

Prioritizing Vulnerable Road User (VRU) Safety

SAM RICHARDSON

REGIONAL INTERGOVERNMENTAL COUNCIL (RIC) METROPOLITAN PLANNING ORGANIZATION (MPO)

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BURGESS & NIPLE (B&N)



B&N

Agenda

1. Biographies
2. Context for VRUs
3. Overview of RIC Studies
4. VRU Resources
5. Next Steps
6. Questions





Biographies

Sam Richardson



Sam Richardson

- 5 years of transportation planning experience at RIC
- WV LTAP Roads Scholar II
- Specialties in geography, project development, and ADA planning



Kendra Schenk



Kendra Schenk, PE, PTOE, RSP₂₁

- 13 years dedicated to safety
- National safety expertise
- Project Manager for RIC Comprehensive Safety Action Plan and 10 Road Safety Assessments



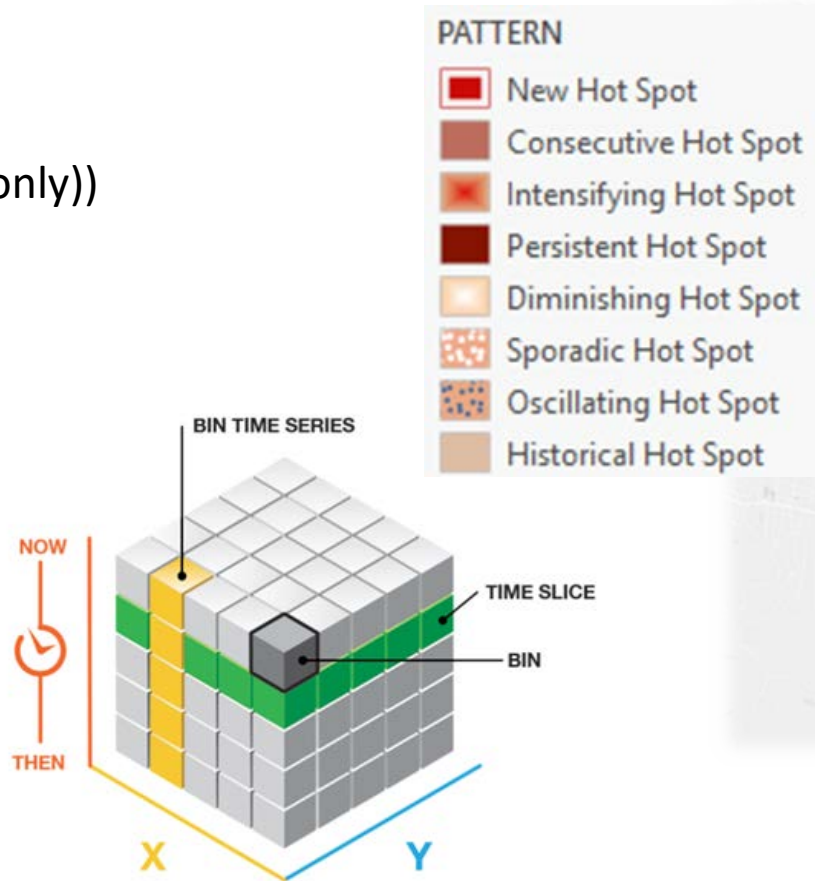


Context for VRUs

Hotspot Identification: Pre-CSAP

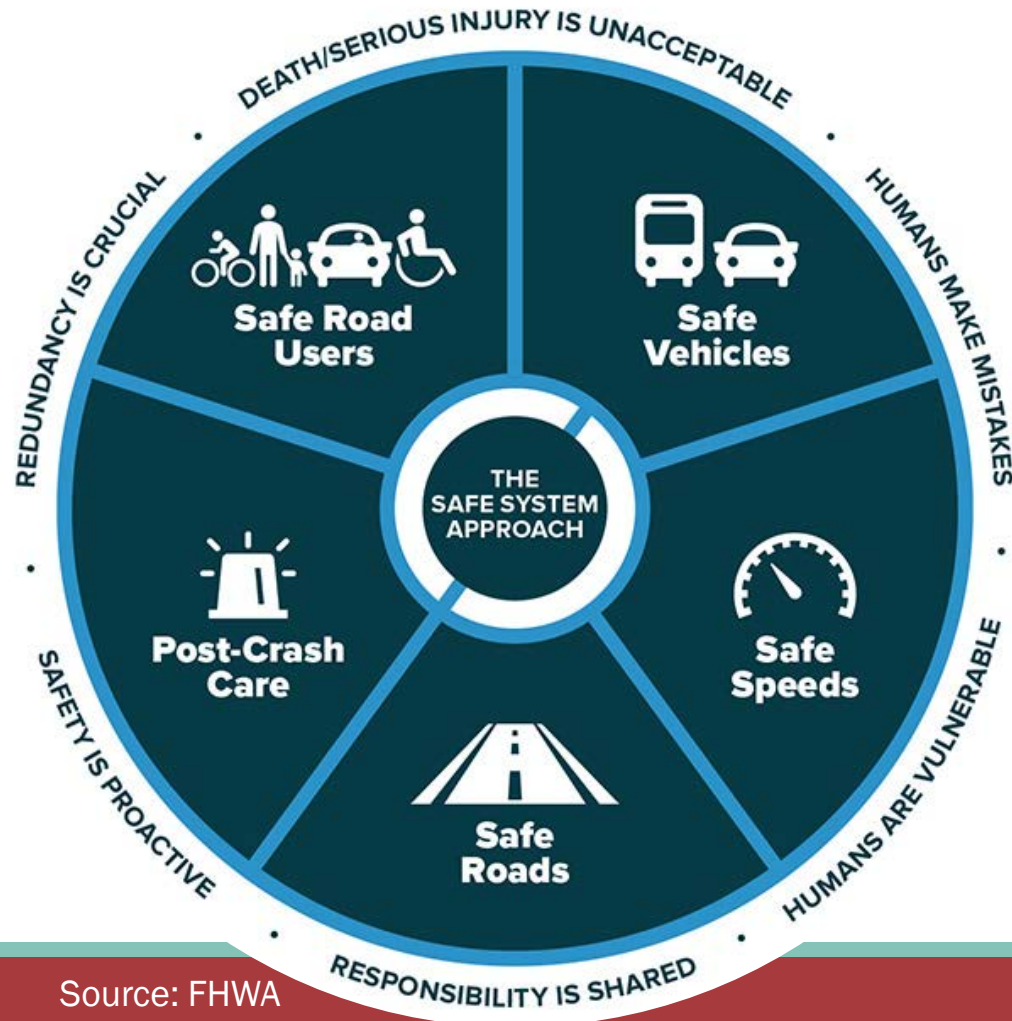
Weight=
(197.7nf(number of fatal)
*5.77ni(number of injury only))
+Nc(number of crashes)

