version of ARTBA’s Buyers’ Guide, found under the “News” tab of artba.org. Please contact Dave Weidner at 202.683.1026, or adsales@artba.org, to discuss options and rates.

Finally, special thanks to our regular and new advertisers, online and in print. Your support during this difficult year is greatly appreciated.

EDITOR’S NOTE
MARK HOLAN | Editorial Director
“The historic challenge for leaders is to manage the crisis while building the future.”

This sentiment from Henry Kissinger in an April 3 Wall Street Journal op-ed about how national leaders should prepare for a new world order resulting from the coronavirus resonated with me when thinking about ARTBA’s new strategic plan.

Since COVID-19 brought major sectors of the economy to a halt beginning in mid-March, ARTBA’s staff and volunteer leaders have been working overtime to provide value-added services to help the industry navigate these uncharted waters.

At the same time, we’ve remained mission-focused, advocating for congressional action to stabilize state highway programs reeling from virus-related declines in user fee revenues, and pass a long-term surface transportation bill.

In the middle of the pandemic, the association’s volunteer leaders have also been looking to a better future.

Setting and pursuing goals is a hallmark of high functioning enterprises and it’s a process most ARTBA members utilize in their own businesses. For a national association, the strategic plan institutionalizes a process of membership engagement and outcome-oriented decision-making to help ensure the success of ARTBA and our industry in the years to come.

ARTBA’s Board of Directors June 25 gave its unanimous approval to the strategic plan, which will guide our comprehensive program of work through the end of 2022. As a national advocacy organization, the plan’s five objectives shouldn’t be a surprise. They include:

1. **Transportation Funding:** Achieve long-term, sustainable and secure funding for transportation infrastructure.

2. **Regulatory Advocacy:** Increase resources and expand direction for ARTBA’s regulatory advocacy.

3. **Membership Growth:** Significantly increase financial support from existing members and new members over three years.

4. **Policy & Issues Forums:** Develop cross-divisional discussion forums and policies addressing risk allocation, project delivery, safety and technology. See related story on the new forums on page 10.

5. **Value-Added Member Services:** Focus rigorously on programs and services that are mission critical.

The plan’s objectives are the result of 10 months of work from the Strategic Planning Committee (SPC) and quantitative and qualitative research from the board. The SPC had a good mix of association veterans and new leaders. Their deliberations were forward-looking, spirited, and healthy expressions of diverse perspectives—all of which helped make the final product better.

We owe a huge debt of gratitude to SPC Co-Chairs Ward Nye (Martin Marietta Materials) and Tim Duit (Duit Construction) and the 15 other committee members—see opposite page—for their leadership and collaboration.

Now, the hard part begins with the plan’s implementation. Achieving some of the objectives will be a heavy lift given the current economic and political climate. But, based on what I’ve seen over the past year from ARTBA’s volunteer leaders and other active members, we are well-positioned to “manage the crisis while building the future.”
## STRATEGIC PLANNING COMMITTEE LEADERS

### Co-Chairs:

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<td>President &amp; CEO</td>
<td>Martin Marietta Materials</td>
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<td>Tim Duit</td>
<td>President</td>
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<td>Sofia Berger</td>
<td>Senior Vice President</td>
<td>WSP</td>
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<td>Jeff Clyde</td>
<td>President</td>
<td>Clyde/Geneva Group</td>
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<td>Brian Ness</td>
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<td>Ramin Younessi</td>
<td>Group President, Construction Industries</td>
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If you had told me last year that the director of the National Institute of Allergy and Infectious Diseases would be throwing out the first pitch of the Major League Baseball season in July, I would have had more questions than answers. But Dr. Anthony Fauci’s first pitch highlights how the nation is both struggling and persevering amid the rigors of the COVID-19 pandemic.

This ceremonial activity—often reserved for political leaders, celebrities, and armed service members—was performed four months later than usual, and Dr. Fauci’s wayward pitch may be the most fitting metaphor yet for 2020.

After five months of uncertainty, sheltering-in-place, and new safety protocols, there is no doubt the coronavirus has disrupted virtually every corner of the American way of life. There is a big difference, however, between disruption and defeat.

Whether it be sports without fans in the stands, the continuity of essential services, virtual classrooms or exponential growth in teleworking, our nation has been remarkable in creating new paths forward for a wide range of activities previously taken for granted.

The foundation of this adaptability has been a willingness to accept that the things we want and must do will—for the time being—need to be done in a different fashion.

Resilience in the face of adversity has long been a core competency of the transportation construction industry. That strength has certainly been needed in 2020.

ARTBA members continue to adjust their practices in the wake of COVID-19, as chronicled in Rich Juliano’s regular reports. Project owners and the private sector are partnering to deliver transportation improvements, while protecting the health and safety of workers and the travelling public.

ARTBA members AECOM, Trimble, and Sterling Construction Company described during a July 8 webinar how their businesses have evolved as they have encountered different stages of the pandemic. Panelists discussed best practices for the new normal, like return-to-work protocols, expanding work from home, and how the industry is helping public agencies return to service.

Like our members, ARTBA continues to fulfill its mission throughout 2020, albeit in new and different ways. Instead of a traditional May board of directors meeting in the nation’s capital, we conducted a virtual board meeting June 25 where the association leaders discussed our ongoing push for increased federal transportation investment. The board also unanimously approved a three-year strategic plan.

This event complemented earlier sessions where ARTBA members received a Capitol Hill update from White House Legislative Affairs Director Eric Ueland and supporters of ARTBA’s political action committee received an overview of the 2020 elections from the Cook Political Report’s David Wasserman.

In July, both the annual Transportation Investment Advocacy Center Workshop and Public Private Partnerships in Transportation Conference were conducted through an interactive, online platform. Over 300 participants received the same high-quality content they have come to expect with a wide array of public and private sector experts sharing current developments in the funding and delivery of transportation infrastructure projects. Several participants remarked their ability to interact and network with fellow attendees exceeded their expectations for a virtual conference.

The one certainty after the last five months is the next five months will bring even more unforeseen developments.

Regardless of what comes next, two things will not change: the nation will continue to need improvements to its transportation infrastructure network; and ARTBA will remain nimble and innovative in supporting the delivery of those improvements.

Thank you for your continued support, engagement and partnership in these challenging times.

Resilience in the Face of Adversity
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Councils, committees and task forces have formed an integral part of ARTBA’s organizational fabric for decades. While these entities have facilitated valuable policymaking by members, they have also served as entry points for volunteer industry advocates. Many of them have stayed engaged with ARTBA through the years, rising to important leadership positions.

For all these reasons, as ARTBA’s Strategic Planning Committee (SPC) carried out its work earlier this year, its members wanted to review and make recommendations to modernize the association’s governance structure. The result, as reflected in the strategic plan unanimously adopted by ARTBA’s Board of Directors in June, is a new concept: the Forum.

These entities will focus on key policy priorities reaffirmed by the SPC: Construction, Innovation & Technology, and Safety. Collectively, they provide a new path for members to collaborate on policy development, and share information and best practices. And they represent an approach beyond simply reorganizing ARTBA’s committees.

**Why “Forums?”**

Here are some important objectives the three forums will accomplish:

- Empowering policymaking through task-oriented groups, focused on a specific mission and set of issues within a defined time frame.
- Inviting and easing participation by members from all eight ARTBA divisions.
- Providing organizational flexibility to address both perennial and emerging industry issues. Facilitating the sharing of division-specific policy concerns with members of other divisions.
- Achieving consensus on important issues from across the membership, representing the diversity and common interests of the transportation construction industry generally.
- Helping further the next generation of advocates and leaders.
- Streamlining the roster of inactive or minimally-active councils and committees by merging and eliminating them as needed.

“The name ‘forum’ is purposeful,” says Rich Juliano, ARTBA’s general counsel. “We want members to feel welcome participating and sharing their views, without the formalities that sometimes come with the older committee structure.”

“The forums will facilitate open, vibrant conversation,” he added. “They will be akin to ‘umbrellas’ covering their respective policy areas, but not ‘silos,’ since forums will collaborate on issues of common concern when appropriate. Moreover, the forums are not a substitute for ARTBA’s eight membership divisions, which will remain as home base for the member segments they represent.”

**Launching the Forums**

Each forum has a chair or co-chairs, and a principal staff person, and a steering committee, with at least two representatives from each of the divisions.

Each forum will launch with a dedicated, virtual meeting this September. Check artba.org and the Washington Newsline for dates and details.

Some committees, councils and task forces are being merged into the forums. Others are being eliminated. Even more importantly, each forum will have the ability to create a new committee, task force, work group or even a smaller informal collection of members to review a specific issue and report back recommendations as needed.

The meetings will feature outside presenters on select issues and ample time for internal discussion to set the priorities going forward. The forums will also help organize content for sessions taking place during major events, such as National Conventions, Federal Issue Programs and regional meetings.

