

Funding and Evaluating Systemic Safety Improvements for Pedestrians



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VHB

March 5, 2019



Housekeeping

⇒ **Problems with audio?**

Dial into the phone line instead of using “mic & speakers”

⇒ **Webinar issues?**

Re-Load the webpage and log back into the webinar. Or send note of an issue through the Question box.

⇒ **Questions?**

Submit your questions at any time in the Questions box.



Archive and Certificates

Archive posted at www.pedbikeinfo.org/webinars

- ⇒ Copy of presentations
- ⇒ Recording (within 1-2 days)
- ⇒ Links to resources

Follow-up email will include...

- ⇒ Link to certificate of attendance
- ⇒ Information about webinar archive



PBIC Webinars and News

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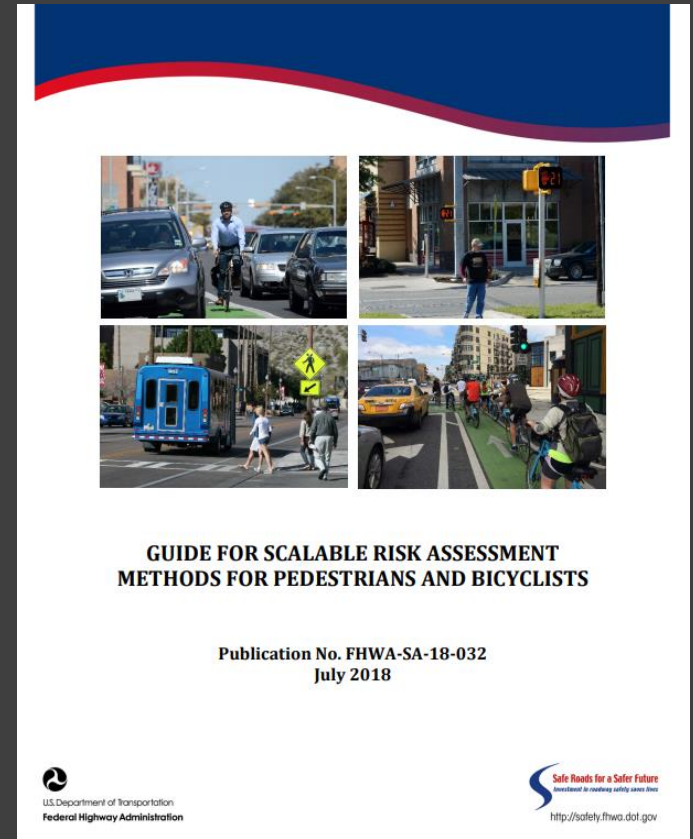


The screenshot shows the 'Webinars' section of the Pedestrian and Bicycle Information Center website. The header includes the PBIC logo and navigation links: 'Data & Resources', 'Community Support', 'Planning & Design', 'Training & Events', and 'Programs & Campaigns'. The main content area is titled 'Webinars' and features a list of 'Upcoming and Recent PBIC Webinars' with dates and titles, such as '11/17/2015 - "Road Users: Increasing Safety for All Road Users" (BILCSM11 Webinar)' and '11/19/2015 - "Bicycle Safety Guide and Countermeasures Detection Systems (BILCSM11 Webinar)'. Each entry includes the presenter's name and affiliation.



The screenshot shows the Facebook page for the Pedestrian and Bicycle Information Center. The header features the PBIC logo and the text 'Pedestrian and Bicycle Information Center Government Organization' along with the website URL 'www.pedbikeinfo.org'. The page includes a 'Timeline' section with posts, a 'Find New Customers' section, and a 'About' section. The 'About' section contains a quote: 'Your potential to improve the quality of life in your community through the increase in safe walking and bicycling is a viable means of transportation.' and a map of the United States.





Two Tools for Risk-Based Safety Analysis



Objectives of NCHRP Report 893

Develop a process (and Guidebook) that includes:

- 1) Analytical methods to identify roadway features, behaviors, and other contextual risk factors associated with pedestrian crashes
- 2) Methods to identify appropriate and cost-effective systemic pedestrian safety improvements to address the associated risk factors
- 3) Information to enable transportation agencies to prioritize candidate locations for selected safety improvements

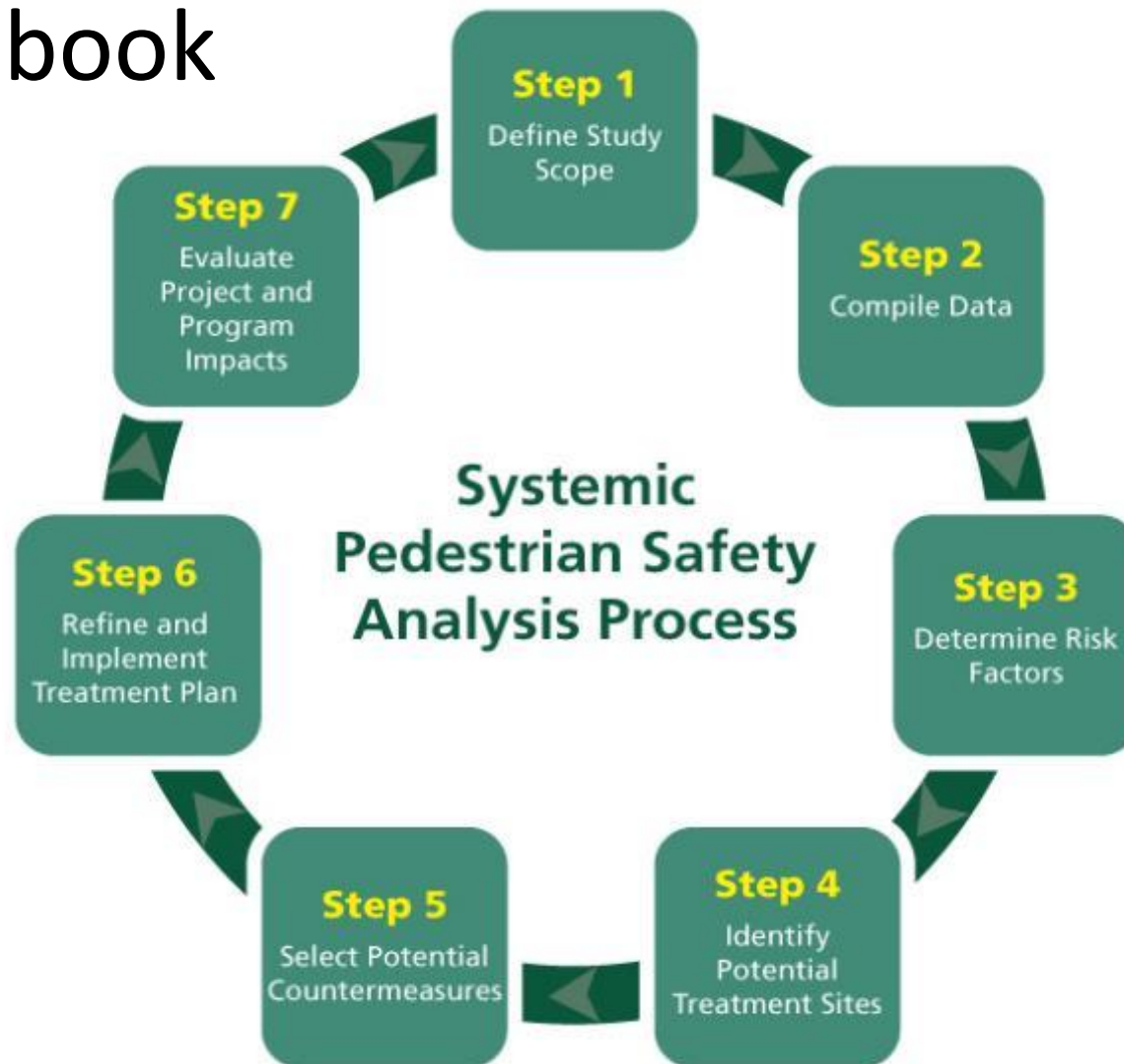


Guidebook Elements

- Overview
 - Background on a Systemic Process and key features
 - How to use the Guidebook and intended audience
 - Relation to other agency processes
- Process steps
- Examples
- Glossary of key terms
- Appendices
- Companion: Final Report



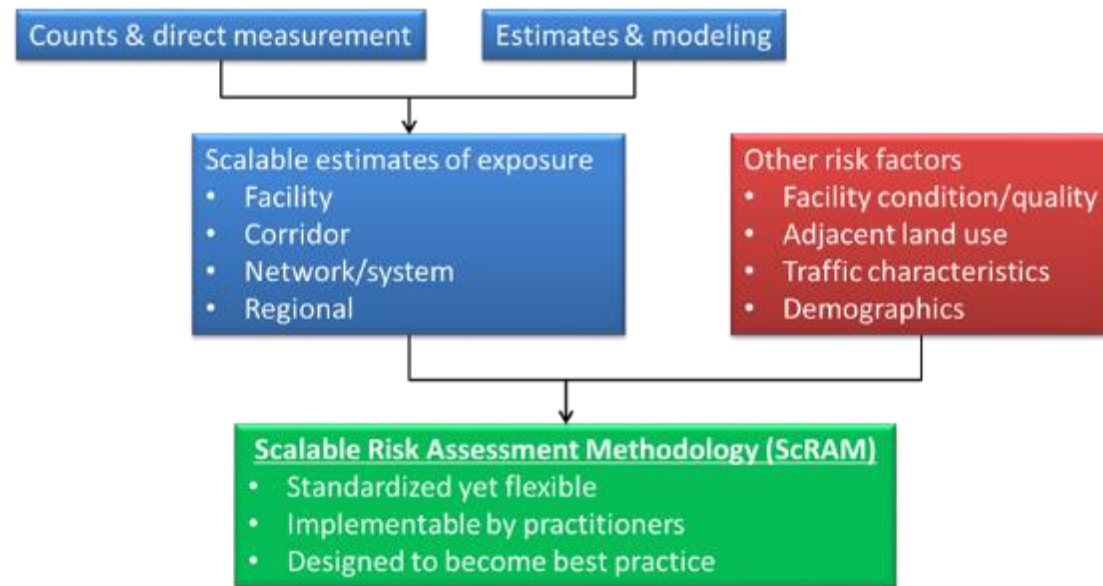
Steps in the Guidebook



Scalable Risk Assessment Methodology

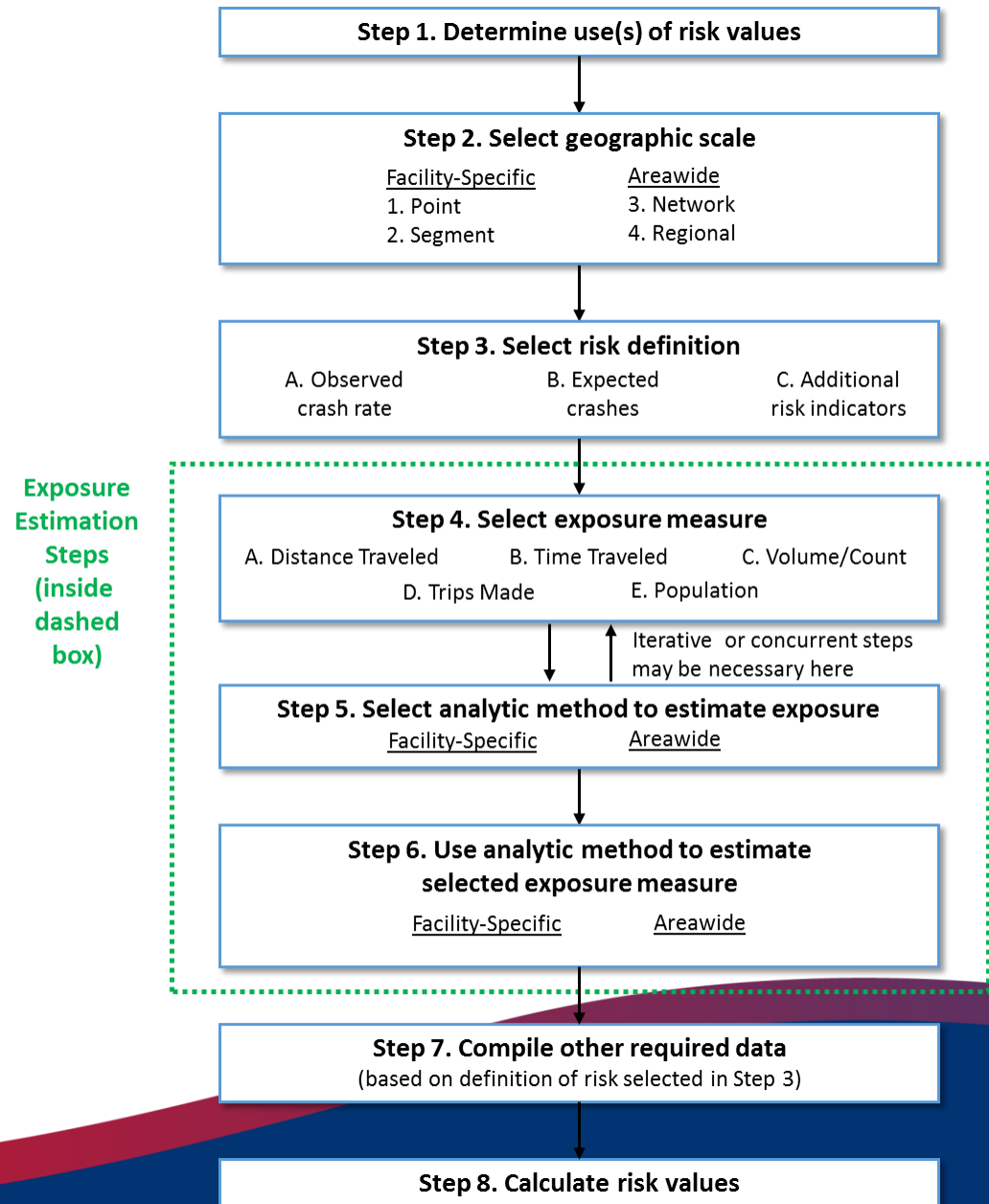
- Develop a standardized approach to estimate pedestrian and bicyclist exposure to risk.
- ScRAM Complete May 2018.
- Technical Assistance and Training Available 2018 ~May 2020.