Source: National Safety Council, 2015



Source: Esri, Emerging Hotspot Analysis, 2019

Safe System Approach



Source: FHWA

Safe System Approach

Equality



Equity

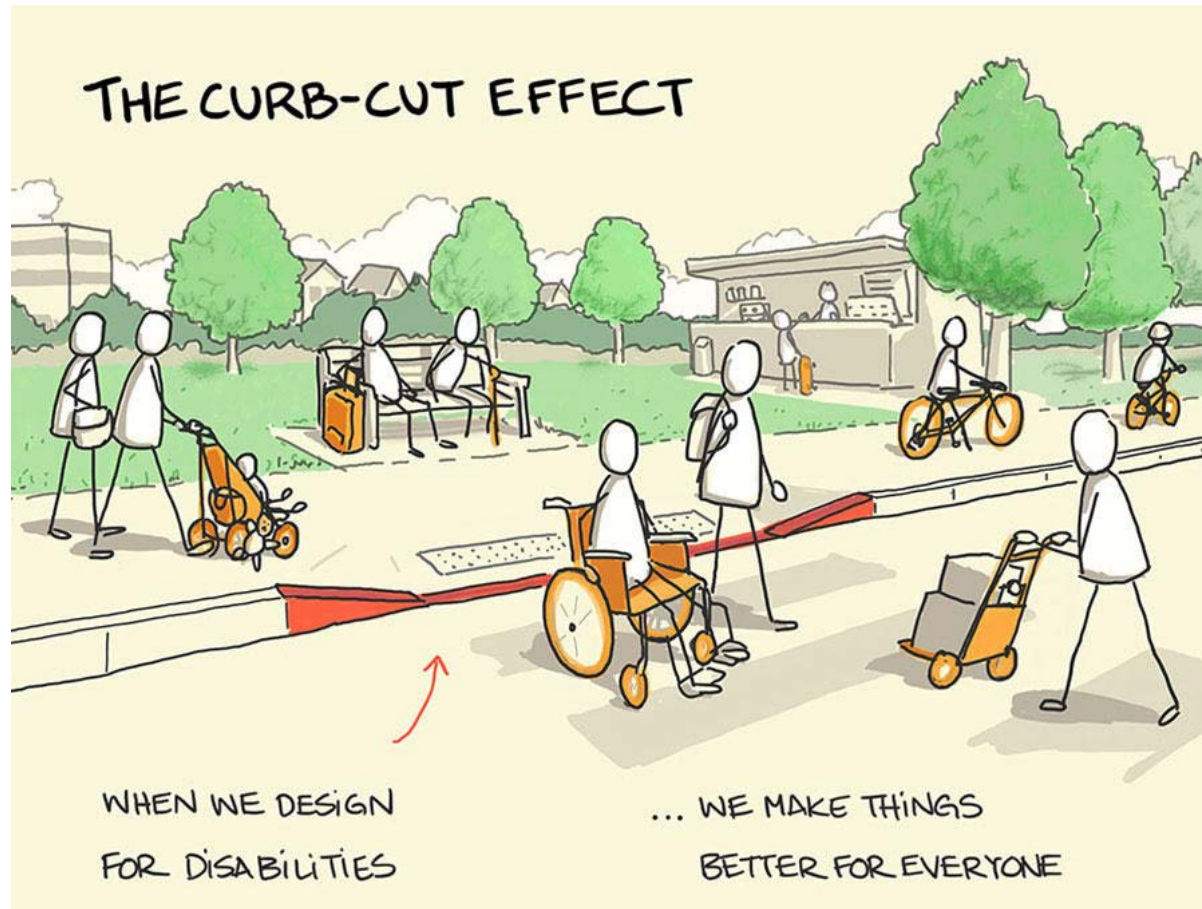


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Source: Robert Wood Johnson Foundation

