



U.S. Department of Transportation  
Federal Highway Administration

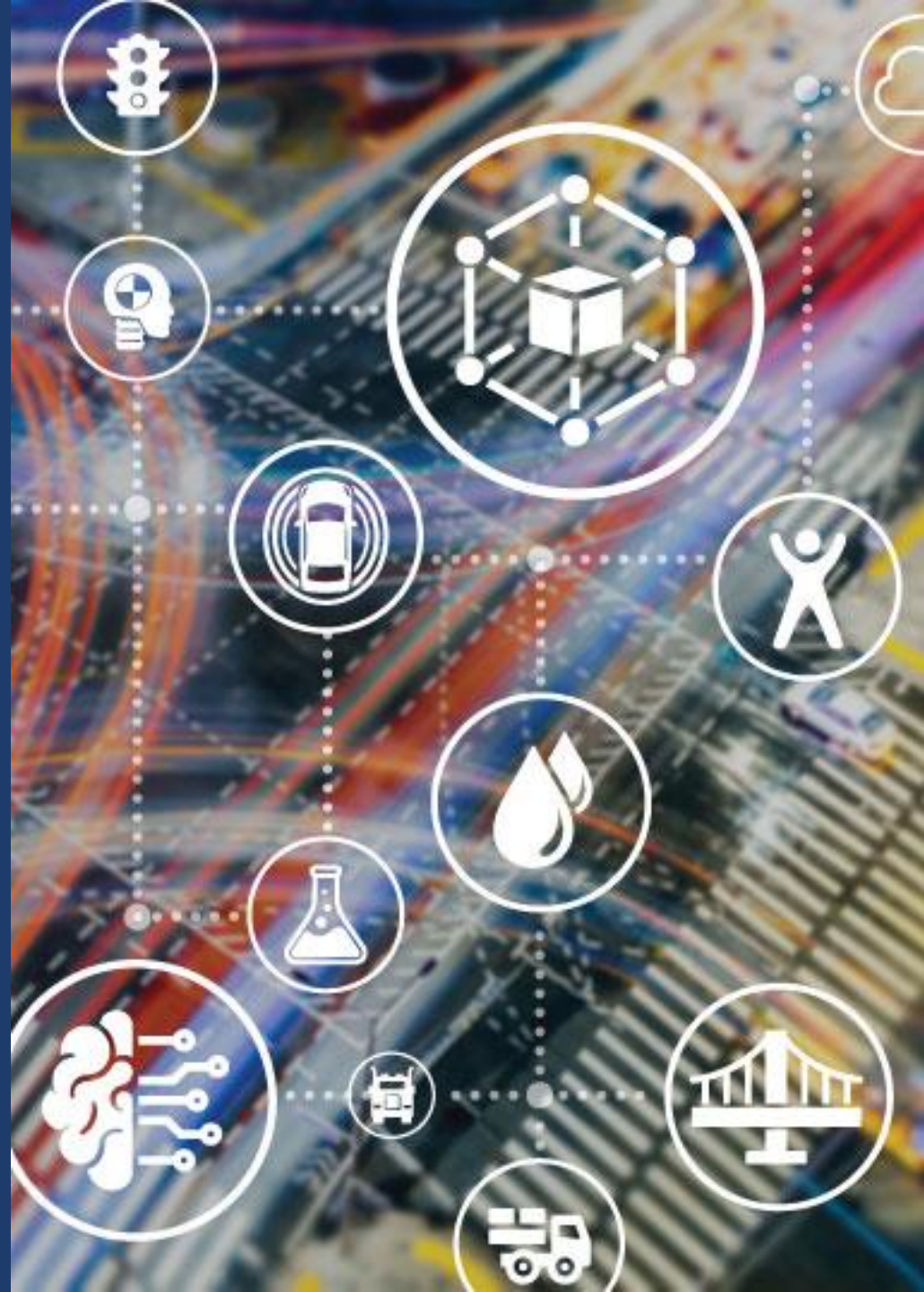
Turner-Fairbank  
Highway Research Center

