vhb viewpoints

BUILDING
a Sustainable, Resilient, and Equitable Future

RETHINKING
RESHAPING
REBUILDING

MEET OUR THOUGHT LEADERS

Kris Dramby, CWB, PWS, CE | *Energy Market Leader*

Kris is a visionary in the energy market, with a focus on **sustainable, clean energy** generation and implementation. He understands that today's energy is about diversity and alternatives, including **renewables** such as wind, hydro, and solar power. Kris' strategic problem-solving approach and commitment to **sustainable solutions** makes him a trusted partner to clients and colleagues alike.

Maxine Hill | *Previous Northeast Transportation Market Leader*

With experience delivering complex, high-profile infrastructure projects via design-bid-build and design-build delivery, Maxine is an advocate for advancing **alternative delivery methods**, addressing **technology challenges**, and creating project management best practices. She is also regarded as one of the most well-respected leaders, **champions for diversity**, and mentors in the AEC industry, and is a frequent speaker on the topic of bias in engineering.

Keri Kocur | *Chief People Officer*

Keri provides strategic Human Resources direction with a **focus on people**. She is a founding member of the American Council for Engineering Companies (ACEC) Design Professionals Coalition (DPC) Diversity and Inclusion Working Group, comprised of 22 ACEC member firms focused on **advancing diversity, equity, and inclusion** (DEI) at the corporate level across the AEC industry.

Dave Mulholland, PE | *Chief Technology Officer*

Dave's **technology-driven** career began more than 20 years ago, and he continues to provide technical guidance and experience in the **development of creative solutions** for public and private clients. With a passion for **innovation**, Dave is focused on providing strategic direction on key projects and helping clients become **future-focused** as they plan, design, and build communities for today and tomorrow.

Ryan Prime, ENV SP, LEED AP, WELL AP | *Sustainability Practice Leader*

Ryan is a passionate developer of **sustainable solutions for the built environment** whose experience spans from risk management and environmental compliance to contract administration and business development. An avid **navigator of stakeholders** at every level, Ryan's goal is to achieve consistent applications of sustainability that offers clients and communities **environmental, social, and economic benefits** through better solutions.

BUILDING a Sustainable, Resilient, and Equitable Future

How we live, work, and play is rapidly transforming. Environmental, social, and economic issues are top of mind, especially in light of the coronavirus and its consequences. Changes are affecting our daily lives—and will have lasting impact. As we look toward the future, there is opportunity for the AEC industry to reimagine the built environment for the better. Integrating robust public engagement, applying diverse perspectives, and harnessing the power of data and technology will help make our communities more sustainable, more resilient, and more equitable.

What will communities of tomorrow look like? While predicting the future is difficult, one thing is certain: change is the only constant. And with change comes opportunity. From renewable energy power, to better connected and accessible transportation networks, to more affordable housing, there are changes large and small that communities across the country can make to become future-focused and better prepare for tomorrow.

Technology is the gateway to creating smart communities**.** Leveraging the latest technological advancements, local officials and the residents they serve can together rethink, reshape, and rebuild their communities. Data is key to making informed decisions. For example, by analyzing data, we can predict where motorists are likely to drive under various scenarios—from detouring bottlenecks during rush hour to mandatory evacuation routes during extreme weather events. This technology helps predict, plan, and manage traffic.

But becoming future-focused is about more than just adding apps and widgets to our infrastructure. **Smart communities are interconnected—and are co-created with its citizens.** Innovation and technology are not the drivers; they are tools to help achieve objectives. To be truly prepared, all communities—from sprawling cities to rural towns—must work together to understand challenges and fundamentally transform key aspects of the built environment, from housing and transportation to water and electricity.