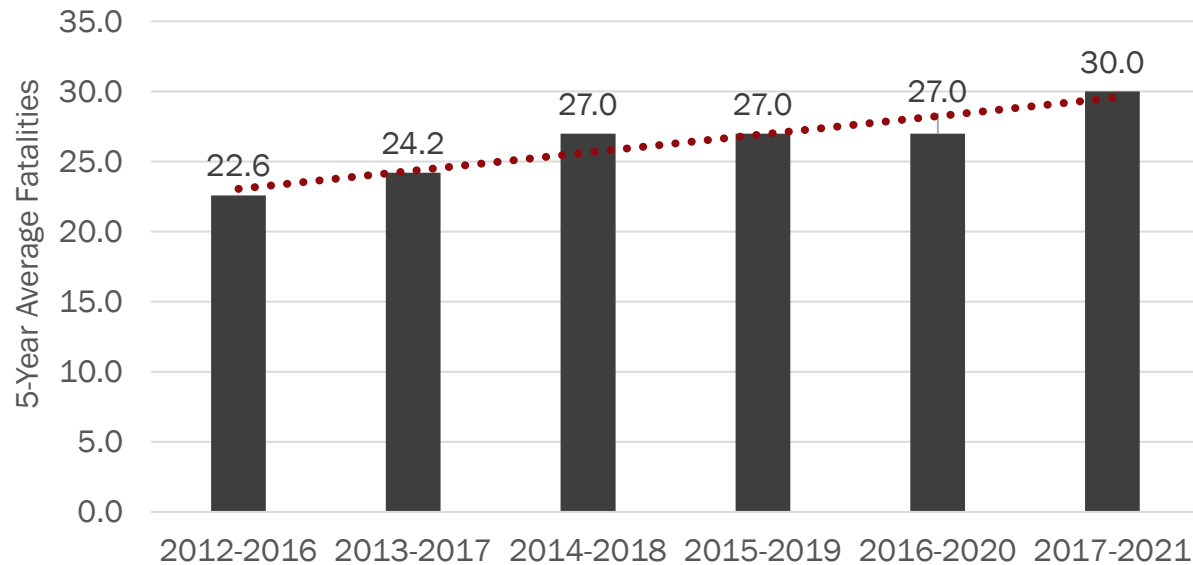
Safe System Approach



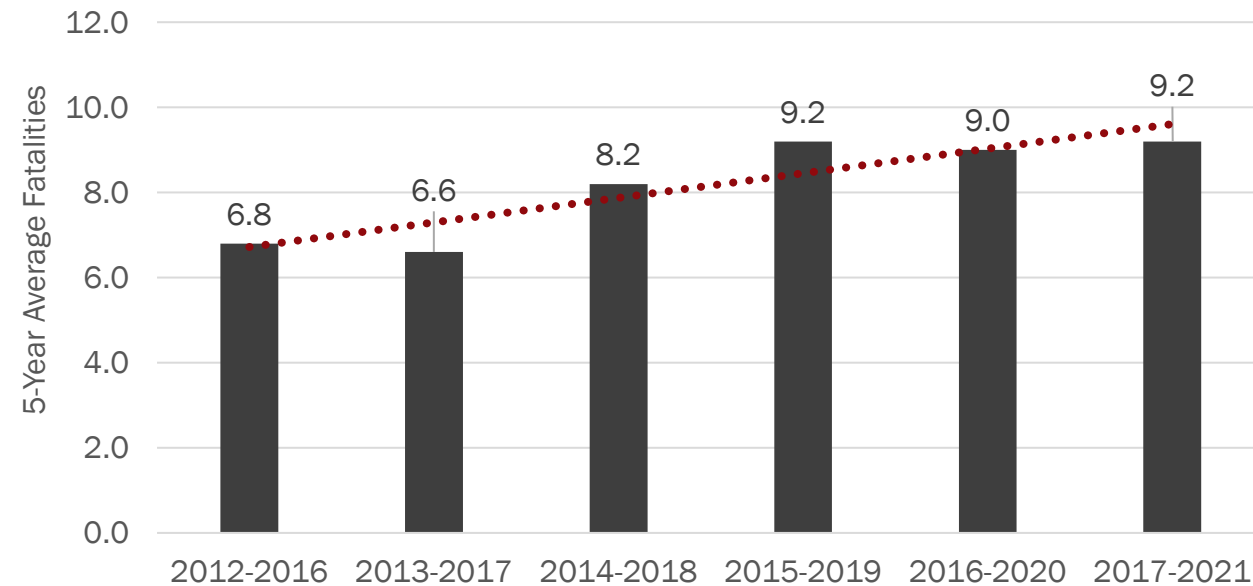
Source: Sketchplanations

RIC Comprehensive Safety Action Plan (CSAP)

Fatalities in Kanawha County

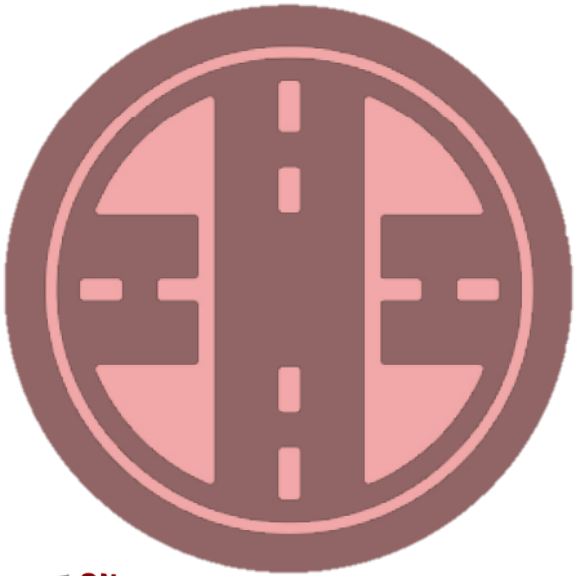


Fatalities in Putnam County



RIC Comprehensive Safety Action Plan (CSAP)

Intersections



Roadway Departure



Pedestrians



Speed and Aggressive Driving



Pedestrians as an Emphasis Area



R_x

How Healthy is Your Road System?

Find out with systemic analysis

Systemic analysis is like a health screening for your road system. Just as your doctor identifies risk factors for illness, systemic analysis identifies locations that are at highest risk for severe crashes. Practitioners can then prioritize projects based on risk and apply low-cost safety treatments to reduce severe crashes across the whole at-risk system.



Pedestrians as an Emphasis Area

▪ Risk Factors Identified for Pedestrian Crashes

- Vehicular volume
- Number of vehicle lanes
- Free-flow speed
- Heavy vehicle percentage

