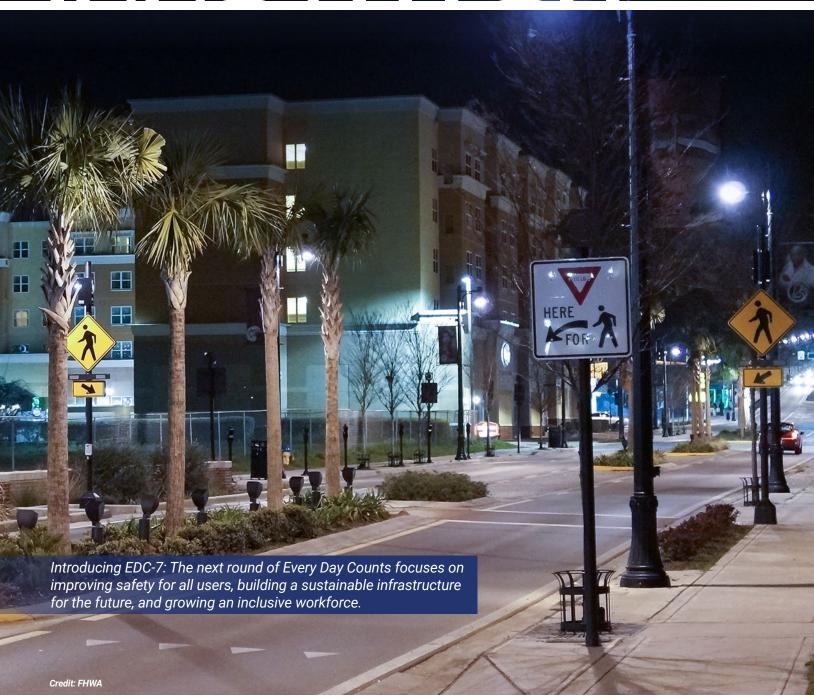


# INNOVATOR



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# **Moving Innovation Forward: A New Round of Every Day Counts**



The Federal Highway Administration (FHWA) rolled out seven new innovations in the latest round of its Every Day Counts (EDC) program. The innovations selected for **EDC round seven** (EDC-7), which takes place during 2023 and 2024, focus on helping transportation agencies improve safety for all users, build a sustainable infrastructure for the future, and grow an inclusive workforce.

EDC is a State-based program that promotes market-ready and proven but underutilized innovations that merit widespread implementation. Every 2 years, FHWA asks State transportation agencies, local governments, Tribes, industry groups, and other stakeholders to help identify transformative, game-changing innovations that can have a national impact on the transportation system. The EDC-7 call for ideas yielded more than 70 suggestions.

In line with the U.S. Department of Transportation's recent commitment to expand the EDC model to more modes of transportation. some of the innovations chosen for EDC-7 were selected with multimodal State transportation agencies in mind and are of interest to both transit and rail agencies.

FHWA will host a virtual summit in February **2023** that will bring together transportation

professionals from across the country for a more in-depth look at the benefits of each innovation. **State Transportation Innovation Councils will** then select innovations to adopt based on their State's program needs. EDC deployment teams offer a variety of resources and technical assistance to help agencies accelerate the implementation of their adopted innovations during the 2-year cycle.

### **Improve Safety for All Users Nighttime Visibility for Safety**

The nighttime crash fatality rate is three times the daytime rate. Enhancing visibility along corridors, intersections, and pedestrian crossings can help reduce fatalities. This initiative promotes traffic control devices and properly designed lighting to improve safety for all users.

### **Next-Generation TIM: Technology for Saving Lives**

More than 6 million crashes occur each year in the United States that put responders and other vulnerable road users at risk. Next-generation traffic incident management (TIM) programs promote emerging technologies such as emergency vehicle lighting and gueue warning solutions. These and other tools can advance safety and operations to mitigate incident impacts.



Enhanced lighting at a rural intersection.

Sample Environmental Product Declaration for Pavement Mixtures				
TRACI Impact Indicator	Unit	Materials	Transport	Production
Global Warming Potential	Kg CO2- Equiv.	90.5	10.0	175

Environmental product declarations reveal the environmental impacts of highway construction materials.

# **Build a Sustainable Infrastructure for the Future**

### Integrating GHG Assessment and Reduction Targets in Transportation Planning

Transportation is the largest emitter of greenhouse gases (GHG) in the United States. This initiative provides resources to help agencies quantify GHGs and set goals to decrease motor vehicle, construction, and life-cycle emissions through planning and project development.

