

# Federal Highway Administration (FHWA) Pedestrian and Bicycle Research and Program Activities

## December 2019

This document is available online  
at [https://www.fhwa.dot.gov/environment/bicycle\\_pedestrian/resources/](https://www.fhwa.dot.gov/environment/bicycle_pedestrian/resources/).

### Federal-Aid Funds for Pedestrian and Bicycle Programs and Projects

- In Federal fiscal year 2018, States obligated [\\$1.026 million](#) in Federal-aid highway program funds for pedestrian and bicycle programs and projects.  
See [https://www.fhwa.dot.gov/environment/bicycle\\_pedestrian/funding/bipedfund.cfm](https://www.fhwa.dot.gov/environment/bicycle_pedestrian/funding/bipedfund.cfm).
- FHWA lists [Pedestrian and Bicycle Funding Opportunities](#) to indicate potential eligibility for pedestrian and bicycle activities under U.S. DOT surface transportation programs. [https://www.fhwa.dot.gov/environment/bicycle\\_pedestrian/funding/funding\\_opportunities.cfm](https://www.fhwa.dot.gov/environment/bicycle_pedestrian/funding/funding_opportunities.cfm).

### FHWA Offices with Pedestrian and Bicycle Programs and Projects

- Office of Safety, Pedestrian and Bicycle Safety: [https://safety.fhwa.dot.gov/ped\\_bike/](https://safety.fhwa.dot.gov/ped_bike/)
- Office of Federal Lands Highway: <https://flh.fhwa.dot.gov/>
- Office of Infrastructure, Geometric Design: <https://www.fhwa.dot.gov/programadmin/>
- Office of Innovative Program Delivery: <https://www.fhwa.dot.gov/innovativeprograms/>
- Office of Operations, Manual on Uniform Traffic Control Devices: <https://mutcd.fhwa.dot.gov/>
- Office of Planning, Environment, Realty
  - Office of Human Environment: [https://www.fhwa.dot.gov/environment/bicycle\\_pedestrian/index.cfm](https://www.fhwa.dot.gov/environment/bicycle_pedestrian/index.cfm)
    - [Bicycle and Pedestrian](#)
    - [Recreational Trails Program](#)
    - [Transportation Alternatives](#)
  - Office of Planning: [https://www.fhwa.dot.gov/planning/processes/pedestrian\\_bicycle/](https://www.fhwa.dot.gov/planning/processes/pedestrian_bicycle/)
- Office of Policy and Governmental Affairs, Office of Highway Policy Information: <https://www.fhwa.dot.gov/policyinformation/>
- Office of Research, Development, and Technology: <https://highways.dot.gov/research/>
  - Exploratory Advanced Research: <https://highways.dot.gov/research/exploratory-advanced-research>
  - Pedestrian and Bicycle Safety: <https://highways.dot.gov/research-programs/safety/pedestrian-and-bicycle-safety>