Future-focused communities build a foundation for success by addressing **Sustainability** | **Resiliency** | **Social Equity**

> Data is important for making informed decisions. From justifying the need for new developments, to identifying where infrastructure enhancements will do the most good, gathering and analyzing data is key to planning future-focused communities."
>
> **Dave Mulholland,** PE
> *Chief Technology Officer*

Sustainability

One of the most visible factors affecting societies is climate change, which has an ever-greater impact with each passing year. While pandemic lockdowns briefly reduced the number of cars on our roads and highways, temporarily cutting pollution, air quality suffered as economies reopened. And the planet is still warming at unprecedented rates. Extreme weather events have ravaged communities across the country, from hurricanes to wildfires, with many Americans now living in places totally unsuited to the rapidly changing environment.

While sustainability has been a watchword across government and industry for years, what does it mean to the AEC industry in practice? Too often, policymakers see sustainability as a short-sighted fix, promoting month-to-month stimulus spending or specific subsidies rather than focusing on the bigger picture—persistent climate change, economic inequality, and other deeply ingrained challenges. **Genuine sustainability is an ongoing practice, a philosophy to problem-solving, and one that requires analysis and work across industries, infrastructure, and stakeholders.**

Traditional environmentalism has often relied on asking individuals to simply do less—think using less plastic or driving to work less—than on asking industry and institutions how to improve things. But sustainability is about more than just protecting the environment.

A smart community focused on sustainability takes a holistic view and considers social, environmental, and economic issues while leveraging innovation to make long-term enhancements.

City of St. Petersburg, Florida

St. Petersburg is the first city in Florida and the 20th in the U.S. to commit to becoming completely reliant on sustainable energy sources. It is also one of more than 57 U.S. cities to sign the Chicago Charter, a commitment to further reduce greenhouse gas emissions. The City has pledged to become more resilient to the effects of climate change, such as sea level rise and extreme weather. As a blueprint for advancing sustainability and resiliency goals, the City developed their Integrated Sustainability Action Plan (ISAP) in partnership with VHB as the lead consultant. The ISAP establishes smart city goals and strategies for broad social, economic, and environmental sustainability with a focus on equity, livability, and resiliency. The identification of these goals and strategies is data-driven, informed by community input, and emphasizes the relationship between transportation, urban design, and health.

Sustainability through Innovation

Technological advancements are helping to boost sustainability across communities—and help citizens become future-focused.

[Water line breaks cost public utilities nearly $3 billion each year]. By equipping pipes with sensors, officials can precisely pinpoint the location and magnitude of a leak, saving money—and preserving supplies, which is especially vital in drought-ridden areas.

Technology can support the plastics industry's cyclical model, helping cut waste across sectors while creating economic and environmental benefits. One example is pyrolysis, which uses heat and the absence of oxygen to reconvert plastic waste back into liquid feedstock.

With rising sea levels, many coastal communities need strong defenses. Rather than simply using seawalls, buffer zones of vegetation require less maintenance. They also provide space for flora and fauna to flourish, promoting sustainability and creating an inviting landscape.

By installing filters and purifiers for rain water, neighborhoods can create personal reserves, reducing pressure on traditional infrastructure and boosting sustainability at a time when [drought conditions are becoming more frequent across parts of the U.S.]

Traditionally, engineers have spent energy and money reactively fixing bridges. New technology can monitor cables for strain and wear, helping engineers target work where it's needed—and before it becomes critical. Apart from being less costly, this approach cuts unnecessary industrial work, thereby promoting sustainability.

By linking solar panels to battery storage units inside houses, residents rely less on the power grid. They can save electricity they do not use for later (or even sell their excess), improving system reliability and reducing peak power demands. If they need more, they can buy extra directly from the grid. Rather than an on-off binary approach, it is a fluid movement of natural resources. Learn more about the benefits of residential battery storage.

> Sustainability is not possible without a holistic approach to problem solving. Technology and data are critical when considering social, environmental, and economic perspectives—and for developing long-term solutions."

