

FHWA Fostering Multimodal Connectivity Newsletter

The Federal Highway Administration's (FHWA's) *Fostering Multimodal Connectivity Newsletter* provides transportation professionals with real-world examples of how multimodal investments:

- Make our transportation system safer for all people
- Promote an inclusive and sustainable economy
- Reduce inequities across our transportation systems and the communities they affect
- Address the climate crisis by building more resilient transportation systems to reduce emissions and our carbon footprint
- Support complete trips and mobility innovation.

This newsletter also showcases how FHWA and its partners are improving connectivity, accessibility, safety, and convenience for all transportation users, including equitable transportation options for traditionally underserved communities.

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Implementing the GO KC Sidewalk Program in Kansas City, Missouri

Uday Manepalli, Utility Manager, City of Kansas City, Missouri

In August 2017, Kansas City, Missouri City Council approved the <u>GO KC Sidewalk Program</u> to evaluate, inspect, repair, and replace sidewalks throughout the city. Prior to 2017, property owners in Kansas City were subject to paying for sidewalk repairs identified by city assessments. The GO KC Sidewalk Program receives funding each year from General Obligation Bonds to work on projects such as making corners and ramps American Disabilities Act (ADA) compliant, repairing sidewalks as reported through the 311 system, and conducting citywide sidewalk condition inventory. The GO KC Sidewalk annual allocation of \$5 million is split between two categories: the ADA Program and the Sidewalk Program, which encompasses the Sidewalk Full Block Spot Repair and the Sidewalk Priority Maintenance/Sidewalk Design Inspections.

The Sidewalk Full Block Spot Repair program began repairs of sidewalks that were backlogged from 2008-2016. The initial estimated timeline for these repairs was set to be completed by the end of 2025. Remarkably, the city is now on track to finish these repairs by early spring in 2024. Holistic inspection of streets will take place through this initiative to ensure safe travel of the entire length of the block.



Figure 1: Before and after rubberized sidewalk implementation. (Source: City of Kansas City)

The program initiated the inventory of sidewalks through citywide inspections beginning in 2020. Roughly 60 percent of the sidewalk inventories have been completed as of 2023. During the inspections, data was collected on various categories, including vertical displacement/tripping hazards, with thresholds set at less than 0.5 inches, 0.5 to 1 inch, and greater than 1 inch. Additionally, the inspections aimed to identify the trees responsible for upheaval in the

sidewalks. A \$5 million annual allocation is split between the Sidewalk Full Block Spot Repair and the Sidewalk Priority Maintenance/Sidewalk Design Inspections for identified repairs.

Addressing the identified repairs has traditionally involved costly replacement of sidewalks, often accompanied by the removal of trees in the area. Kansas City, however, has placed a high value on tree preservation, particularly pointing out the importance of retaining existing trees in the city's Climate Action Plan. To minimize the amount of tree removals necessary during sidewalk repairs, Kansas City explored two innovative initiatives:

- Shaving /Slicing Operation for Trip Hazards: This approach focused on identifying and addressing trip hazards that were less than one inch in height. Instead of traditional grinding, which can leave ridges and may not meet ADA compliance standards, the city adopted this new method. Initially tested in three pilot neighborhoods, it proved to be four times more cost-effective than full concrete replacement. Over the course of a week, around 500 trip hazards were successfully removed. This approach is now being scaled up to eliminate more than 25,000 tripping hazards over the next year, with plans to continue its implementation into future projects.
- Recycled Rubberized Materials for Sidewalks: The city partnered with the University of Missouri-Kansas City to study the implementation of recycled rubberized materials for sidewalks. The year-long study involved testing materials under various weather conditions, including snow and extreme heat, which are common in Kansas City due to its freeze/thaw cycles and hot summers. The results of this study indicated that it was possible to protect trees while providing safer walking paths using the provided recycled rubberized materials. Building on these findings, the city is now adopting a hybrid approach for entire blocks by replacing driveways with concrete while using recycled rubber for the walking paths. Implementation of this hybrid approach is made on a case-by-case basis after on-field reviews and gaining community support. It is anticipated that this solution will assist in the preservation of over 10,000 mature trees.