## ***SAFETY: Reduce Transportation-Related Fatalities and Serious Injuries Across the Transportation System.***

- **Pedestrian and Bicyclist Scalable Risk Assessment Methodology (ScRAM):** This assessment approach allows agencies to estimate pedestrian and bicyclist risk as it relates to exposure, to help inform funding decisions. The ScRAM tool was finalized in Fall 2018. An Areawide Exposure Tool (an Excel spreadsheet) is supplemental to the Guide for ScRAM. This tool allows practitioners to obtain and summarize nationwide travel survey data to estimate risk at statewide and Metropolitan Planning Organization (MPO) area scales while providing functions for the user to supply local data when available. [https://safety.fhwa.dot.gov/ped\\_bike/tools\\_solve/fhwas18032/](https://safety.fhwa.dot.gov/ped_bike/tools_solve/fhwas18032/).
- **Bikeway Selection Guide:** This resource guide helps State and local agencies identify the most appropriate types of bike facilities to use based on user and roadway characteristics. Technical assistance has been provided to several pilot communities to assist in using the guide. [https://safety.fhwa.dot.gov/ped\\_bike/tools\\_solve/](https://safety.fhwa.dot.gov/ped_bike/tools_solve/). (PDF)
- **Safe Transportation for Every Pedestrians (STEP):** Through the FHWA Every Day Counts (EDC) program, STEP focuses on improving pedestrian crossing locations, urban and rural, and works with stakeholders to develop a systemic approach to improve quality of life for pedestrians of all ages and abilities. The following countermeasures are being promoted: Rectangular Rapid Flashing Beacons (RRFB), leading pedestrian intervals, Pedestrian Hybrid Beacons (PHB), crosswalk visibility enhancements, raised crosswalks, pedestrian crossing/refuge islands, and road diets. [https://safety.fhwa.dot.gov/ped\\_bike/step/](https://safety.fhwa.dot.gov/ped_bike/step/)
- **Pedestrian and Bicyclist Focus States and Cities Technical Assistance:** This program works to aggressively reduce pedestrian deaths by focusing extra resources on the cities and States with the highest pedestrian fatalities and/or fatality rates. The States and cities receiving technical assistance is revised every four or five years and currently includes 16 States and 35 cities. The Pedestrian/Bicyclist Focus States and Cities initiative supports Peer-to-Peer Exchanges, quarterly webinars, and technical assistance and training to improve safety and develop action plans. [https://safety.fhwa.dot.gov/ped\\_bike/ped\\_focus/](https://safety.fhwa.dot.gov/ped_bike/ped_focus/)
- **Update Bicycle and Pedestrian Transportation University Course:** This project will update and modify the 2006 course materials based upon reports and guidelines that have been released since the last update. The goal is to mainstream the bicycle and pedestrian transportation content into multiple University-level courses. [http://pedbikeinfo.org/resources/resources\\_details.cfm?id=5174](http://pedbikeinfo.org/resources/resources_details.cfm?id=5174)
- FHWA's **Pedestrian Forum Newsletter** highlights recent pedestrian safety activities that will help reach FHWA's safety goals and save lives. [https://safety.fhwa.dot.gov/ped\\_bike/pedforum/](https://safety.fhwa.dot.gov/ped_bike/pedforum/)
- **Lighting for Pedestrians Design Guide:** The objective of this project is to develop a lighting design guide and implementation policy that will be cost-efficient to promote pedestrian safety in an urban street environment. The design guide and implementation policy will focus on lighting the sidewalks as well as crosswalks and other pedestrian critical conflict points around schools. Expected Spring 2020.
- **Pedestrian Countermeasures Crash Modification Factor (CMF) Study:** The purpose of the project was to demonstrate the effectiveness of pedestrian safety plans in reducing pedestrian fatalities, injuries, and conflicts and to demonstrate the plan's portability to other jurisdictions within the United States. There are two countermeasures being

evaluated for CMF: (1) Permissive to Protected Left Turn Phasing and (2) Leading Pedestrian Interval (LPI)

<https://www.fhwa.dot.gov/publications/research/safety/18044/index.cfm>

- **SmartCross** – Traffic Signal Interface on the Smartphone (SBIR Phase IIB)  
This system enables pedestrians to safely navigate busy intersections with the help of a mobile application, by requesting a pedestrian walk phase directly from their smartphone, and provides an in-vehicle warning to drivers approaching a mid-block crossing in which a pedestrian is present and is also using the application. The current application requires no on site infrastructure and runs entirely on mobile devices using cellular communications. Contact [ann.do@dot.gov](mailto:ann.do@dot.gov)
- **Development of Crash Modification Factors (CMF) for Different Separated Bike Lane (SBL) Configurations.** The study will evaluate the feasibility and requirements for developing CMFs for intersection-related crashes separately from crashes that occur at midblock locations. The overall goal is to determine the influence that SBLs have on the total number and severity level of crashes with particular attention to those crashes involving bicycles. Because intersections must accommodate bicycles that travel straight through the intersection, bicycles that may turn left or right at the intersection, and bicycles that need to execute a lane change due to the intersection design. Contact [ann.do@dot.gov](mailto:ann.do@dot.gov)
- **Development of Pedestrian-Intersection Crash Modification Factors.** The objective of this project is to develop Crash Modification Factors (CMFs) where they do not currently exist for treatments and strategies that apply at intersections for the convenience and safety of pedestrians, and quantify the safety effects on pedestrians as well as the intersection overall. Specifically, this project will assess the geometric design of intersection corner radii to determine and characterize the resulting crash frequency and severity, as well as traffic-speed relationships. Contact [ann.do@dot.gov](mailto:ann.do@dot.gov)

The **FHWA Office of Planning, Environment, and Realty** and the **Federal Railroad Administration** completed a Rails-with-Trails: Lessons Learned study through the U.S. DOT Volpe Center. It describes effective practices to plan, design, construct, operate, and maintain rails-with-trails facilities. It has methods to ensure railroad and trail safety and security, promote active transportation and health and wellness, support network connectivity and economic development, and enhance the environment. Will be posted at upon final completion [https://www.fhwa.dot.gov/environment/recreational\\_trails/publications/](https://www.fhwa.dot.gov/environment/recreational_trails/publications/)

**Pedestrian and Bicycle Crash Analysis Tool (PBCAT):** PBCAT is a crash typing software product that analyzes motor vehicle and pedestrian or bicyclist crashes. An update to PBCAT is underway under a new Highway Safety Information System (HSIS) task order that began in December 2018. It will be completed by summer 2020.