Ryan Prime, ENV SP, LEED AP, WELL AP
Sustainability Practice Leader

While protecting the environment is fundamental to the future health of the planet, true sustainability must not forget economic and social considerations. The pandemic proved how integral the environment is to personal health. Even simple pleasures—meeting friends for dinner or going to the movies—were put on hold during the health crisis. And with 60 percent of Americans switching to remote work, getting out and about is important to physical and mental well-being. Having a clean, pleasant environment is crucial for thriving. But what if poor air quality makes long walks difficult? What if abnormally high temperatures—peaking at 130°F in California in August 2020—make any outdoor activity impossible? As climate change gathers pace, these questions only increase in urgency, making the battle for a sustainable future one of today's biggest challenges.

Los Angeles World Airports

Los Angeles World Airports (LAWA), the authority that owns and operates Los Angeles International Airport (LAX) and Van Nuys Airport (VNY), uses sustainability planning to increase facility performance, reduce environmental impacts, and enhance the benefits they offer to the communities they serve. Using VHB's Strategic Planning Optimization Tools (SPOT), LAWA collects and analyzes data, develops meaningful content, and designs Annual Sustainability Reports. These reports help LAWA to gain a better understanding of their assets and programs, make smart decisions, move projects forward, and efficiently achieve their goals.

Progress cannot be made without partnerships. Finding solutions means collaboration between consultants, stakeholders, government, and with residents themselves. Planning must also include quality data. It's virtually impossible to make informed decisions or measure success without reliable metrics. From leak detection sensors on pipes to residential battery storage, the sustainability philosophy can be put into practice—and help citizens become future-focused for whatever comes next.

Resiliency

If sustainability aims to make communities better places to live in the present, resiliency is about preparing for tomorrow. For instance, COVID-19—and the crisis that followed—showed how vulnerable many places are to sudden economic shocks. But with the right support, communities can become truly future-focused, bouncing back more quickly when the worst happens, and keeping citizens safe along the way.

Nowadays, the world feels more uncertain than ever. From environmental change to social unrest and economic transformation, communities need to be prepared for every eventuality—and those that are not face even greater upheaval, putting both citizens and infrastructure at risk. Unfortunately, studies show that infrastructure in the U.S. is unfit for the challenges of the future.

According to the U.S. Department of Transportation, there is a $836 billion backlog of unmet capital needed to fix highways and bridges, yet our transportation network is critical for the successful movement of people and goods.

> Technology allows us to analyze multimodal forms of transportation and understand how people get in and around a city—and then make smart decisions around transport and infrastructure enhancements that are accessible for all."
>
> **Maxine Hill** | *Previous Northeast Transportation Market Leader*

Supply Chain and Food Security Concerns

Apart from the vast health and economic consequences, the coronavirus also highlighted vulnerabilities in modern supply chains. As food processing plants closed, and workers stayed at home, panic buying led to empty shelves and increased prices. According to data from the U.S. Department of Agriculture, the wholesale benchmark price for a dozen eggs in California increased from $1.73 in mid-March to $3.47 by mid-April. Shoppers faced aisle upon aisle empty of other critical day-to-day food staple needs. These striking statistics speak to fundamental questions about where and how food is produced and consumed. Not since World War II have people been faced with the question: do communities have the ability to grow locally to cope with a decline in international and domestic trade? Given freight rates for transatlantic air cargo increased on average by 300 percent once the pandemic began, and major ocean carriers canceled more than 400 sailings due to reduced demand, these are questions worth asking. And it is not just pandemic related. From extreme weather events and economic crashes to social unrest, these are problems communities need to prepare for.

Suffolk Downs Redevelopment

The Suffolk Downs redevelopment in Boston and Revere, MA, a 161-acre site, is being redeveloped from the ground up into a new mixed-use neighborhood, providing a unique opportunity to prepare for climate change through upfront infrastructure planning. VHB's Resiliency and Adaptation Study—the first of its kind for a single development—analyzes current and future climate conditions for rainfall and coastal flooding. By analyzing data from multiple sources, and creating detailed hydrologic and hydraulic models, both current sea levels and sea level rise under different conditions were studied. Using this valuable data, the flow of floodwaters could be accurately simulated under many scenarios. Visualizations of possible storm events were then created, effectively communicating the project's complexities to regulators and city officials. As a result of the Study, developer HYM Investment Group committed $6 million in mitigation funding to improve flood resiliency at the project site and over 1,000 surrounding properties.