It is important to note the forums will not absorb all existing councils and committees. Because of their uniqueness and respective purposes, the Industry Leader Development Council, Women Leaders in Transportation Design & Construction, and Transportation Investment Advocacy Council, will remain as currently structured.

Please review the leadership and structure of each forum.
**CONSTRUCTION FORUM**

**Co-chairs:**

- **Al Hoffman**  
  Road-Con Inc

- **Mike Mangione**  
  WSP USA

- **Ananth Prasad**  
  Florida Transportation Builders’ Association

**Staff Liaison:**  
Rich Juliano  
rjuliano@artba.org

Two co-chairs from the Contractors Division and one from the Planning & Design Division lead this forum. Pursuant to the SPC report, the initial focus will be risk allocation, working with subgroups from the Contractors, Planning & Design and Public Private Partnerships Divisions.

The Construction Forum will encompass the content of the former Contract Administration Committee, as well as the existing Environmental Committee, Bridge Policy & Promotion Council, modal councils and Transportation Law Committee. Its leadership will have the option of retaining committees or forming task forces or work groups in these policy areas. The Disadvantaged Business Enterprise (DBE) Program Policy Task Force, formed in 2019, remains. A new Workforce Development Council will also be based within the Construction Forum.

**INNOVATION & TECHNOLOGY FORUM**

**Chair:**  
Steve Berglund  
Trimble

**Staff Liaison:**  
Allison Klein  
aklein@artba.org

One chair or two co-chairs, one of whom will be drawn from the Materials & Services Division, will lead this forum. It will absorb the work of the recent task force on New Technologies, and focus on such areas as 3D technology, artificial intelligence, robotics, Unmanned Aerial System (UAS—commonly known as drones), and other innovations impacting transportation design, construction, maintenance and inspection.

It will also be home base for a work group monitoring state-level implementation of the repeal of the proprietary products rule. While ARTBA advocated for the repeal as a means of deploying safety enhancements and innovations on federal-aid highway projects, it is important that they do not lead to needless project cost increases. Through this work group, all interested members can share information as the repeal takes effect.

**SAFETY FORUM**

**Co-chairs:**

- **Former U.S. Secretary of Transportation Jim Burnley**  
  Venable LLP

- **Lee Cole**  
  CRH Americas Materials

- **Laura Huizinga**  
  Lindsay Transportation Solutions

**Staff Liaison:**  
Brad Sant  
bsant@artba.org

This forum will draw its leadership from the many safety professionals active in ARTBA. The co-chairs will be the president of the Traffic Safety Industry Division and the chairs of the Safety Committee and the Transportation Safety Advisory Council. Together, these three individuals will represent the major components of ARTBA’s array of safety activities.

A cross-divisional task force will assist the co-chairs in organizing and prioritizing the association’s safety initiatives. Under this structure, the two key existing entities referenced above, the Safety Committee and Transportation Safety Advisory Council, will be housed within this forum. Among other tasks, the Safety Forum will lead a review and update of the association’s safety policy statement, as well as ARTBA’s interactions with federal agencies.

It will also promote safety training and education, including participation in the Safety Certification for Transportation Project Professionals™ (SCTPP) program. As with the other forums, there will always be the option of spinning off additional task forces or work groups as needed.

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**GET INVOLVED**

All three forums are looking for volunteers from throughout the ARTBA membership. Feel free to contact the appropriate staff liaisons with questions and to join any of the forums of interest.
ARTBA’s National Convention

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In a year full of uncertainty, it’s fitting the fall congressional calendar is equally unsettled.

The annual transportation spending bill and the pending expiration of the current surface transportation law, the FAST Act, present opportunities to foster economic recovery through transportation infrastructure investment—if Congress seizes the moment.

Like all of us, COVID-19 upended Congress. Instead of hearings, roundtable discussions, and mark-ups, lawmakers were forced to focus on the pandemic and propping up the U.S. economy. With the FAST Act expiring Sept. 30, here is where things stand:

- **House of Representatives:** The Moving Forward Act, passed July 1 on a party-line vote, provides $1.5 trillion in infrastructure funding. A five-year, $494 billion surface transportation authorization bill is included.

- **Senate:** America’s Transportation Infrastructure Act was approved by the Environment & Public Works Committee in July 2019, but three additional committees need to add safety, trucking, transit and revenue components before the bill can reach the Senate floor.

- **Executive Branch:** President Donald Trump’s administration has developed a surface transportation proposal, but it is unclear when or if it will be made public.

- **State departments of transportation (DOTs):** States continue to face revenue losses due to falling motor fuels tax receipts. The American Association of State Highway & Transportation Officials suggested revenue losses may top $37 billion through FY 2024.

The other looming deadline is the annual appropriations bill, with current funding for the federal government expiring Sept. 30. Capitol Hill lawmakers will have no appetite for a government shutdown weeks before the national election. While the House has passed 11 of its 12 annual spending bills, the Senate has not taken up any, creating a tight deadline for getting legislation signed into law. The usual alternative is to pass a “Continuing Resolution,” which extends current funding levels for a specified time period.

Both chambers are eager to hit the campaign trail, particularly in the Senate, where Republicans’ majority is at risk. Democrats need to pick up four seats—or three seats, plus the White House—in order to gain control. At publication, seven Republican seats are considered competitive while only one Democrat seat is likely in play.

In the House, Democrats are expected to maintain control and could make modest gains. And with former Vice President Joe Biden (D-Del.) currently leading in most national and battleground state polls, the Democrats’ perceived strong position headed into the elections may make them less inclined to compromise with Republicans on anything not considered critical.

For more on the 2020 election and what changes to expect in the 117th Congress, watch for ARTBA’s 2020 pre-Election Guide, coming in October.

ARTBA will continue to work with allies on Capitol Hill this fall to help ensure action to secure federal assistance to stabilize state transportation programs, pass a multi-year surface transportation reauthorization bill, and the annual government appropriations measures.

Lauren Schapker is ARTBA’s vice president of legislative affairs.
A comprehensive safety training program for the transportation construction industry, including:

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For more information, contact Robinson Vasquez at rvasquez@artba.org or 202.289.4434
SMART DESIGN & CONSTRUCTION

Utilizing Innovation and Technology to Maximize Public Investment in America’s Transportation Network
# Smart Design & Construction:
Utilizing Innovation and Technology to Maximize Public Investment in America’s Transportation Network

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ARTBA Chairman's Message

FORWARD-LOOKING THINKERS DELIVER U.S. TRANSPORTATION PROJECT ROI

Welcome to “Smart Design & Construction: Utilizing Innovation and Technology to Maximize Public Investment in America’s Transportation Network,” a special Transportation Builder insert.

As the association’s first chairman from a construction software company, the editorial content really hits home.

Written by thought leaders reflecting ARTBA’s diverse membership, this publication highlights how our industry is deploying 3D digital modeling tools, robots and artificial intelligence, apps, software and other cutting-edge technologies and equipment in the planning and construction of the world’s safest and most sophisticated transportation network. In the process, it also provides a glimpse of what to expect in the coming years as we build infrastructure more efficiently.

Of course, the beneficiary of this work is the American public, whose tax dollars help finance transportation improvements.

ARTBA’s commitment to innovation and technology is nothing new. This year marks the 10th anniversary of the Dr. J. Don Brock TransOvation Workshop, which will be held Nov. 16-17 in conjunction with ARTBA’s Central and Western Regional Meetings. Participants and speakers will discuss the evolution of transportation in the era of COVID-19 and explore the future of work, funding, and mobility. This commitment also extends to the recently-approved ARTBA strategic plan, which features creation of the “Innovation & Technology Forum” to serve as an “idea and best practice incubator” in these areas. See the related article on page 10 of this issue of Transportation Builder.

We will be sharing this insert with members of Congress. Special thanks to all of our public and private sector contributing writers. You are helping advance ARTBA’s advocacy mission of educating policymakers and the public about the many benefits of transportation investment.

STEVE MCGOUGH | President & CFO, HCSS
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Contact Rick Stone for more information at 1-888-488-7446
When the Santa Clara Valley Transportation Authority (VTA) began considering a tunnel through downtown San Jose, California, in the early 2000s, twin-bore construction was the likely method.

Today, advancements in tunneling technology are allowing VTA to move forward with a $6.5 billion plan to construct a single-bore tunnel large enough to accommodate two trainways and station platforms. The relatively new method promises to minimize surface disruptions to downtown residents and businesses that will be virtually unaware of the massive construction project occurring below them.

Represents an Industry First
The VTA's proposed project would be a first for the U.S. transit industry. There is only one other large-diameter, single-bore transit tunnel in the world, in Barcelona, Spain. Other large-diameter tunneling projects have been successfully completed around the world, leading to increased confidence in the construction method, which allows owners to pursue these minimally invasive concepts.

Conventional subway construction entails the use of cut-and-cover techniques that involve removing the street surface, relocating and protecting existing utilities, and excavating from the street level. For example, using cut-and-cover techniques in San Jose would require the station excavation to be approximately 1,500 feet long, 60 feet deep, and extend from curb to curb on one of the city's busiest streets and downtown centers. Construction would be highly disruptive to daily activities and likely have devastating consequences for existing businesses and potential developments.