Before

After

Figure 2: The before and after of sidewalk shaving. (Source: City of Kansas City)



When looking at sidewalk repair needs, Kansas City, like any urban center, faces the challenge of identifying areas where pedestrian access is needed. To tackle this, the city is conducting a comprehensive citywide analysis that considers factors such as equity, access, connectivity, public support, safety (including pedestrian and bicycle crashes), sidewalk condition, and pedestrian demand. Much of the public comment focuses on how updates and reporting will be provided to the community, as well as how the sidewalk program can promote more consistent repair. This plan is currently in its final stages and is soon to be presented to the City Council for review, approval, and adoption.

The results of these initiatives align strongly with the goals of the Federal Highway Administration, further encouraging Kansas City to apply for implementation U.S. DOT grants such as Safe Streets for All (SS4A) and Congestion Mitigation and Air Quality (CMAQ) Improvement Program. These grants can further support the city's commitment to enhancing pedestrian safety, accessibility, and the preservation of its urban trees, while providing a sustainable and cost-effective solution to sidewalk repairs. Rubberized sidewalk surfaces are an innovative alternative that addresses sustainability issues. They provide a permeable material that reduces winter ice build-up, allows water infiltration to the benefit of tree roots, and allows for evaporative cooling which reduces the urban heat island effect. Programs like GO KC Sidewalk allow for new solutions to take root.



Piloting Innovative Initiatives with the Connected Autonomous Shuttle Supporting Innovation Program in Cary, North Carolina

Sarah E. Searcy, Senior Advisor for Innovation – Integrated Mobility Division, North Carolina Department of Transportation

The North Carolina Department of Transportation (NCDOT) envisions a transportation system in the State where shared mobility options are convenient, reliable, affordable, clean, safe, and accessible to all. NCDOT is exploring how the use of shared automated vehicles can help achieve their vision through the <u>Connected Autonomous Shuttle Supporting</u> <u>Innovation program</u>, or CASSI. CASSI demonstrates what automated vehicle technology can do in safe, real-world settings and evaluates how automated vehicles can best be used by riders with different needs and in different scenarios. NCDOT and communities Statewide are partnering to test and evaluate automated vehicles in pilots that provide free shared rides to the public. These pilots focus on the usefulness of automated vehicle technology in a variety of transit applications such as first-mile/last-mile solutions and demonstrating connected vehicle infrastructure.

Navya is a French-based company specializing in the design and construction of automated and electric vehicles. Navya manufactured the low-speed automated shuttle used for NCDOT's most recent pilots under the CASSI program (Figure 3). The shuttle relies on Light Detection and Ranging (LiDAR), cameras, and Global Positioning System (GPS) technology to navigate on a fixed route. Beep, Inc. (Beep), a company based in Florida, focuses on deploying autonomous transportation solutions and operating the shuttle for the pilots. Beep provides a trained onboard attendant to take manual control of the shuttle if needed. The attendant is also tasked with providing customer service such as answering riders' questions about the technology and assisting riders using mobility devices.



Figure 3: Shuttle at the temporary traffic signal-controlled intersection in Cary's Bond Park. (Source: Cary)

Since the shuttle does not feature a traditional driver's cockpit, mirrors, steering wheel, accelerator, or brake pedals, it does not meet Federal Motor Vehicle Safety Standards (FMVSS). The shuttle operates at Society of Automotive Engineers (<u>SAE</u>) Level 3 automation, known as "conditional automation." This means that the shuttle's Automated

Driving System (ADS) can drive the vehicle under limited conditions, but a human onboard attendant must take over driving when the ADS requests. As a safety precaution, the shuttle is programmed to automatically disengage from autonomous mode and come to a complete stop when an obstacle is too close or when all required conditions for operation are not met. The attendant can also manually disengage from autonomous mode when necessary. The shuttle was imported into the United States from France for research and demonstration purposes with oversight from the National Highway Traffic Safety Administration (NHTSA) and is not commercially available for purchase. NHTSA is responsible for reviewing and approving both projects and routes before the shuttle can operate or accept passengers.

