5 Ways Public Works Agencies and Municipalities Can Prepare for a Historic Project–Funding Opportunity

How the $1.2 trillion Infrastructure Investment and Jobs Act can transform your digital processes and practices.

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It's no secret that U.S. infrastructure needs major updating. That's why the Infrastructure Investment and Jobs Act (IIJA) is a critical bill of historic importance. The $550 billion on the table for infrastructure renewal can help define the nation for decades to come.

The IIJA budget provides $110 billion in new funds for roads and bridges, $66 billion for rail, $65 billion for universal broadband, $55 billion for clean water, $39 billion for public transit and more. Signed into law in November 2021, the bipartisan-approved measure doesn't just ensure a surge in infrastructure investment funding today. The IIJA also promises to help advance shovel-worthy projects through 2026.

Even so, the road ahead has its share of challenges for civil project owners, engineers and contractors: COVID-19 isn't going away anytime soon, supply chain disruptions continue to roil the economy, attracting and retaining staff is increasingly difficult, and inflation diminishes both project budgets and taxpayer pocketbooks. Then there's the looming question of what the IIJA portends for departments of transportation (DOTs), local public agencies (LPAs), contractors and others responsible for project monitoring and reporting.

This playbook explores five ways public works directors, civil engineers, civil construction contractors and others can prepare for the coming revolution in infrastructure funding.

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1. Embrace Building Information Modeling (BIM)

Long associated with vertical construction, BIM's 3D digital models now inform horizontal construction as well — so much so that BIM is gradually transitioning into civil information modeling. The horizontal evolution makes sense: Throughout the transportation asset life cycle, information is shared and transferred from prime contractors to subcontractors and consultants, from consultants to owners, from owners to compliance agencies, and so on, back and forth. BIM embeds a rigorous and robust data structure within the model itself so it can be reviewed, modified and analyzed repeatedly with confidence.

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"BIM is frequently misunderstood," explained Ron Gant Sr., Business Consultant – BIM and Digital Delivery for Infotech®, a leading U.S.–based software developer for the infrastructure construction industry. "A lot of people look at BIM as a piece of software. BIM is a process. It's a way to work more efficiently together in a collaborative environment."

Gant conceded that it might be difficult for some to envision horizontal BIM. Yet, the same collaboration rules apply to road or bridge construction as they do to any mid– or high–rise construction project. He cited an infrastructure project for the Minnesota Department of Transportation (MnDOT). "The Elk River project uses a lot of these processes, and it's going very well for them. I don't know anyone in the DOT community that isn't looking at applying BIM to infrastructure."

A Closer Look at MnDOT's Elk River Highway 169 Redefine Project

To better understand what life in a paperless, post–IIJA world will look like, the Minnesota Department of Transportation (MnDOT)'s Elk River Highway 169 Redefine Project is a good place to start.

The three-mile, $130 million highway reconstruction project is not especially remarkable except in one respect: It's MnDOT's first example of full building information modeling (BIM) delivery. The first BIM plan was delivered to MnDOT in August 2021. For MnDOT, it resets all project expectations.

For example, the traditional approach of plan reviews at 30%, 60% and 90% milestones are rendered irrelevant. The review process is iterative and continuous, helping eliminate project surprises and risks. "[MnDOT]… accomplished at the 30% design review what normally would not be known until 90%," reported MnDOT's CAD supervisor. Nearly 60 miles of underground utilities were relocated 18 months ahead of schedule, and BIM delivery compressed the project schedule by three months.

Elk River is just one of a growing number of horizontal BIM projects by DOTs nationwide. IIJA is becoming a powerful catalyst to advance the entire infrastructure construction industry.

ELK RIVER PROJECT AT-A-GLANCE

Convert four signalized at-grade traffic intersections into interchanges

Upgrade and relocate utilities and underground infrastructure

Design roadway, drainage and bridge elements

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Transportation infrastructure professionals recognize a series of benefits when using BIM, including:

- Adherence to schedule and cost.
- Prompt payment to contractors.
- Improved data accuracy and reliability.
- Reduced risk.
- Efficient operations and long–term maintenance.
- Comprehensive asset management.