← Presence of vehicles

Presence of pedestrians

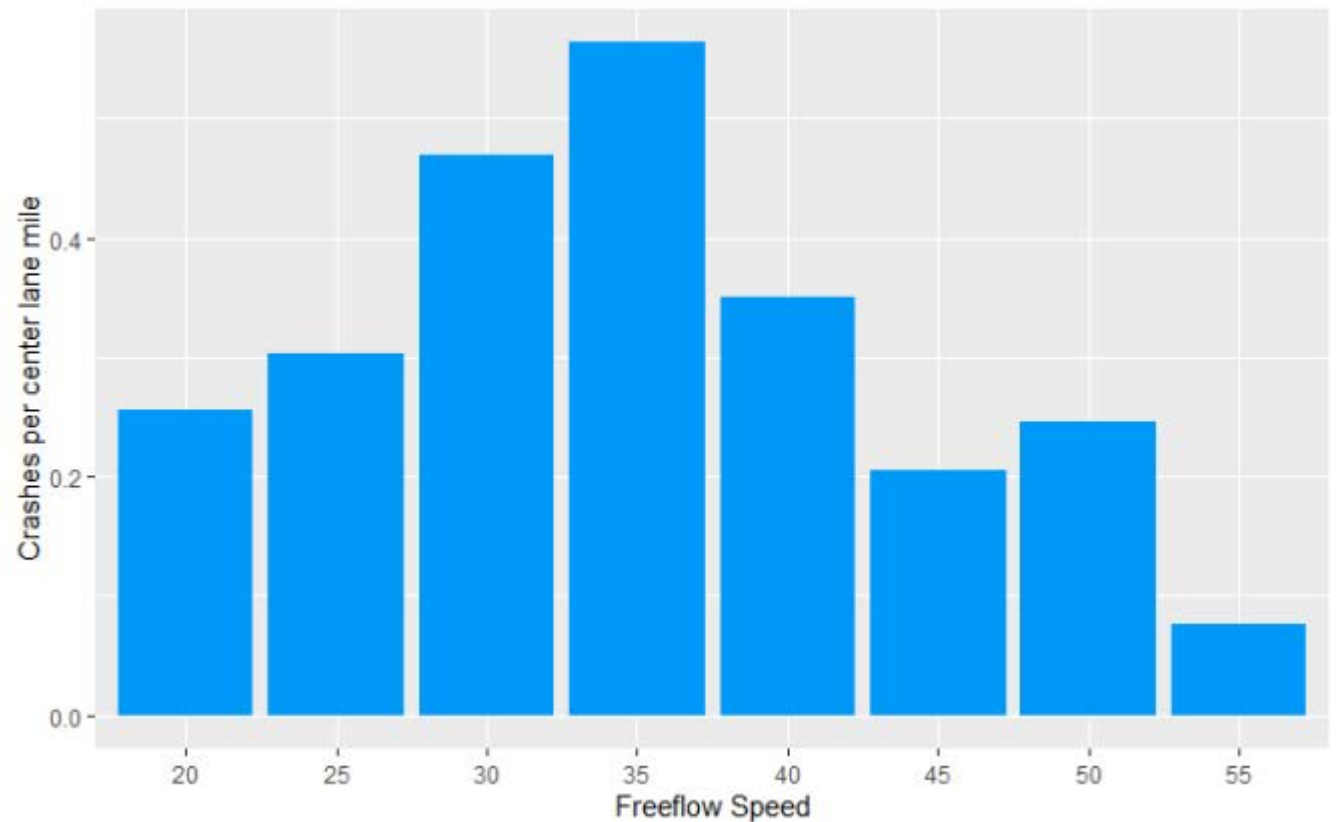
- Population density
- Presence of bus stops
- Presence of public attractions
 - Parks, recreational activity centers, etc.
- Presence of schools
- Presence of businesses
 - Liquor stores, child daycare, bars, gas stations, grocery stores, restaurants, etc.



Pedestrians as an Emphasis Area

- Assigned “scores” to the risk factors

Speed	Score
20 mph	3/8
25 mph	5/8
30 mph	7/8
35 mph	8/8
40 mph	6/8
45 mph	2/8
50 mph	4/8
55 mph	1/8