For their most recently completed pilot under the CASSI program, NCDOT partnered with Cary, NC (Cary) and Beep to bring Navya's low-speed automated shuttle to Fred G. Bond Metro Park (Bond Park) in Cary. NCDOT and Cary executed a general agreement that documented the funding arrangement, responsibilities, and expectations for the pilot. Beep

operated the Navya shuttle on a 1.6-mile, four-stop route within the park that connected the Cary Senior Center, a large park shelter and amphitheater, a lakeside boathouse, and a community center (Figure 4). The shuttle was free and open to the public on weekdays from 10:00 a.m. to 4:00 p.m. during the 13-week pilot period (March 6 through June 2, 2023). The pilot was funded as a 50/50 cost share between NCDOT and Cary. The cost share covered the lease and operating expenses related to the commissioning of the shuttle, attendant training, and public operations associated with the pilot. Cary was responsible for costs associated with on-site work for the project. Teams across multiple departments within Cary collaborated with NCDOT and Beep to plan and launch the pilot, investing significant funding and



Figure 4: Map of the shuttle's route and stops in Cary's Bond Park. (Source: NCDOT)

staff to meet requirements for the shuttle's route, storage location, and charging equipment. As an example, Cary upfitted their carpentry shop adjacent to the Cary Senior Center stop to serve as a suitable shelter and charging location for the shuttle through purchasing and installing charging equipment, a Wi-Fi cradle point, and HVAC upgrades. Cary also designed, fabricated, and installed signs along the route and at the stops, including A-frame signs with information about the pilot and a Quick Response (QR) code that linked to Cary's webpage for the project (Figure 5). To ensure there were no intrusions or perceived obstacles, Cary trimmed back vegetation along the route. To address accessibility concerns at three of the four stops, Cary leased temporary modular ramps to ensure access for riders using mobility devices. Cary also facilitated events with the Cary Town Council, media, and citizens, and numerous marketing and communications efforts were created in collaboration with NCDOT and Beep. Cary also used their 311 service to keep the public informed about the project.

In addition to the efforts made by Cary, this pilot included two special features. The Cary Senior Center stop was shared with GoCary Routes 4 and 8 which enabled riders to explore riding the local bus system and complete their trip within the park on the shuttle. Further, NCDOT and Cary collaborated to install a temporary traffic signal at one of the intersections on the route to demonstrate the shuttle's vehicle-to-infrastructure communication capabilities. This was the first project under the CASSI program to include signal integration.

To evaluate the shuttle and its service, NCDOT and Cary used ridership and operations data provided by Beep in weekly data reports in addition to feedback from riders captured through an online survey. NCDOT and Cary also held an engagement event in partnership with Beep to gather feedback about the accessibility of the shuttle and service from community members. NCDOT and Cary released their findings from the pilot in Bond Park in a final report, datasets, and a curated data story accessible through Cary's <u>Open Data Portal</u> and on the <u>NCDOT website</u>. Some of the key findings outlined in the report and data story are:

- On days when the shuttle was in operation, the shuttle carried an average of 3.5 passengers per trip, totaling 1,718 passengers throughout the pilot period.
- The highest ridership occurred during the week coinciding with Wake County Public Schools' spring break period, notably on Friday, March 31, when 80 passengers were served—the most on any given day.
- Most riders had a good experience using the shuttle and with the onboard attendant.
- Some riders did not like the shuttle's jerky braking and sudden stops.
- New trips within Bond Park resulted from the introduction of the shuttle and some personal vehicle trips were replaced by the shuttle during the pilot period.
- Additional testing in more complicated settings and potentially more advanced technology is needed to optimize communications between the shuttle and traffic signals.
- Making sure the public is involved in the decision-making process about automated vehicles in their communities is important to success.