Conceptual Framework for ScRAM



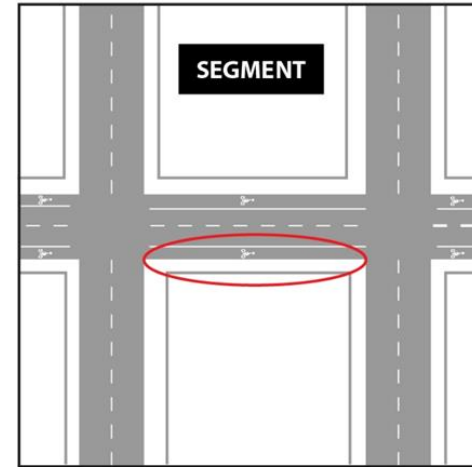
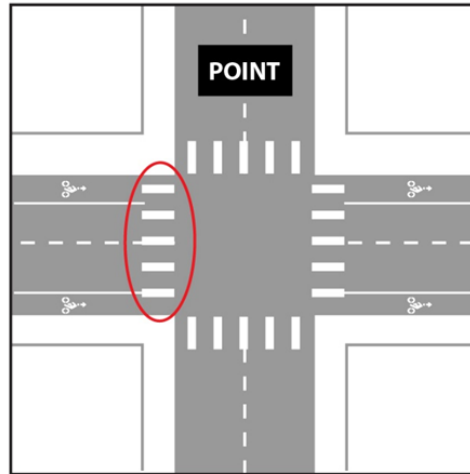
8 Steps

- Framework with flexibility
- Scale matters (a lot)
- Exposure is key ingredient, focus in project

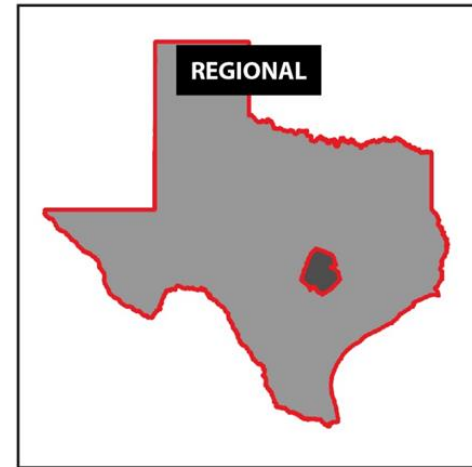
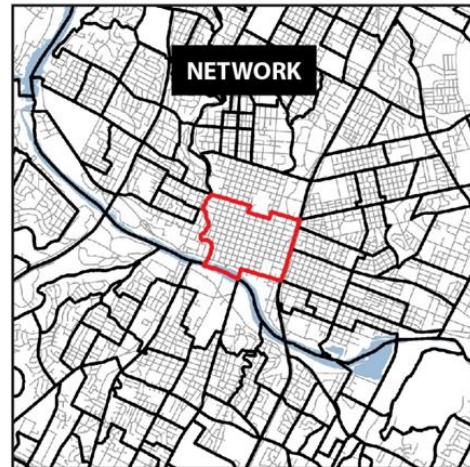


Geographic Scales Covered

Facility-Specific

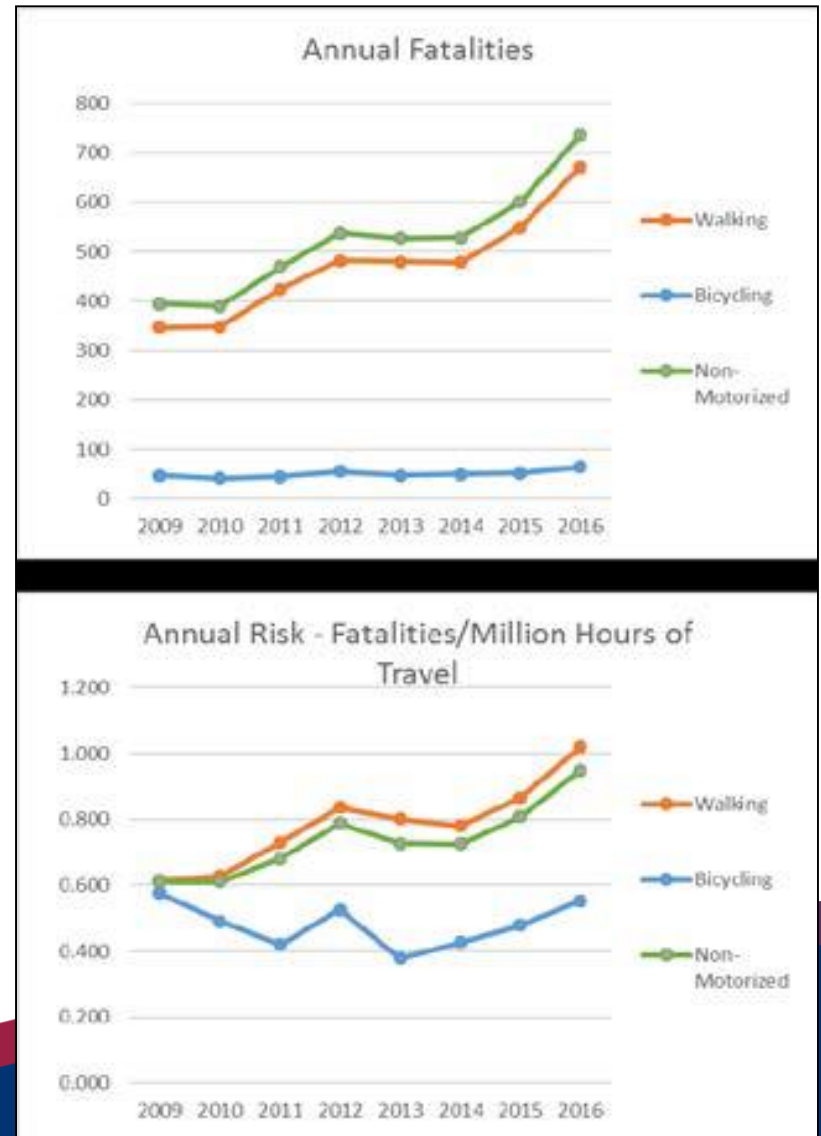


Areawide



Areawide Non-Motorized Exposure Tool

- Combines the best of NHTS and ACS travel surveys
- Statewide and MPO area estimates of TOTAL pedestrian and bicyclist exposure



Resources

- Synthesis of Methods (FHWA-SA-17-041)
 - https://safety.fhwa.dot.gov/ped_bike/tools_solve/fhwas17041/index.cfm
- Guide for Scalable Risk Assessment
https://safety.fhwa.dot.gov/ped_bike/tools_solve/fhwasa18032/
- Scalable Non-Motorized Exposure Tool
 - Can be downloaded here:
https://safety.fhwa.dot.gov/ped_bike/tools_solve/



How HSIP can be used to support systemic safety projects

Funding and Evaluating Systemic Pedestrian Safety Improvements Webinar

March 5, 2019

*Karen Y. Scurry, P.E.
FHWA Office of Safety*



U.S. Department of Transportation
Federal Highway Administration

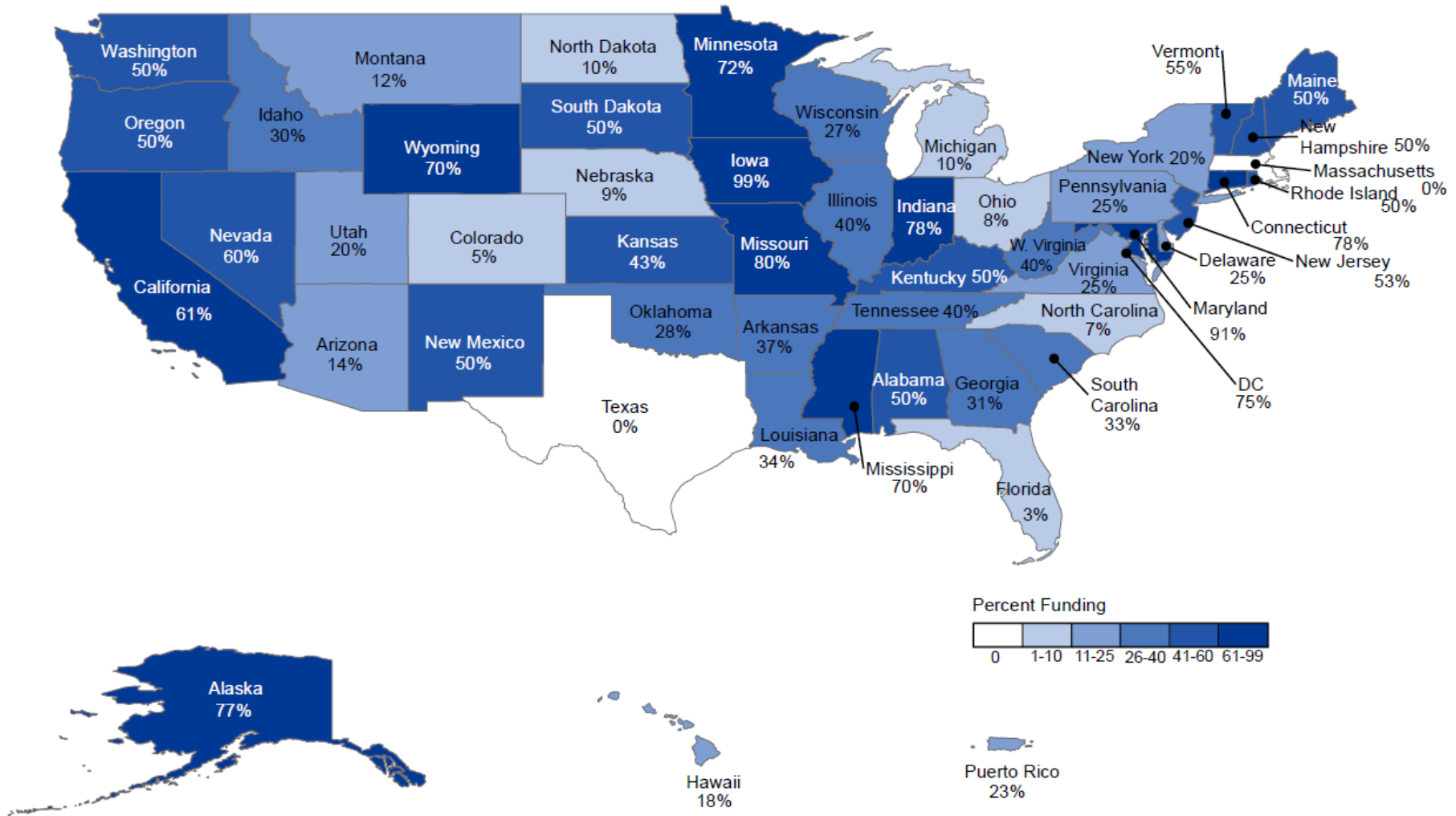


<http://safety.fhwa.dot.gov>

Highway Safety Improvement Program (HSIP)

Percent of 2017 HSIP Funding Toward Systemic Safety Improvements

National Average: 40%



Source: 2017 HSIP Reports

How can HSIP be used to support systemic projects?

- What is HSIP?
- What are HSIP eligibility requirements?
- What are systemic projects?
- Are systemic safety projects necessary?
- Are systemic projects cost effective?
- What resources are available?

Highway Safety Improvement Program

Purpose:

Reduce fatalities and serious injuries on ALL public roads

- Strategic safety planning
- Data-driven roadway safety management process
- Highway safety improvement projects
- Federally-funded, state administered

HSIP Project Eligibility

Addresses an SHSP Priority

Identified through a data-driven process

Targets identified safety issue

Reduces fatalities and serious injuries

Highway Safety Improvement Program

Project Eligibility

The Focus is Results!

In 2009, motor vehicle fatalities reached levels not seen since 1950. Can all of this decline be attributed to the economic downturn leading to less roadway travel? The numbers say "no." Vehicle miles traveled (VMT) have declined much less than the decrease in fatalities, giving credence to the fact the increased focus on and commitment to safety is paying off. Legislation in 23 USC 148 and advances in the science of safety have ushered in a different approach for states, regions, and localities to address safety issues and challenges, and the difference is clear.

By requiring the states to develop and implement Strategic Highway Safety Plans (SHSP) as part of the Highway Safety Improvement Program (HSIP), HSIPs became part of a broader vision involving multiple stakeholders and integrating into the planning process. The clear purpose is to achieve significant reductions in traffic fatalities and serious injuries on all public roads. The new approach provides direction for achieving the purpose.

A formula apportions HSIP funds to state departments of transportation (DOT) to administer, but any public road or pathway, including those owned by local governments, can benefit. The objective is to target resources where they will be most effective, which means the focus is results.

Eligibility Criteria

All transportation projects should include an explicit consideration of safety and can be funded through a variety of Federal and state sources. To most effectively and efficiently apply limited HSIP funds, use the criteria below.

- Project addresses priorities in the state's SHSP.

Through collaboration with safety partners, the SHSP process identifies statewide emphasis areas with the greatest potential for reducing fatalities and serious injuries. Linking the HSIP with the SHSP ensures HSIP projects address priorities identified through the broader statewide strategic approach. For example, many SHSPs include a roadway departure emphasis area addressed using HSIP funds to implement low-cost safety improvements.

- Project or countermeasure selection is based on a data-driven process.