# Enhancing Performance with Internally Cured Concrete (EPIC<sup>2</sup>)

Cracking in concrete is a limiting factor in achieving long-term concrete performance. Internal curing mitigates shrinkage cracking and has the potential to substantially extend the service life of concrete bridge decks and enhance the performance of pavements and repairs.

### **EPDs for Sustainable Project Delivery**

Construction materials such as concrete and asphalt have environmental impacts during their life cycle. Environmental product declarations (EPDs) document those impacts. This tool helps States support procurement decisions and quantify embodied carbon reductions using life-cycle assessments for sustainable pavements.



Strategic workforce development strategies can help identify, train, and place skilled workers in jobs that support the highway system.

### **Grow an Inclusive Workforce Rethinking DBE for Design-Build**

Many design-build contracts do not adequately provide opportunities for disadvantaged businesses. New practices are available to support the effective integration of program requirements to help small, disadvantaged businesses compete for design-build contracts.

### **Strategic Workforce Development**

The demand for highway workers is growing, and emerging technologies require new skills. This innovation helps stakeholders improve their ability to **identify, train, and place** highway construction workers. The focus will expand to rural and Tribal communities to increase career opportunities.

## **MORE INFORMATION**

- Visit the EDC website.
- Ocontact Julie Zirlin, FHWA Program Manager for Every Day Counts, for more information.



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## Save the Date: EDC-7 Virtual Summit

Plans are underway for the EDC-7
Virtual Summit, which will bring together members from each of the **State Transportation Innovation Councils** and other transportation professionals from across the country to identify the innovations that best fit the needs of their respective State's programs. Registration for the summit, which is sponsored by FHWA, is free and open to anyone.

The live event will be held in three, half-day sessions February 14–16, 2023. The sessions will be recorded so that the innovation deployment team presentations, virtual exhibit hall, and other resources can be accessed on-demand by registered guests.

**Register Now!** 

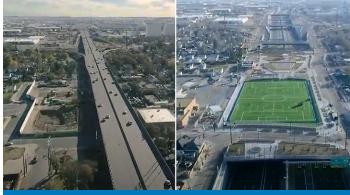
# Colorado Bridge Connects People to Opportunities

The Colorado Department of Transportation (CDOT) is using infrastructure upgrades to re-connect communities.

For its \$1.2 billion Central 70 Project, CDOT reconstructed a 10-mile stretch of Interstate 70 (I-70) through Denver. The focus of the project is a historically Hispanic area that is home to several neighborhoods and more than 1,200 business. However, the community was divided by an antiquated viaduct and the interstate itself, making mobility and connection difficult for pedestrians, bicyclists, and others in the neighborhoods.

"You could see dirt trails in the neighborhood from people trying to find their own way around. They had to walk underneath the old viaduct, which was not well lit," said Stacia Sellers, Central 70 Project communications manager and government liaison.

For CDOT, revitalizing and reconnecting the Elyria and Swansea communities that were divided a half-century ago when the viaduct was built was a priority. The Central 70 Project razed the viaduct and replaced it with a nearly 1.5-milelong lowered section of I-70, then added an at-grade crossing over a portion of the lowered



The Central 70 Project removed an aging viaduct (shown in photo on left), lowered the interstate, and built a new 4-acre cover park (shown in photo on right) for the surrounding community.



CDOT used videos to supplement public meetings and other outreach for residents in the Central 70 project area.

section to improve mobility, safety, and **community connections** for all types of road users.

"Now there are streetlights all over and cross-walks where there weren't crosswalks before," Sellers said. "People had no idea that they were that close to Colorado Boulevard—where we have restaurants, convenience stores, and gas stations. Also, we now can see students walking safely home from school again."

CDOT installed 7 miles of properly lighted sidewalks along the highway, creating two new direct access points between neighborhoods and to transportation facilities and other shared amenities. The most impressive point of access is a 4-acre cover park that extends over I-70, adjacent to Swansea Elementary School. Lined with walking paths and 100 newly planted trees, the park has a community building, athletic facilities, playgrounds, and an amphitheater and serves as another drop-off/pick-up site for students.

"There was a lot of skepticism prior to the project because this area has been ignored for decades," Sellers said. "The residents were constantly promised sidewalks, which they never saw until this project came about. I think people are starting to get really excited seeing that we are following through on a promise to the community."