The large-diameter, single-bore tunneling method avoids most in-street impacts because the tunnel, trainways, and boarding platforms are constructed below ground within the tunnel. Modern tunnel boring machines (TBM) use "smart" technology that allow operators to precisely monitor and control ground behavior through pressurization, as demonstrated in the SR 99 tunnel construction in Seattle, to achieve nearly zero surface settlement and associated building/utility impacts.

Facilitates Economic Development
With the promise of the Bay Area Rapid Transit (BART) expansion service and minimal surface disruption during tunnel construction, development has begun to flourish in downtown San Jose. As it currently stands, many commercial, residential, and mixed-use developments have been planned around the future BART stations.

Simplifies Construction
The large-diameter, single-bore methodology minimizes surface disruptions, thus reducing environmental concerns and simplifying construction. With a single-bore tunnel’s off-street station entrances, the majority of station construction can occur independently from tunnel construction. Decoupling these activities allows the owner to issue separate tunneling and station construction contracts resulting in greater procurement and schedule flexibility.

Further, large-diameter, single-bore tunnels eliminate mined cross passages which accompany twin-bore tunnels—often one of the highest risk activities in an underground transit project. Excavation of cross passages sometimes cause severe surface settlements, sinkholes or inflows into the tunnel. A single-bore tunnel provides the ability to locate cross passages within the tunnel itself to connect adjacent trainways.

Some considerations on the single-bore concept include the limited number of contractors with large-diameter tunnel construction experience and higher capital costs for the TBM. However, depending on the project characteristics, a single-bore tunnel configuration can be cost competitive with a traditional twin-bore arrangement. With this developing
technology and increasing advances in TBM controls, it is critical to pay attention to contractor’s, designer’s, and machine manufacturer’s pre-qualification process as part of the tunnel contract procurements.

Positions the U.S. as a Leader

Single-bore tunnel construction can offer a number of environmental, community, and construction impact benefits and should be considered by any agency exploring an underground transit project. Demonstrating the single-bore tunnel’s viability in San Jose will serve as a model for other organizations exploring how to better construct infrastructure projects in cities.

Ronak Naik is a transportation engineer for the Santa Clara Valley Transportation Authority. Anthony Bauer, P.E., is West Region tunnel practice lead for HNTB Corp.

**Underground, from A-5**

The CatchNet® Arrestor System for Runaway Trucks is the result of years of Impact Technologies’ experience in the road safety industry. Mountain roads built with access to spacious areas can make the design of run out ramps quite simple, but areas of greatest peril rarely give engineers and designers the required space or “ride down” room.

Gravel systems require up to 1500 feet of run out room to safely decelerate a truck. More problematic areas with less space need a more flexible system with placement almost anywhere; not only saving lives, but also completely securing cargo.

The CatchNet® System is a series of nets set up between two TL-5 vertical profile barrier walls. The array of nets is designed to stop the vehicle in the specified distance allowed, while minimizing the deceleration forces on both the driver and cargo. The CatchNet® Systems utilize designs based on speed, weight and downslope and are generally 20 feet wide and 350 to 660 feet long.

Arresting cables like those on aircraft carriers are woven into a net attached to patented energy absorbers and distribute the force of an errant vehicle when it enters the escape ramp. The absorbers are primarily comprised of a chamber, a length of metal tape and a series of offset pins.

At impact, the metal tape is pulled through, and bends back and forth to its yield point. The process of bending and friction are the mechanisms that absorb the impact energy. Utilizing few moving parts, the absorbers are virtually maintenance free. Following a capture, the system is quickly returned to service by replacing the energy absorbers. Restoration time rarely exceeds two hours.

This design allows for vehicles weighing up to 129,000 pounds and travelling up to 90 mph to be stopped safely in under 600 feet.

**Company Profile: CatchNet® System**

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**PAID CONTENT**
Transportation design, construction, and system operations, like many other industries, are being transformed by the COVID-19 pandemic and governmental responses to the crisis.

Motor fuel taxes and toll collections have suddenly dropped to less than half of their budgeted levels. Transit farebox collections have decreased by 50 to 90 percent from anticipated levels. Sales tax revenues have declined over 30 percent, and even longer-term property tax revenue is anticipated to be affected with a softening real estate market.

Travel behavior is changing, too. There are potential long-term implications to telecommuting, the desirability of transit, shared rides, and demand for commercial space and mixed land uses.

We are facing a future that is both unknown and without contemporary precedent.

Some disruptions began before the pandemic. Since 1993, the last time the federal gas tax was increased, inflation has eroded 44 percent of buying power and the average fuel efficiency of a new car has increased 28 percent at the same time. The combination is making the motor fuel tax an unsustainable revenue source.

Technology is a disrupter, but also an asset during the pandemic. The ubiquitous webcam in laptops, once seen as an unnecessary feature or a security risk, today is as essential to many businesses as email and smartphones. It has enabled telecommuting to increase from single digit percentages shares to upwards of 90 percent of employees at large firms. Industry experts anticipate high rates of telecommuting will continue next year.

That impacts peak-hour travel. Technology has also streamlined toll and fare collections, with many operators converting to all cashless and touchless collections virtually overnight. Broad adoption of electronic toll and fare collection technologies opens the door to a more collaborative, seamless and customer-friendly approach to transportation payments.

For example, California and Minnesota are exploring the integration of road usage charges with shared mobility operators. The 15-state Road Usage Charge (RUC) West Consortium is advancing the state of the art for interoperability of these payments.

The Oregon Department of Transportation (ODOT) has pioneered the design for a mobility marketplace, which combines multimodal transactions into one customer account. ODOT’s open architecture accommodates road usage charges, future state tolling, urban congestion pricing and transit fare collection into an open system that preserves vendor options for not only the state but also the end customer.

Only with these advancements can highway and transit operators meet the growing demands for transportation in congested urban areas, coupled with the absolute necessity of providing for sustainable funding to address our aging systems’ asset management, rehabilitation and replacement.

Technology also has advanced our ability to manage traffic and transit operations. WSP has leveraged its global experience to bring the Australian Managed Motorways concept to the United States. This technology uses highly precise traffic sensors to provide for real-time flow management on freeways and predictive responses before the onset of congestion.

Now in development in Colorado, North Carolina, California and Georgia, this technology can provide the same capacity benefit as adding lanes to a freeway, but at a fraction of the cost and without community disturbance.

The road to post-pandemic recovery of transportation infrastructure is not clearly marked. We must be willing to take new turns, to find new sources of funds, and to use those funds better and more efficiently. The right road ahead includes applied technologies in revenue collection, RUC, mobility marketplaces, and advanced predictive traffic management.

WSP will continue to provide leadership in all these areas and help clear the path to recovery.

David Ungemah is national director for Transportation Operations Strategy at WSP USA.
In order to keep pace with aging infrastructure and growth, the transportation industry needs to continually bring innovative solutions to stakeholders and the general public. Advancement in digital innovations span across the spectrum of planning, design, and construction, as well as the operations and maintenance of infrastructure assets.

AECOM professionals have adopted an integrated approach to best leverage the most current digital technology tools. With many aspects of the nation’s infrastructure reaching the end of its as-designed life, and with the purchasing power of construction dollars continuing to be stretched, developing systematic processes for determining the most cost-effective infrastructure investment strategy is critical. At the same time, consideration of life-cycle asset management is key to successful owner stewardship of public dollars.

The use of Building Information Modeling (BIM) for infrastructure, or what AECOM calls Civil Infrastructure Information Modelling (CIIM), is a key focal point in our engineering services delivery. CIIM provides enhanced design, cost, and operational certainty through 3D data models of intelligent components. Lessons learned from the vertical construction industry can be applied to horizontal construction. Adopting this technology for civil infrastructure is essential to moving forward.

**Design Certainty**

3D technology and software have existed for decades. Introducing newer and more comprehensive technology provides enhanced design certainty (in particular for geometric aspects) on a project whether greenfield, brownfield, or existing conditions inventory and assessment. For example, BIM with LiDAR reality capture elevates the life-cycle management of the asset from the start. The next phases in this workflow—cost certainty and operational certainty—can be evaluated early and intelligently in the decision and analysis process. Geo-spatially referenced data capture of existing conditions and as-built geometry (via laser scanning and other methods) provides geometric accuracy and can provide component data for integration into the 3D data model, or what can be referred to as digital twin.

**Cost Certainty**

The workflow for design and construction needs to support all stages of the asset management process: condition assessment and data capture, data analysis, deficiency identification, cost estimating, capital investment planning and project prioritization, and OPEX budget modeling. In the past, complex tasks like organizational and operational planning, space optimization, and climate change resilience were time consuming, but with digital innovations, can be achieved much more quickly with more in-depth analysis.

Each of these variables can be connected to help inform capital project development and prioritization. Data mining schemes can provide outputs and relevant parameters can be selected to suit the needs of the owner. Providing the greatest level of interoperability between common data environment platforms for effective project collaboration and delivery is key.

