



The Federal Highway Administration's (FHWA) Office of Human Environment (HEPH) develops and implements programs and activities that advance multimodal innovation, improve the human environment, and enrich human interaction with transportation systems.

The FHWA Office of Planning, Environment, and Realty (HEP) offers research opportunities to improve transportation decision-making and promote efficiency while improving communities, integrating environmental justice in all phases of the transportation decision-making process, and protecting the environment. Within HEP, HEPH supports and conducts research that:

- ◆ Informs Decision-making on Transportation Investments
- ◆ Reduces Negative Environmental Impacts and Enhances Benefits
- ◆ Enhances Quality of Life
- ◆ Accelerates Project Delivery
- ◆ Advances the Transportation Planning Process

Research Focus

HEPH efforts focus on supporting the advancement of livability, documenting the local and regional economic development impacts of highways, planning and implementing research, and managing human environment-related funded programs. The resulting research is focused on the following areas:

- Quality of life and environmental justice
- Community impact assessments
- Pedestrians, bicyclists, and micromobility
- Context-sensitive solutions and design
- Economic development
- Research program management and outreach
- The National Highway System (NHS)
- Multimodal networks and recreational trails

These efforts are directed toward providing technical assistance, tools, and training on highway systems and complementary modes of transportation, including transportation enhancements, and bicycle and pedestrian facilities.

HEPH research seeks to identify methods to help transportation practitioners and communities effectively evaluate project and program impacts and identify, improve, and implement sound mitigation options. HEPH aims to improve coordination and communication between State departments of transportation (SDOTs), partner agencies, and the public to ensure project understanding and create new efficiencies.

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FEATURED RESEARCH ACTIVITIES

Fostering Innovation in Pedestrian and Bicycle Transportation Pooled Fund Study

This pooled fund focuses on bicycle and pedestrian network planning, safety, design issues (design flexibility, developing crash modification factors, network connectivity), traffic control devices (experimenting on innovative markings, signals, and signs), and other issues designed by participants. For more information, please visit the [pooled fund website](#).

Staff Contact: [Darren Buck](#), 405-465-9878.

Crosswalk Marking Selection Guide

This guide synthesizes existing research and guidance on the safety, cost, and effectiveness of crosswalk marking patterns and makes recommendations for crosswalk marking selection and application. It includes illustrations, examples, and case studies that will enable practitioners to select the crosswalk markings that will be most effective. The [Crosswalk Marking Selection Guide](#) was published in September 2023.

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Electrical Bicycle (E-bike) Trends, Impacts, and Opportunities: Literature Review Summary

This literature review provides an overview of the legislative and regulatory context surrounding e-bikes in the United States at the national and state levels. It also examines existing research on the impacts of e-bikes in eight topic areas: ridership trends, safety, physical activity and health, accessibility, equity, trail infrastructure and environment, energy and emissions, and freight use cases. Each of the topic areas include a summary of gaps in research and identifies future research needs. The [Literature Review Summary](#) was published in May 2023.

Staff Contact: [Christopher Douwes](#), 202-366-5013.

Micromobility Regulations and Permitting Equity Synthesis

This synthesis discusses the role of regulations and permitting in advancing equitable micromobility systems, provides a literature review summarizing the existing research on this topic, and identifies areas for future research. The [Micromobility Regulations and Permitting Equity Synthesis](#) was published in October 2023.

Staff Contact: [Bronwen Keiner](#), 202-493-0280, and [Bernadette Dupont](#), 502-223-6729.

Micromobility Equity and the Economy Research

HEPH is continuing to conduct research and develop resources related to the role of equity and the economy in shared micromobility systems. This work includes developing the following micromobility case studies:

- [E-Bike Libraries Advance Mobility Options that Incorporate Equity and Climate Goals in Denver, Colorado](#) which explores an e-bike library in Denver, CO that lends e-bikes at no cost to low-income residents in its northeast neighborhoods (published in April 2024).
- [Chicago, Illinois Uses Regulatory Approaches to Improve E-Scooter Equity](#) which explores an e-scooter pilot evaluation in Chicago, IL that assesses e-scooter impacts on access and climate goals (published in July 2024);
- [Shared Micromobility Pilot Promotes Low-Income Access in Fort Smith, Arkansas](#) which highlights a pilot program in Fort Smith, AR that seeks to provide electric bikes and scooters in underserved neighborhoods (published in July 2024); and
- A future case study on the e-bike charging pilot in New York City which is currently in the works. (*Anticipated Completion March 2025*).