Resiliency through Innovation

Community resiliency isn't simply about economic output. For the most vulnerable, it can be a matter of life and death. Creating future-focused communities is vital for the well-being of its citizens. Fortunately, there are many innovative technological investments that can help.

The use of computers, tablets, and smartphones enables e-learning and gives access to information quickly, improving communities' ability to withstand shocks. For example, mobile applications can support education efforts aimed at boosting the ability to prepare for, and cope with, disasters.

Gathering robust data from drones, sensors, and other high-tech equipment can help plan roads and other infrastructure so that they are less affected by floods and other natural disasters. For example, coastal airport runways can be designed so that flood water quickly flows off, bringing them back online sooner.

By analyzing current and future climate conditions for rainfall and coastal flooding, urban planners can evaluate whether developments would displace floodwaters, or if they are likely to be resilient in the face of emergencies and recommend appropriate action.

When electricity grids fail, communities can experience debilitating blackouts. By investing in localized solutions, households and their neighbors can weather the storm, drawing from solar panels and batteries to keep the lights on even in an emergency.

Sensors can alert emergency services of fires or floods as soon as they begin, saving precious time and lives. "Digital twins" offer virtual three-dimensional blueprints of buildings with current datapoints, helping emergency responders navigate terrain and get residents the help they need faster.

Communication is essential in an emergency, especially in disadvantaged communities, which generally lack robust networks. Creating public Wi-Fi networks makes the internet accessible to everyone and remains useful long after danger has passed. Rescue and relief workers can even use mobile telephones or "wearable routers" to form wireless local area networks during a crisis.

"Innovation and advancements in technology are increasing every day and allowing more and more infrastructure to be built with greater potential for renewable energy generation. These naturally replenishing energy sources reduce impacts on the environment and help to combat extreme weather and unforeseen events."