To build this level of confidence and trust, CDOT held 300 public meetings, supplemented with virtual public involvement techniques such as telephone town halls, to engage with communities in the Central 70 project area. The concerns of residents were incorporated into the 4-year construction program and partly materialized as commitments to the community. Nearly 300 homes within 500 feet of I-70 construction. received improvements such as new air conditioning units, attic insulation, and storm windows to mitigate the impacts of construction noise and dust. The elementary school received \$19 million worth of improvements, including two new early childhood education classrooms and a medical-grade heating, ventilation, and air conditioning system. The project also committed \$2 million to assist with affordable housing needs.



The Central 70 project includes a 4-acre cover park over I-70 that will host community and athletic facilities and playgrounds.



Watch a CDOT video on how its Highway Construction Workforce Partnership recruited and trained a workforce for the Central 70 Project and beyond.

In addition, CDOT is part of a **Highway Construction Workforce Partnership** that provided recruitment, training, and placement for Central 70 construction jobs.

"We have a local hire requirement that requires the contractor to hire 20 percent of its workforce from the local community," Sellers said. "We also have job training requirements for those community members who didn't have prior construction experience. These commitments were great, not only for our projects because we had 4,000 positions that needed to be filled, but they also created long-lasting benefits for the local construction industry as a whole."

Sellers suggested the most recent neighborhood feedback has reflected pride and reconciliation. CDOT held a neighborhood appreciation event on Nov. 30, 2022, to celebrate the community collaboration.

### **MORE INFORMATION**

**Credit: Shaun Cutting** 

- Contact Monica Pavlik of FHWA's Colorado Division to learn more about the Central 70 Project.
- ➤ Visit the FHWA Community Connections webpage for links to tools and strategies and to resources such as case studies, recorded webinars, and the Community Connections Innovations Handbook.
- **▶** Learn about the U.S. DOT **Reconnecting Communities Pilot Program**.



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# The e-Ticket: A Catalyst for **Digital Integration**

e-Ticketing is an example of technology that enables additional innovation and growth in the e-Construction space. This innovation does more than just provide stakeholders with an electronic means to produce, transmit, and share materials data and track and verify materials deliveries.

According to Kathryn Weisner, Every Day Counts round six (EDC-6) team co-lead, "e-Ticketing is a gateway technology to many other digital applications and integrations in the e-Construction space." The information contained on e-Tickets is now being used by numerous partners in a roadway's lifecycle to enhance the quality of construction, use, and maintenance.

At the Minnesota Department of Transportation (MnDOT), e-Tickets are one part of a much larger e-Construction effort that seeks to digitally connect the lifecycle of a roadway from end-to-end. MnDOT is the steward for the American Association of State Highway and Transportation Officials (AASHTO) provisional standard (pre-publication) for the material delivery management system (MDMS). MDMS is a system that integrates digital information across a spectrum of users from contract administration, construction, materials, civil rights and labor compliance to industry partners. e-Ticketing fits uniquely into MDMS because an e-Ticket provides much of the information that will be used across these groups. A great deal of information is required to create a digital roadway. MDMS is a complex system where the information has many "on- and off-ramps," but it all starts with an e-Ticket.

### One e-Ticket's Journey

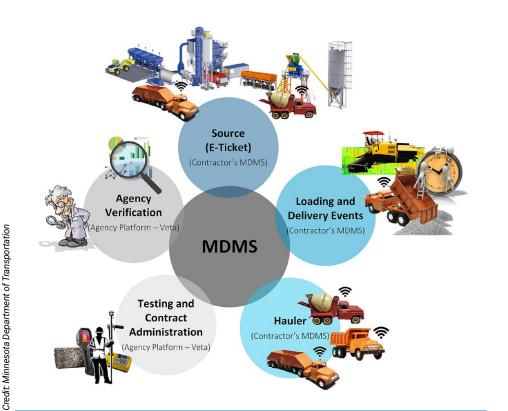
Moving through the lifecycle of a roadway, an e-Ticket begins by capturing source data and loading and delivery events. On-site testing can add information to a ticket such as material temperature, ambient conditions, laboratory and field test results, paver-mounted thermal

profiling, and more. Equipment operators using MDMS can use the delivery time reporting to better time their work, reducing paver stops that would normally negatively affect the quality of the pavement. The information contained on the e-Ticket then flows to agency departments and systems, including:

- The Civil Rights Department for use on prevailing wage reports—indicating time on site, how long items take to deliver, etc.
- Contract administration for reconciling quantities for payments and for future estimates.
- Materials engineers for geolocation information on dump sites with respect to material source, mix design, laboratory and field test results, paver-mounted thermal profiling, and more, which can be used for assistance in monitoring quality, specification refinements, etc.
- Pavement management systems for lab- and field-testing efforts on the finished roadway. along with other intelligent construction technology information to link to roadway performance.