# Overview of FHWA Complete Streets Activity

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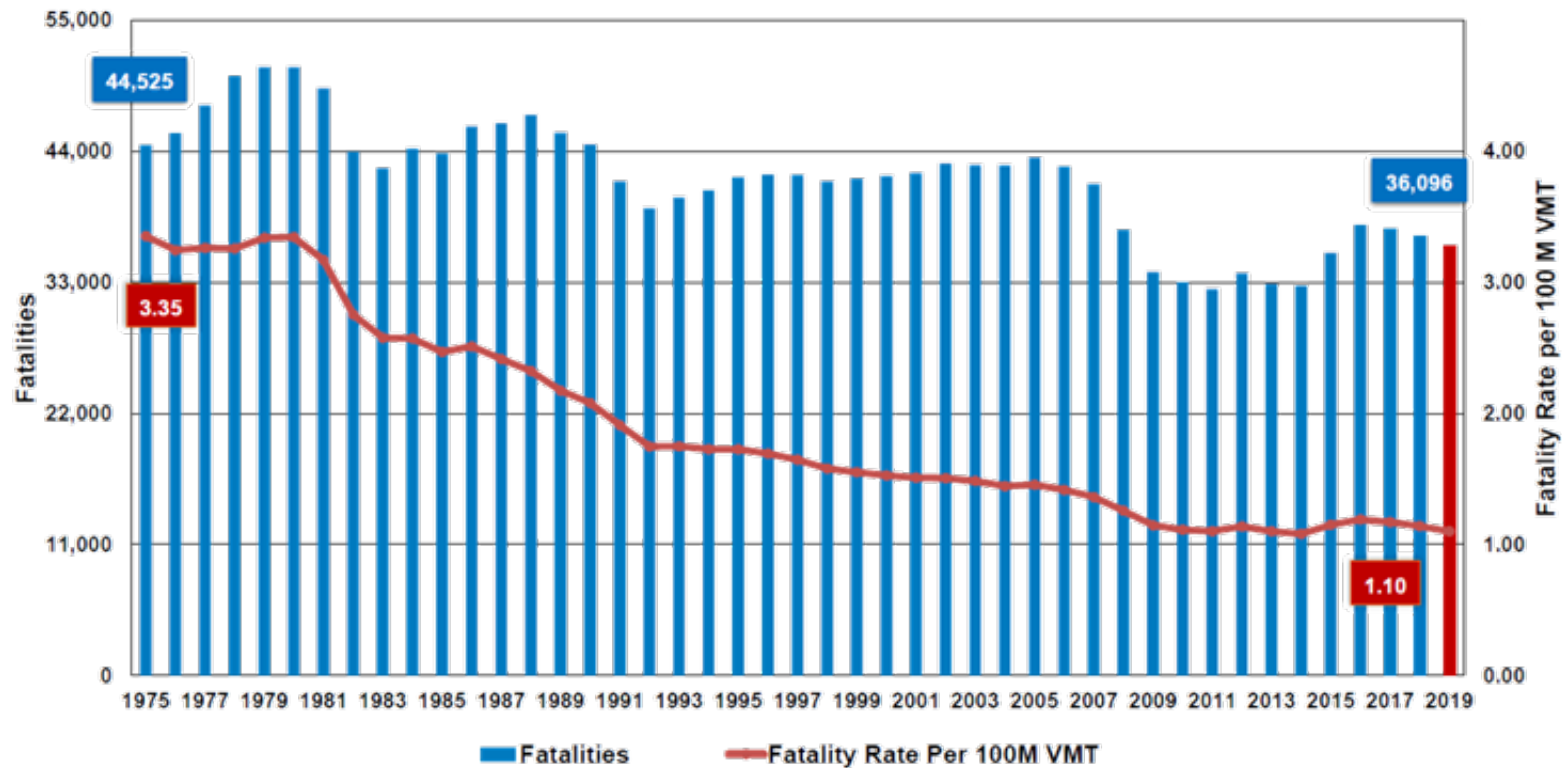
James Pol – Federal Highway Administration Office of  
Safety and Operations Research and Development

*December 9, 2021*



# Transportation Safety Improvements Have Slowed

Fatalities and Fatality Rates Per 100 Million VMT



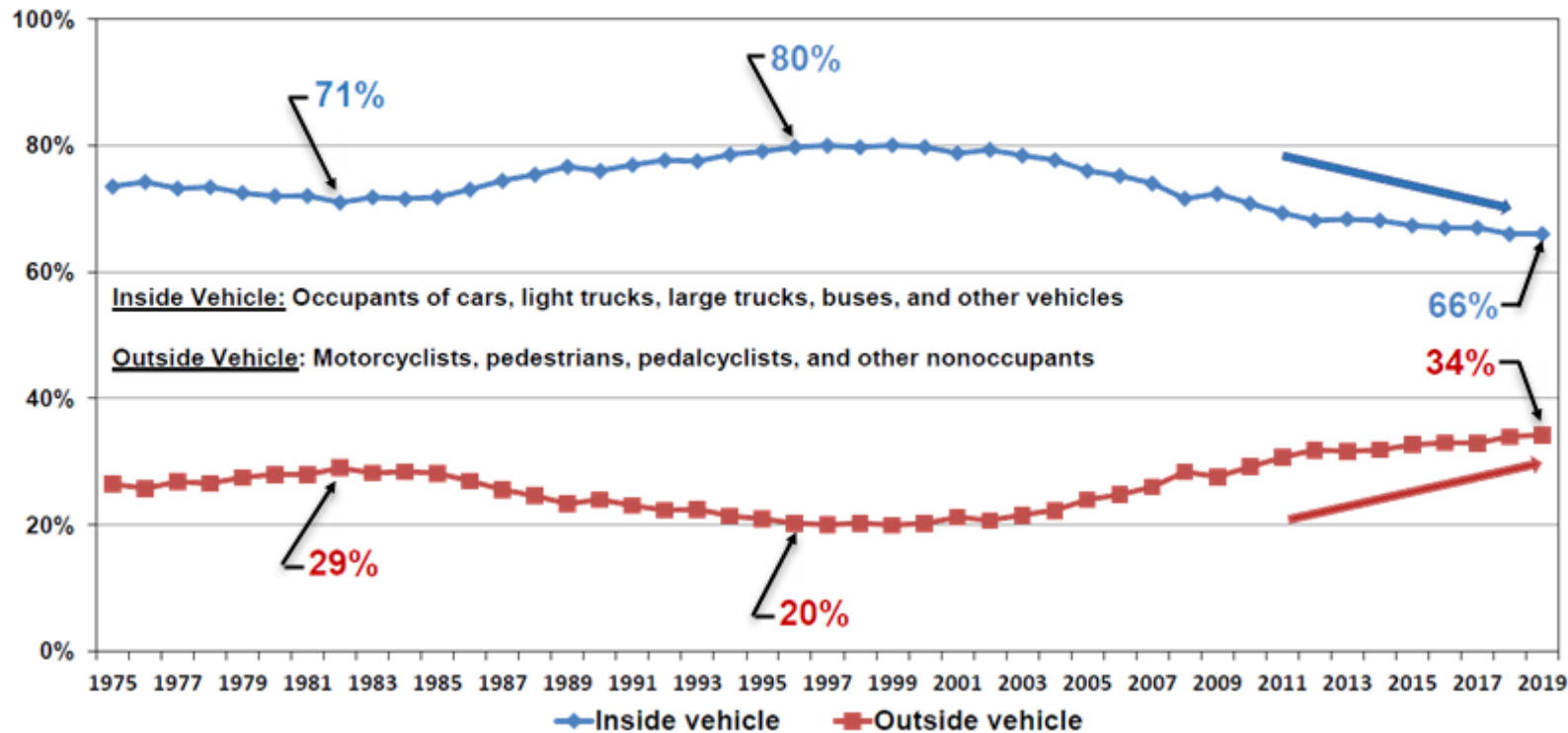
VMT = vehicle miles traveled.