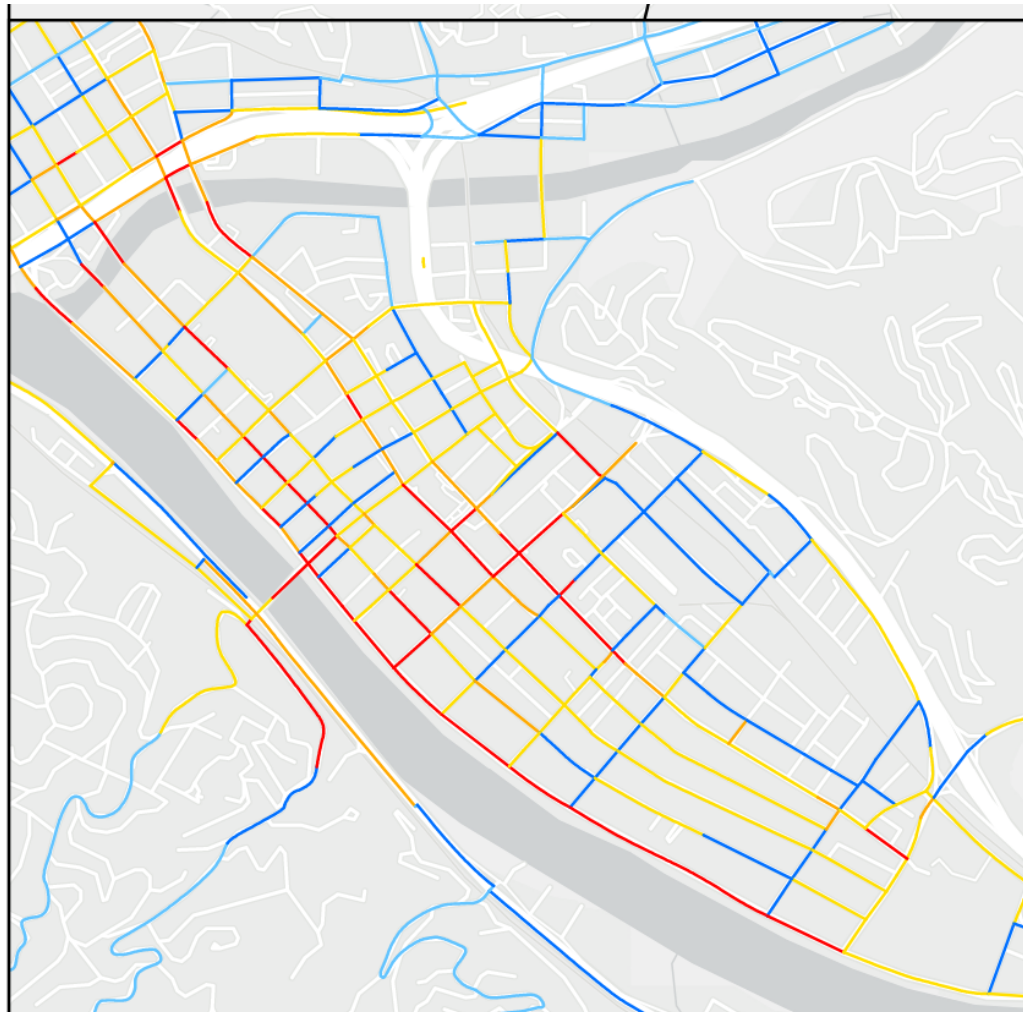


Pedestrians as an Emphasis Area

- Added the risk factor scores in two “categories”
 - Road Network Scores
 - Pedestrian Volume Scores
- Pedestrian Risk Score
 - Higher Pedestrian Risk Score = More Potential for Pedestrian Crash