Eventually, this information will all come together to develop a digital material as-built of the roadway. Over time, the information will be used again and again by asset management, pavement management, and materials groups, providing valuable data for roadway lifecycle costs. maintenance, and future project scoping. Mix design reviews will now include specific geolocated information that goes all the way back to the plant where it was loaded.

Access to this information is already providing MnDOT with tangible benefits. Trucking is the second-largest expense for contractors in Minnesota, and digital integration of e-Ticket information is reducing the time needed for audits to verify hauling information such as driver information, load verification, load acceptance, and reconciliation.



Visual representation of the Minnesota Department of Transportation's material delivery management system.

### The Road Ahead

According to Rebecca Embacher, MnDOT advanced materials and technology engineer, "We are only scratching the surface in terms of what digital integration and the creation of the digital roadway can accomplish."

MnDOT, along with other participating Transportation Pooled Fund (TPF-5 (466)) States and the Federal Highway Administration (FHWA), continue to develop a standardized testing and contract administration software, called Veta, which integrates with the MDMS. Veta currently provides the agency with geospatial and statistical information on intelligent compaction, pavermounted thermal profiling, dielectric profiling systems, and pavement spot tests. The pooled fund continues to expand Veta's e-Construction capabilities, with plans to further integrate with MDMS, ground-penetrating radar systems for roadway thickness and depth, and other upcoming intelligent construction technology applications. Future approved funding will integrate the material and geometric as-built information contained within Veta with pavement and asset management systems.

Once Veta collects and prepares this data, it can be transferred or pulled by AASHTOWare or other agency systems. Being part of the greater MDMS digital environment, this software not only receives data from other nodes, but can also feed information back into the system for greater synergy.

The digital space for e-Construction is rapidly expanding with potential reach into all aspects of highway construction and management. The e-Ticket's role has grown and expanded since its inception to enable many of these digital advancements in e-Construction.

"e-Tickets continue to expand and integrate into an increasing number of other e-Construction systems as time goes on," said

Rob Elliott, EDC-6 team co-lead. "e-Tickets improve efficiencies around data workflows and get our project delivery teams out of harm's way, enhancing project safety. Our team is available to help agencies, whether their e-Ticketing programs are in their infancy or are well developed but looking to advance to the next level, through technical assistance or peer exchanges."

## **MORE INFORMATION**

- @ Contact Kathryn Weisner, FHWA Construction & Contract Administration Engineer, FHWA Resource Center, or Rob Elliott, Technical Director, Construction and Project Management Team, FHWA Resource Center, for information and technical assistance.
- Visit FHWA's e-Ticketing and Digital As-Builts EDC webpage for more information and resources.



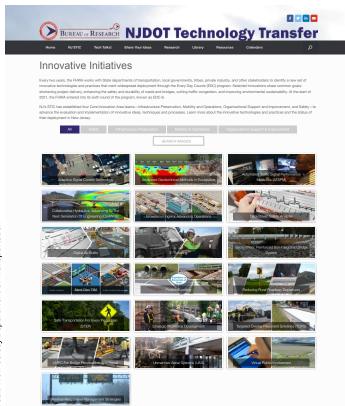
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# 2022 STIC Excellence Award Winners

New Jersey, Ohio, and Idaho build strong cultures for innovation.

State Transportation Innovation Councils (STICs) in New Jersey, Ohio, and Idaho received **2022 STIC Excellence Awards** for demonstrating success in fostering a strong culture of innovation in their transportation communities.

The American Association of State Highway and Transportation Officials (AASHTO) and Federal Highway Administration (FHWA) sponsor the annual award to promote innovation nationwide. This is the seventh year the two organizations have collaborated on the award to recognize excellence within STICs. Acting FHWA Administrator Stephanie Pollock announced the award recipients on October 23, 2022, at the AASHTO Annual Meeting.



The New Jersey STIC created a new core innovation area for "organizational support and improvement" on its <u>Innovative</u> <u>Initiatives webpage</u>.

# New Jersey: Active and Engaged Leadership at Every Level

New Jersey's STIC implemented a proactive communication strategy and organizational improvements to support institutionalizing innovations statewide.

The New Jersey STIC Communications Plan identified strategies for sharing exemplary innovation technologies and disseminating lessons learned with the broader transportation community. This has led to new member engagement and a steady increase in attendance at the STIC's quarterly meetings.