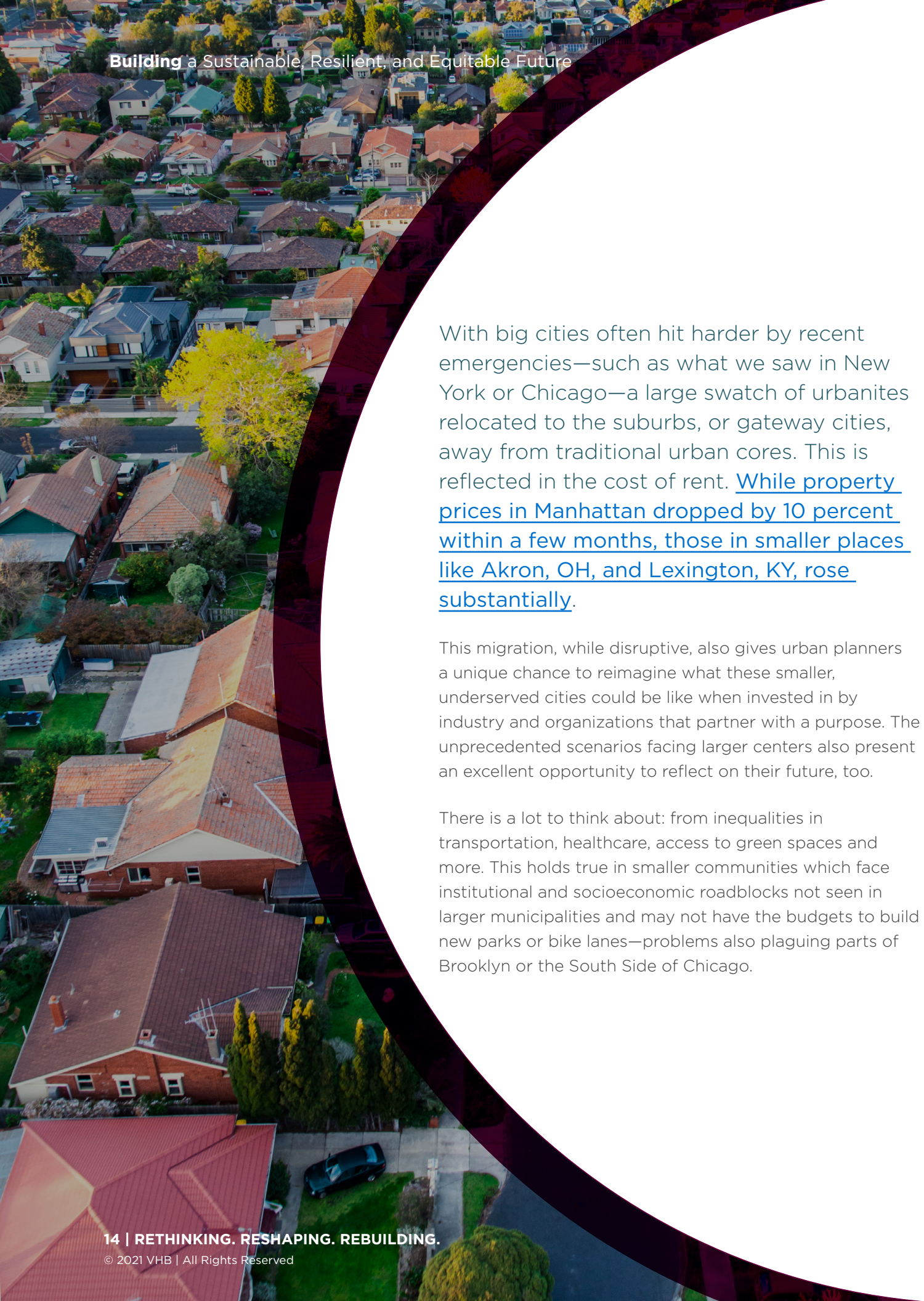
Kris Dramby, CWB, PWS, CE
Energy Market Leader

Community resilience has a major impact on the health of its people. Uncertainty breeds anxiety. In the four months after the pandemic began, 53 percent of the country's adults reported their mental health deteriorated. Economic shocks can have devastating, long-term negative effects. If you cannot work, you cannot pay rent, or buy food for your family. All this tends to disproportionately affect the most vulnerable members of society.

AEC consultants have a vital role in the years to come. Resiliency means thinking about everything from improving infrastructure, to disaster management, to adequate food supplies. How these challenges are met can build a strong foundation, ultimately making communities future-focused and ready for tomorrow.

Social Equity

For all the challenges currently facing the U.S., there are also opportunities for communities to become more sustainable and resilient, with both feeding into important questions of social equity. Many communities lack the resources they need to live fulfilled lives every day, and struggle to cope when things go wrong. But it does not have to be this way. As recent events forced us to re-examine how our cities use resources, now is also the chance to make them safer, more equitable, more accessible, and more enjoyable—for all.



With big cities often hit harder by recent emergencies—such as what we saw in New York or Chicago—a large swatch of urbanites relocated to the suburbs, or gateway cities, away from traditional urban cores. This is reflected in the cost of rent. While property prices in Manhattan dropped by 10 percent within a few months, those in smaller places like Akron, OH, and Lexington, KY, rose substantially.

This migration, while disruptive, also gives urban planners a unique chance to reimagine what these smaller, underserved cities could be like when invested in by industry and organizations that partner with a purpose. The unprecedented scenarios facing larger centers also present an excellent opportunity to reflect on their future, too.