**Operational Certainty**

The benefits of an innovative approach that includes digital and cost certainty from project inception will allow for more informed operational planning and life-cycle costing and budgeting. Advanced CIIM facilitates the study of multiple operations and maintenance options quickly using real-world simulated influences to find the optimum solution. Systems coordination can be accomplished utilizing CIIM and can provide the ability to produce quantity surveys, takeoffs, and cost estimates at any time during the asset’s lifecycle, helping an owner track, analyze and forecast quantities and costs more effectively.

BIM and CIIM centric approaches become the tie that bind. The digital collaboration of BIM and CIIM technology leaders, engineers, information technology specialists, systems and asset management analysts, constructors and operators, creates a holistic modelled system for reliable operational certainty of the infrastructure asset over the long term.

Innovative and advanced digital approaches for the inventory, planning, design, construction, and operations and maintenance of our infrastructure assets is essential. AECOM is proud to be a leader in the adoption and use of these technologies along with industry partners and infrastructure owners, with the best interests of the travelling public and users in mind throughout.

Michael Warren is director of digital practice & technology at AECOM.
Pittsburgh-based Advanced Construction Robotics (ACR) is bringing innovative robotics solutions to the transportation construction market and other building sectors. It’s the next step in the long-standing partnership of man and machine.

Last year, ACR introduced TyBot, a rebar tying robot initially designed to bulk tie the rebar for bridge decks. It was developed by Steve Muck, owner and CEO of Brayman Construction Corp. for over 25 years.

Using TyBot during horizontal bridge deck rebar installation can cut human worker hours in half. “TyBot is our first initiative to stop the decline of productivity on our job sites while addressing labor shortages at critical points during the annual construction cycles,” Muck says.

TyBot was used at the Koppel Bridge near Pittsburgh; the Central Susquehanna Valley Transportation project, about 80 miles north of Harrisburg, Pennsylvania; and in Tampa and Orlando, Florida. It will be used this summer at projects in Virginia and Michigan. There are currently seven TyBot robots.

In the third quarter, Muck and ACR co-founder Jeremy Searock will unveil a second autonomous solution for the heavy/highway sector.

See Robots, A-11
To learn more about TyBot visit: www.tybotllc.com

WE HAVE A PASSION FOR BUILDING

GREAT WORKS

Leading Bridge Builder Has Founded One Of The Most Innovative Technology Companies: Advanced Construction Robotics

Brayman Construction prides itself on it's ability to provide creative and innovative solutions to our customers, from start to finish, utilizing the latest technology and industry advancements.
Robots, from A-9

industry, called IronBot. It carries and places the rebar that TyBot secures on bridge decks using tie wire.

“Both robots are applicable to other horizontal reinforced concrete applications and plans are in the works to make modifications that will accelerate their use in ground slabs for the building market and the precast industry,” Searock says.

Shelby Erectors, Inc., of Davie, Florida, is among the specialty subcontractors that has used TyBot in its embrace of technology. “This doesn’t replace our workforce, it enhances it and supports us during the labor shortage,” company Vice President Jack Nix says.

Muck also has forged relationships with union leaders, including the International Association of Ironworkers (IAW). Its members tie rebar for the heavy construction industry, including bridge decks. The outreach has resulted not only in support for TyBot, but also financial investment in the technology by the Laborers’ District Council of Western Pennsylvania.

“We have partnered with the unions while performing many demonstrations for the contractor community at our frequent TyBot roadshows, including a stop at last year’s IAW’s annual training conference,” says TyBot Vice President Carson T. Carney. Most of his 25 years of construction experience has included working with IAW members on complex projects.

At the July 2019 IAW conference, General President Eric Dean said the union’s leadership wants to train its members to embrace the new technology. He explained if their members don’t embrace the technology, others will; the technology is a way to help labor shortages and gain market share by making their members more productive.

Searock notes that autonomous robots can work through extreme conditions, such as heat, rain, and cold, that put human workers at risk. And performing the same work with less man-hours through automating repetitive tasks statistically improves safety performance.

The productivity improvement of man and machine working together is substantial.

“The opportunity to perform twice the work in half the time will be hard to ignore,” he says. “We will continue to lead the way making new robots that will decrease the cost of infrastructure.”

Danielle Proctor is business development specialist at TyBot, LLC.
The way we move from point A to B continues to evolve. The global disruption caused by the COVID-19 pandemic has only accelerated that change. The immediate pandemic impacts on airline, transit, and roadway travel are clear as millions have sheltered in place. How quickly travel among these various modes will resume is less clear.

What does this mean for transportation technology and the adoption of this technology into our transportation systems? The current crisis may be seen in the future as a momentary pause, with technological progress picking up where it left following virus containment. Another scenario is market stagnation caused by abandoned plans as bruised governments and private industry try to avoid risk and focus on essentials rather than exploration and innovation. A more optimistic possibility is that we can seize this unprecedented opportunity to make progress by leaps and bounds and even discover innovative ideas that will change the world for the better.

Here’s what we might see in the coming months:

**A Surge of Electric Vehicles**
As traditional automotive manufacturers begin to recover from COVID-19, electric vehicles, with their simpler manufacturing processes, will accelerate. The trend towards electric vehicles will continue to be encouraged by new breakthroughs in battery technology and the experience of cleaner skies from reduced fossil-fuel burning vehicles. Expect increasing demand for new battery-charging infrastructure built near roads.

**Communications Technology for Vehicles Will Remain Uncertain**
For a decade, 75Mhz of the 5.9Ghz wireless spectrum has been reserved for Wi-Fi-based connected vehicle communications. Responding to an increased need for internet connectivity because of the pandemic, the Federal Communications Commission temporarily released 45Mhz of this spectrum for use as rural broadband access. If made permanent, this will accelerate the debate between cellular or Wi-Fi based protocols for connected vehicle communications, delaying widespread deployment of either technology. However, don’t expect resolution in protocols anytime soon as the debate will continue to persist for several years.

**A Lull in Automated Vehicles**
Expect things to go relatively “quiet” the rest of this year with respect to significant automated vehicle announcements. This is part of the natural lifecycle of technology adoption though it has been exacerbated by the COVID-19 pandemic and subsequent financial fallout. But look for the excitement to begin to rebuild in 2021 and 2022. Those planning, updating or constructing infrastructure should stick with the core tenets of future-proofing, such as preparing for significant data processing needs, incorporating dedicated power and communications, and including roadway navigation aids.

**Personal Mobility Expands**
Personal mobility devices will rebound and will continue to spread across the U.S. post-pandemic. However, expect companies to be more strategic and targeted in their rollouts. Beyond scooters, other types of personal mobility options will emerge such as “pod vehicles,” electric sitting scooters, electric mopeds, electric skateboards and more. Roadway designers will need to account for the mixed-use roadways needed in the next decade.

**Tolling Continues to Transform**
Tolling will continue its modern evolution. As a New York City central business district tolling launch looms, other cities will set the groundwork for their own cordon-based tolling programs. Discussions will also return to road user charging as an alternative funding mechanism. All-electronic tolling will continue gathering steam, accelerated by agencies seeking to reduce exposure risk of their employees and the public.

Ben Pierce is transportation technology program leader at HDR.
As society and industry grapple with managing the impacts of the COVID-19 pandemic, construction technology offers a good example of how state transportation departments (DOTs), producers, and contractors can adopt new ways to leverage technology to ensure employees and customers remain safe.

Over the past decade, the Federal Highway Administration’s (FHWA) Every Day Counts initiative has deployed innovative digital solutions, or e-construction, to help solve industry problems. FHWA’s focus on e-construction has led to changes in the way stakeholders build projects and communicate key data across the lifecycle of a project.

Innovating in a Crisis with e-Ticketing

By Matthew Valle
matthew.valle@haulhub.com

Trimble and Purdue University are partnering to develop a slowdown alert service that notifies commercial drivers to help reduce rear-end crashes, particularly in highway work zones. The service will interpret planned routes throughout the U.S. against real-time traffic incidents, such as roadwork and accidents, and slowdown patterns in order to understand congestion ahead.

It will deliver visual and audible in-cab slowdown alerts to drivers using the firm’s commercial navigation and driver trip planning apps, CoPilot Truck and MileOn by PC*MILER, or through telematics and electronic logging device (ELD) providers that integrate these apps. The service will also be available as a part of the Trip Management API in the Trimble MAPS Platform. Drivers can download premium subscriptions of CoPilot Truck or MileOn by PC*MILER in the Google Play or Apple App Store, which includes the slowdown alerts.

Smarter Technology

"We are big believers in the power of technology to empower drivers to make better, smarter, safer decisions on the road," said Dan Popkin, executive, Trimble MAPS Division. "We are enhancing our routing, scheduling, visualization and navigation platform to detect locations of work zone traffic queues throughout the U.S. to offer an advanced slowdown alert service to hundreds of thousands of professional drivers using our transportation-oriented solutions and in-cab truck navigation software."