To facilitate organizational improvements, the New Jersey Department of Transportation (DOT) created a full-time Innovation Coordinator position to build on its culture of innovation and strategically plan an enterprise-level innovation program. In addition, the New Jersey STIC created a new core innovation area related to organizational support and improvement to implement strategic workforce development, virtual public involvement, and other innovations that do not fall into typical transportation discipline areas.

# Ohio: Expanding STIC Membership to Foster Diversity and Cost Savings

Ohio's STIC committed to diversifying its membership and developing a new process for evaluating innovations, while also striving to save \$100 million in operational costs over a 4-year period to reinvest in the State's infrastructure.

The Ohio STIC expanded its membership to rural transportation planning organizations (RTPOs) and higher education institutions while strengthening its ties with the Ohio DOT Lean Team and research programs. This expanded membership brought more diverse viewpoints and developed a long-term, collaborative approach to promote innovative ideas statewide.



The Ohio STIC is funding innovations that can save operational costs, such as use of ground-penetrating radar to determine pavement condition.

To create a transparent innovation evaluation process and capture cost savings, the Ohio STIC developed **standardized criteria** to select **STIC Incentive** projects, which resulted in more project submittals. The STIC also created a subcommittee with representatives from the Ohio DOT, the County Engineers Association of Ohio, a metropolitan planning organization, and an RTPO to better understand the impact that the projects could have statewide.

The Ohio DOT is capturing cost savings through its internal processes. With more than 2,000 suggestions received, 201 implemented, and 271 under further analysis—the savings as of Spring 2022 totaled \$72.2 million that can be invested into Ohio's infrastructure.



ICONIC training program students replaced a concrete sidewalk at an interstate rest area in partnership with Idaho Transportation Department staff.

# Idaho: Building Partnerships and a Future Workforce

Idaho's STIC made strides to increase outreach, diversity, and real-world career opportunities through its support of the Idaho Career Opportunities—Next in Construction (ICONIC) training program.

The Idaho STIC's support of this strategic workforce development initiative allowed the ICONIC training program to triple in size and take a geographic approach by targeting students in the areas where training is held. This was done in effort to keep students close to home and their families during their training.

In 2022, ICONIC delivered a 5-week training program to residents in Idaho Falls that incorporated classroom and hands-on instruction. The Idaho Falls class graduated 15 students, 40-percent of whom were female and 60 percent were minority. Eleven members of the class were employed in the highway construction industry within 30 days of graduating.

The ICONIC program was expanded to include hands-on training in heavy equipment operation and concrete cement masonry. It also provided opportunities for students to network. The classroom instruction and in-field training prepared the students to partner with the Idaho Transportation Department's district staff to replace a sidewalk at an interstate rest area near Idaho Falls. Inviting contractors to observe the in-field training gave students an opportunity to demonstrate their skills.

## **MORE INFORMATION**

- ▼ Visit FHWA's STIC Excellence Award webpage.
- Contact Sara Lowry of FHWA's Office of Transportation Workforce Development and Technology Deployment for information on the STIC Excellence Award.



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# States Innovate!

### **California Spotlights Successful Innovations**

The California Department of Transportation (Caltrans) 2022 Innovation Expo highlighted innovations that have proved successful in a variety of areas such as operations, public engagement, and safety. Among these are using unmanned aerial systems (UAS) to improve safety and productivity for maintenance inspections and rockfall mitigation efforts. When standard surveying methods were ruled out due to hazardous site conditions, Caltrans implemented virtual reality technology and three-dimensional UAS modeling to conduct surveys for rare plants and monitor vegetation growth for rockfall projects. The agency's State Route 11 project at Enrico Fermi was spotlighted for its innovative diverging diamond interchange (DDI) design. The DDI incorporates border wait time technologies that enhance regional mobility and reduce greenhouse gas emissions while improving driver safety along this busy bi-national route. The expo also highlighted a new virtual public involvement approach that used QR codes placed on the ground within the bike and pedestrian rightof-way. People walking and biking could see and scan the QR codes with their devices to access a survey, provide responses, and learn about the project. The QR code method proved to be an effective, low-cost solution for targeted stakeholder outreach with minimal need for installation and upkeep. Learn more about these and other innovations featured at the expo by listening to session recordings and browsing the Virtual Exhibit Hall.