Systemic Analysis Results



All top 50 segments were in Kanawha County

Pedestrian Crash Network Model - Kanawha

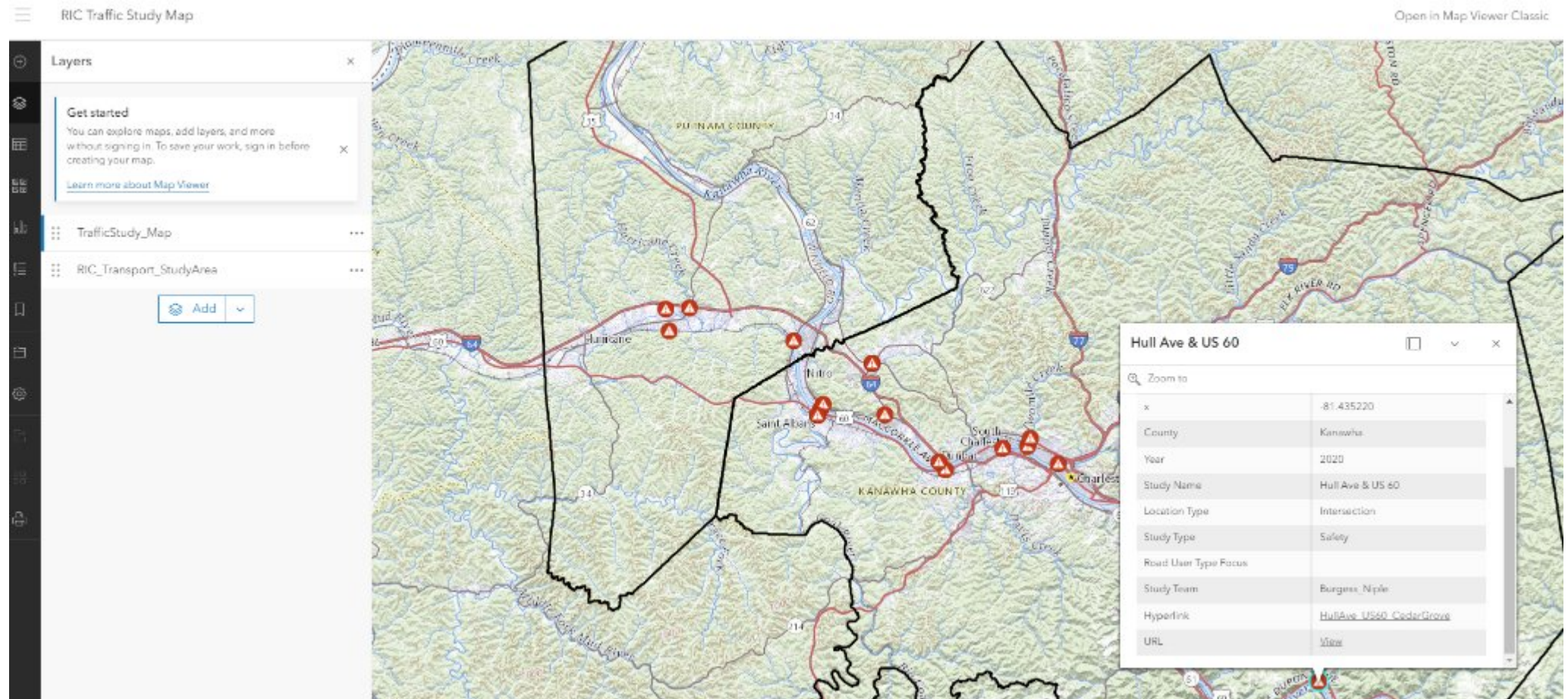
- 1 - 50
- 51 - 150
- 151 - 450
- 451 - 800
- > 800