Source: USDOT.<sup>(1)</sup>



# Fatalities Outside Vehicles Are Increasing

Proportion of Fatalities by Road User, 1975-2019



Source: USDOT.<sup>(1)</sup>



# Recent Findings

A recent study of the top 34 pedestrian fatality hot spot corridors in the United States found:

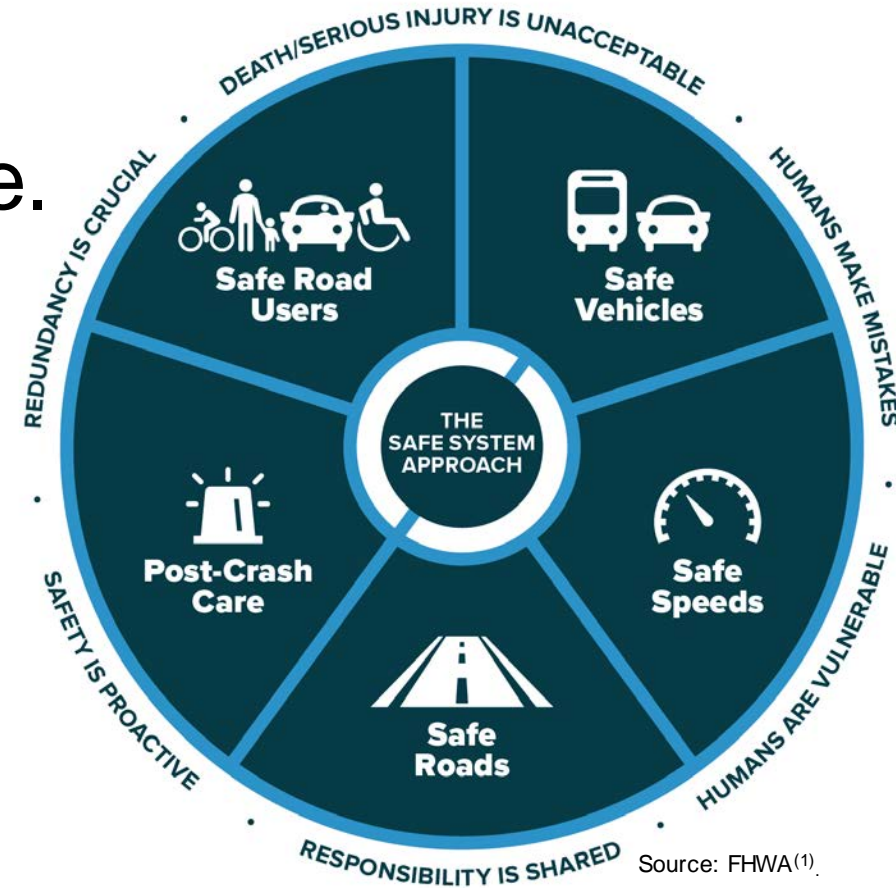
- ▶ **Almost all** (97 percent) hot spots are **multilane roadways**.
- ▶ **70 percent** require pedestrians to cross **five or more lanes**.
- ▶ Over **three quarters** have speed limits of **30 mph or higher**.
- ▶ **62 percent** have traffic volumes over **25,000 vehicles per day**.
- ▶ **Three quarters** were bordered by **low-income neighborhoods**.
- ▶ **Nearly all** had adjacent **commercial land uses**.





# The Safe System Approach: Six Core Principles

- ▶ Death/serious injury is unacceptable.
- ▶ Humans make mistakes.
- ▶ Humans are vulnerable.
- ▶ Responsibility is shared.
- ▶ Safety is proactive.
- ▶ Redundancy is crucial.



Source: FHWA<sup>(1)</sup>.