In 2017, 18,000 total crashes in U.S. work zones involved trucks, according to the ARTBA-managed National Work Zone Safety Information Clearinghouse.

Rear-end crashes are the most common type of work zone crash and the majority of fatalities occur on roads with speed limits greater than 50 mph. Such crashes have killed more than 4,400 people and injured 200,000 others in the past five years, according to government data.

"Our research has shown that there is sufficient penetration of connected vehicles operating on highways that we can provide advance warning of interstate queues," said Darcy Bullock, professor of Civil Engineering and director of the Joint Transportation Research Program, Purdue University. "If we can communicate that information in a timely and non-distracting manner to commercial vehicles, this will provide an opportunity to reduce rear end crashes involving trucks."

Trimble said the slowdown alert service is expected to be available in the third quarter.

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Rishi Mehra is an executive at Trimble MAPS.

INNOVATING IN A CRISIS WITH E-TICKETING

By Matthew Valle
matthew.valle@haulhub.com

As society and industry grapple with managing the impacts of the COVID-19 pandemic, construction technology offers a good example of how state transportation departments (DOTs), producers, and contractors can adopt new ways to leverage technology to ensure employees and customers remain safe.

Over the past decade, the Federal Highway Administration’s (FHWA) Every Day Counts initiative has deployed innovative digital solutions, or e-construction, to help solve industry problems. FHWA’s focus on e-construction has led to changes in the way stakeholders build projects and communicate key data across the lifecycle of a project.

See e-ticketing, A-14
Electronic ticketing, or e-ticketing, is one area that has an immediate impact on reducing face-to-face contact. It provides the digital transmission of construction material data from producer to consumer. Many states are exploring e-ticketing options. For example, the Pennsylvania Department of Transportation (PennDOT) has several e-ticketing pilot projects, including resurfacing work in Allegheny County.

PennDOT facilitated this change by starting with a simple initiative, and adding small continuous improvements until it achieved the desired result. Such innovations have saved the agency more than $60 million since it began the initiative in 2013.

PennDOT’s leadership and innovation in e-ticketing highlight several benefits to state DOTs, producers, and contractors. These include:

- enhanced project documentation;
- tracked material yields;
- streamlined payment process with digital reconciliation; and
- integrated accounting systems.

Advances in cloud storage and computing are also helping the operators of asphalt plants, quarries, and ready-mix facilities integrate e-ticketing with their IT systems.

As all 50 state DOTs determine the most efficient path forward in safely transferring critical project data, cloud computing offers the opportunity to help unify and standardize how this information passes between public agencies, producers, and contractors.

The challenges of the COVID-19 pandemic provide an opportunity to reshape our thinking on how we transfer construction materials information from the plant to the field. This is likely to prompt even more innovation.

Matthew Valle is vice president of services at HaulHub Technologies.

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HaulHub Technologies is leading the digital construction revolution with integrated SaaS tools that allow materials producers, contractors and fleets to digitize their supply chain and enhance operational performance. HaulHub’s deep industry experience and passionate team are focused on leveraging the latest technological developments to help drive the industry forward.

HaulHub’s Field App provides crews with real-time visibility into fleet performance and offers in-app analytics to provide insight into overall job performance, with visibility down to the individual truck level.

HaulHub’s Web Portal enables office personnel to efficiently dispatch, monitor, and pay their truckers. Dispatchers can rapidly communicate job changes to their entire fleet of trucks in a single click. Whether paying by the ton or by the hour, the flexibility of the platform allows efficient payment and cost coding.

HaulHub’s robust timesheet solution system easily integrates into leading ERPs and provides daily fleet job costs to improve business operations. The HaulHub Carrier App provides fleets and drivers with the tools needed to accept jobs, monitor performance, and get paid.

HaulHub is revolutionizing the industry with its e-ticketing solutions: DOTslip and JOBslip, which provide digital materials tickets to asphalt, aggregate, and ready-mix consumers. These apps were built collaboratively with DOTs and leading materials producers throughout the US. DOT inspectors, and field crews now have a tool that allows them to safely and quickly accept delivery of materials, make project notes, and easily reconcile quantities through the DOTslip and JOBslip web portals, all without ever having to touch a paper ticket.

By combining their own deep industry experience with the expertise and feedback of leading producers and contractors, the team at HaulHub is solving some of the industry’s most complex problems and looks forward to building the integrated technology solutions that will push our industry forward.

Learn more at haulhub.com.
INVESTIGATING CONSTRUCTION MANAGEMENT SOFTWARE OPTIONS

By Greg Norris
gnorris@b2wsoftware.com

With most construction tradeshows and conferences cancelled due to COVID-19, software itself has become a leading venue for exploring software options. A growing number of contractors are connecting online with suppliers to evaluate the ROI value of new technology. Faster, more accurate estimating, operational efficiency and mobile capabilities are at the top of their lists.

Look for these four priorities:

Workflow Connectivity and Real-Time Data
Efficiency increases when applications for estimating and operations talk to each other. Estimating logic is visible to leaders in the field. Performance data can be used to adjust operations immediately. Repair requests, equipment moves, resource needs, inspection results and dozens of other critical pieces of intelligence can be communicated and seen instantly across workflows.

Enterprise-Class Performance
The architecture of the software should accommodate multiple users and run fast and reliably, without bugs. How aggressively a supplier keeps pace with technology and delivers updates are things to look for. Requirements also change, so contractors should make sure software can scale to meet future needs.

Construction Logic
Some applications are intuitive for accountants or IT pros, but contractors often complain the apps don’t match how they work in the field. Look for software that aligns with existing processes. A user interface that’s easy to learn and use is also essential, so users buying it can stay focused on construction, rather than getting software to work.

Support and Fit
Get a feel for the personality of the supplier, the expertise of its employees and how well they could work together with your team. Look for proven implementation and training processes and ask questions about support resources, such as how long it takes to respond to calls or resolve issues. References on support capabilities from existing users should be readily available.

Greg Norris is marketing communications director at B2W Software.

INNOVATE ITD CONTINUES TO PRODUCE BIG IDEAS & BIG SAVINGS

By Reed Hollinshead
Reed.Hollinshead@itd.Idaho.gov

Idaho is one of the fastest-growing states in the nation, with higher demand than ever on its transportation system of more than 12,000 lane miles of roads and highways, 1,830 bridges, and 31 backcountry airstrips. Like too many other states, however, funding hasn’t kept pace.

To help bridge the funding gap and encourage employee-driven solutions, the Idaho Transportation Department (ITD) in 2014 developed the Innovate ITD program, which helps the agency operate more like a business. It has turned 1,630 employee ideas into $11 million in savings. The innovations have benefited Idaho citizens and other users of the state’s transportation network. It also has improved trust, credibility, and confidence in the agency.

Employees are the driving force behind Innovate ITD. They create ideas and implement solutions. Workers at every level are encouraged and empowered to submit ideas to save time and money.

See Innovate, A-16
"When you trust your employees to be innovative and make decisions about how to do their jobs, they will do the right thing," says ITD Director Brian Ness. “To be the best and deliver on our mission, ITD harnesses the innovative spirit of our employees. Innovation allows us to change and get better.”

Three ideas have been recognized with American Association of State Highway & Transportation Officials (AASHTO) President's Awards:

• Combining 17 bridge repairs into one contract, saving $4.7 million in design and construction costs and shaving an estimated 17 years off the work schedule.

• Building nesting platforms for protected osprey to allow for bridge inspections.

• Deploying geocells to combat swelling and heaving in clay soils beneath the roadbed, the first U.S. use of this technique.

“ITD creates a culture where employees look for ways to innovate. This translates into better service for our customers,” Ness adds.

In addition to better service, the innovative effort by ITD helped the department earn the respect of elected officials. The Idaho legislature provided ITD with two transportation-funding increases in the last five years worth about $87 million after no investment boosts the previous two decades. ITD’s annual operating budget is about $750 million.

Another accomplishment has been seeing that a public agency can compete with the private sector. In 2016, ITD was one of three finalists for Idaho Innovative Company of the Year, sponsored by the Idaho Technology Council, a business advocacy group. It was the first time a public agency was named as a finalist, a feat that ITD repeated in 2019.

“Innovate ITD shows that a government agency can be just as innovative as the private sector and move at the speed of business,” says Ness. “By finding better ways to do our jobs, we put the focus on the customer and serve the citizens, not ourselves.”

Innovative solutions generated by employees help ITD better serve the citizens of Idaho with savings and efficiencies and deliver critical customer-service improvements. Visit the “Innovation” section of itd.idaho.gov for more details and videos.

Reed Hollinshead is public information officer at the Idaho Transportation Department.
THE INDUSTRY’S CHOICE FOR ELECTRONIC TICKETING

We power digital ticketing for producers, contractors, and DOTs nationwide.