Facts from the project will inform NCDOT and Cary's future test programs and projects. The findings also provide information to the public about the current challenges and successes of automated vehicle technology and where it may advance in the future.



Figure 5: Sign provided at stops in Cary's Bond Park for the CASSI project. (Image courtesy of NCDOT)

NCDOT's current project under the CASSI program is taking place on the campus of University of North Carolina at Charlotte (UNC Charlotte). Service opened to the public on July 12, 2023 and will run through December 22, 2023. This new project continues to advance NCDOT's goal of incrementally increasing the complexity of projects while learning from past challenges and building on successes. Lessons learned from the project in Cary's Bond Park were applied towards the deployment at UNC Charlotte. The project increases the complexity of the vehicle-to-infrastructure communications from a single temporary traffic signal to four naturalistic traffic signals and features the longest route and most complex operating environment to date. NCDOT is evolving the CASSI program to include the latest technological advancements and will continue to pilot automated shuttles across the State. The agency is further exploring how automated vehicles can be tested and integrated into high quality, on-demand transit services, including through grant applications to the U.S. DOT Advanced Transportation Technology and Innovation (ATTAIN) program while also supporting N.C. A&T State University to develop shared automated vehicles, an innovative rural test track, and an automated shuttle pilot between the university and downtown Greensboro.

For more information about the CASSI program and projects, please visit <u>www.ncdot.gov/cassi</u>.



Improving Access and Safety with the SunRunner Bus Rapid Transit System in St. Petersburg, Florida

Stephanie Weaver, Communications & Public Relations Manager, Pinellas Suncoast Transit Authority

On October 21, 2022, the Pinellas Suncoast Transit Authority (PSTA)—alongside the City of St. Petersburg, Florida, the Florida Department of Transportation (FDOT), and the Federal Transit Administration (FTA)—launched the SunRunner bus rapid transit (BRT) service between downtown St. Petersburg and the Pinellas County beaches. The SunRunner BRT aims to improve access to jobs, safety for vulnerable road users such as pedestrians and bicyclists, traffic congestion, economic growth, opportunities for transit-oriented development and affordable housing and other needs. Pinellas County first identified the BRT service as a preferred mode of transport in 2003. Planning and study efforts began in 2009 followed by stakeholder engagement. The design process kicked off in 2018 with the SunRunner Rising Development Study—a Federally funded project through the FTA Transit-Oriented Development (TOD) Pilot Program, leading to the implementation and launch of the SunRunner BRT in 2022. The FTA awarded \$21.8 million of the total \$43.93 million project cost through the Capital Investment Grants Program, the first ever awarded to the Tampa Bay region.

Access and safety for vulnerable road users was a priority in the SunRunner planning studies. St. Petersburg is a diverse city with many walkable and bikeable streets, so pedestrians and bicyclists remain an important piece of the SunRunner story. Every SunRunner bus is bicycle-friendly, with level boarding and three secure, easy-to-use bicycle racks, plus standing room for bicyclists on board. Refer to the <u>SunRunner website</u> for a video and infographics on how to park a bicycle on the bus. To complement the onboard amenities, many improvements were made to bicycle lanes to increase access and improve safety. For example, bicycle lanes were moved to more central locations and were significantly widened. In addition, bicyclists are permitted to ride in the bus-and-turn lane in certain parts of the SunRunner's route, and buffered bicycle lanes have been added along and around the SunRunner route.



Figure 6: Bicyclist waiting to board SunRunner at a BRT stop. (Source: PSTA)

The SunRunner also posed a valuable opportunity to help improve traffic congestion along Pinellas County's busiest corridor, in the most densely populated county in the State—in fact, one SunRunner bus takes as many as 50 cars off the road. The implementation of dedicated bus lanes has helped transit and emergency vehicles move more efficiently through traffic, especially during rush hour. During the height of hurricane season, bus lanes are made available for extreme weather evacuations. The BRT service also alleviates parking congestion, as many street parking spots along the



route were widened to make them safer and easier for drivers to access. With many connections to essential routes offered by PSTA, riders can easily connect to the SunRunner, potentially eliminating the use of cars altogether.