There is a lot to think about: from inequalities in transportation, healthcare, access to green spaces and more. This holds true in smaller communities which face institutional and socioeconomic roadblocks not seen in larger municipalities and may not have the budgets to build new parks or bike lanes—problems also plaguing parts of Brooklyn or the South Side of Chicago.

It is important to recognize that the journey is ongoing. The work will not be done today or tomorrow—and staying engaged is the key to progress. Advancing DEI requires dialogue, engagement, advocacy, and action—in our communities and in our infrastructure. Our approach to planning, design, and constructing can either challenge or perpetuate systems of inequity. AEC consultants have a responsibility to change the status quo. From college outreach and community fundraisers to specialized internship programs and unconscious bias awareness programs, there is opportunity to make companies more diverse and inclusive, gain different perspectives, and be better prepared to listen to local stakeholders from the earliest planning stages on—resulting in holistic solutions that address true community needs.

"Our industry continues to lead the way in solving some of our nation's most complex challenges. And we compete for highly skilled talent to prepare for the rapidly changing nature of our world and society. It is critical that we remain focused on building organizations that include individuals with diverse backgrounds, thinking, and perspectives to help us get to smarter solutions and better results for our clients and communities."

Keri Kocur
Chief People Officer

Driving Change

VHB is proudly leading the way in advancing DEI across the AEC industry, spearheading the American Council of Engineering Companies (ACEC) Design Professionals Coalition (DPC) Diversity and Inclusion Working Group with Woodard & Curran and RS&H. Comprised of 22 ACEC member firms, the working group is committed to creating more inclusive environments throughout the AEC industry so that everyone is able to bring their whole, authentic self to work. This group worked together to share best practices and challenges around DEI initiatives, affinity groups/employee resource groups, and awareness programs. In 2020, the group published a report highlighting best practices and lessons learned for the industry.

Social Equity through Innovation

Social equity should be at the heart of smart, future-focused community design—and there's much planners, designers, and engineers can do to make this happen, enhancing our communities through advancements in technology and new ideas.

Making infrastructure smart not only boosts community resilience, it can also promote equality. By connecting battery storage units to the electricity supply, even impoverished households can keep the lights on in an emergency. By establishing technology lending libraries with WiFi hotspots and tablet check-outs in community centers we can bridge the digital divide, allowing vulnerable children to study at home and the elderly to access family, friends, and health services.

Imagine getting everything you needed—your food, exercise, education, access to mass transit—within a 15-minute walking radius of your home? Since COVID-19 forced social distancing and lockdowns, this has become a major infrastructure goal. Across the world, cities from Milan to Melbourne are experimenting with this idea, pedestrianizing streets, expanding parks, limiting cars, and mandating the opening of new grocery stores.

Talk to the locals and it is clear they do not always need extravagant new green spaces. Rather, they just want their streets to be clean—the garbage cleared, and sidewalks maintained. Apart from being less costly than major renovation proposals, these solutions also avoid middle-class gentrification at the expense of current residents.

By working with local municipalities, especially to improve zoning laws, civil engineers play a key role in building affordable housing for lower-income residents. New technologies like 3D printing and automated planning help, too, making future-focused neighborhoods quick to design and cost-effective to build.

Rather than looking at transportation modes in silos—buses, trains, subways, cars—integrating an entire transportation network into a unified app can make urban life more equitable. Given more than 20 percent of people who use public transit earn less than $15,000 per year, facilitating access to mass transit is crucial in the continuing battle for equity. It also requires a change in mindset: view mobility as a service. With the ability to monitor transportation data remotely, administrators can quickly inform citizens about emergencies, and shift priorities where necessary. Watch this video to learn more about mobility as a service.

With the pandemic upending transport systems across the country, civil engineers can make what comes next more equitable—and it begins with listening to local communities and analyzing data. By studying travel patterns in New York during the pandemic, we learned that many essential workers rely on buses rather than subways, driving the need to build new bus lanes rather than expensive and disruptive underground lines. There is also intense interest in and satisfaction from using bicycles, increasing the need to build cycle lanes, too.