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"I was out on a job a couple of months ago and noticed a superintendent and foreman working through problems that the project manager didn't even know yet because they were seeing the data first," said Jake Anderson, project controls manager at Austin Bridge & Road. “They are solving problems for us before it even gets to our financials. That is a transformational change for us.”

In the age of COVID-19, eliminating paper improves safety, too. Reducing the person-to-person contact of paper-based systems minimize the chance of spreading any virus. And safety advantages go beyond the current health crisis. For example, having someone standing among trucks on a busy site is dangerous. Recording truck tickets from a distance or without human intervention virtually eliminates that danger and decreases the time spent reconciling truck ticket invoices.

So why doesn’t every company go paperless? It’s a big change, to be sure, one that can seem daunting in the middle of coping with all the usual challenges faced by construction firms.

To help them manage, HCSS has developed a “Go Paperless in 30 Days” process. The goal is to eliminate paper with the least amount of distraction or disruption to the firm’s regular work. HCSS offers a 12-month money-back guarantee on new software if customers are not happy with the results.

We believe the cost is secondary, but we also know that conserving cash is critical at this time. Companies need a fast payoff on their investment. Having analyzed our customers with between 10 to 20 foremen, it typically costs between $3,500 and $5,500 per foreman for the first year and around $3,000 per foreman in subsequent years. This is the entire cost of the software divided by the number of foremen, not just the cost of the foremen. We would expect payback for the expense to occur within six months. Even better, the company is positioned for efficient growth.

HCSS has customers of all sizes. Our “Go Paperless in 30 Days” process is geared to companies with 30 foremen or less. Larger companies, especially those with multiple offices, will take longer.

Mike Rydin is CEO at HCSS.
The construction industry is entering the digital age. Technological innovation has transformed many industries—retail, auto manufacturing, media—but the construction and infrastructure segments of the economy have been slow to adapt, operating much the way they have for the past 20 years.

That is changing. Today's work sites include laptops and iPads, cell phones with GPS connections, augmented reality headsets making the workers look more like video gamers, and even a drone or two flying overhead. And for a variety of reasons, mostly health and safety related, the COVID-19 pandemic is speeding the adoption of many of these new technologies.

Digital construction technology offers the promise of building roads, buildings, and bridges faster and more efficiently than ever before with significant cost savings to contractors, owners, and, in the case of publicly-owned infrastructure, taxpayers.

"Today you can take a 3D constructible model of a bridge, incorporate it into an augmented reality platform like HoloLens glasses," Cyndee Hoagland, senior vice president of Trimble, told the California Transportation Commission in an August 2019 presentation. "Your field workers and your stakeholders can all be viewing that bridge, in a reality type environment to collectively identify where the problems are in real-time and make better, more informed decisions. This reduces rework and saves time and money."

The introduction of digital construction technology in the highway and bridge sector began in earnest more than 10 years ago. That's when the Federal Highway Administration (FHWA) began to encourage the adoption of innovative construction techniques through its Every Day Counts partnership with the states.

The Utah Department of Transportation became an early adopter of 3D modeling throughout the bid, design and construction process. Florida's DOT also began taking advantage of 3D data models and the benefits of automated machine guidance resulting in better quality roads, improved safety during the construction process and reduction in rework costs. Both state DOTs continue to lead in the pursuit of broader and more integrated application of digital construction technology, which can produce cost savings of up to 25 percent in major projects, according to The Boston Consulting Group.

The COVID-19 pandemic has introduced new challenges for the construction industry. In order to fully re-open our economy in a sustainable manner, industries will need to meet certain criteria and adhere to social distancing and other guidelines or risk shutdown and delays. Fortunately, the same digital construction technology already employed for remote worksite monitoring can be adapted to include features that address COVID-19 and any future outbreak. These technology-based solutions—including access control systems for worksite security, tracking worker time and attendance, safety compliance, and even drug screens and background checks—can improve transparency and keep projects operational while ensuring that proper health and safety measures are in place.

Congress has directed the FHWA to develop an incentive program to help accelerate the adoption of digital construction technology by public agencies at the state and county levels, technologies that have been extensively validated by DOTs through research as well as collaboration through the Every Day Counts partnership. With technology becoming less expensive and more user-friendly, now is the time for the construction industry and the owners of public infrastructure to take advantage of these advances and adopt these strategies as standard operating procedures.

Gregory Nadeau is founder and chairman of Infrastructure Ventures, a policy based market development business. He was the FHWA administrator during the Obama administration.
Q: The surface transportation system continues to undergo transformation, in terms of both the technology on our roads and the way the traveling public uses the roadways. How has U.S.DOT prioritized innovation to ensure we are prepared for the future needs of our transportation system while providing for the traveling public's safety?

CHAO: There is so much innovation going on in the transportation field today. Our mantra has always been: The Department needs to engage with emerging new technologies to address legitimate public concerns about safety, security, and innovation without hampering progress.

The Department is technology neutral—not top-down, command and control. That means the government is not in the business of picking technology winners and losers. Our goal is to enable the safe testing and deployment of a wide variety of new technologies, so communities and individuals can choose what fits their needs best. This employs a flexible, performance-based approach that protects safety while giving entrepreneurs the room they need to innovate and grow.

One example of how we are advancing innovation and improving safety and infrastructure is through our new pilot program designed to help avoid traffic accidents and save the lives of first responders by utilizing the 5.9 GHz Safety Band. Recently, the Department has announced its intention to invest up to $38 million in the First Responder Safety Technology Pilot Program, which will help equip emergency response vehicles and key infrastructure with vehicle-to-everything (V2X) communication technology.

Many of the new technologies are cross-modal, so in March 2019 the Department established the Non-Traditional and Emerging Transportation Technology (NETT) Council, which is a one-stop shop to make it easier for innovators and stakeholders to work with the Department. In July, the NETT Council released its “Pathways to the Future of Transportation” guidance document that lays out a process for innovators and stakeholders to approach the Department with their plans and proposals for emerging technologies.

The Department is also engaged in ground-breaking rulemakings that will create a path forward for some of the most advanced emerging transportation technologies.

Q: How is the Department preparing for the future of Automated Vehicle (AV) technology?

CHAO: On Jan. 8, I announced the release of “Ensuring American Leadership in Automated Vehicle Technologies: Automated Vehicles 4.0.” This document unifies AV efforts across 38 Federal departments, independent agencies, commissions, and Executive Offices of the President. It signifies that the federal government is all in for safer, better, and more inclusive transportation, aided by automated driving systems. It recognizes the value of private sector leadership in AV research, development, and integration.

Bringing to fruition the vast potential of AVs will require collaboration and information-sharing among industry partners, state and local governments, academia, non-profits, standards development organizations, and the federal government.

An example of such an effort by the Department can be seen through FHWA’s CARMA program. The CARMA program is a multi-modal research initiative focused on improving the transportation system by leveraging emerging automated driving technology and V2X technology to enhance safety, efficiency, and operational performance in moving people and goods.

Automated vehicles have the potential to save thousands of lives annually and restore mobility to millions of people who face transportation challenges, such as older Americans and people with disabilities.

And FHWA is pursuing an update of the Manual on Uniform Traffic Control Devices (MUTCD), the first major update in a decade. The updated version will reflect advances in technologies that are not currently represented in the MUTCD today.
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Unionport Bridge is a critical section of the Bruckner Expressway Service Road in the Bronx, New York. The roadway carries an average 55,000 cars and buses daily, and the bascule drawbridge allows commercial and recreational marine traffic on Westchester Creek.

Because of its critical transportation function, the 67-year-old bridge has been forced to remain in continuous service and never received major repairs. Now, it is being replaced by Schiavone Construction Co. LLC of Secaucus, New Jersey, and The Lane Construction Corp. of Cheshire, Connecticut, teamed as Unionport Constructors Joint Venture (JV), on behalf of the New York City Department of Transportation.

The main construction challenge of the $232 million project is keeping the busy waterway navigable and arterial route open while replacing the bridge. To accomplish this task required constructing two temporary bridges to maintain vehicle traffic, erecting the final bascule span in an open position, and finishing all work in the navigation channel within strict time limits.

The two vertical lift bridges are the first temporary hydraulically driven bridges in the United States. They were designed by Acrow Corporation of America of Parsippany, New Jersey.

The north bridge carrying westbound Bruckner traffic is 24 feet wide and has a 66-foot lift span supported by four lift towers housing the concrete counterweights and the hydraulic ram system. The lift towers are founded on a temporary support platform designed by UrbanTech Consulting Engineering, P.C. of New York, which is supported by the existing piers of an earlier bridge.

The south bridge carrying eastbound traffic is 30 feet wide with an 85-foot lift span and a 5-foot cantilevered walkway along the south edge of the bridge. The lift span is supported by four lift towers founded on a temporary steel cap beam system with eight, 54-inch shafts drilled into bedrock designed by GEI Consultants, Inc., P.C. of Washington, D.C.