Data is the driving force in the decision-making process. With good data and analytic tools, states are able to identify systemic or site-specific safety problems, select and prioritize countermeasures, and evaluate impact on reducing fatalities and serious injuries.

- The selected countermeasures address the identified problems.

Ample resources and tools are available to help select the most effective projects, which also may include well-designed innovations.

The Focus is Results



Strategic Highway Safety Plans (SHSPs)

Data-driven *statewide* plan

Vision

- Establishes a common vision, mission and goals to save lives on all public roads

- Identifies a State's key transportation safety needs and guides investment decisions

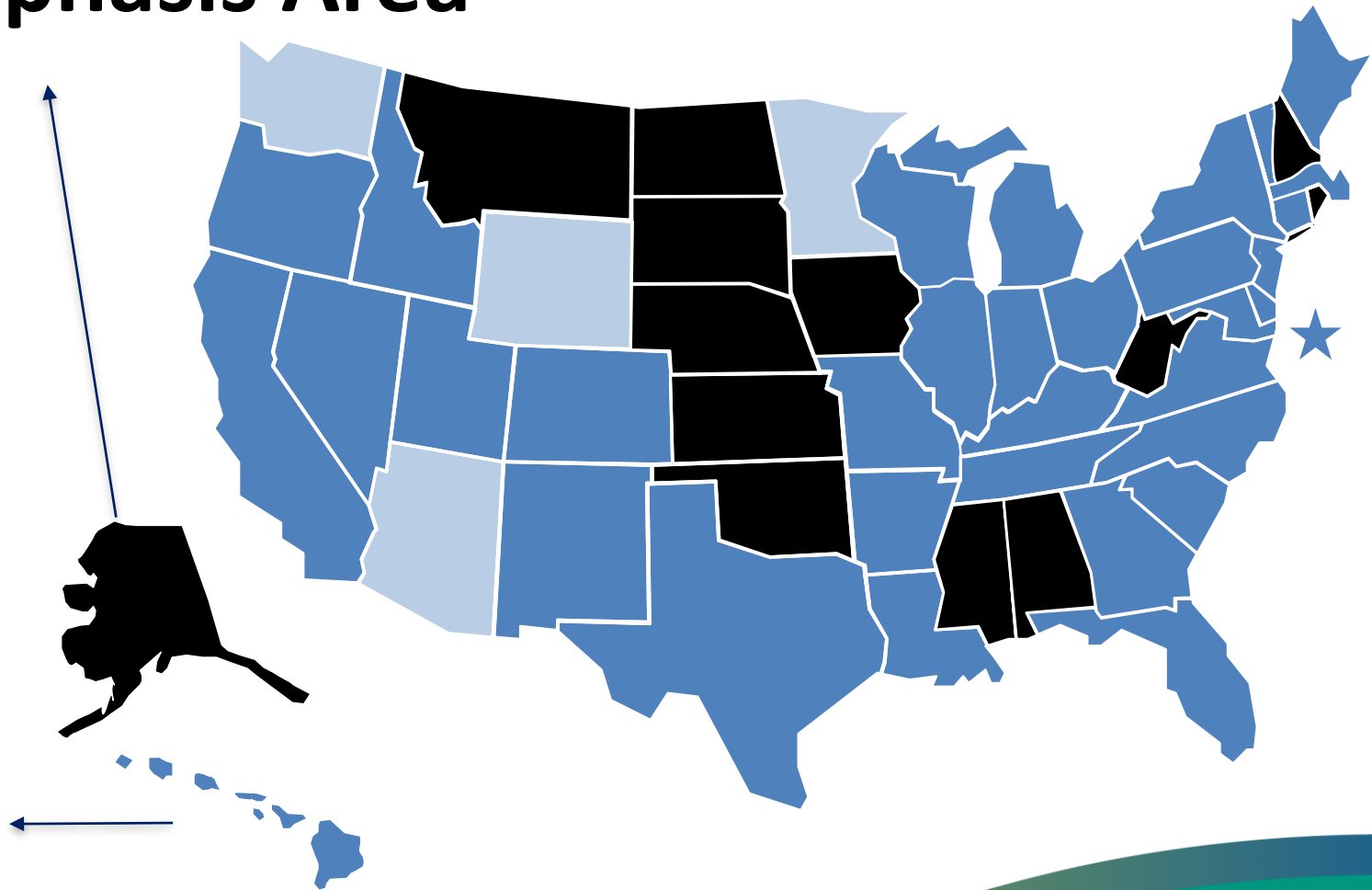
- Prioritizes strategies with the greatest potential to reduce fatalities and serious injuries

- Developed in collaboration with a broad range of stakeholders

- Multidisciplinary addressing 4 Es of Safety

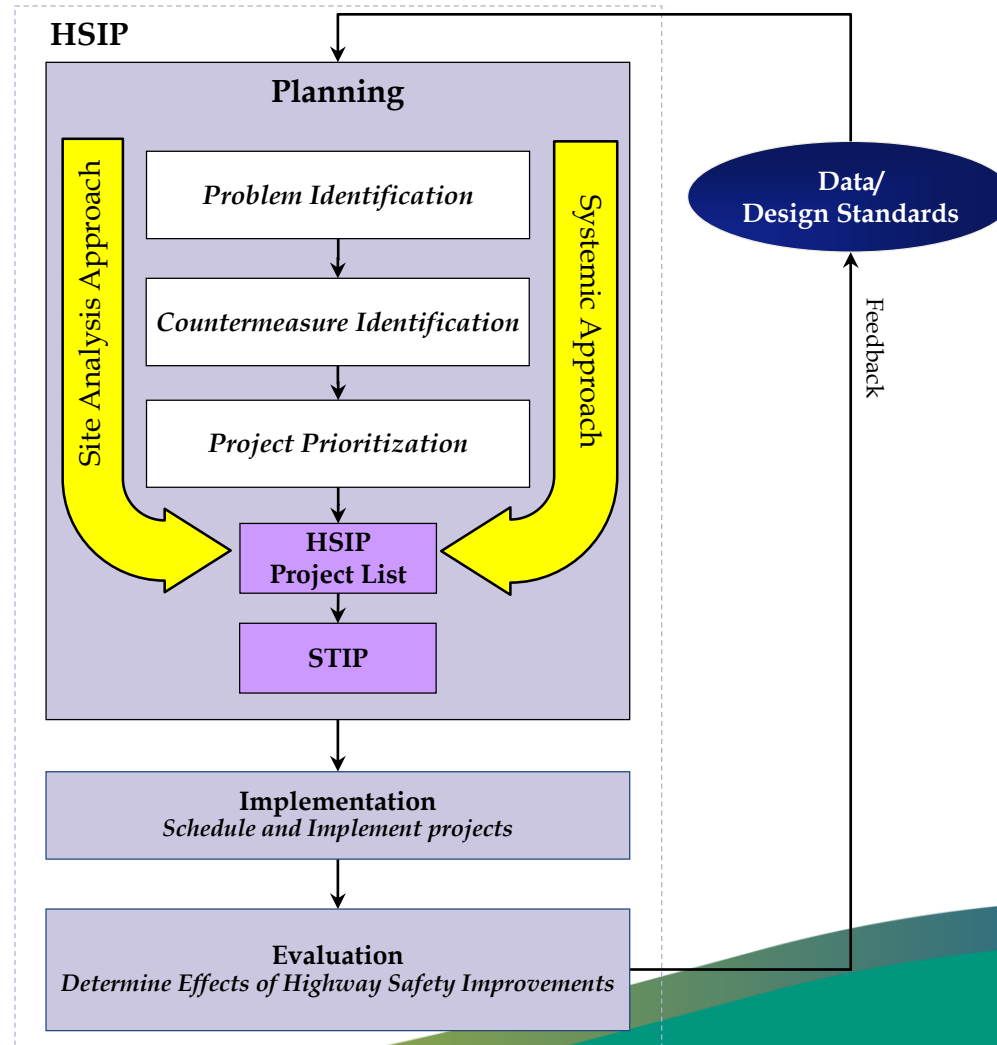
Innovation

State SHSPs with Pedestrian-related Emphasis Area



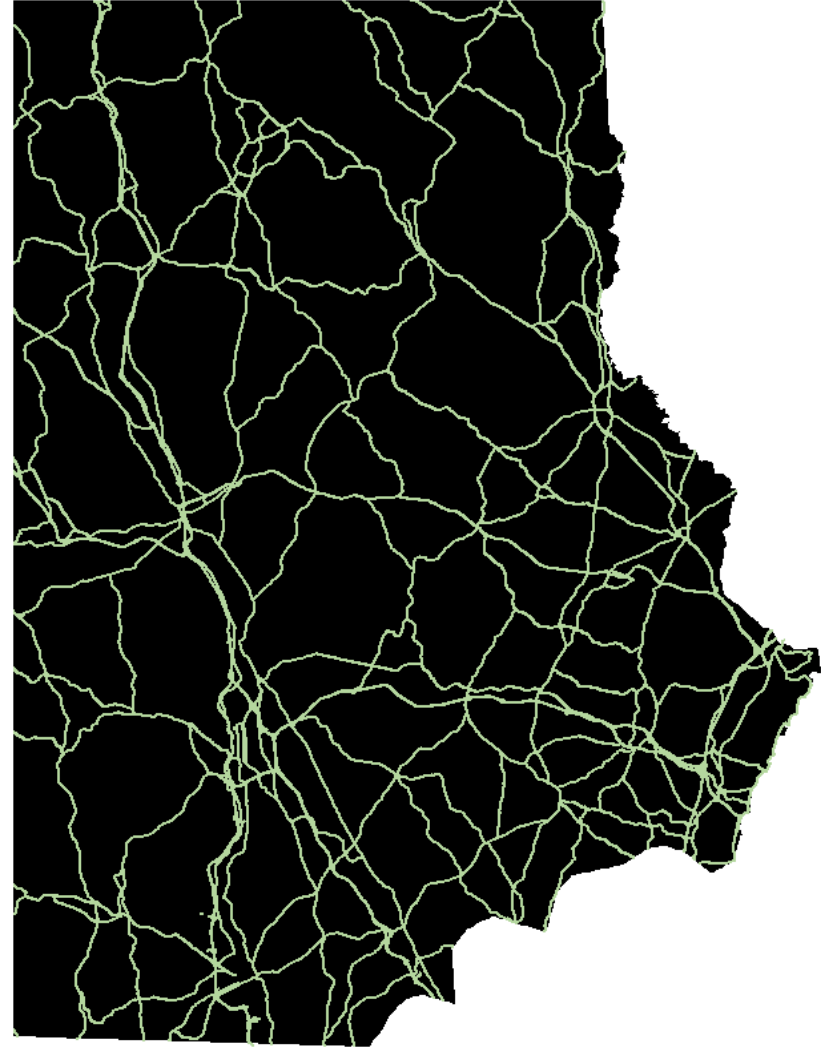
Source: SHSP Database

Data-Driven Process



What is systemic safety?

- Hotspot Screening
 - High crash locations
 - Address unique problems
 - Higher cost projects
- Systemic Approach
 - Moderate-low crash locations
 - Address common problems
 - Lower cost projects
- Systematic Approach
 - Policy-based improvements
 - Address all necessary sites



What is systemic safety?

Systemic safety improvement means a **proven** safety countermeasure(s) that is widely implemented based on **high-risk** roadway features that are correlated with particular **severe** crash types.

Select focus crash type(s)



Select focus facilities



Identify common characteristics/risk factors



Select Countermeasures



Refine and Implement Treatment Plan

Are systemic projects necessary?

States are required to establish:

A process for analyzing safety data to:

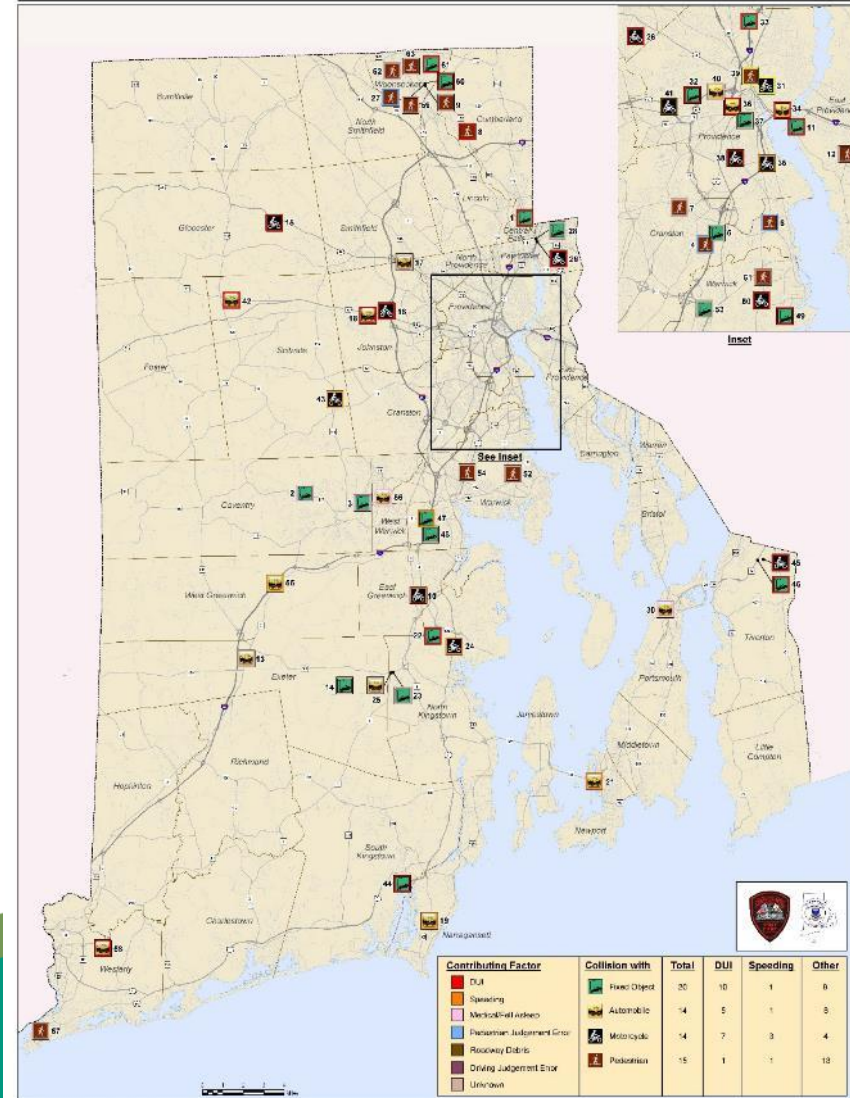
(i) Develop a program of highway safety improvement projects, in accordance with 23 U.S.C. 148(c)(2), to reduce fatalities and serious injuries on all public roads through the implementation of a **comprehensive program** of systemic and spot safety improvement projects.