Overview of RIC Studies

Overview of RIC Studies



RIC Studies Library

Name	Modified	Modified By	File size	Sharing
3rdunderpass2012.pdf	November 3, 2023	Sam Richardson	33.3 MB	Shared
3rdunderpass2016.pdf	November 3, 2023	Sam Richardson	33.1 MB	Shared
campbells.pdf	November 3, 2023	Sam Richardson	11.3 MB	Shared
centerbridge.pdf	November 3, 2023	Sam Richardson	368 KB	Shared
cross1997.pdf	November 3, 2023	Sam Richardson	160 KB	Shared
cross2016.pdf	November 3, 2023	Sam Richardson	21.9 MB	Shared
dunbar10th.pdf	November 3, 2023	Sam Richardson	6.19 MB	Shared
hull_milebranch.pdf	November 3, 2023	Sam Richardson	15.7 MB	Shared
montrose.pdf	November 3, 2023	Sam Richardson	39.5 MB	Shared
nitro1st.pdf	November 3, 2023	Sam Richardson	20.4 MB	Shared
patrick.pdf	November 3, 2023	Sam Richardson	19.8 MB	Shared
pennave.pdf	November 3, 2023	Sam Richardson	20.3 MB	Shared
springhill.pdf	November 3, 2023	Sam Richardson	3.73 MB	Shared
teays.pdf	November 3, 2023	Sam Richardson	21.8 MB	Shared
us119n.pdf	November 3, 2023	Sam Richardson	29.2 KB	Shared
vernon.pdf	November 3, 2023	Sam Richardson	17.1 MB	Shared
washwrebecca.pdf	November 3, 2023	Sam Richardson	20.2 MB	Shared
wv25_62.pdf	November 3, 2023	Sam Richardson	94.7 KB	Shared
wv34.pdf	November 3, 2023	Sam Richardson	15.1 MB	Shared
wv817teays.pdf	November 3, 2023	Sam Richardson	12.9 MB	Shared



How are Traffic Studies Funded?

- A Consolidated Planning Grant (CPG) through consolidated FHWA PL funds and FTA MPP funds.
 - Funds available to MPOs in an urbanized area with a population of 50,000 or more
 - RIC and WVDOT provide a local match at the rate of 10% each
 - This information is available for public review in the RIC UPWP