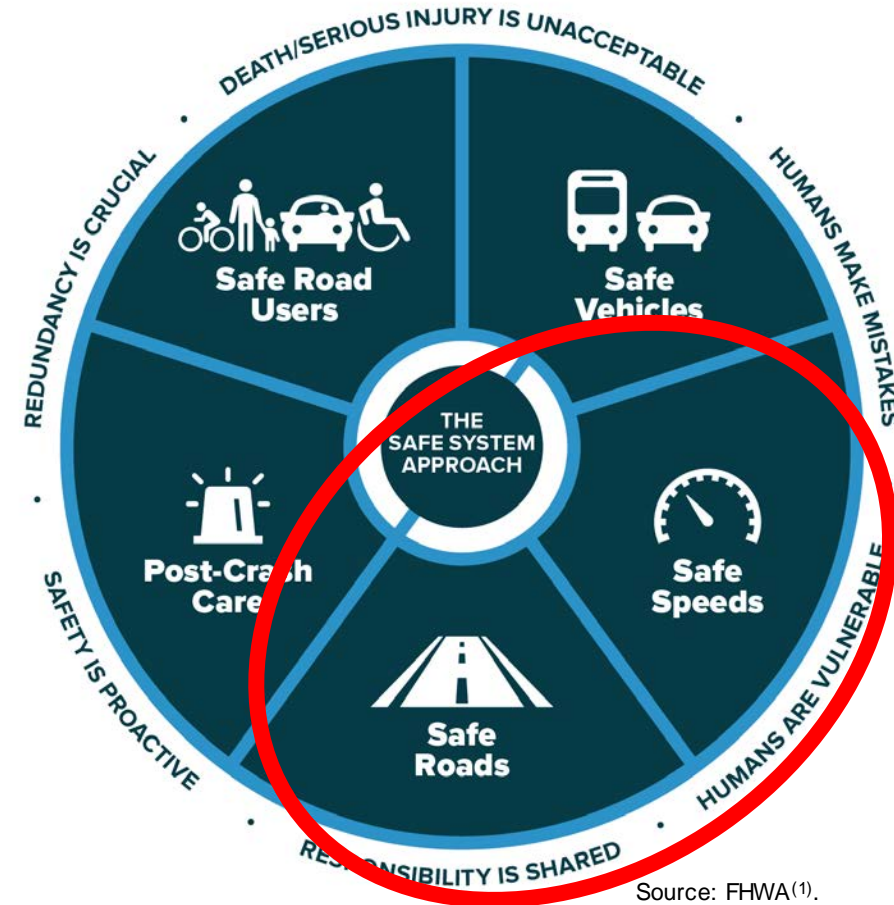
## Five Inter-Related Elements

<sup>1</sup>FHWA. 2020. The Safe System. FHWA-SA-20-015. Washington, DC: Federal Highway Administration. [https://safety.fhwa.dot.gov/zerodeaths/docs/FHWA\\_SafeSystem\\_Brochure\\_V9\\_508\\_200717.pdf](https://safety.fhwa.dot.gov/zerodeaths/docs/FHWA_SafeSystem_Brochure_V9_508_200717.pdf), last accessed November 24, 2021.



# An Implementation Strategy: Complete Streets

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**Five Inter-Related Elements**

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(c) 2021 Charlotte NC DOT.<sup>(1)</sup>

# What Are Complete Streets?

- “A complete street is safe and feels safe for everyone using the street.” – FHWA Deputy Administrator Stephanie Pollack
- Complete Streets implementation means routinely improving safety and access for all road users<sup>(2)</sup>.

<sup>1</sup>Photo source: Charlotte NC DOT      <sup>2</sup>“Introduction to Complete Streets” (web page). <https://smartgrowthamerica.org/resources/introduction-to-complete-streets/>, last accessed November 3, 2021.