Source: 23 CFR 924

Are systemic projects necessary?

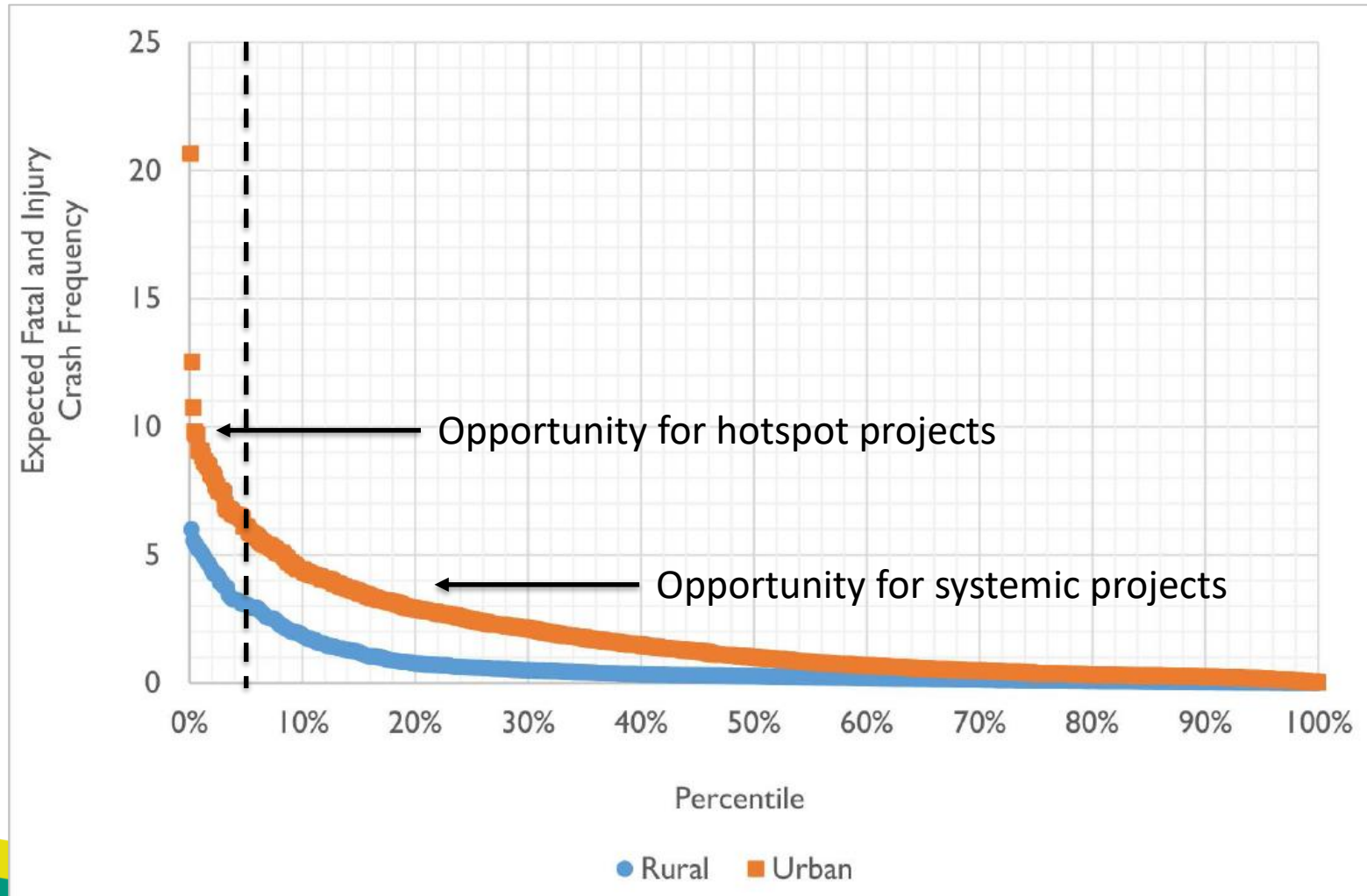
- Don't chase fatalities
- Identify sites with potential for safety improvement

2011 Fatal Crash Locations
Rhode Island



Are systemic projects necessary?

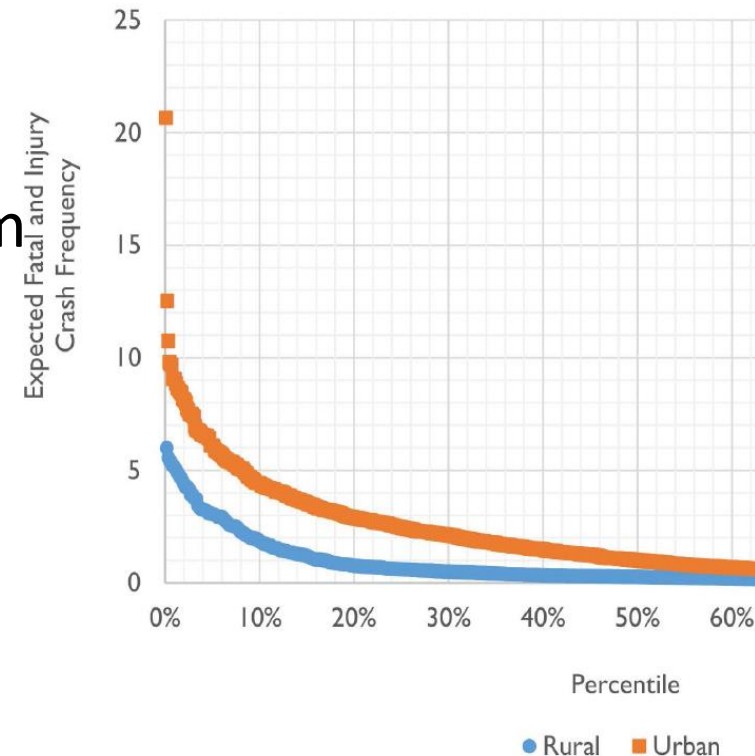
Statewide Distribution of Intersection Safety Performance



Is it more cost-effective to implement hotspot or systemic projects?

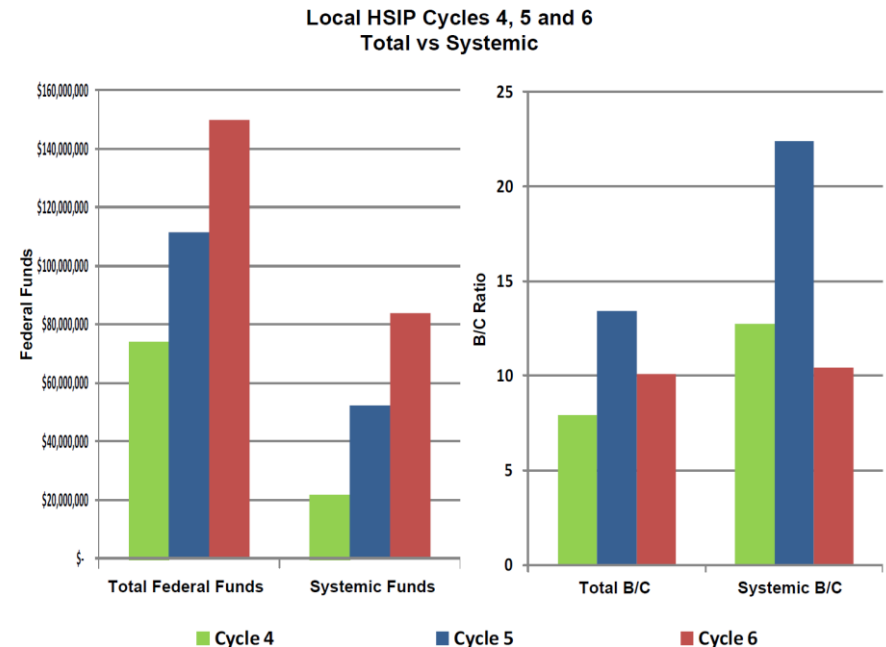
Budget = \$3M

- Site-specific
 - 3 roundabouts @ \$1M/site
 - $CMF_{Total} = 0.60$ (40% reduction)
 - 10-20 crashes/yr without treatment
 - Benefit = 12 – 24 crashes/yr
- Systemic
 - 500 intersections @ \$6000/site
 - $CMF_{Total} = 0.95$ (5% reduction)
 - 3 crashes/yr without treatment
 - Benefit = 75 crashes/yr



Caltrans Local Safety Success

- In addition, the B/C for “Systemic” projects continued Cycle 5’s trend with 40% higher B/Cs than “Spot Location” projects (11.59 vs. 8.25) and over 45% more Systemic-type applications submitted.



Source:

<http://www.dot.ca.gov/hq/LocalPrograms/HSIP/summary-of-results-cycle6.htm>

Are systemic projects HSIP-eligible?

- Addresses priority in State SHSP
 - Intersections, Roadway Departure, **Pedestrians**, Bicyclists
- Identified through data-driven process
 - Selected based on crash experience **or other data-supported means** using either a hotspot analysis **or risk-based system approach**
- Targets identified safety problem
 - Focus on **risk factors** tied to focus crash type and facility type
- Contributes to reduction in fatalities and serious injuries
 - Research-based, **proven**, effective countermeasures

Systemic Approach to Safety: Using Risk to Drive Action

The screenshot shows a Windows Internet Explorer browser window displaying the website <http://safety.fhwa.dot.gov/systemic/>. The page header includes the U.S. Department of Transportation Federal Highway Administration logo and the title "Office of Safety A Systemic Approach to Safety - Using Risk to Drive Action". A navigation menu contains links for Home, About Systemic, Why Systemic, Training and Technical Assistance, and Resources/Contact. The main content area features a large image of a highway with a white GMC pickup truck in the foreground. A text box overlaid on the image reads: "The systemic approach to safety involves widely implemented improvements based on high-risk roadway features correlated with specific severe crash types. The approach provides a more comprehensive method for safety planning and implementation that supplements and compliments traditional site analysis. It helps agencies broaden their traffic safety efforts and consider risk as well as crash history when identifying where to make low cost safety improvement locations." Below the image are two sections: "A Way to Manage Risk" and "Systemic In Practice". The "A Way to Manage Risk" section states: "Highway safety improvement projects are designed to improve safety by minimizing or eliminating risk to roadway users. Rather than managing risk at certain" followed by a small image of a road sign. The "Systemic In Practice" section states: "Several states are using the systemic approach to safety and achieving results. Click on the following noteworthy practices and case studies that illustrate these applications." The browser's taskbar at the bottom shows the system tray with the date 8/28/2015 and time 3:28 PM, and the address bar shows the URL <http://safety.fhwa.dot.gov/systemic/>.

<http://safety.fhwa.dot.gov/systemic/>

FHWA Resources

The collage features three main document covers:

- Systemic Safety Project Selection Tool**: A cover with a green and yellow header, showing a winding road through a forest and a city street scene.
- Reliability of Safety Management Methods: Systemic Safety Programs**: A cover with a brown header, featuring a line graph of crash frequency vs. traffic volume and a photograph of a busy intersection.
- Systemic Safety Project Selection Tool Supplemental Case Studies**: A cover with a green and yellow header, showing a city street scene and the 'Safe Roads for a Safer Future' logo.

Additional text on the collage includes:

- December 2016
- FHWA-SA-16-041
- September 2016
- U.S. Department of Transportation Federal Highway Administration
- Safe Roads for a Safer Future: Investment in roadway safety saves lives. <http://safety.fhwa.dot.gov>

- Systemic Safety Project Selection Tool
- Supplemental Case Studies
 - Limited Data
 - Pedestrian Safety
- Reliability of Safety Management Series: Systemic Safety Programs
 - <https://safety.fhwa.dot.gov/rsdp/downloads/fhwasa16041.pdf>
- Focus Crash Types and Risk Factors Research Project
 - To be published in Spring 2019

Training & Technical Assistance

****Available upon request****

- Systemic safety training
 - Introduces the systemic safety analysis process with examples and case studies
 - 4-hr instructor led workshop
- Technical Assistance
 - Systemic safety analysis
- Determine the balance between spot and systemic improvements
 - Evaluation of systemic improvements

Questions???

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FHWA Office of Safety Programs
202-897-7168

karen.scurry@dot.gov



Highway Safety Improvement Program
Data Driven Decisions



SYSTEMIC SAFETY IMPROVEMENT

Bicycle & Pedestrian Focus

Tracy Turpin, PE.