The vertical lift bridges operate utilizing a hydraulic ram system connected to precast counterweights within each lift tower to raise and lower the span. It was designed to function in a “heavy span” condition under all operating conditions. The concrete counterweights are connected to the lift span via four cables in each corner of the bridge that are run through the lift towers and around a set of sheave cassettes that direct the wire down to the bridge corners for connection.

When the lift bridges are in the closed position, the hydraulic ram system is extended with the concrete counterweight to the top of the lift towers. During a bridge opening, the hydraulic ram is retracted to pull the concrete counterweight down within the lift tower to overcome the span heavy condition of the lift bridge, thus raising the bridge. In order to close, the hydraulic ram is extended under hydraulic control to raise the counterweight, thus lowering the span onto the bearings. A variety of limit switches, inclinometers, and tilt sensors assist the hydraulic controls system for the raising and lowering operations.

The lift bridges are operated from a control panel that operates the bridges in individual or dual span operations for any bridge openings. The hydraulic system, along with the bridge operations controls was designed, manufactured, and commissioned by Electro Hydraulic Machinery Co. of Hallandale Beach, Florida. The sequencing and installation of the system on site required several days of testing and configuration for each lift bridge to ensure the bridge opening operations ran in a smooth fashion.

The temporary lift bridges have been in service since December 2019 and are expected to remain operational until the third quarter of 2021.
Helping motorists see and stay in their lanes has been a challenge for road planners since the start of the automobile age. Solutions have evolved from simple painted white lines in the early 1900s to the range of retroreflective pavement markings on today’s roads. These critical pieces of transportation infrastructure are engineered for visibility by providing contrast with the road and reflecting light to drivers, whether that’s sunlight during the day or light from headlights at night.

However, research has revealed that pavement markings, even those made of retroreflective materials, are almost impossible to see in rainy nighttime conditions. Rain increases the risk of crashes by as much as 57 percent, according to a 2018 study.

Most people who have driven on a rainy night recognize the difficulties—surrounding objects are harder to see, headlights create glare, and standard pavement markings become virtually invisible. The primary cause of this is because mediums such as air and water bend light. This is measured using the refractive index, or RI.

The RI of air is just over 1, meaning that air bends light very little. In dry conditions, retroreflective pavement markings optimize the amount of light reflected back to the driver using spherical glass beads attached to the road using a colored binder. Water decreases reflectivity because its RI is 1.333, which means it bends and disperses light. When a standard retroreflective pavement marking gets wet, it reflects light from a vehicle’s headlights in a much broader, weaker cone. Less light is returned to the driver and the pavement marking becomes more difficult to see.

Wet Retroreflective Pavement Markings
In rainy nighttime conditions, pavement markings need to counteract the effects of water so drivers can see their lane lines. Manufacturers, engineers, and safety experts have developed wet retroreflective technology that helps make pavement markings more visible in all conditions—day or night, rain or shine.

Wet retroreflective pavement markings contain ultra-high RI optics specifically engineered to reflect more light in a narrower cone, optimizing visibility even when the markings are wet.

The Georgia Department of Transportation (GDOT) in 2012 started installing 3M all-weather pavement marking tape to reduce accidents on their roads—specifically in rainy conditions.

“The department made the decision to use 3M’s tape because it checked all the boxes—from a retroreflectivity perspective, from a longevity perspective, and from a lifecycle cost perspective—so that we felt confident that we were being strong stewards of taxpayer dollars,” said GDOT Traffic Engineer Andrew Heath.

Pavement marking visibility is also important to driver assistance technologies such as lane guidance systems, which use images from cameras. The effectiveness of these systems is jeopardized if markings are not visible to the camera in challenging weather conditions such as a rainy night. As more and more connected and automated vehicles find their way onto the road networks, wet reflective technology can help improve marking visibility.

Chris Edwards is global business manager, pavement markings, at 3M.
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Adam Maier, CSP
Corporate Safety Professional, Terracon Consultants, Inc.
Jeff Southard — A Highwayman Says Farewell

By John Schneidawind
jschneidawind@artba.org

Fifteen years at the helm of the Virginia Transportation Construction Alliance (VTCA) has given Jeff Southard a unique perspective on what works and what doesn’t in advancing transportation construction projects throughout the commonwealth. During that time, he transformed VTCA into a powerful voice for contractors, aggregate producers, engineers, suppliers and service providers who design, build, and maintain Virginia’s transportation network.

Fostering the state’s transportation infrastructure expansion through design-build projects and public-private partnerships (P3s) has been one of the key successes of his tenure. ARTBA interviewed Southard shortly before his Aug. 31 retirement. He is being succeeded by Gordon Dixon, former CEO of the Associated General Contractors of Virginia.

“Have watched the design-build and P3 programs maturing into the best in the country; that’s been the most rewarding,” says Southard, who was instrumental in working with state legislators to reform the process. “The Virginia Department of Transportation (VDOT) has been a national leader in both design build and P3 transportation infrastructure delivery methods and it was a true partnership in bringing these programs to maturity.”

In 2005, when Southard became VTCA executive vice president, funding for the commonwealth’s transportation network was not growing enough to keep up with public demand. Roadways needed improvement; a third of the state’s bridges were obsolete; and few multimodal transportation options meant that Virginians were wasting time and money.

Today, Southard points to a multi-billion-dollar transportation construction program that includes over $1 billion in design-build projects on the books and $10 billion in P3 projects. That’s quite a turnaround, fostered by Southard’s and VTCA’s ability to work with elected leaders to achieve consensus on funding initiatives and reforms to the design-build and P3 processes.

“Jeff’s ability to work with legislators and governors, as well as VDOT senior management has been outstanding,” said Ken Lanford, 2015-16 VTCA president. “I can’t imagine where our whole community of transportation and construction companies would be without his leadership.”

Southard says the design-build process in Virginia has succeeded because it gives contractors more flexibility in making decisions on projects, while at the same time assuming more risk. That required establishing a sense of common purpose between VDOT and contractors. To deal specifically with design-build delivery issues, VTCA and VDOT formed a committee that meets regularly to address implementation issues.

“It’s been a tremendous model, because decisions made in a vacuum on either side just won’t work,” Southard says.

Bringing together industry, business, community, and trade associations to educate, update and advocate for long-term, sustainable, transportation funding is another part of Southard’s legacy. He relates one conversation he had with a contractor from a large firm about VTCA’s value.

“He said, ‘We could afford to (advocate) but I don’t believe we would be as effective,’ as VTCA,” Southard says. “VTCA is able to bring 330 companies together and speak as one voice instead of 330 voices.”

Southard has been impressed by technology advancements in two areas: the ability to get more traffic capacity out of existing roadways, and global positioning system (GPS) technology to foster more accurate planning and construction.

Southard’s favorite project at VTCA was the construction of the Springfield Interchange that connects Washington, D.C.’s Beltway with Interstates 395 and 95 north and south. It was a complex project that included building new flyovers over the existing Interstate 95. That meant closing 95 to hoist massive beams into place at the interchange. The task came off without a hitch, he says.

To watch it happen was “like trying to put your pants on while you’re dancing,” Southard says.

John Schneidawind is ARTBA’s vice president of public affairs.
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8

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0

0

Editions of report distributed to industry leaders highlighting the virus impacts on transportation projects state by state

It started at 9 pages

It’s now up to about 410

1,100

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Visits to artba.org/coronavirus

5,850

19

Calls ARTBA has hosted with its 36 contractor chapter affiliates to share real time information about developments

65

Washington Newslines produced

3

issues of Transportation Builder

*Since mid-March
Highway Construction Shows Growth Over Summer, Revenue Concerns Continue

By Dr. Alison Premo Black
ablack@artba.org

Amid a historic decline in U.S. GDP and record unemployment, highway construction activity continued to show growth, with the value of work increasing 7 percent between March and June compared to the same four-month period in 2019.

Other markets that saw gains include airport terminal and runway work, transit and rail construction and ports and waterways spending. Bridge construction activity and work on transit and rail stations were down.

For now, states continue to get work into the construction pipeline. The value of state and local government contract awards between March and June for highway and bridge work was up 10 percent compared to the same time period in 2019.

While this is good news and the outlook over the next three months remains positive—there is ongoing concern in many states about the impact of a prolonged economic downturn on transportation revenue and capital spending.

At publication time, 16 states and 20 local governments and transportation authorities had announced project delays or cancellations valued at over $9.5 billion. This includes major program cuts in North Carolina and the cancellation of all lettings in Kentucky for May and June. Other states, such as Vermont, Mississippi, Pennsylvania, Wyoming and West Virginia have delayed state-funded projects. Hawaii and Ohio delayed major projects that were going to go out for bid this year.

Federal-aid Reauthorization
A wild-card impacting the future market is the reauthorization of the federal-aid highway program, set to expire on Sept. 30. Federal investment provides an average of half of state funding for highway and bridge programs.

Historically, an increase in federal transportation revenues and investment has spurred growth in highway and bridge construction activity by an annual average of 6 percent. By contrast, a one-time injection of federal funds after the 2008 Great Recession helped stabilize the market but did not result in increased activity. Despite the additional federal investment, it took eight years for state highway and bridge program spending to reach pre-recession levels.