If BIM isn't a project consideration today, it likely will be tomorrow as more and more architect, engineering and construction (AEC) professionals and contractors recognize the power of this uniquely collaborative digital platform. It's also one of the primary reasons the IIJA allocates $100 million to accelerate digital project management compliance "throughout the construction life cycle, including the design and engineering, construction, and operations phases." The IIJA funds are designed to support five technology initiatives:

Maximize interoperability with other systems, products, tools or applications

Boost productivity

Manage complexity

Reduce project delays and cost overruns

Enhance safety and quality

BIM implementation helps advance the aims of the IIJA across all five phases.

2. Plan for Digital Everything

Unfortunately, far too many LPAs may be marginalized by a continued reliance on paper–based project management processes in a post–IIJA world. BIM is only part of the story. The Federal Highway Administration (FHWA) has highly specific requirements for e-bidding, project management, reporting and recordkeeping, and data security that will compel DOTs and LPAs to adopt a more systematic and automated approach to project oversight.

DOTs are aware of FHWA reporting requirements and routinely work within them. The question is LPA compliance. The evolving regulatory environment puts new pressure on local public works directors, consulting engineers and public officials to do a better job of standardizing reporting processes that address waste, fraud and abuse in federally funded projects.

Some LPA officials see the handwriting on the wall and have taken aggressive steps to up their game, even if the funds to automate weren't immediately available. Just ask Howard Weissberg, P.E.

As the Director of Public Works for Meriden, Connecticut, he knew it was time to back away from a dead–end project management reporting system based on paper methods. "We put together a STIC grant request with the state," Weissberg explained. A State Transportation Innovation Council (STIC) grant can help LPAs modernize their processes, and each state has a STIC that administers the grants. In Weissberg's case, the grant award enabled his team to underwrite a two–year pilot program using a project management application from Infotech called Appia®.

The quickening tempo of infrastructure projects over the next five years puts even more pressure on Weissberg and his peers to "get their game on from a technology standpoint," said Joe Rowland, Sr. Business Consultant – Bidding. "The IIJA really spells that out. Federal administrators expect to see technology initiatives like e–bidding as part of the process."

Consider letting bids, for example. Kim Bailey, Purchasing Director of Huntington, West Virginia, knows all about paper–based bidding. "It would take a minimum of four hours of word processing to prepare a complex bid," the procurement specialist said. "You had to make sure all the information was in it, zip it and print it" before sending out physical copies of the proposal by mail. Bailey's office was also required to place bid notices in the newspaper, which could run up to $400 apiece. An electronic notification reduces advertising costs significantly.

Rowland cited the capability to manage more project bids as a critical benefit of transitioning to e–bidding. Digital repeatability and templates simplify bid preparation and review, easing the burden on short–staffed LPAs facing IIJA project priorities. For Bailey, e–bidding represents a quality and quantity advantage: "Probably about 60% of the bids I've done, I've templated. My bids take me 15 minutes, max," she said.

What's more, electronic distribution of bid requests allows your agency to reach contractors around the state who aren't necessarily going to look at every county's website or read every newspaper, Rowland pointed out.

e–Bid technology also maintains the sanctity of a sealed bid. For example, Infotech's Bid Express® e–bidding service offers the following protections:

Bids held in an electronic lockbox before unsealing

Content encryption for security

Redundant power sources and repeated file backups to protect data

The ability to withdraw or resubmit bids as needed

Automatic bid error and omission checks to prevent discarded bids

Bid awards posted online in real time and in a fair, transparent manner

To understand how broadly accepted e–bidding is, Rowland said 80% of all roads and bridges in the U.S. managed by a state DOT or funded by the federal government came through Bid Express.
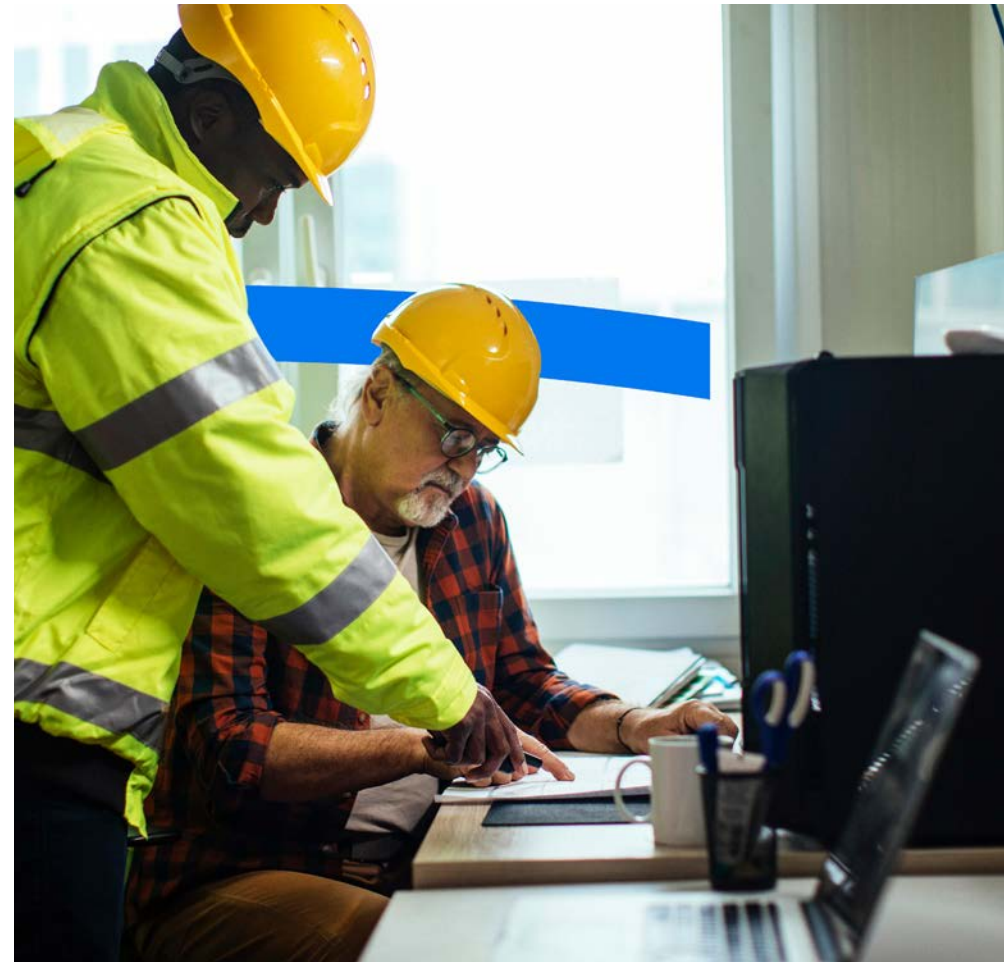
e–Bidding has been broadly demonstrated to improve bidding efficiency, speed and accuracy while increasing contractor participation, all key goals of IIJA's digital–first focus. As you align your operation to best meet state and IIJA requirements, keep e–bidding a top project management consideration.

3. Harness the Power of E-Construction

The experience of LPA officials such as Weissberg and Bailey will rapidly become more common as a digital-first mandate takes root across all jurisdictions.

The transition to digital project management, often called e-construction, allows LPAs to conduct business with the same benefits their DOT colleagues have long taken for granted.

Among those e-construction advantages include the mitigation of:

Duplicate Data Entry. Up to six hours saved per week per employee.

Inspector Travel Time. Up to four hours per week per employee.

Inspector Travel Expense. An estimated $100,000 a month saved for a large engineering firm.

**Research and Audits.** A 95% reduction in time spent researching old files for a midsize engineering firm.

Bid Advertisements. A 95% reduction in bid ad costs for a city procurement office.

Bidding Audience. A 40% to 70% increase in bidders per project for a county construction office.

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By contrast, analog project management methods hamper LPAs in a variety of ways. For example, the workflow of a traditional daily field report often looks like this:

1 Fill out paper forms in the field

2 Travel back to the office

3 Scan forms onto a hard drive

4 Manually enter forms into a spreadsheet

5 Determine item costs for each day of the month

6 Tally up item costs

7 Transfer item totals into a new spreadsheet

8 Calculate the payment due to the contractor
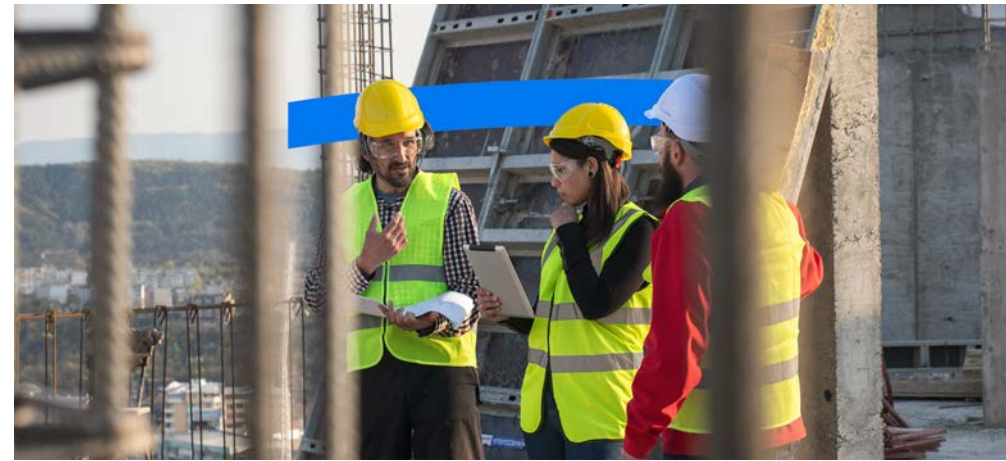
"Unfortunately, on the construction administration side, there are way too many spreadsheets being used," Infotech's Gant said. "A lot of effort goes into building out elaborate spreadsheets to manage everything about payment structure and split revenue. There's going to be funding from the feds. There may be funding from the state, the county and the city. Sometimes a major company is involved in funding. How do you track that split funding? And what about disadvantaged business enterprise compliance? The feds are going to look at that."

Gant knows equipping each LPA inspector with a laptop or tablet running construction administration and inspection software comes with a hard cost, which can present a budget challenge for many LPA offices. "The upside is the gains the department makes by keeping their people in the field seven to eight hours instead of four or five hours" because of efficiencies gained in reporting, Gant said.

Douglas Cade, Hancock, Ohio, county engineer, agreed with Gant. "Our inspectors are now able to stay out in the field and do the reporting directly on their laptop. We can determine what kind of problems are occurring at any time. No more waiting one week to find out the problem was a big problem," Cade explained.

The right software can simplify construction contract oversight by capturing data with convenience and speed. Appia®, Infotech's solution for construction administration and inspection, incorporates know–how gained from working with nearly all state DOTs for the last 40 years, notably as the exclusive contractor behind the AASHTOWare Project software. The AASHTOWare Project is a web–based program designed to serve state transportation agencies.

The IIJA mandates that state governments that accept federal funding must report on the progress of technology implementation on those funded projects at least once a year. e–Construction goes to the heart of that requirement, simplifying the task of identifying:

- Federal, state and local cost savings.
- Project delivery time improvements.
- Congestion impacts.
- Safety improvements for roadway users and construction workers.

Now is the time to get in front of IIJA expectations. Consider the next steps in your digital conversion strategy if you haven't already.

4. Monitor Best Practices

Fortunately, the FHWA is a benevolent broker in helping DOTs and LPAs identify the practices and technology best suited to advance horizontal infrastructure.

Every Day Counts (EDC) is the central clearinghouse for vetted, proven ideas DOTs and LPAs can confidently consider and adopt. Every two years, the EDC announces a carefully researched assortment of innovations. The program claims usage across all 50 states, with every state using 20 or more EDC innovations and some adopting more than 45.

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"EDC sets the bar. They do their research," said Ron Perkins, Infotech's director of sales. "EDC programs definitely make people aware of the things they need to do to stay on track." He cited BIM for horizontal projects as an example of how EDC can help push the e-construction needle.

In general, look to the field office of your state's FHWA division for "…technical assistance for planning, design, construction, preserving and improving public roads and in the stewardship of Federal funds."

The FHWA division offices are the primary contact for state DOTs and LPAs for guidance and best practices. They also help ensure funds are distributed in accordance with IIJA requirements. View your state's division office as information central on IIJA questions and processes.

How Does Your LPA Rank?