HSIP Project Delivery Program Manager

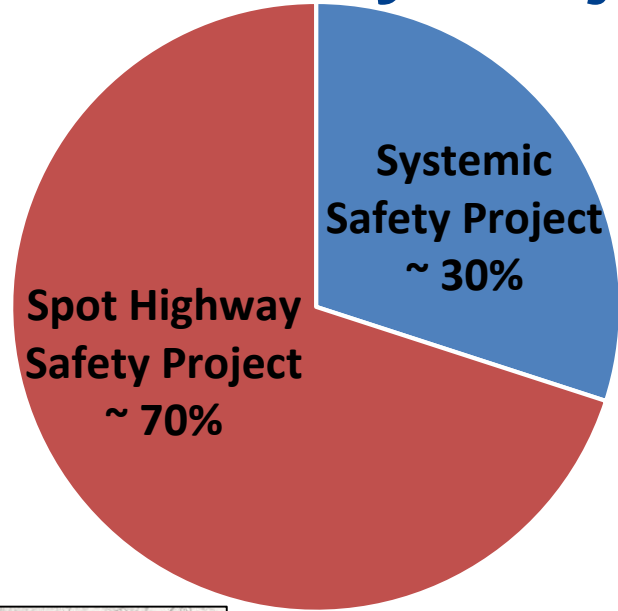
03/05/2019

VDOT Safety Program:



VDOT Safety Projects:

VDOT Business Plan Action Item 3.2.3 States:



Systemic Highway Safety Project –

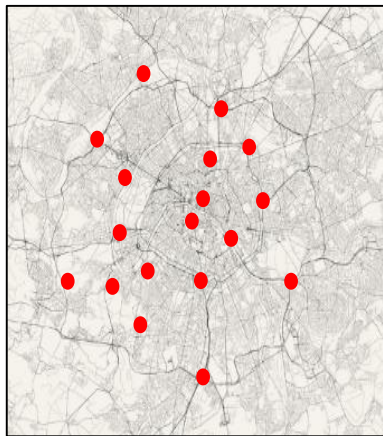
- A project that consists of a lower-cost/high-benefit highway safety countermeasure that is deployed at multiple higher-risk roadway locations to address a particular crash type.
- Systemic projects rarely involve reconstruction of the existing roadway features.
- Typical lower-cost safety countermeasures range from \$1000 to \$100,000 per treated location.

Spot Highway Safety Project –

- A project that deploys a safety countermeasure or countermeasures at a single location or along a single corridor on the highway network.
- The scope of work often involves reconstruction of existing roadway features or construction of new features such as turn lanes or new travel lanes.
- Typical cost to treat a single location is much higher than the individual cost of a single location within a systemic project.
- Costs for spot projects can vary widely but are generally in the \$100,000 to \$10,000,000 range.

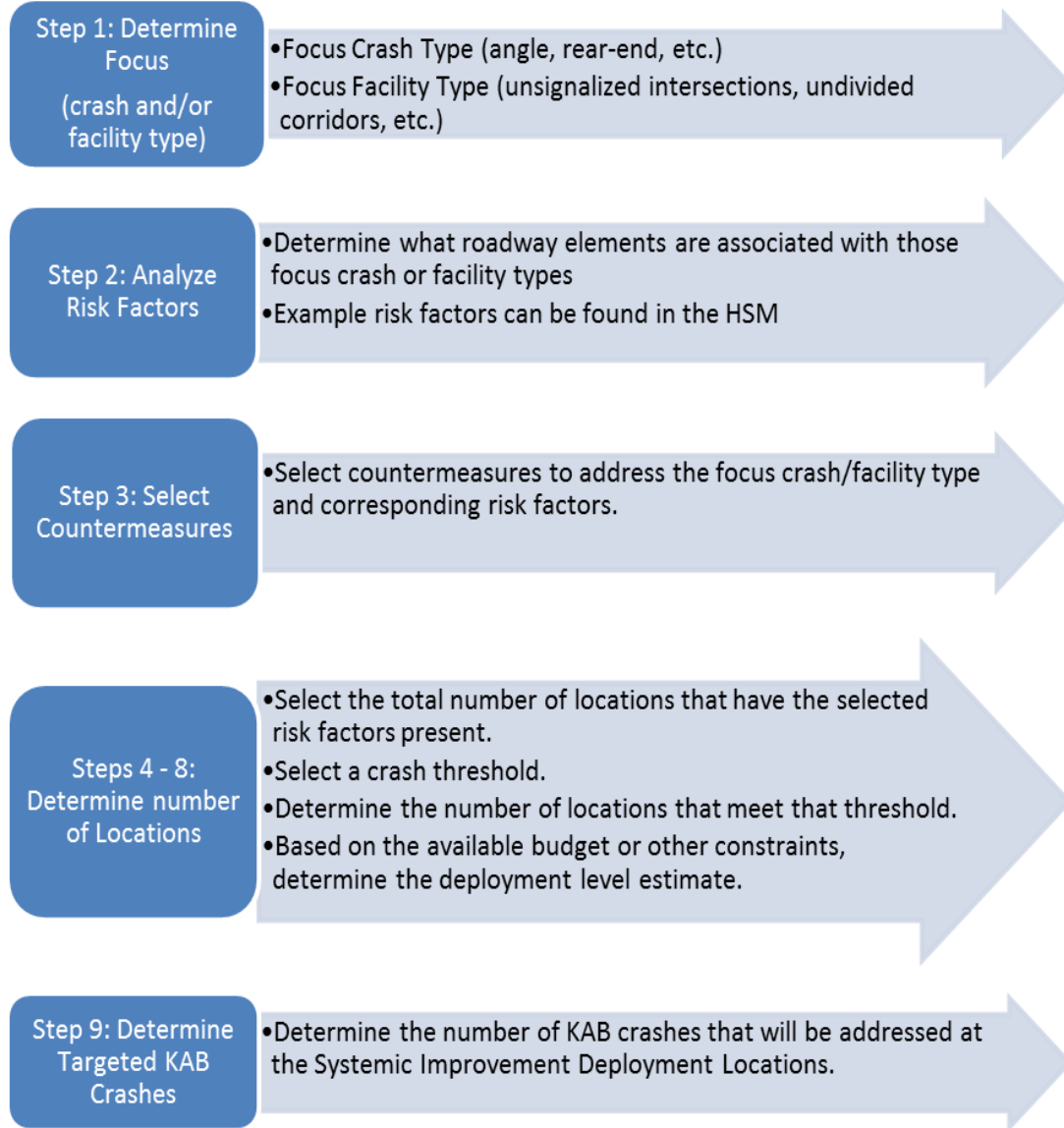


Spot Highway Safety Project



Systemic Highway Safety Project

VDOT Systemic Safety Process:



VDOT One Stop Shop:



Home New Application Dashboard About

105 21 Tracy Turpin ▾

Welcome to SMART Portal

SMART SCALE
Funding the Right Transportation Projects in Virginia

Applications About

Transportation Alternatives

VDOT Virginia Department of Transportation

Applications About

Revenue Sharing

VDOT Virginia Department of Transportation

Applications About

Highway Safety Programs

VDOT Virginia Department of Transportation

Applications About

Bike Pedestrian Safety

VDOT Virginia Department of Transportation

Applications About

Rail Safety Improvements

VDOT Virginia Department of Transportation

Applications About

Systemic Safety Improvements

VDOT Virginia Department of Transportation

Applications About

State of Good Repair
Locally Owned Bridges

Forms About

State of Good Repair
Primary Extensions

Applications About

All submitted project applications will be subject to requirements of the Freedom of Information Act (FOIA).

If you need assistance with this site, send your requests to SmartPortal@CTB.Virginia.gov.



Systemic BikePed Application:



Viewing HSIP BikePed Application

A: Systemic Pedestrian Safety in PSAP Zones Phase III

Project Status: **Scored**
Organization: Richmond City
Project ID: 5096

- Print Version
- Save as PDF
- Rollback App
- Compare Differences
- ★ Mark as Funded

Created: 08/08/2018 @ 3:21PM by Michael Sawyer
Submitted: 10/30/2018 @ 4:54PM by Michael Sawyer
Last Updated: 02/14/2019 @ 2:54PM by Angie Pearson



Systemic BikePed Application Contd.:



Home New Application Dashboard About





Problem
Identification



Is this location included in the VDOT Pedestrian Safety Action Plan (PSAP) as a hotspot or a priority corridor?


2A. DOCUMENT THE RISK EXPOSURE FOR NON-MOTORIZED TRAVEL. DOCUMENT ANY NON-MOTORIZED CRASHES BY DATE, TIME, FREQUENCY, TYPE, AND SEVERITY THAT WILL BE ADDRESSED BY THIS SAFETY PROPOSAL.


Proposed
Improvement
Project




1. DESCRIBE HOW THIS SAFETY PROPOSAL ADDRESSES THE NON-MOTORIZED SAFETY AND MOBILITY ISSUES, SUCH AS:

- Eliminates a barrier for non-motorized travel to destination(s)
- Provides multi-modal access


Proposal
Schedule
and Cost



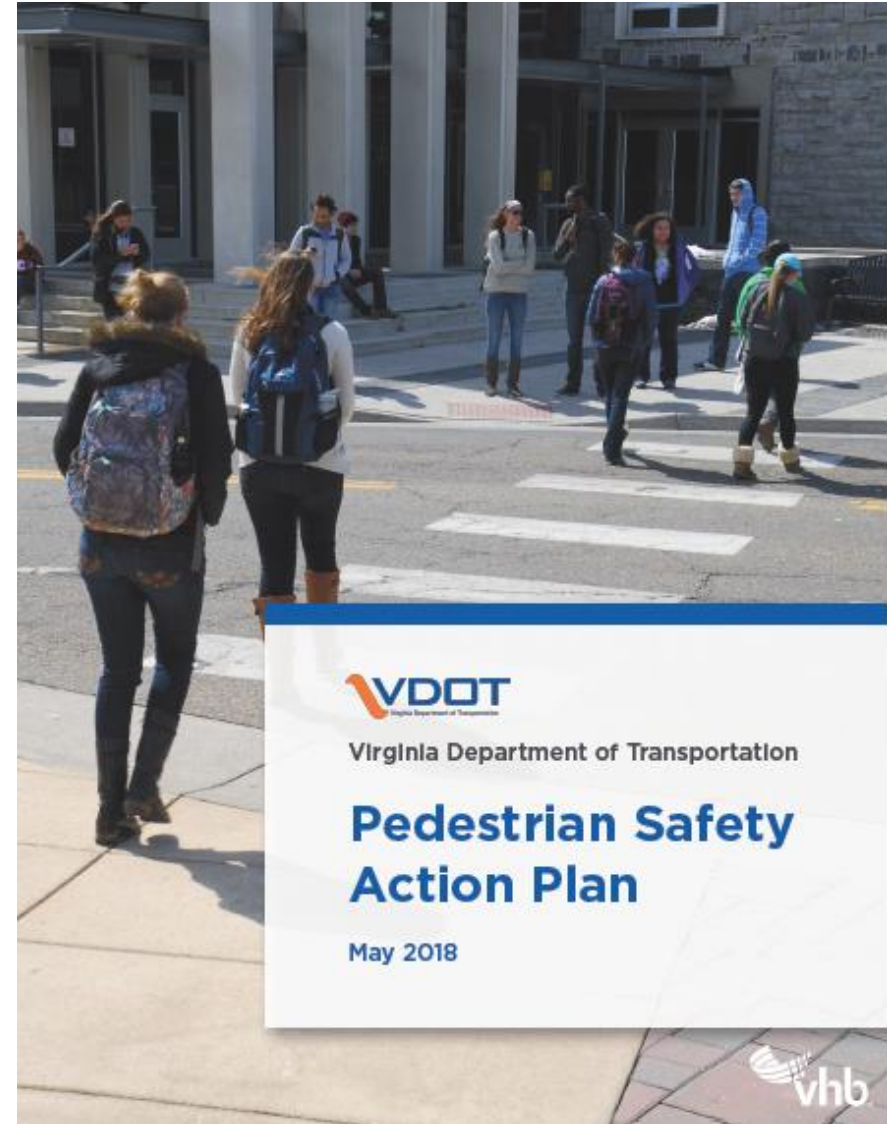
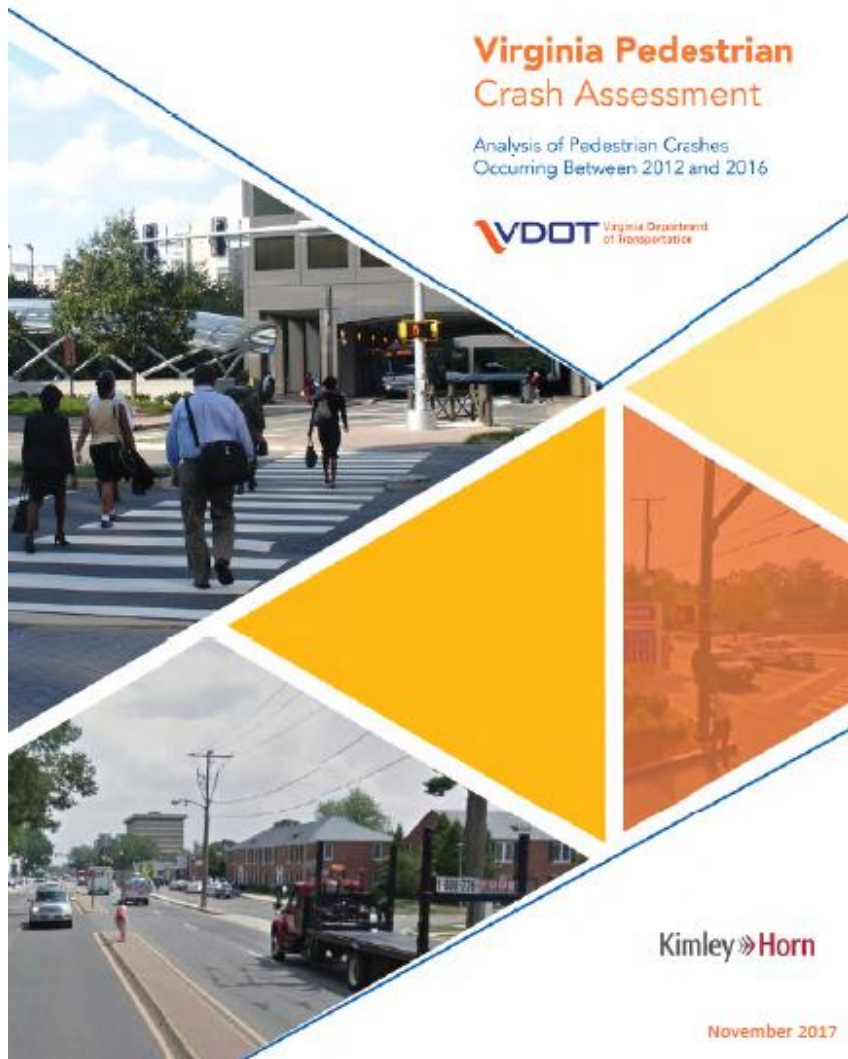
1. PROVIDE DETAILED SCHEDULE AND COST ESTIMATE INFORMATION USING VDOT'S COST ESTIMATING SYSTEM REPORTS OR WITH ITEMIZED LOCALITY COSTS INCLUDING VDOT PRELIMINARY ENGINEERING COSTS.