# Complete Streets in the Bipartisan Infrastructure Deal

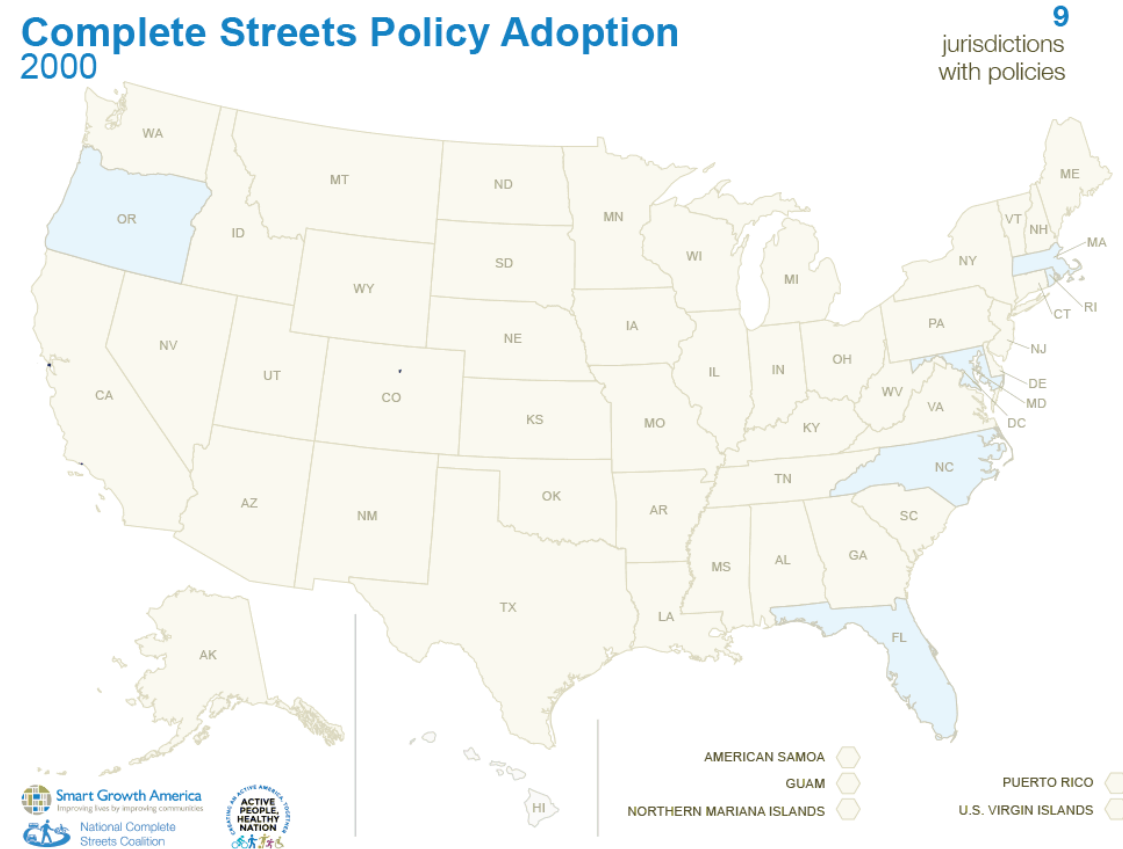
According to the *Infrastructure Investment and Jobs Act*<sup>(1)</sup>:  
Section 11206: DEFINITION OF COMPLETE STREETS  
STANDARDS OR POLICIES.

The term “Complete Streets standards or policies” means standards or policies **that ensure the safe and adequate accommodation of all users of the transportation system, including pedestrians, bicyclists, public transportation users, children, older individuals, individuals with disabilities, motorists, and freight vehicles.**





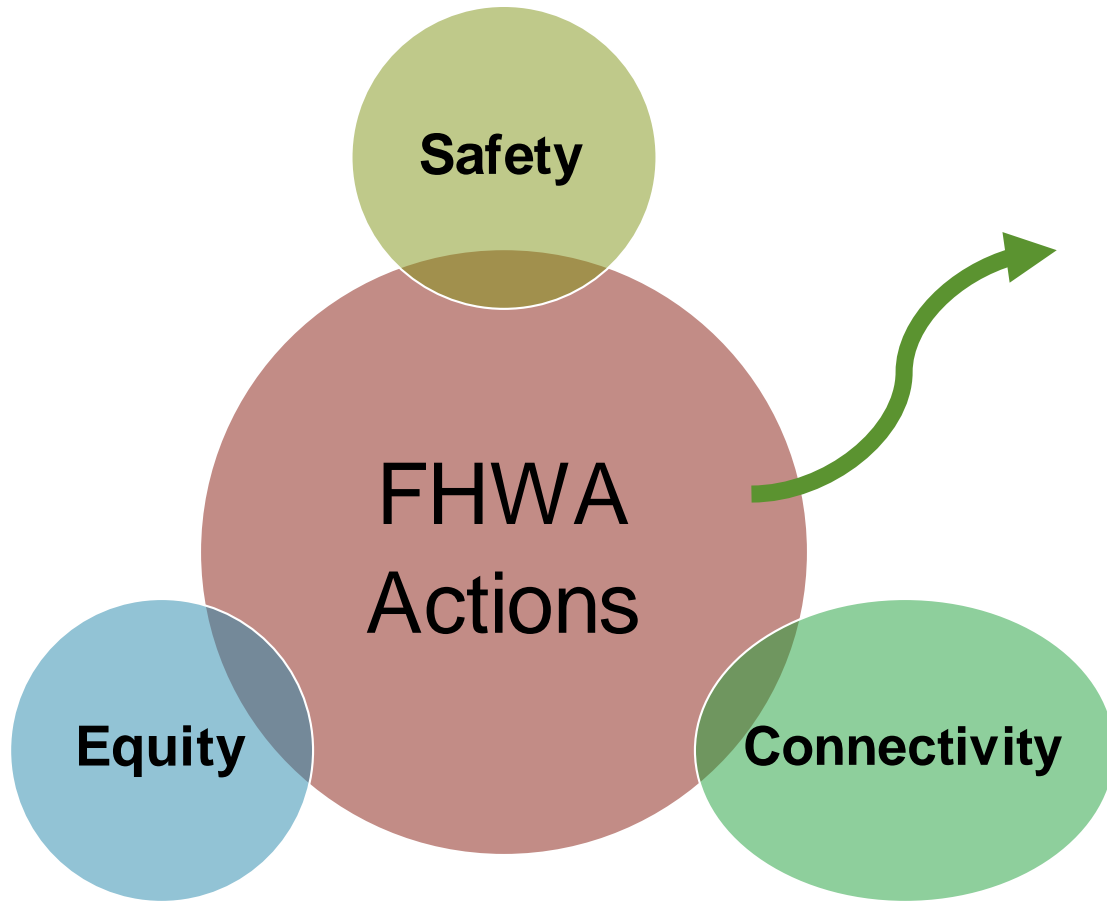
# Complete Streets Expansion to Over 1,500 Jurisdictions



© Smart Growth America



# FHWA Complete Streets Initiative



- ▶ Update FHWA processes.
- ▶ Educate and train practitioners.
- ▶ Find new measures of success.