[http://www.pedbikeinfo.org/pbcats\\_us/](http://www.pedbikeinfo.org/pbcats_us/)

**Pedestrian and Bicycle Information Center:** FHWA has a cooperative agreement with the **University of North Carolina Highway Safety Research Center** to develop, synthesize, promote, and distribute bicycling and walking information to improve the quality of life in communities through the increase of safe walking and bicycling as a viable means of transportation and physical activity. <http://www.pedbikeinfo.org/>

## ***INFRASTRUCTURE: Invest in Infrastructure to Ensure Mobility and Accessibility and to Stimulate Economic Growth, Productivity, and Competitiveness for American Workers and Businesses.***

FHWA is updating the [National Highway Institute](#) Bicycle Facility Design course. It will be converted to a web-based course, free to users, and will be available in Early 2020. <https://www.nhi.fhwa.dot.gov/home.aspx>

**The Corps Network** (TCN) signed a cooperative agreement with FHWA to develop resources to help encourage States to enter into contracts and cooperative agreements with qualified youth service or conservation corps to perform appropriate projects, including pedestrian and bicycle projects and recreational trail projects. TCN developed a Trails and Transportation webpage, and published [Building the Future: A Guide for Utilizing the Recreational Trails Program to Partner with Service and Conservation Corps](#) to describe methods that States use to complete projects cost effectively while developing job skills.

## ***INNOVATION: Lead in the Development and Deployment of Innovative Practices and Technologies that Improve the Safety and Performance of the Nation's Transportation System.***

### **Understanding traffic systems with innovative pedestrian and cyclist**

**detection.** Working in partnership with the U.S. DOT's Intelligent Transportation Systems (ITS) Program and the Federal Transit Administration (FTA), FHWA is pursuing research to enable the secure sharing of electronic messages between traffic management systems, ITS devices, transit vehicles and systems, and travelers using connected mobile devices. The goals of research and future efforts include (1) exploit the sharing, integration, and use of data with connected devices (CDs) to proactively manage and control traffic, and (2) improve the safety and mobility of all travelers. The research includes pedestrians and bicyclists as road users. Contact [Jon.obenberger@dot.gov](mailto:Jon.obenberger@dot.gov)

### **Sharing and Using Connected Device Data to Improve Traveler Safety and Traffic**

**Management:** This project is exploring the requirements to enable the exchange of electronic messages between roadside devices, traffic management systems, transportation service providers, connected and automated vehicles, and travelers using mobile devices to improve their safety and mobility. The report identifying these requirements along with the data to include within electronic messages to ensure it meets the needs of different travelers (e.g., pedestrians, bicyclists) will be available Fall of 2020. Contact [Jon.obenberger@dot.gov](mailto:Jon.obenberger@dot.gov)

**Planning Multimodal Networks in a Connected and Automated Vehicle Future:** This task order will conduct research and describe scenarios of how pedestrian and bicycle network planning may change as deployment of connected and autonomous vehicle technology begins widespread deployment. This project has just begun, and will complete in early 2021. Contact [Darren.buck@dot.gov](mailto:Darren.buck@dot.gov)

**Multimodal Alerting Interface with Short-Range Transmissions (MAIN-ST):** This is a Small Business Innovation Research ([SBIR](#)) project with Charles River Analytics to develop hardware and software to bring bicycles onto connected vehicle networks and to provide safety information related to possible hazards to the bicyclist. The project developed prototype Dedicated Short Range Communication (DSRC) capability using commercially available hardware, as well as a software hazard detection and notification system that will

work with any connected vehicle hardware transport mechanism (potentially including 5G or Bluetooth). The project also developed a virtual reality bicycle simulator and supporting software that has been installed at the Turner-Fairbank Highway Research Center (TFHRC) and that interoperates with the existing driving simulator. Completed October 2019.