The FHWA has a self-assessment framework to judge e-construction capabilities across four key categories. Is your LPA beginner, intermediate or advanced? Take 15 seconds to find out:

1. ELECTRONIC BIDDING

- [ ] **Beginner:** Bidding and awarding with paper

- [ ] **Intermediate:** Pairing online and offline/paper bids

- [ ] **Advanced:** Mandating electronic bidding

2. CONSTRUCTION MANAGEMENT

- [ ] **Beginner:** Documenting the project on paper

- [ ] **Intermediate:** Combination of paper and electronic systems to track and store daily reports

- [ ] **Advanced:** Electronic construction management system to track daily reports, progress percentage, change orders, payments and more

3. PROJECT INSPECTION

- [ ] **Beginner:** Manual paper-based methods such as field notes and measuring wheels

- [ ] **Intermediate:** Mix of manual and electronic systems to track inspections and material test results

- [ ] **Advanced:** Electronic systems to track all inspections and material test results

4. PROJECT CLOSEOUT

- [ ] **Beginner:** Manual tracking of most warranty items

- [ ] **Intermediate:** Some automated tracking of warranty items through spreadsheets

- [ ] **Advanced:** Release retainage amount to contractor automatically and have the ability to show all project warranty items and details on a map

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5. Supercharge Public Works With Technology

One unintended outcome of the IIJA is the juxtaposition between a vast project–funding program and an undersized construction workforce.

Today, over 50% of civil contractors report that difficulty in finding workers impairs their project delivery time. Another survey reveals that nonresidential construction spending has slowed because of a lack of qualified workers. The projects are there, but the workers aren't — at least not in the numbers required to meet demand.

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Staffing difficulties extend to the agency side as well. That's especially worrisome for LPA offices already struggling with paper-based management systems, Infotech's Perkins noted.

"Imagine you're a young person coming out of college. You probably flew drones and other cool stuff in school. It's going to be a struggle attracting people if you're not offering the latest digital technology and showing why this can be a fun place to work," Perkins said.

Infotech's Gant agreed: "What excites me about the future is how digital transformation now makes it easy for companies to work together," he said. "The ability to collaborate and federate data across applications in a common data format is coming." Industry tools that can wed the best elements of multiple software applications may help energize the image of state DOTs and LPAs — and help retention.

"Consulting engineers already work collaboratively like this," Perkins said. He cited Infotech's recent partnerships with Trimble and Leica as examples of how collaboration puts even more powerful inspection and reporting insight into the hands of AEC and public works professionals.

A new spirit of collaboration across the entire construction ecosystem will be required to meet IIJA's ambitious vision for America. The days of adversarial relationships between project members will inevitably give way to a digitally connected workflow where all stakeholders command a single indisputable version of the truth, helping eliminate distrust, miscommunication and errors. Cloud-based applications such as Infotech's Bid Express and Appia are helping lead the way.

A $100 Million "Yes" to e-Construction

The next few years will mark the slow fade of paper-based construction management processes in much the same way more advanced systems displaced things such as vacuum tubes, transistors, incandescent lights and other technologies. If the pandemic didn't set the course, the IIJA most certainly will. Digital compliance will be expected across all levels of the infrastructure chain of development, from the halls of federal agencies to the smallest LPA team.

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That's evident from the $100 million the IIJA sets aside for "advanced digital construction management systems." The law specifies those systems must maximize interoperability with other systems, products, tools or applications; boost productivity; manage complexity; reduce project delays and cost overruns; and enhance safety and quality.

For senior DOT and LPA leaders, the way is clear. There's never been a better time to simplify, speed and enhance infrastructure development with e-construction efficiency and collaboration.

Widespread adoption of digital tools will help public works directors, contractors and subs prepare for a civil works future transformed by IIJA. Paperless applications such as Infotech's Bid Express® and Appia® are uniquely qualified to help meet the challenges and opportunities of a rapidly evolving infrastructure environment.

Infotech provides software solutions for construction administration and inspection, secure online bidding, and paperless contracting. Infotech is uniquely positioned to work with state, local, and private entities on streamlining outdated processes and introducing new efficiencies. Interested in working with us?

WE OFFER THE FOLLOWING SOLUTIONS:

Appia®: Designed for project owners and their consultants, Appia helps construction teams track quantities, change orders, reports, and more.

Bid Express®: Created for public agencies and counties, Bid Express provides a secure, online platform for all your construction bidding or procurement needs.

Doc Express®: Included with Appia, Doc Express enables teams to handle contracts and other documents electronically.

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