Source: FHWA.



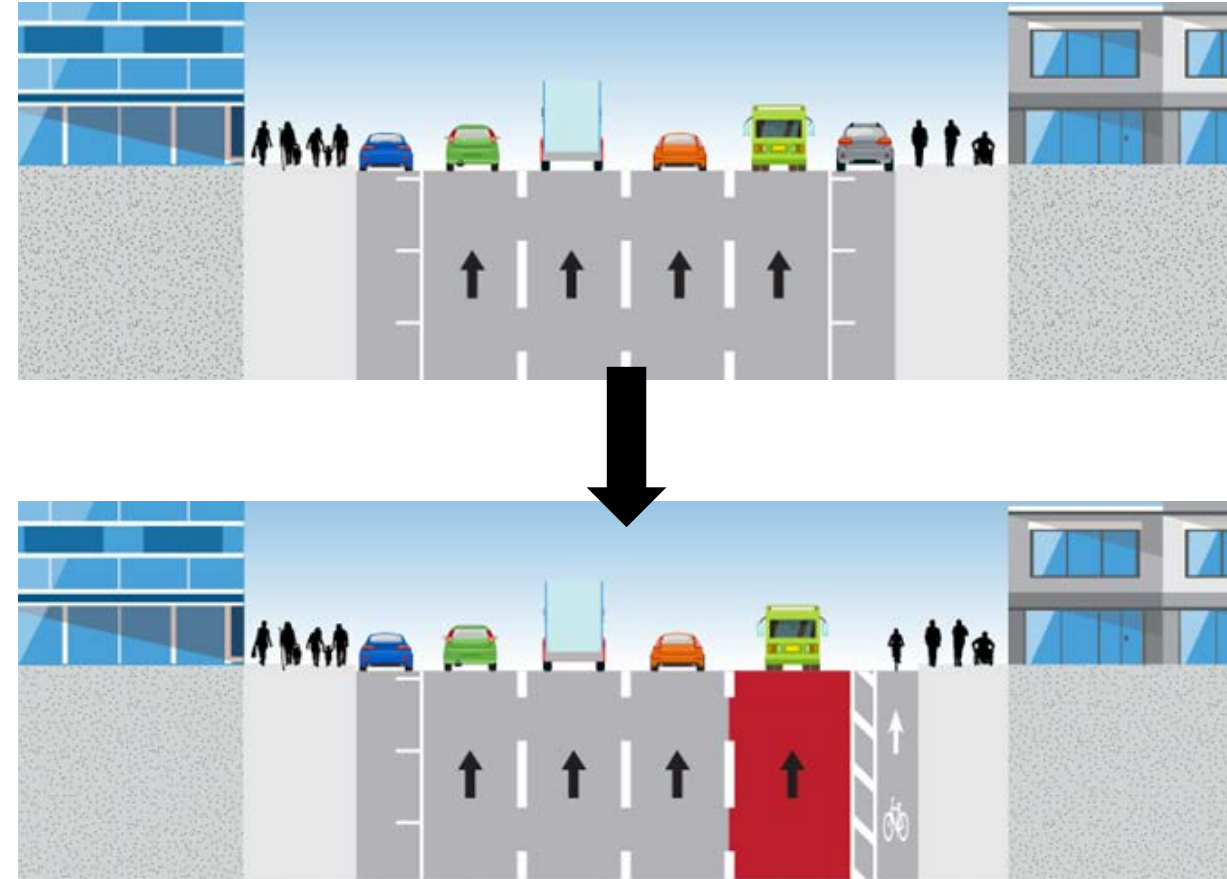
# Our Scope

## Focus

- ▶ Non-freeway arterial:
  - ▷ Speed limits < 55 mph.
  - ▷ Within metropolitan planning organization boundaries.
  - ▷ Small-town main arterial street.

## Emphasis

- ▶ Complete pedestrian networks.
- ▶ Complete cycle networks.
- ▶ Accessible transit.



All figures source: FHWA.



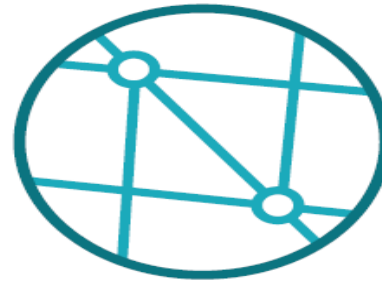
# Complete Streets Create a Safe Network