Figure 7: Diagram of a typical intersection along the SunRunner BRT route. (Source: PSTA)

The SunRunner has exceeded expectations, which has already resulted in the addition of new bus stops. Since its October 2022 opening to October 2023, the Tampa Bay region's first and only bus rapid-transit system has provided service to more than <u>one million riders</u>. The PSTA's strategies for improving vulnerable road users' access and safety will continue to mirror the growth of the SunRunner service. Such improvements may be in the form of improved foot crossings along the route and long-term bicycle parking/storage at or near the SunRunner stations. PSTA also hopes that the excitement and reliability around the SunRunner will encourage the redevelopment of publicly owned properties and surface parking lots in downtown St. Petersburg.

For the SunRunner and possible new BRT lines in the Tampa Bay Area, the future is bright and public interest and excitement is palpable. SunRunner rider Steven Fyalkowsi speaks to this positivity, explaining that convenience is one of the most valued qualities of the service: "The route saved me money on parking and allowed me to better enjoy what the city has to offer." PSTA's partnership with initiatives like <u>Car Free St. Pete</u>—which aims to reduce car usage, bolster public transit, and encourage health and wellness through cycling and walkable cities—only furthers the agency's mission to put pedestrians and bicyclists first.



Collecting and Reporting Paved Trail Data with the Iowa Data Bike in Central Iowa

Zhi Chen, Senior Planner, Des Moines Area Metropolitan Planning Organization

Central Iowa provides more than 600 miles of interconnected multi-use trails that connect urban centers to rural areas and natural resources. Local governments recognize the value of these paved trail assets as they begin to mature, and maintenance needs become more evident. In 2017, the Des Moines Area Metropolitan Planning Organization (MPO) launched the <u>lowa Data Bike</u>, a Federally funded, proof-of-concept initiative for data-based trail pavement maintenance and decision making. The electric-assist cargo bicycle is equipped with an iPhone that records trail pavement roughness through an iPhone app, a GoPro camera that takes images of the trail surface, and a 360° camera that captures immersive photos of trail surroundings.



Figure 8: Iowa Data Bike Concept. (Source: DMAMPO)

Proven effective, the Des Moines Area MPO has continued to use the Iowa Data Bike yearly to collect trail data. During the summer of 2023, the Des Moines MPO collected trail data on more than 260 miles of Central Iowa's regional trails. Data collection on the Central Iowa trail network is staggered on a cycle—one year for the regional trails, followed by a year of one quadrant of the local trails (northwest, northeast, southwest, and southeast). In 2023, the Data Bike, ridden by MPO staff, took more than 70,300 photos of trail pavement surfaces, of which 12,504 were identified as showing some distress (cracking, pothole, vegetation, etc.).

The Des Moines MPO compiles trail roughness data each year and publishes it as a report and through an <u>interactive</u> <u>online map</u>. Since the summer data collection effort, the 360° Google Street View imagery of the Central Iowa trail network has accumulated more than 455,000 views. In addition, in July 2023, the Iowa Data Bike joined the Des Moines Register's Annual Great Bicycle Ride Across Iowa (RAGBRAI)'s 50th Anniversary Ride through Des Moines, from the Iowa State Capitol through downtown Des Moines to Water Works Park. The event typically averages 30,000





Figure 9: Des Moines Area MPO staff riding the Data Bike across the High Trestle Bridge on Google. (Source: DMAMPO)

The pavement photos and the 360° imagery of the trail network have not only allowed people from all over to virtually engage and explore the trail system, but they have also assisted local trail managers in better assessing trail conditions and preparing for trail maintenance and improvements. "We use the Data Bike assets pretty regularly for in-office field inspection uses such as cross-checking pavement condition complaints from residents and checking types of signage in place and near street crossings. The condition reports produced from the data are also a great rehabilitation planning and post occupancy assessment tool that will provide a snapshot of paving system performance and changes in condition over time," says Colby Fangman, Park Planner III with the City of Des Moines Parks and Recreation.