As Congress debates the reauthorization of the federal-aid highway program, the decisions made about the program will have a significant impact on the future growth of the transportation construction market. But in addition to the immediate economic impact, the investment to improve our nation’s infrastructure—a key part of our supply chain—would support lower operating costs for many American businesses and help increase productivity.

Interactive Economics Dashboard
ARTBA’s Transportation Construction Market Intelligence Service helps industry professionals and analysts track contract awards by state and mode, as well as the value of construction put in place, and federal-aid highway program funds. Visit: economics.artba.org to subscribe.

Dr. Alison Premo Black is ARTBA’s chief economist.

This interactive tool allows users to easily identify and explore the benefits of federal highway investment and how states leverage those dollars to improve the nation's infrastructure network.

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NEPA Modernization Will Speed Transportation Projects

By Nick Goldstein
ngoldstein@artba.org

President Donald Trump in July announced a “top to bottom overhaul” of the National Environmental Policy Act (NEPA). The aim of the administration changes focus on the law’s original intent—assessing environmental impacts of major projects and actions supported by the federal government—instead of being used as a mechanism for causing delays and uncertainty in planning and building projects, including those in the transportation sector.

Modernizing NEPA has been one of ARTBA’s top regulatory priorities for decades. The association has championed reforms in multiple past reauthorization bills, presented congressional testimony, and worked with previous administration officials on the subject.

In January, ARTBA President & CEO David Bauer was at the White House when President Trump launched the NEPA modernization. Since then, ARTBA and its volunteer leaders have supported the administration with regulatory comments and public testimony.

The administration’s actions are the most significant regulatory upgrades to NEPA since the law was passed in 1969, when communications, technology, and public participation was much different than today. Adversaries have weaponized NEPA’s outdated review procedures to delay—often for years—or derail transportation improvement projects. Such delays and uncertainties add significant costs to these projects at a time when funding is constrained nationwide.

The changes will result in a more expeditious, while still thorough, review process, without impacting existing environmental standards. The new NEPA will not undermine environmental stewardship in planning transportation projects, which will still need to comply with all existing federal air, water, and other environmental regulations.

As the president said in July, NEPA modernization will not guarantee favorable decisions on projects, but it will greatly improve the process’ reliability and timeline. The new rule:

- Requires a single, final environmental document for projects involving multiple agencies. This mirrors Trump’s 2017 “One Federal Decision” executive order.
- Allows a lead agency to set a schedule for projects involving multiple agencies. The lead agency will also develop the “purpose and need” and “alternatives” for the project review.
- Requires all issues in litigation be raised during the comment process.
- Clarifies that the “effects” of a project must be “reasonably foreseeable and have a close causal relationship to the proposed action,” meaning a project is only responsible for those impacts it directly causes, as opposed to potential impacts that might occur in the future.
- Requires that alternatives to a project be “technically and economically feasible.”
- Allows for private entities to prepare an EIS under the supervision of a federal agency.
- Excludes non-federal projects and those with “minimal federal involvement” from NEPA review.
- Allows projects to “cure” NEPA violations while continuing to move forward, rather than be halted.

There is still work to be done. The projects that will benefit the most from these reforms are large, multi-year projects, such as new roads, bridges and transit systems. Such projects cannot be undertaken, however, until Congress passes a multi-year surface transportation bill and agrees on a stable funding source for the Highway Trust Fund. Without a reliable source of federal funding, states will not be able to undertake the types of projects these NEPA reforms are designed to help.

The NEPA rule will take effect Sept. 14. Multiple anti-growth groups have indicated they will begin litigation aimed at striking down the rule, so the industry should be prepared to respond legally.

Nick Goldstein is ARTBA’s vice president of regulatory and legal issues.
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Hydrogen-Powered Construction Equipment

According to a report by the OECD’s International Energy Agency, “supplying hydrogen to industrial users is now a major business around the world. Demand for hydrogen, which has grown more than threefold since 1975, continues to rise.”

JCB took a majority share in ITM Power—a producer of hydrogen-creating systems that create hydrogen from water. JCB recently revealed a prototype of a hydrogen-powered excavator. The 20-tonne 220X excavator is equipped with a hydrogen fuel cell system and has been undergoing testing on JCB’s proving grounds for more than a year.

Hyundai Construction Equipment announced they are also bringing a hydrogen fuel excavator to market by 2023. According to the company, hydrogen fuel cells are more compatible with large construction equipment because of easier capacity expansion than lithium batteries.

Keestrack Global Distribution Manager Michael Brookshaw announced at CONEXPO-CON/AGG that the company is investing into alternative power sources. He says the manufacturer wants to put hydrogen-powered crushers onto the market.

Diesel has powered construction equipment for decades; however, due to increased costs in resource extraction, environmental concerns, regulatory limitations and social trends, manufacturers are experimenting with other means of powering equipment.

Electric is popular for non-mobile, small mobile, indoor demolition, short-haul transportation and underground mining equipment, but it doesn’t meet the challenges for a lot of general construction applications.

In order to power large, mobile equipment in construction applications, manufacturers are investing in alternative fuel, such as propane, biodiesel and hydrogen.

Propane-Powered Construction Equipment

Propane has been used to power pavers for decades—not for environmental benefits or government regulations, but because it is more effective at heating asphalt.

For example, Bomag has designed the BW 120 AD-5 LPG tandem drum roller in diesel, electric and liquefied petroleum gas (LPG) models. The LPG model has been on the trade show tour since 2019 and had a big impact on audiences at CONEXPO-CON/AGG 2020, but it’s not commercially available.

“A proposed use for LPG-powered rollers would be in areas where emissions are critical and where the exposure to exhaust particles is very limited, which is an important concern when running construction equipment,” says Bert Erdmann, product manager, Heavy Compaction, Bomag Americas, Inc.

The LPG model produces less fine dust, carbon dioxide and nitrous oxide compared to diesel. It is 21 percent more powerful and LPG is up to 40 percent cheaper than diesel and gasoline.

Each tank of LPG can power the unit for up to five hours, so users will need to make only two five-minute tank changes throughout the day—at lunch and at the start/end of the day.

Renewable Synthetic Diesel/Hydrotreated Vegetable Oil

Bringing alternative fuels in closer reach, Volvo Construction Equipment made the announcement that all of its diesel-powered construction equipment can be fueled by Hydrotreated Vegetable Oil (HVO) without making any modifications to the engine.

HVO is different from other biodiesels in that it uses hydrogen—not methanol—as a catalyst. This produces propane, whereas when methanol is used as the catalyst, the product is glycerin. All oxygen is removed during the process of creating HVO and it isn’t as sensitive to heat or cold or sunlight as other biodiesels. It also performs similar to regular diesel, says the company.
2020 ARTBA Public-Private Partnerships in Transportation Award Winners

Two leaders and two projects were recognized with special awards July 16 at ARTBA’s virtual 32nd Annual Public-Private Partnerships (P3s) in Transportation Conference.

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Given to an individual who has made outstanding contributions to, and advocacy for, the forward progress of P3s in the U.S. transportation industry.

Louisiana Department of Transportation & Development Secretary Dr. Shawn Wilson

Dr. Wilson has been a tireless advocate for new revenue, maximizing federal dollars available to Louisiana, advancing a balanced and comprehensive transportation policy for the state, and ensuring the agency is more collaborative in its work at every level.

**Emerging Leader**
Recipient demonstrates contribution and advocacy to the forward progress of P3s, as well as outstanding promise for continuing service and leadership in the future.

Vice President of Project Management at ACS Infrastructure Development, Inc. (ACS) Noah Jolley

Jolley is responsible for multiple and parallel pursuits featuring dozens of equity, design and construction partners and advisors, and is highly skilled in bridging the commercial, legal, technical and financial components for these large, complex P3 transactions.

**Innovation of the Year**
Spotlights an idea within a P3 project that demonstrates how the development and/or application of new, innovative, and unique concepts help provide value for users.

Pennsylvania Rapid Bridge Replacement Project, Plenary Walsh Keystone Partners

The Pennsylvania Department of Transportation selected 558 bridges to be replaced as part of the largest ever multi-asset P3 to be awarded in North America. Plenary Walsh Keystone Partners was awarded the $1.12 billion Design Build Finance Maintain contract with price and schedule risk, and bridge maintenance requirements extending 25 years following construction completion. The project featured $899 million of design and construction works.

**Community Impact of the Year**
Recipient demonstrates economic, philanthropic, or humanitarian benefit to the public and an improved quality of life for the community and/or users of the asset.

State Street Redevelopment Project, West Lafayette, Indiana; Plenary Group

The $120 million project includes bike paths and pedestrian walkways, with a goal of enhancing safety for pedestrians, cyclists and drivers and de-emphasizing the use of State Street as the primary road leading to downtown West Lafayette and through Purdue University. The overall design repurposes the corridor with a focus on pedestrians, businesses and campus needs.
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