**Safety**



**Comfort**

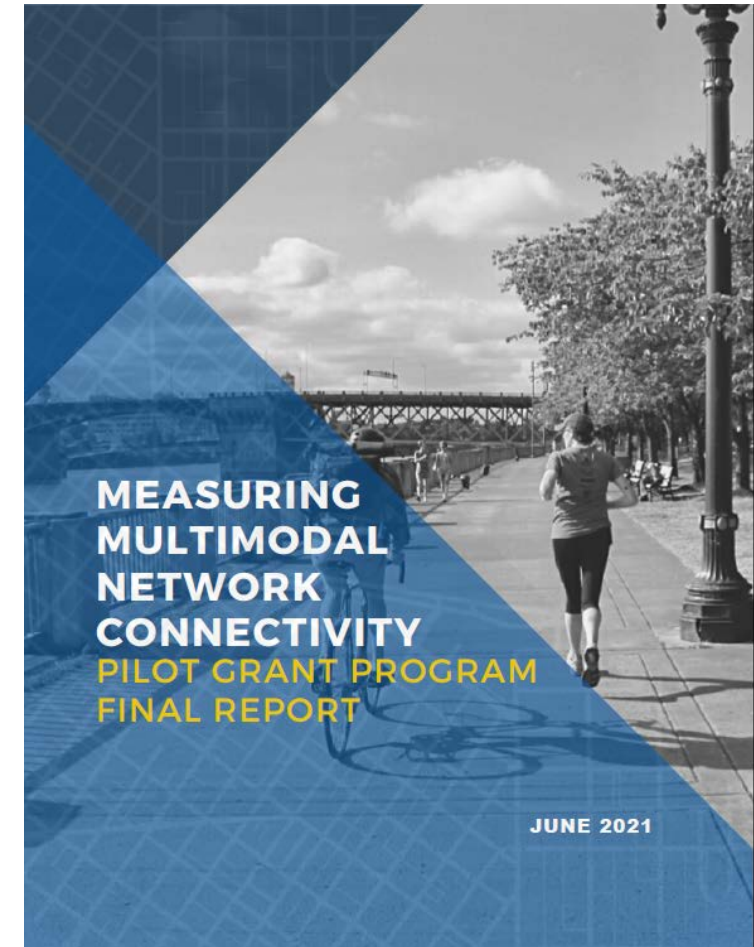


**Connectivity**

## Resources:

Federal Highway Association. n.d. “Fostering Multimodal Connectivity Newsletter” (web page). <https://www.fhwa.dot.gov/livability/newsletter/>, accessed 11/18/2021.

Federal Highway Association. n.d. “Guidebook for Measuring Multimodal Connectivity” (web page) [https://www.fhwa.dot.gov/environment/bicycle\\_pedestrian/](https://www.fhwa.dot.gov/environment/bicycle_pedestrian/), accessed 11/18/2021.



Source: FHWA.<sup>(1)</sup>



# New Measures of Success

We are missing basic data and information:

- ▶ How many people are walking and bicycling and taking public transportation on a corridor?
- ▶ What safety infrastructure is present?
- ▶ What are the safety benefits of installing multiple countermeasures?
- ▶ How can we model Complete Streets outcomes?





# Educate and Train Practitioners

We need answers to the questions that practitioners are asking:

- ▶ Who can we learn from?
- ▶ Where is Complete Streets implementation succeeding?
- ▶ How much does it cost to build Complete Streets?



# Research Approaches Near Term

- ▶ Collect walking and bicycling data.
- ▶ Perform the Complete Streets safety analysis.
- ▶ Develop modeling for Complete Streets.
- ▶ Provide better information to the field.
  - ▷ Project-level case studies and peer/roundtable events.
  - ▷ National Complete Streets assessments.
  - ▷ Complete Streets cost case studies.



# Complete Streets Safety Analysis

- ▶ Leverage ongoing FHWA and National Cooperative Highway Research Program projects developing crash modification factor (CMF) expressions for the *Highway Safety Manual*<sup>(1)</sup>.
- ▶ Assess the available CMFs, assess availability of data, and design potential approaches for conducting the safety assessment.



Photo source: FHWA<sup>(2)</sup>.

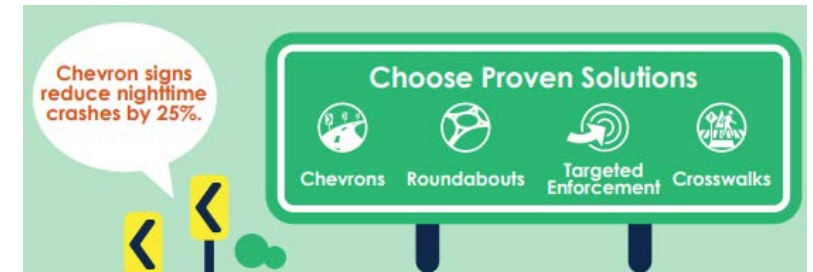


Photo source: FHWA<sup>(3)</sup>.

<sup>2</sup>Federal Highway Association. n.d. "Roadway Safety Data Program" (web page). <https://safety.fhwa.dot.gov/rsdp/ddsa.aspx>, last accessed November 24, 2021.

<sup>3</sup>Federal Highway Association, n.d., "Local Safety Road Plans" (web page) [https://safety.fhwa.dot.gov/provencountermeasures/local\\_roads.cfm](https://safety.fhwa.dot.gov/provencountermeasures/local_roads.cfm) November 24, 2021.

<sup>1</sup>American Association of State Highway and Transportation Officials. n.d. "Highway Safety Manual" (web page). <http://www.highwaysafetymanual.org/Pages/default.aspx>, last accessed November 19, 2021.



# Complete Streets Safety Analysis

## Notional outcomes:

- ▶ Create lists of candidate CMFs and crash modification functions (applications of multiple CMFs) for the Complete Streets safety analysis.
- ▶ Recommend the optimized alternative method and procedure for combining multiple CMFs and CMF functions from the Complete Streets safety analysis.
- ▶ Include suggested next steps: Applicability of the method to safety performance functions.
  - Additional features/design domain of case study.
  - Lists of CMFs that need development for CS safety analysis.