<https://www.cra.com/work/case-studies/main-st>

### **Assessing Potential Safety Benefits of Advanced Pedestrian Technologies Through a Pedestrian Technology Test Bed:**

This project investigates the effectiveness and limitations of diverse systems to improve pedestrian safety and mobility based on real-world crash scenarios within a standardized test plan framework. This will improve the development and evaluation of future vehicle automation technology to maximize road user safety and mobility. Contact [karen.timpone@dot.gov](mailto:karen.timpone@dot.gov)

### **Fostering Innovation in Pedestrian and Bicycle Transportation Pooled Fund**

**Study:** This [Transportation Pooled Fund](https://www.pooledfund.org/Details/Solicitation/1441) (TPF) focuses on bicycle and pedestrian network planning, safety, and design issues, and seeks to address short term research needs of interest to the practitioner community. <https://www.pooledfund.org/Details/Solicitation/1441>.

Two projects are nearly complete, and one has just begun:

- Project 1 — **Driver Comprehension and Sign Design Options for Left Turn Yield to Bikes and Shared Street Signs:** This study evaluated driver comprehension and sign design options to inform decision making relating to the Manual on Uniform Traffic Control Devices (MUTCD).
- Project 2 — **Development of Crash Modification Factors for Curb Extensions and Bicycle Specific Intersection Markings:** This study performed the necessary literature review, data collection, and state of the practice scan to serve as the precursor to the full development of CMFs for these two safety interventions.
- Project 3 – A task order, **Effective Selection of Crosswalk Patterns**, will produce a guide to help practitioners prioritize where the placement of high-visibility crosswalks would be most effective. This effort has just kicked off.

**VisionEval** is a framework and set of models for strategic planning and scenario evaluation at State and regional scales. The **FHWA Office of Planning** has been coordinating a pooled fund effort with 7 States and 3 MPOs to develop VisionEval, which is currently being updated to evaluate new metrics related to active transportation, including health outcomes and mode share for emerging modes. <https://visioneval.org>.

**Guidebook for Measuring Multimodal Network Connectivity** focuses on measuring pedestrian and bicycle network connectivity and incorporating connectivity analysis into the transportation planning process.

[https://www.fhwa.dot.gov/environment/bicycle\\_pedestrian/publications/multimodal\\_connectivity/](https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/multimodal_connectivity/)

**Measuring Multimodal Network Connectivity Pilot projects:** FHWA is supporting 8 communities to operationalize multimodal network connectivity measures into a performance-based planning and/or project development approach. FHWA selected 8 metropolitan planning organizations representing a variety across the country. Each report will describe prior work, identify the planning or project development context, define the analysis method, assemble data, and compile the results. Contact [Darren.buck@dot.gov](mailto:Darren.buck@dot.gov)

FHWA awarded a **Small Business Innovation Research (SBIR)** Phase II feasibility project to Knowledge Based Systems, Inc. (KBSI) to design and develop the "WalkOn™" mobile application. It will facilitate the crowd-sourced collection of sidewalk inventory and condition assessment data. The tool will use recent advances in social networks, mobile data collection, and data mining to provide integrated sidewalk datasets. The project was completed in October 2019; the company can now seek commercialization.

The **National Bicycle Network** will gather national geospatial data in a consistent common format to represent bicycle travel facilities such as routes, trails and shared use roadways including both bicycle routes as part of the roadway systems and independent bicycle trails. It will develop a mechanism such as crowd sourcing or other data sources where new bicycle geo-spatial data and other directly necessary information can be supplied by the public and agencies to maintain the bicycle geo-spatial inventory's accuracy on a timely basis. Contact [Steven.jessberger@dot.gov](mailto:Steven.jessberger@dot.gov)

**Accessible Transportation Technologies Research Initiative (ATTRI)** is a joint USDOT initiative, co-led by the FHWA, FTA, and Intelligent Transportation Systems Joint Program Office (ITS JPO), with support from the National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR), and other Federal partners. The ATTRI Program is leading efforts to develop and implement transformative applications to improve mobility options for all travelers, particularly those with disabilities. The USDOT has awarded application development funding for [Wayfinding and Navigation](#), [Pre-trip Concierge & Virtualization](#), [Safe Intersection Crossing](#) with NIDILRR awarding a grant in the [Robotics and Automation](#) technology area.

The **FHWA Office of Innovative Program Delivery** also administers the State Transportation Innovation Council ([STIC](#)) Incentive funds, which can provide funding for safety, mobility, and project delivery.