### **Delaware Deploys e-Ticketing**

After e-Ticketing officially went live for all hot-mix projects for the Delaware DOT (DelDOT) in late Spring of 2022, field inspectors immediately asked for additional integrations of collected field data that directly populates DelDOT's electronic systems. DelDOT is accommodating those requests by completing a



The Caltrans 2022 Innovation Expo highlighted projects such as an innovative diverging diamond interchange design that was incorporated into a border crossing project near San Diego.

connection between its e-Ticket and e-Construction platforms that will reduce user input required for payment to a handful of mouse clicks. Not only will this be guicker, but it will also improve accuracy by reducing the opportunity for human error in transferring values between paper and computer. DelDOT sees e-Ticketing as an opportunity to improve staff safety, increase information access throughout the chain of command, and reduce its administrative and paperwork burden. In addition, DelDOT is considering the expansion of data associated with e-Ticketing to include location of materials placed, integrated live data stream from the pavers, and coordinated sharing of data with law enforcement for size and weight enforcement.

### Virginia Uses Value Capture for a **Multimodal Corridor**

The Virginia Department of Transportation (VDOT) is using value capture techniques to fund its Transform 66 Outside the Beltway project. The project is being delivered under a 50-year design-build-finance-operate-maintain public-private partnership concession. It provides 22.5 miles of new express lanes on

Interstate 66, which were completed in November 2022. in addition to bicycle and pedestrian paths, safety and operational improvements, 4,000 park and ride spaces, and new and expanded commuter bus service. According to a **VDOT** news release, the project will deliver about \$3.7 billion worth of transportation improvements benefiting the northern Virginia I-66 corridor that will be financed by a consortium of private developers.

### **Wyoming Pilots Automated Variable Speed Limits**

The Wyoming Department of Transportation (WYDOT) announced a pilot program to semi-automate variable speed limit (VSL) signs this winter. VSL changes are normally prompted by WYDOT and Wyoming Highway Patrol personnel driving on that section of highway based on specific criteria, such as weather or traffic conditions. The new automated program uses data from WYDOT sensors to adjust the speed indicated on the VSLs when those personnel may not be in the area to initiate the changes themselves. The speed limit changes prompted by the program can still be altered by agency personnel on the ground. The weather-responsive management strategies used by WYDOT include a Mobile Road Condition Reporting App for electronic tablets installed in maintenance vehicles that allows field crews to report road condition information remotely. WYDOT developed the mobile app to free-up radio traffic, save employee time, and help provide information to the public quickly.

### **Massachusetts Enhances Public Engagement**

The Massachusetts Department of Transportation (MassDOT) launched its 2050 **Statewide Long Range Transportation Plan effort** by including virtual public involvement techniques such as online surveys, meetings in a box, and pop-up outreach alongside traditional in-person methods. The pop-up outreach included a series of community-centered engagements



The Ohio DOT began a recent video newscast with an update on the benefits of a restricted crossing U-turn intersection 1-year after installation.

designed to broaden representation. These engagements involved outreach street teams setting up a kiosk at various locations across the State, sharing information about the plan, and offering incentives for passersby and others to participate in the public survey. MassDOT then held a virtual public meeting to present survey results and maintain engagement.

### **Ohio Highlights Innovative Intersection** Design

A recent video **newscast** by the Ohio Department of Transportation (ODOT) featured the benefits of an intersection safety improvement project called a restricted crossing U-turn (RCUT). **RCUTs** are reduced left-turn conflict intersection designs that simplify decision-making for drivers and minimize the potential for higher-severity crash types, such as head-on and angle. ODOT's report pointed out that in the year after this particular RCUT was installed, there were only two crashes and neither resulted in injuries, only property damage. ODOT's website provides more information and a factsheet on RCUTs as well as on median U-turns, another non-traditional design for enhancing safety at intersections along multi-lane divided roadways.



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Credit: Ohio Department of Transportation

## INNOVATOR

INNOVATOR, published by the FHWA's Office of Innovation Management, Education, and Partnerships, advances the implementation of innovative technologies and accelerated project delivery methods in highway transportation.

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# **Build a Better Mousetrap Spotlights Innovative Solutions**

The **2022 Build a Better Mousetrap** winners include tools for filling barriers or berms with compact materials such as gravel, for removing debris from around guardrails, and for removing dirt buildup in culverts, as well as an electronic survey tool for prioritizing emergency response.

FHWA sponsors this national recognition program to showcase innovative solutions at the local government and tribal agency levels. Entries are submitted from Local Technical Assistance Program and Tribal Technical Assistance Programs centers from around the country. For more information, visit the Build a Better Mousetrap website.



Better Mousetrap competition.

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