# Possible Future Safety Analysis Activities

- ▶ Data collection and realistic artificial data applications for Complete Streets: Overcome high-cost data collection to enable high-fidelity analysis.
- ▶ Built Complete Streets assessment: Comparative analysis of additional complete streets deployments.
- ▶ Guidebook on safety analysis of Complete Streets: Consideration of analysis approaches that can be applied to suit varied Complete Streets configurations.



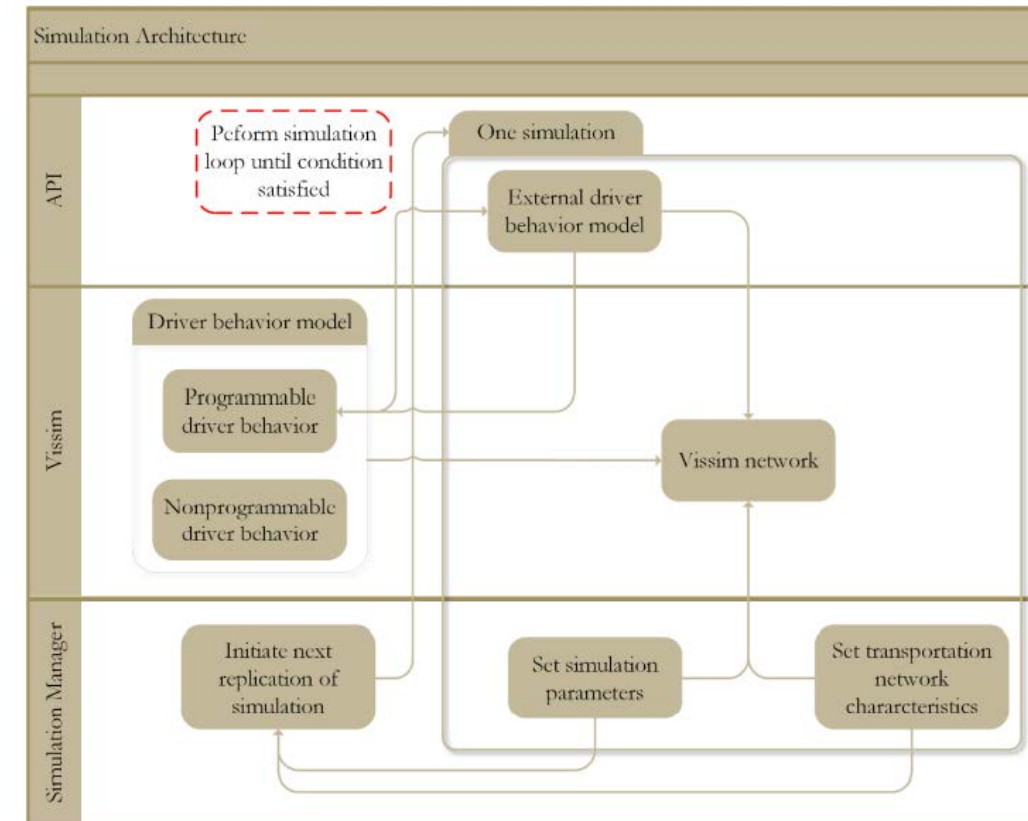


# Complete Streets Modeling

- ▶ Assess current capabilities and gaps for forecasting Complete Streets effects on performance measures.
- ▶ Consider methodologies in the *Highway Safety Manual*<sup>(1)</sup> and *Highway Capacity Manual*<sup>(2)</sup>, and other widely applied tools.

<sup>1</sup>American Association of State Highway and Transportation Officials. n.d. "Highway Safety Manual" (web page). <http://www.highwaysafetymanual.org/Pages/default.aspx>, last accessed November 19, 2021.

<sup>2</sup>Transportation Research Board. 2016. *Highway Capacity Manual 6th Edition: A Guide for Multimodal Mobility Analysis*. Washington, DC: The National Academies Press. <https://doi.org/10.17226/24798>, last accessed November 19, 2021.



Source: FHWA.<sup>(3)</sup>

<sup>3</sup>Ma J., Y. Guo, and Z. Huang. 2021. *Developing Analysis, Modeling, and Simulation Tools for Connected and Automated Vehicle Applications: A Case Study for I-66 in Virginia*. Report No. FHWA-HRT-21-050. Washington, DC: Federal Highway Administration.



# Possible Future Modeling Activities

- ▶ Use an interim set of best practices and evaluate Complete Streets using available modeling and analysis tools.
- ▶ Build a system dynamics model:
  - ▷ Offers a framework for understanding complex intermodal interactions along Complete Streets and across a range of neighborhoods/communities.
  - ▷ Will support the development of new models and analysis tools.
- ▶ Develop a longer term research agenda and consider intermodal shifts and transportation demand shifts over time due to Complete Streets.



# Providing Better Information to the Field

- ▶ Case study collection.
- ▶ National Complete Streets assessment:
  - ▷ Define Complete Streets key performance areas.
  - ▷ Work with the American Association of State Highway and Transportation Officials to survey States.
  - ▷ Evaluate maturity of State Complete Streets implementation.
  - ▷ Identify technical assistance opportunities.



# Questions?

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# Contact

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