Parramore Comprehensive Neighborhood Plan

The Parramore community, an 819-acre neighborhood in Orlando, FL, experienced increasing depopulation and unemployment due to significant roadway construction and slowing economic growth. Home ownership in this community hovered at just nine percent, while unemployment reached more than 20 percent. Orlando city planners and VHB worked in collaboration to revitalize the area, supporting access to healthy food, encouraging mixed-use developments, and planning a significant new urban park and SunRail transit station. Apart from shrinking inequity, this comprehensive Healthy Community Design approach made the neighborhood more sustainable. For example, partnership with a community consortium resulted in a commitment to build 10 sustainable family homes every year for two decades. Home gardens were also promoted, making residents healthier, and reducing the need for trips to the grocery store—ultimately supporting self-sustainability.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Orlando Future-Ready

As an early adopter of Future-Ready technology, Orlando, FL, is focused on preparing for tomorrow. Their Orlando Future-Ready City Master Plan encompasses the span of the built environment:

- Connectivity
- Energy and utilities
- Public health and safety
- Water and wastewater
- Multimodal transportation mobility
- Solid waste management

True sustainability, resiliency, and equity can only come when the people within communities provide direct input into what they need. As the prime consultant for Future-Ready, VHB is helping the City engage important stakeholders, including the local business community, educational partners, utility providers, and nonprofits to inform priorities and timelines. And, residents are encouraged to participate via community meetings and online surveys, leveraging data and technology to help inform decision-making.

Investment in communities is fundamental to make our lived environment fairer for everyone. Of course, every redevelopment needs to make a profit, but focusing purely on the economic benefits of expensive infrastructure projects risks hurting residents. For example, as transport links and urban planning improve, property prices inevitably rise, often forcing out the very people that need help the most. The solution is to work closely with local communities, listen, understand their needs, and adapt plans accordingly.

Challenges

There is vast space to make our communities sustainable, resilient, equitable—and ultimately future-focused. But there are challenges to consider to avoid delay in implementation, such as:

Infrastructure and Design. Given the work required to create equitable and sustainable communities—from integrating technology into the transport system to building disaster-proof houses—there are huge challenges to create forward-looking neighborhoods. That's especially true given all the stakeholders involved, from banks and private investors to municipalities and government agencies—and the residents themselves.

Politics, Economics and Culture. With the U.S. more divided than ever, finding the political and economic willpower to rebuild communities post-COVID will not be easy. Another challenge is opposition from established homeowners, the so-called NIMBY (Not in My Backyard) phenomenon often preventing new infrastructure and housing projects from happening. For example, while California needs 200,000 new units each year to keep up with demand, only 750,000 were greenlit between 2007 and 2019.

Funding. When the economy struggles, encouraging investors to fund significant new infrastructure projects can be difficult. The United States needs $2 trillion in infrastructure funding by 2025, and though Public Private Partnerships (P3s) are a solution, they have traditionally not been successful. According to PWC, only five P3 deals worth a total of $2.4 billion closed in 2015. That compares to an average of $5.8 billion every year in the United Kingdom.

Conclusion

At VHB, we see the challenges of today as opportunities for tomorrow. Climate change, racial disparities, an unprecedented pandemic—they offer important lessons in how we need to do better, be better, and build better.

The needs of our communities are evolving, with sustainability, resiliency, and social equity all gaining importance. It's time to look ahead and work together to understand persistent problems—and collaborate to craft technology-empowered solutions.

If we truly want to make our communities sustainable, resilient, and equitable, everything from our houses to our transportation systems to our energy supplies must be reimagined. At VHB, we cannot wait to get started working with our clients and communities to reimagine our built environment for the better and be future-focused for tomorrow.

Connect with our thought leaders to share insights on building a sustainable, resilient, and equitable future.

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