### ***ACCOUNTABILITY: Serve the Nation with Reduced Regulatory Burden and Greater Efficiency, Effectiveness, and Accountability.***

The [Traffic Monitoring Guide](#) (TMG), published by the **FHWA Office of Highway Policy Information**, describes recommended data collection strategies for motorized and nonmotorized users. The TMG also contains specifications of data structures for count locations and count data that are implemented in the Traffic Monitoring Analysis System. The Traffic Monitoring and Analysis System (TMAS) is a national database of traffic counts that has been updated to receive and manage bicycle and pedestrian count data (including counts collected both manually and by machine, both from temporary and permanently installed count locations). For information on contributing or reviewing data in TMAS, contact Steven Jessberger ([steven.jessberger@dot.gov](mailto:steven.jessberger@dot.gov)) or Jeremy Raw ([jeremy.raw@dot.gov](mailto:jeremy.raw@dot.gov)).

FHWA posted the FY 2018 **Transportation Alternatives (TA) Annual Report** at [https://www.fhwa.dot.gov/environment/transportation\\_alternatives/annual\\_reports/](https://www.fhwa.dot.gov/environment/transportation_alternatives/annual_reports/). The TA Set-Aside is the single largest source of Federal-aid highway program funds for bicycle and pedestrian projects.

FHWA posted FY 2019 **Recreational Trails Program Annual Report** at [https://www.fhwa.dot.gov/environment/recreational\\_trails/overview/report/2019/](https://www.fhwa.dot.gov/environment/recreational_trails/overview/report/2019/). The RTP supports trails that provide access to outdoor recreation areas.

FHWA's **Fostering Multimodal Connectivity Newsletter** provides transportation professionals with real-world examples of ways that multimodal transportation investments promote economic revitalization, provide access to jobs, and achieve safer communities through support of accelerated project delivery, technology and design innovation, and public/private partnerships. <https://www.fhwa.dot.gov/livability/newsletter/>.

FHWA's **Human Environment Digest** shares the latest information from a range of Federal and non-Federal sources, addressing transportation and its relationship to the human environment. This newsletter covers items in support of safety; infrastructure, including accelerated project delivery, access to jobs, and community revitalization; technology and design innovation; and accountability, including, data-driven decisions and performance-based planning. [https://www.fhwa.dot.gov/livability/he\\_digest/](https://www.fhwa.dot.gov/livability/he_digest/).

**National Cooperative Highway Research Program (NCHRP) pedestrian/bicycle projects:**

<b>Project #</b>	<b>Title</b>	<b>FHWA Liaison</b>
07-25	Pedestrian and Bicycle Planning, Design, and Operational Issues with Alternative Intersections	Brooke Struve
08-102	Understanding Urban Bicyclist Facility Type Preferences and Facility Type Impacts on Transportation System Performance. (Project contingent 2014-B-16 and resubmitted)	Darren Buck
03-133	Signal Timing Strategies for Non-Motorized Users	Eddie Curtis
03-78C	Training and Technology Transfer for Accessibility Guidelines for Roundabouts and Channelized Turn Lanes (FY 2016)	Jeffrey Shaw
15-73	Design Options to Reduce Turning Motor Vehicle / Bicycle Conflicts at Intersections	Brooke Struve
15-74	Safety Evaluation of On-Street Bikeway Designs	Darren Buck
17-84	Pedestrian and Bicycle Safety Performance Functions for the Highway Safety Manual	Peter Eun
17-87	Enhancing Pedestrian Volume Estimation and Developing HCM Pedestrian Methodologies for Safe and Sustainable Communities	Jeremy Raw
17-94	Tactile Walking Surface Indicators To Aid Wayfinding For Visually Impaired Travelers In Multimodal Travel	Elizabeth Hilton
20-05/Topic 49-08	Pedestrian Injuries and Fatalities Relative to Traffic Speed	Tamara Redmon
20-05/Topic 50-10	Availability of Pedestrian Infrastructure Data For Routing and Network Analysis	Ann Do
20-05/Topic 51-04	A Synthesis on State DOT Practices for Selecting Pedestrian and Bicycle Projects	Darren Buck

22-37	Development of a Barrier Design to Accommodate Vehicles, Pedestrians, and Cyclists	Eduardo Arispe
20-123(02)	Research Roadmap for the AASHTO Council on Active Transportation	Darren Buck