Of note, the 2023 season spurred regional discussions at the MPO's <u>Bicycle and Pedestrian Roundtable</u> on adding and improving trail signage standards and intersections, and developing a regional trails closure map.

The Iowa Data Bike has greatly improved digital media content for immersive and captivating storytelling in addition to better trail pavement maintenance and decision making. The Des Moines MPO welcomes others who are interested in replicating and improving upon the Iowa Data Bike concept for their own trail assessment, maintenance, and usage.



Announcements/New Resources

The Federal Highway Administration released the following:

- <u>Sidewalk Mapping for Pedestrian Navigation Workshop</u>, a summary report on the needs for sidewalk mapping and the roles of stakeholders who impact the deployment of sidewalk mapping technologies.
- The <u>Micromobility Regulations and Permitting Equity Synthesis</u>, which summarizes current literature and examples related to regulations and permitting that advance equity through the availability of shared micromobility options.
- The <u>CMAQ Emissions Calculator Toolkit for Bicycle, Pedestrian, and Shared Micromobility</u>, which provides tools to evaluate emission benefits from the implementation of a shared micromobility project.
- Research, published as <u>Development of Crash Modification Factors for Bicycle Treatments at</u> <u>Intersections</u>.
- Joint studies, titled <u>Developing Crash Modification Factors for Mini-Roundabouts</u> and <u>Developing Crash</u> <u>Modification Factors for Separated Bicycle Lanes</u>, highlighting the safety effectiveness of miniroundabouts and how separated bicycle lanes influence safety performance on the roadway.
- A <u>Crosswalk Marking Selection Guide</u> providing information about selecting crosswalk marking designs based on overall effectiveness and considerations of materials, maintenance, and cost.
- <u>Safe System Approach for Speed Management</u>, a report which links speed management to the <u>Safe</u> <u>System Approach</u>.
- A collection of resources from the <u>Equity and Justice40 in Action Workshop</u>, offering presentation overviews, tools, and resources for transpiration equity screening.
- A <u>poster</u> listing the wide range of Federal funding opportunities available for Complete Streets projects and programs.
- A <u>video</u> on the benefits of using <u>speed safety cameras</u> in school zones to reduce fatalities and injuries for all road users, particularly walking children.
- An <u>ADA Transition Plan and Inventories Mapping Application</u> tool that shows the status of each State's required ADA Transition Plan and provides information on how to access those plans.
- <u>The Role of Metropolitan Planning Organizations in Planning for Equitable Shared Mobility: A Federal</u> <u>Highway Administration Peer Exchange Event</u>
- Office of Planning, Environment, and Realty's Micromobility webpage

The U.S. DOT released the following:

- Resources from the workshop Enhancing Interoperable Connectivity for Safe Transportation: Continuing the Momentum Toward National Deployment. Information provided aims to allow the consistent data exchange between devices installed in vehicles and devices deployed along the roadside by State and local agencies.
- An <u>announcement</u> of the selection of 24 members for the Advisory Committee on Transportation Equity (ACTE).
- <u>VIEW</u>, a tool documenting the blind zones of different vehicles and trucks.
- An <u>announcement</u> of the awardees in planning and demonstration grants for the <u>SS4A program</u>.
- **13 grants** through its <u>Rural and Tribal Assistance (RTA) Pilot Grant Program</u>, <u>awarded</u> for \$3.4 million.

The <u>2024 Equity Summit: Meeting the Moment</u> will be held between March 27-28, 2024 in Washington, D.C. The Summit will bring transportation leaders, community development advocates, and others together to learn from one another and identify tools to advance racial equity through smart growth.