Local
Support



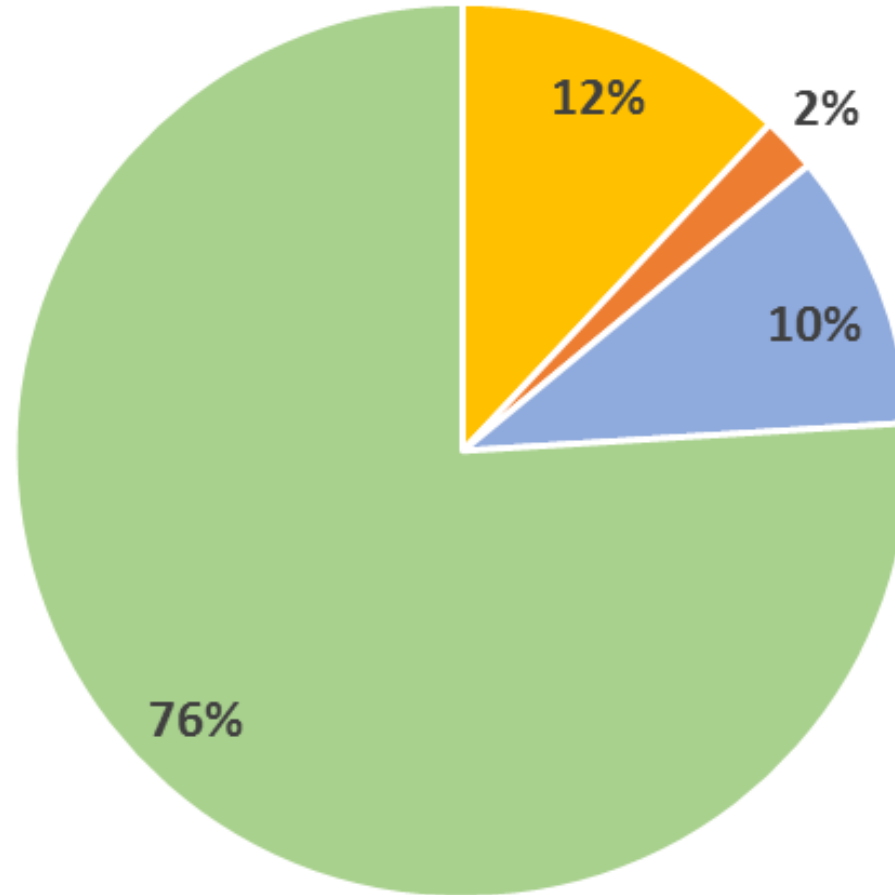
2. DESCRIBE ANY LOCAL OR CITIZEN SUPPORT. PLEASE ATTACH ANY RELEVANT DOCUMENTATION FOR THE SAFETY PROPOSAL, SUCH AS LETTERS, PETITIONS, AND RESOLUTIONS FROM BOARDS, COUNCILS, AND REGIONAL PLANNING AGENCIES.

PSAP Crash Assessment and Action Plan:



Virginia Traffic Deaths By Roadway User Type (2011-2016)

In 2017,
234 vulnerable
road users died,
**27% of
all traffic
deaths**



■ Pedestrians ■ Bicyclists ■ Motorcyclists ■ Other Motorists

Goals for the VDOT Pedestrian Safety Action Plan (PSAP)

- **To better understand the pedestrian safety concerns throughout the state and identify countermeasures to address those concerns**
- **Consider policy, procedure, and practice changes to better promote safe pedestrian travel**
- **To consider the relationship between land development and pedestrian safety**
- **To consider maintenance issues for pedestrian access and safety**
- **To identify HSIP pedestrian safety projects**

A street scene with a crosswalk, traffic lights, and a pedestrian crossing. The background shows a building behind a fence, trees, and a clear sky. A pedestrian is crossing the street in the foreground. Traffic lights are visible at the top, and a 'STOP ON RED' sign is attached to the pole. A yellow pedestrian crossing sign is on the right side of the road.