A new [micromobility webpage](#) was also posted as a formal topic on the [HEP Environment](#) page. This page compiles four years of capacity building resources on the topic of micromobility. The new webpage includes FHWA's micromobility definition; Federal, state, and local roles and responsibilities; and U.S. DOT and external resources and publications. The page was published in November 2023, and it is updated regularly.

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Reconnecting Communities: A Guide to Promising Practices

HEPH is working to produce a new set of case studies that will document examples of projects that successfully reconnect communities through the planning, active transportation, and community visioning processes. These case studies will provide practitioners with real-world tools based on tangible lessons learned from recently designed and implemented projects.

(Anticipated Completion December 2025)

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Rails-with-Trails Design and Engineering Guidebook

This guidebook will provide rail-with-trail (RWT) practitioners with detailed design and engineering guidelines inclusive of variations in RWT context, style, purpose, and limitations. The guidebook will be applicable to all types of RWT and enable practitioners, planners, designers, and engineers to adequately plan, design, construct, operate, and maintain RWT facilities and adapt RWT designs to specific contexts. It will complement the [Rails-with-Trails - Best Practices and Lessons Learned](#) report issued in June 2021. *(Anticipated Completion June 2025)*

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Trails as Resilient Infrastructure Guidebook

This [guidebook](#) focuses on best practices for planning, designing, and managing trails in the face of climate change. Trails provide the community access to the natural environments and infrastructure for active and low emission transportation but can be vulnerable to extreme weather events from droughts to flooding. This guidebook discusses strategies for project management, site selection, and construction methods to promote adaptive and sustainable trails.

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Separated Bike Lanes on Higher Speed Roadways: A Toolkit and Guide

This [guide](#) synthesizes existing research on separated bicycle lanes, including research on potential benefits and obstacles, and existing design and planning guidance. This research aims to identify key obstacles, considerations, and experiences of those who have designed, implemented, and maintained separated bike lanes on higher-speed roadways.

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A Toolkit for Statewide Walking and Bicycling Volume Data Programs

This toolkit will provide information for States and other transportation agencies to create programs that collect, inspect, maintain, publish, and analyze walking and bicycling volume data that is reliable, representative, and insightful. It will synthesize research and best practices on count programs, provide case studies on how different agencies are structuring their count programs, and provide recommendations for agencies on what to consider in planning their own. *(Anticipated Completion December 2024)*

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Tribal Development of Trails and Other Dedicated Pedestrian and Bicycle Infrastructure

The [paper](#) is based on a literature review and discussions with Tribes and staff involved in the FHWA Tribal Transportation Program. The findings suggest the importance of dedicated pedestrian and bicycle infrastructure in addressing Tribal challenges, which are highlighted through nine categories including coordination, funding, health, community engagement, tribal history and culture, planning, health, jobs and training, and active transportation. The Pennsy Trail, associated with the Seneca Nation of Indians, is one of five case studies showcased throughout the white paper. The paved three-mile trail improves quality of life by providing a safe, multimodal pedestrian path

for community members and visitors. The white paper also includes technical assistance and funding resources that are helpful to Tribes and partner agencies.

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Technical Assistance Resources

This document provides a listing of government and non-government entities, programs and tools that provide formal technical assistance that can support disadvantaged communities, biking, multiuse paths, and active transportation. The most recent [Technical Assistance Resources](#) document was published in September 2023.

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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. For more information, please visit the [PBIC website](#).

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Recent Livability Case Studies

HEPH published a few new case studies that focused on context sensitive solutions (CSS) and project impacts over several years, as well as a case study on tracking equitable improvements in a large metropolitan area.

- [Indianapolis Cultural Trail: Ten Years of Context Sensitive Design Connecting Communities](#)
- [Community Engagement Through CSS: The Paris Pike Project \(25-year lookback\)](#)
- [Developing an Equity Tracker for Central Puget Sound Region](#)

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The Corps Network's Trails and Transportation Program

The Corps published four reports to encourage States and project sponsors to enter into contracts and cooperative agreements to use qualified youth service and conservation corps in appropriate projects. The recent reports (available here <https://corpsnetwork.org/programs-initiatives/trails/> with previous reports and case studies) are: Building the Future (Vol II): A Guide for Using Federal Transportation and Trail Programs to Partner with Service and Conservation Corps (Sept 2022), Affinity and Identity-Based Crews and Programs (February 2023), Trail and Transportation Toolkit: A Guide for Supporting Service and Conservation Corps Projects through Federal-Aid Program Funding (October 2023), and Case Studies and Practices for Recruiting the Next Generation of Trail and Transportation Professionals (October 2023).

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