Step 1: Policy Review

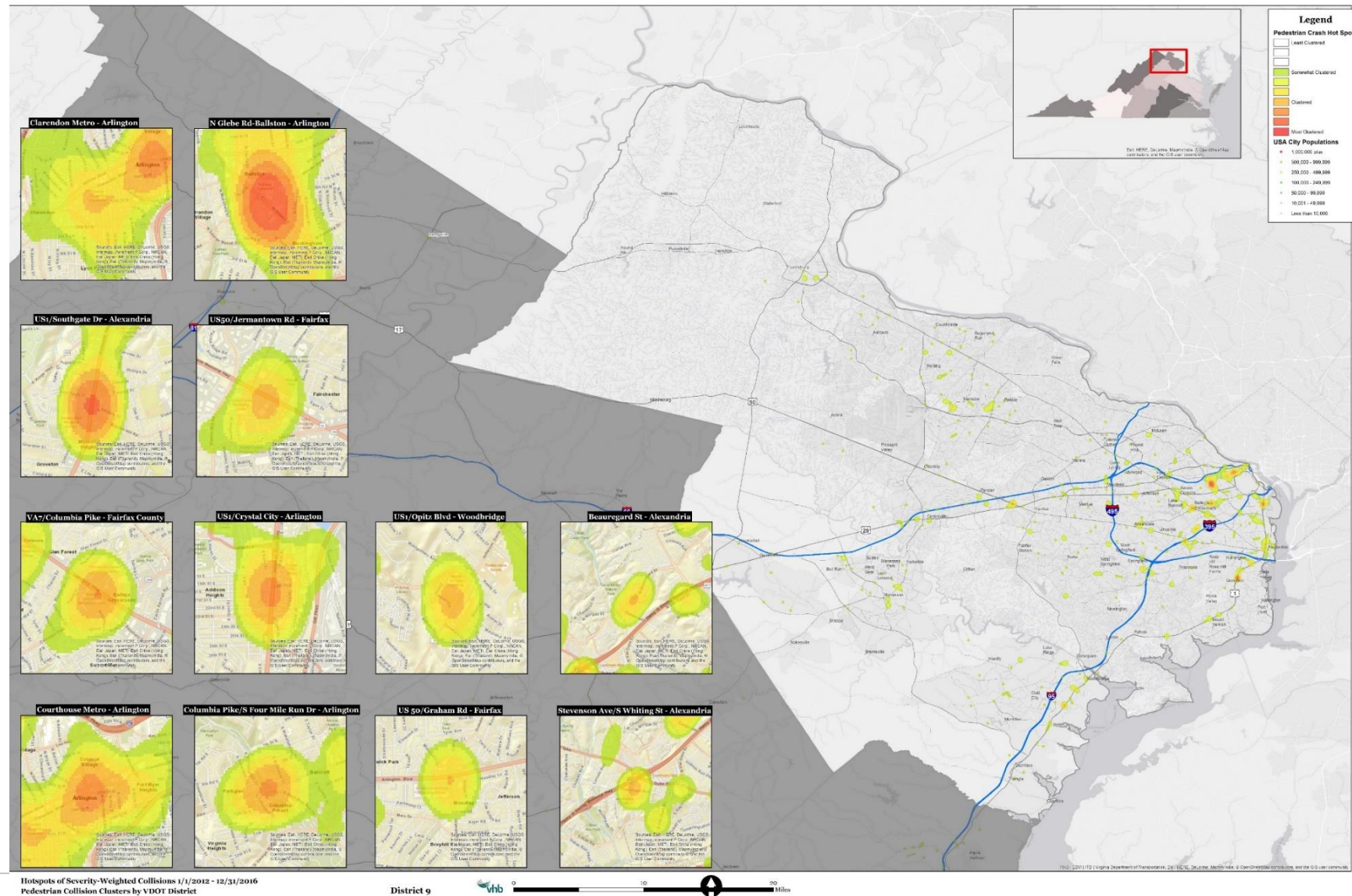
Step 2: Crash and Data Analysis

Step 3: Countermeasure Selection

Crash and Data Analysis

Crash Clusters

- smaller scale
- focus on crash types



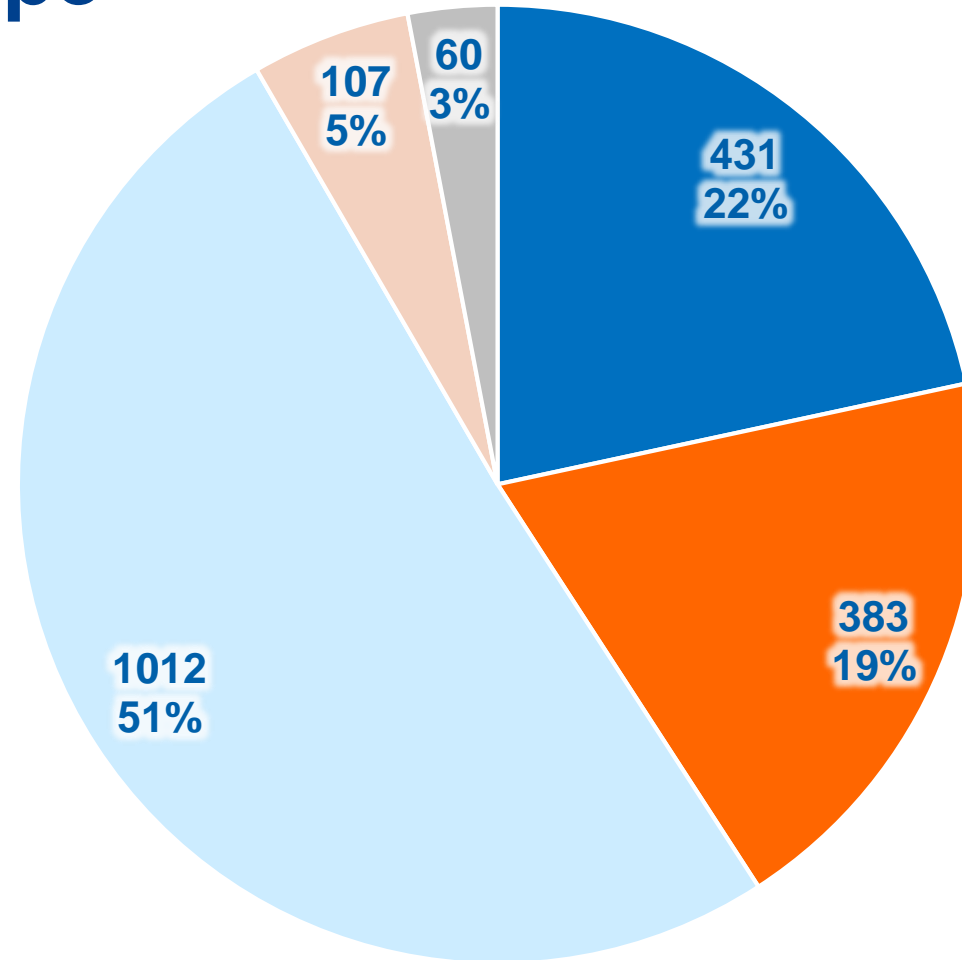
Crash and Data Analysis

Priority Pedestrian Corridors

- larger scale
- selected per criteria evaluating risk for crashes

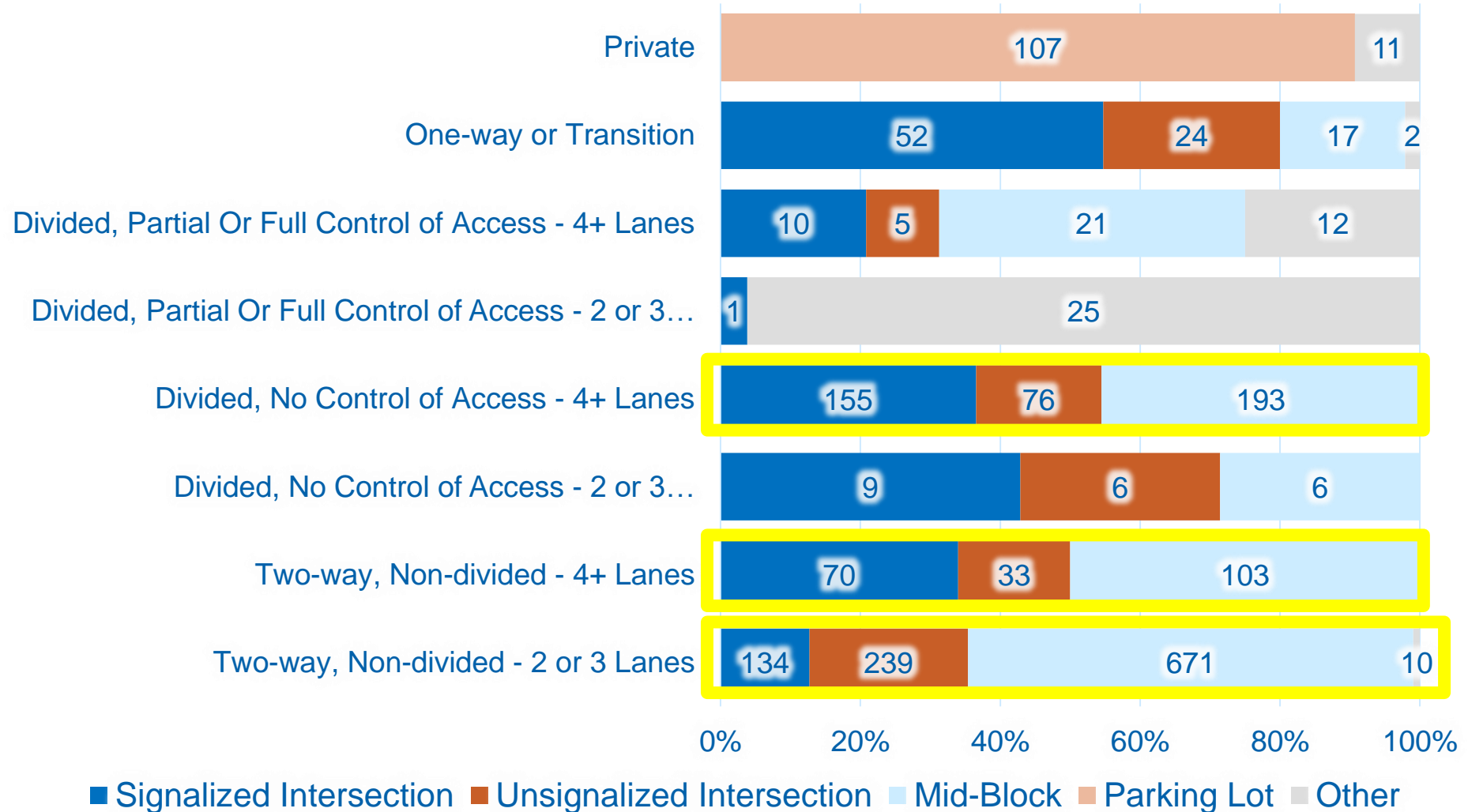


Pedestrian Crashes (Injuries Only) By Intersection Type



- Signalized Intersection
- Unsignalized Intersection
- Mid-Block
- Parking Lot
- Other

Pedestrian Crashes (Injuries Only) By Facility and Crossing Type



Corridor Evaluation: Criteria Considered

LAND USE FACTORS

- ✓ Pedestrian destinations (parks, trails, and schools)
- ✓ MPO urban area/land use data layer
- ❑ Bus stops and transit/passenger rail stations

SPEED FACTORS

- ✓ Posted speed limits
- ❑ Operational speeds

VISIBILITY FACTORS

- ❑ N/A: Lighting
- ❑ N/A: Pavement markings and crossing

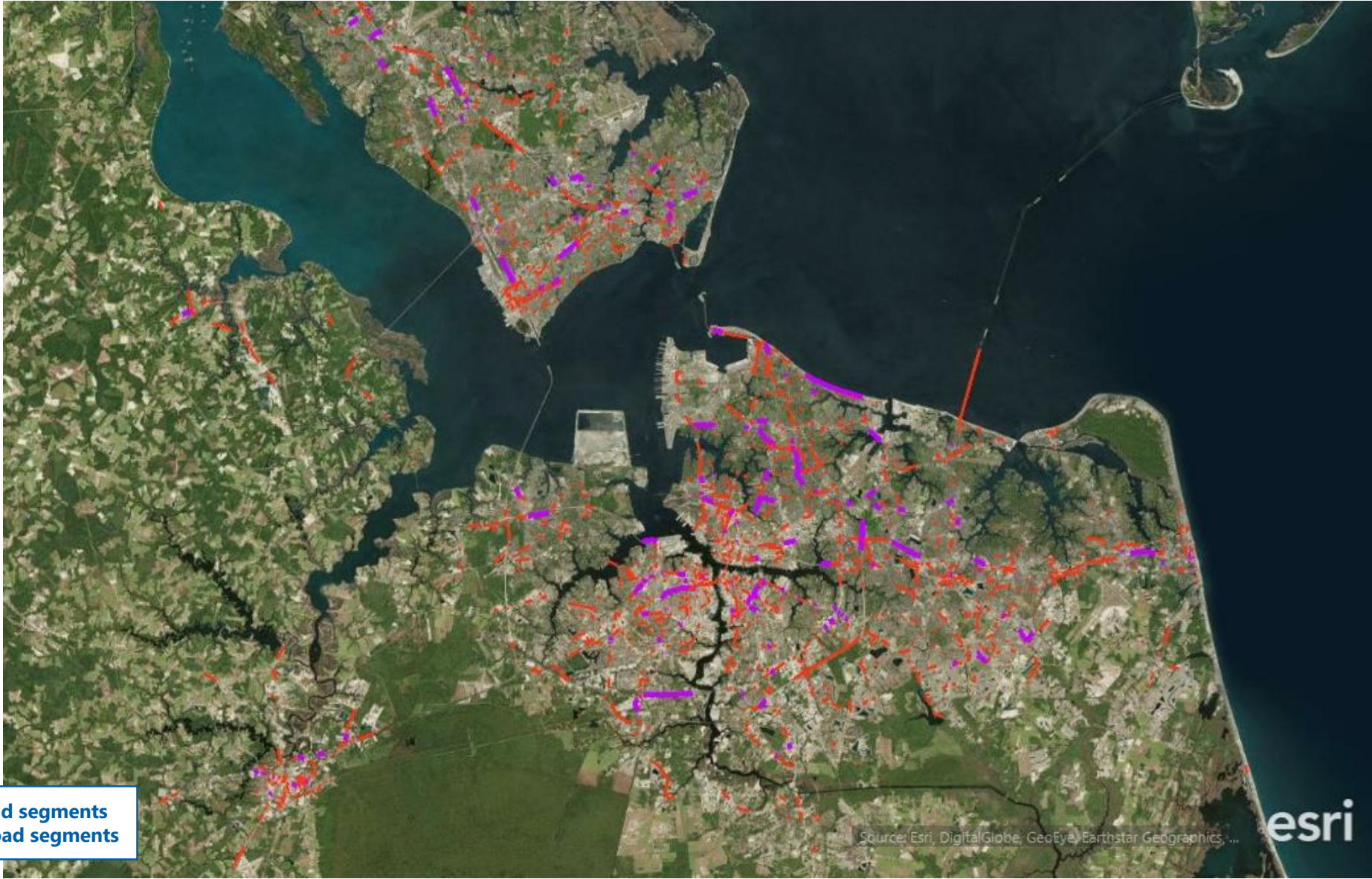
DESIGN/INFRASTRUCTURE FACTORS

- ❑ Signal density
- ❑ Intersection locations
- ❑ N/A: Sidewalk and path accommodations maintained by VDOT
- ❑ N/A: Crossing distance

VOLUME/OTHER FACTORS

- ✓ Pedestrian crash data
- ✓ Vehicle traffic volumes
- ✓ Population and employment density (US Census)
- ✓ Vehicle ownership (US Census)
- ✓ Poverty levels (US Census)
- ✓ Prevalence of impaired (alcohol) citations

Corridor Scoring Example: Hampton Roads



— Top 1% of scored road segments
— Top 10% of scored road segments

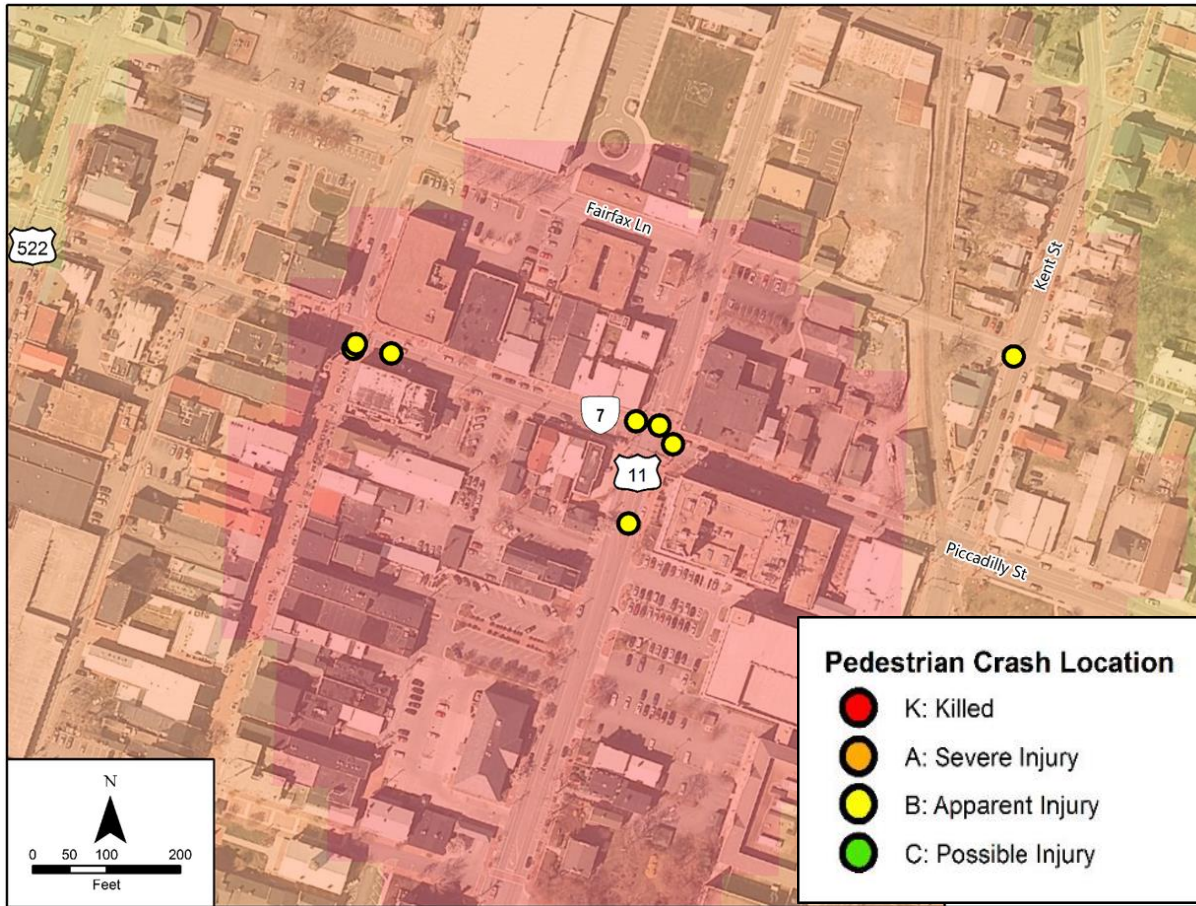
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, ...

esri

Priority Corridor Example: Chesapeake Blvd, Norfolk (VA 194)



Piccadilly Street (SR 7)

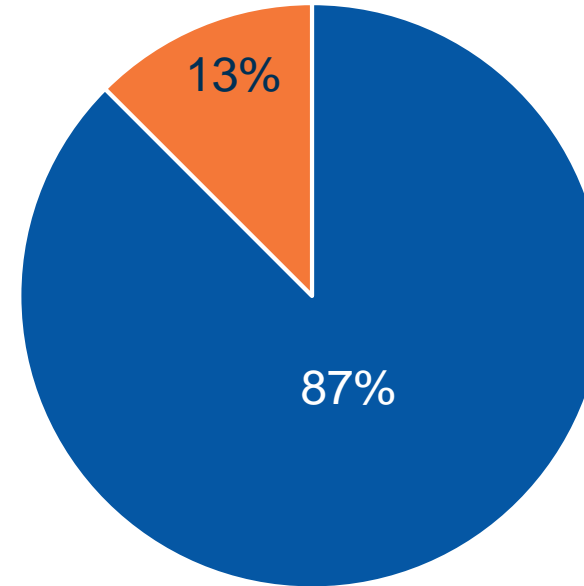


7 out of 8 crashes occurred on 2-lane undivided roadway, all crashes occurred in a 25 mph zone, and 5 out of 8 crashes involved improper action by the driver.

➔ High visibility crosswalks; Right Turn on Red restrictions or Leading Pedestrian Interval

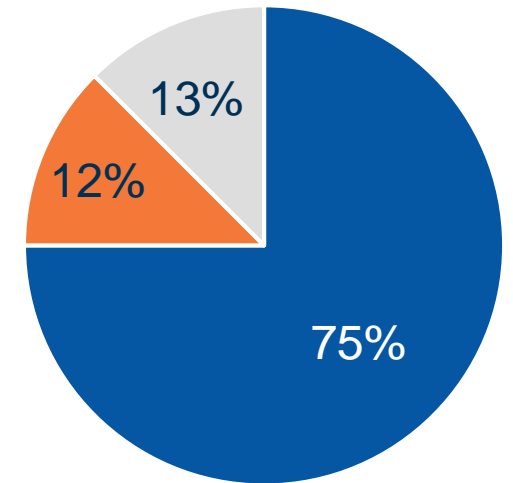
Community: Winchester
VDOT District: 8 (Staunton)

Crash Location



- Signalized Intersection
- Unsignalized Intersection

Pedestrian Action



- Crossing with Signal
- Crossing against Signal
- Crossing; No Signal



- 4-lane median divided roadway with minimal pedestrian crossings and low density residential and commercial land uses. AADT: ~25,000; Speed Limit: 45
- Little to no existing pedestrian crossing infrastructure and wide crossing distances.



Consider sidewalks, pedestrian countdown signals;
PHBs at key mid-block crossings

Countermeasure Selection



Princeton, NJ

- **Focus on FHWA Proven Safety Countermeasures**
- **Review other research and guidance: PEDSAFE and NCHRP reports**
- **Existing VDOT policies**

Details Basemap

Share Print Measure Find address or place

About Content Legend

Legend

Priority_Cluster_Points



Priority_Corridors_Report



Priority_Corridors_All

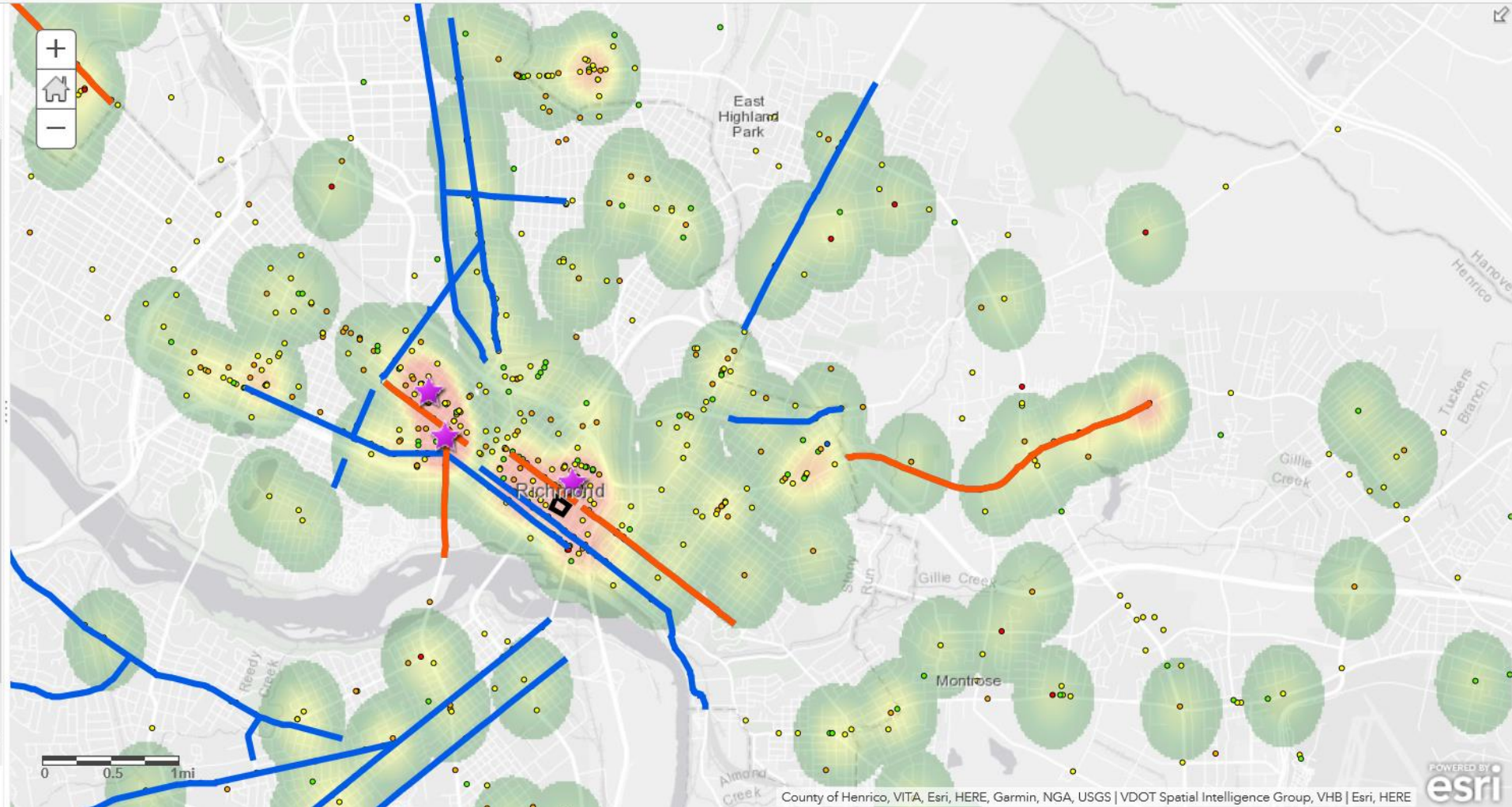


Ped_Crash_2012_16

- K.Fatal Injury
- A.Ambulatory Injury
- B.Visible Injury
- C.Non-Visible Injury
- P.Property Damage Only

Heat Map

ClustersVA



Bike Ped Application Scoring Factor & Criteria:

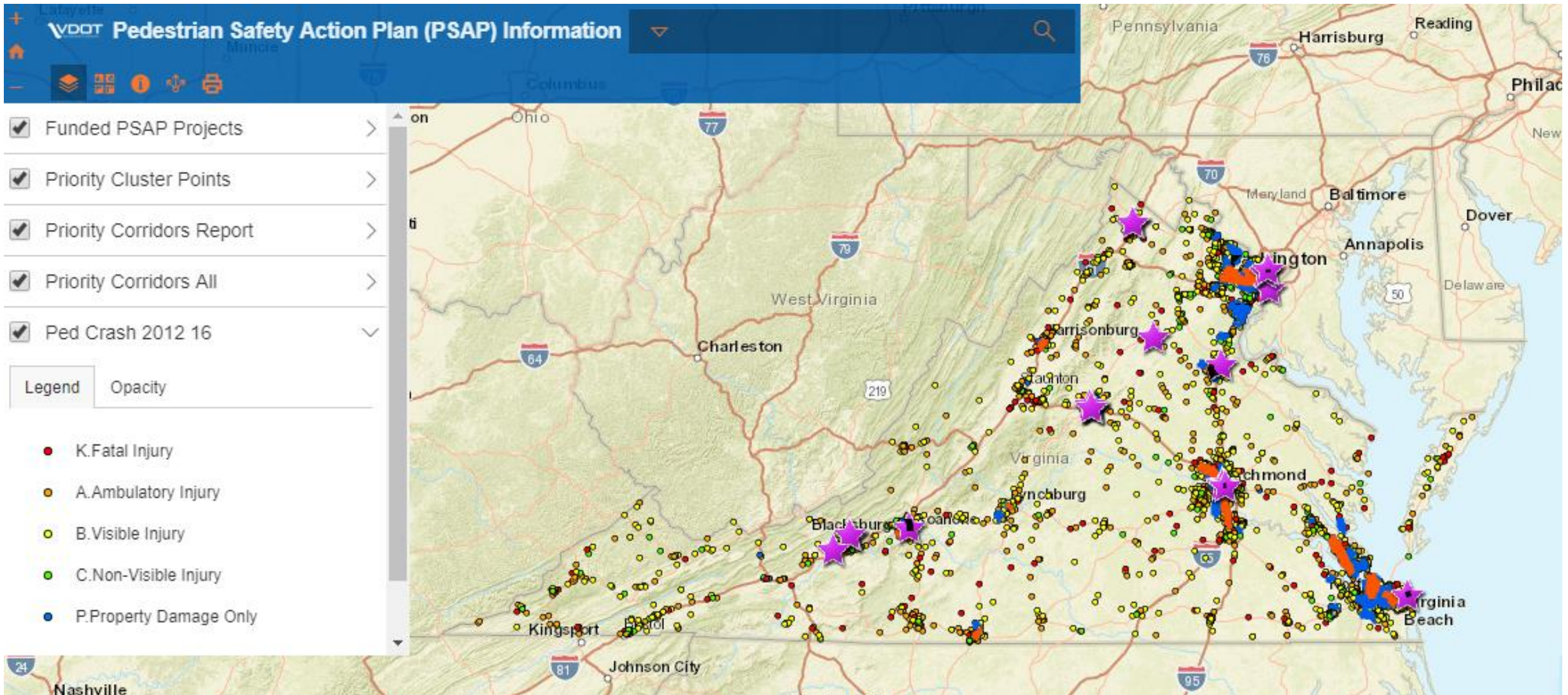
Factor	Description	Weight
Project Identification	Identify the Issues	30%
Proposed Improvement Projects	Identify potential measures to address the issues	45%
Cost Estimate	The cost estimate is uploaded to the Smart Portal and accurately uses PCES or VDOT approved line item costs to estimate the Preliminary Engineering, ROW and Utilities/ Environmental Clearance and Construction costs.	5%
Project Schedule	The project schedule is uploaded to the Smart Portal and indicates start and end dates for the Preliminary Engineering, ROW and Utilities/ Environmental Clearance and Construction phases.	5%
Multiple Funding Sources	The application indicates whether the project requires multiple funding sources.	5%
Supporting Documents	The necessary supporting documents to are uploaded to the Smart Portal.	10%

Bike Ped Application Scoring Factor & Criteria:

Scored	
Factor	Score
Multiple Funding Source	5/5
Cost Estimate	5/5
Project Schedule	5/5
Problem Identification	30/30
Proposed Improvement Project	45/45
Supporting Documents	10/10
Final Score	100/100

Funded	(green)	$\geq 75\%$
Waiting List	(yellow)	$\geq 50\%$ to $< 75\%$
Returned	(red)	$< 50\%$

PSAP Priority Corridor Map and Funded Projects:



Virginia State Preferred CMF list (Bike and Ped)



VIRGINIA STATE PREFERRED CMF LIST

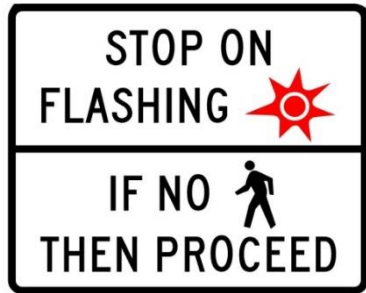
Table 1 Virginia State Preferred CMF List

VIRGINIA STATE PREFERRED CMF LIST

	COUNTERMEASURE	CRASH TYPE	AREA TYPE	K	A	BC	O	SERVICE LIFE	FUNCTIONAL CLASS	SITE DESCRIPTION	PRIOR CONDITION	REFERENCE
BIKE/PED	Add Crosswalk	VP	-	1	1	1	1	2	-	Pedestrian Crossing	No Marked Crosswalk	FHWA Safety Report
	Add Crosswalk Lighting	VP	-	0.56	0.41	0.41	0.56	15	-	Pedestrian Crosswalk	No Lighting Present	CMF ID: 441, 2379
	Add Curb Extensions/ Corner Bulb Outs	VP	-	1	1	1	1	20	-	Pedestrian Crossing at an Intersection Approach	No Bulb Outs or Curb Extensions Present	NYC Study
	Add Median Pedestrian Island	VP	-	0.75	0.75	0.75	0.75	20	-	Multilane Pedestrian Crossing	One-Stage At-Grade Pedestrian Crossing	PED CMF Toolbox
	Add or Upgrade Sidewalk	VP	-	0.12	0.12	0.12	0.12	20	-	Roadway Segment with Pedestrian Traffic Along Roadside	No Sidewalk or Deficient Sidewalk Present	PED CMF Toolbox
	Add Pedestrian Bridge	VP	-	0.1	0.1	0.1	0.14	30	-	High-Volume Pedestrian Crossing	At-Grade Pedestrian Crossing	PED CMF Toolbox
	Add Pedestrian Hybrid Beacon (PHB)	VP	U+S	0.453	0.453	0.453	0.453	20	Minor Arterial	Mid-Block Pedestrian Crossing	No Pedestrian Hybrid Beacon Present	CMF ID: 9020
	Add PHB, Advanced Yield/ Stop Markings	VP	U+S	0.432	0.432	0.432	0.432	20	Minor Arterial	Mid-Block Pedestrian Crossing	No Pedestrian Hybrid Beacon Present	CMF ID: 9021
	Add Pedestrian Signal Heads	ALL	U+S	0.85	0.85	0.85	0.96	20	-	Signalized Intersection with Pedestrian Crossings	No Pedestrian Signals Present	CMF ID: 8480, 8481
	Add Rectangular Rapid Flashing Beacon (RRFB)	VP	U+S	0.526	0.526	0.526	0.526	6	Minor Arterial	Mid-Block Pedestrian Crossing	No RRFB present	CMF ID: 9024
	Add Shared Use Path	VB	Urban	1	0.41	0.41	1	20	-	Roadway segment with Pedestrian and Bicycle Traffic	No Shared-Use Path Present	CMF ID: 4102
	Change Pedestrian Phase to Barnes Dance	VP	Urban	0.49	0.49	0.49	0.49	20	-	Signalized Intersection with Pedestrian Crossings	No Pedestrian Phasing or Standard Pedestrian Phasing	CMF ID: 4117
Convert from Walk/ Don't Walk to Pedestrian Countdown	VP	-	0.3	0.3	0.3	0.3	20	-	Signalized Intersection with Walk/Don't Walk Pedestrian Signals	Walk/Don't Walk Pedestrian Signal	CMF ID: 5272	



Systemic Low Cost Safety Countermeasures – Bike & Ped:



High intensity Activated Crosswalk Beacon

Cost: HAWK Signal: \$90-120K per location
CRF: 29% Total Crashes, 69% Ped Crashes.



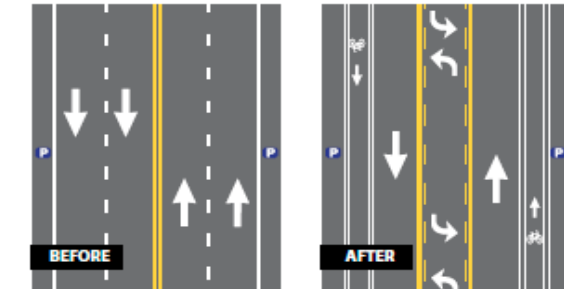
Ped Refuge Islands

Cost: \$20-30K/location if no R/W needed
CRF: Ped crash by 46% 40-45% of all crashes



Rectangular Rapid Flashing Beacon

Cost: \$30-50K/location if no R/W needed
CRF: K Crash By 48% and ABC Injury By 48%



Road Diet

Cost: \$20-30K/mile for pavement marking changes
CRF: 29% Reduction in total crashes

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Discussion

⇒ Send us your questions



⇒ Follow up with us:

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⇒ Archive at www.pedbikeinfo.org/webinars