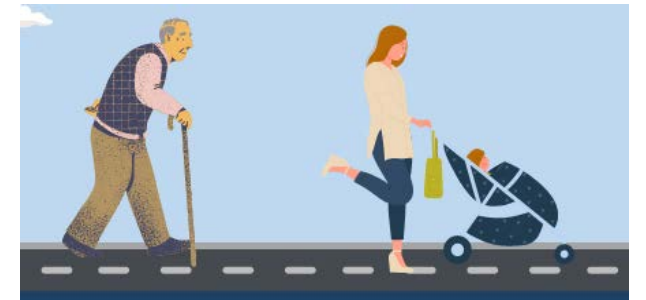
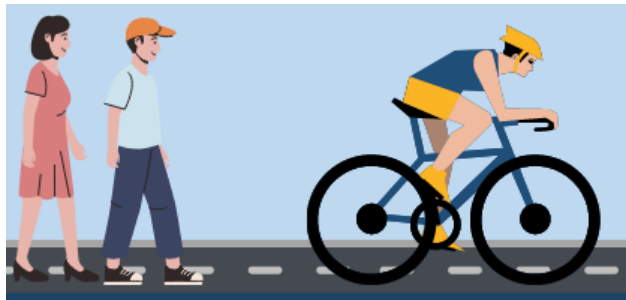


Three RIC Studies Prioritized VRUs

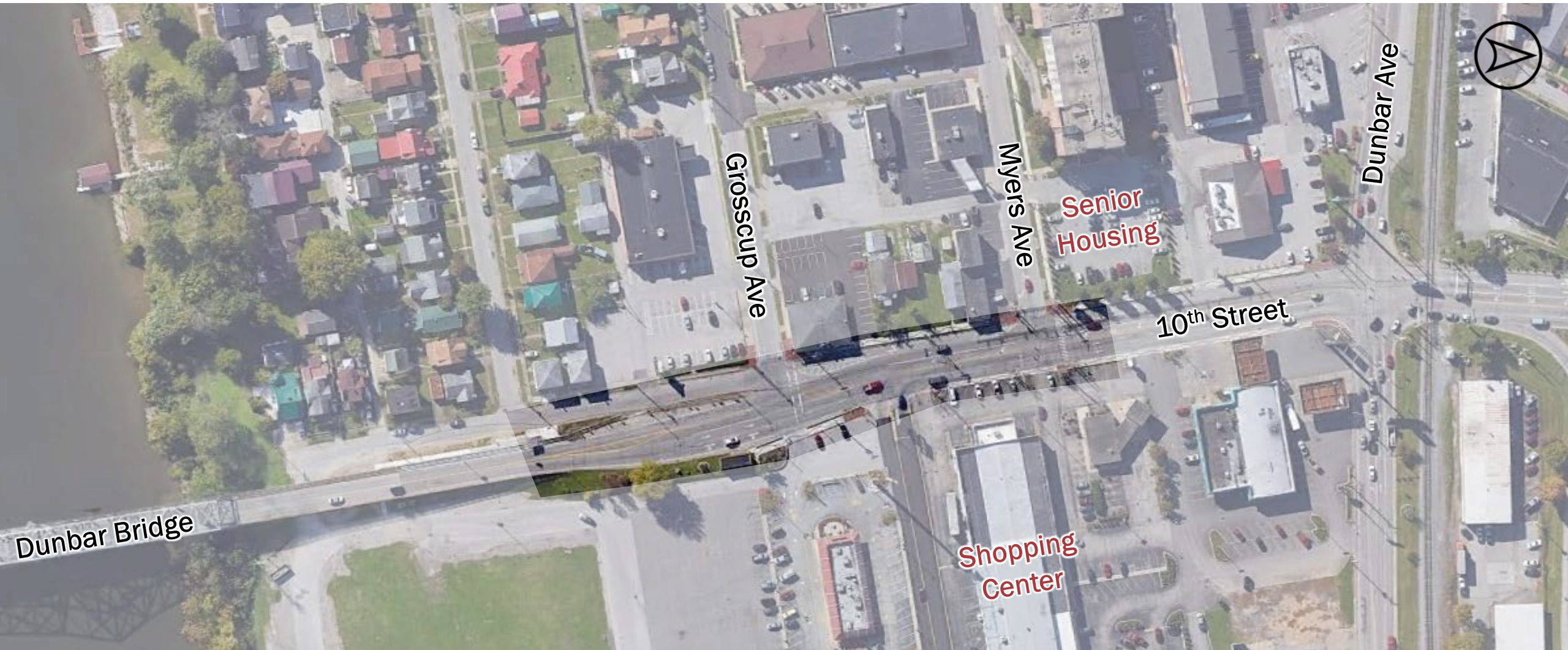
10th Street Between
Myers Avenue and
Grosscup Avenue

Washington Street from
Dooley Lane to Patrick
Street

Washington Street and
Lee Street



10th Street between Myers and Grosscup



10th Street between Myers and Grosscup



10th Street between Myers and Grosscup



10th Street between Myers and Grosscup



10 Pedestrian Crashes in 6 Years
2016 - 2021

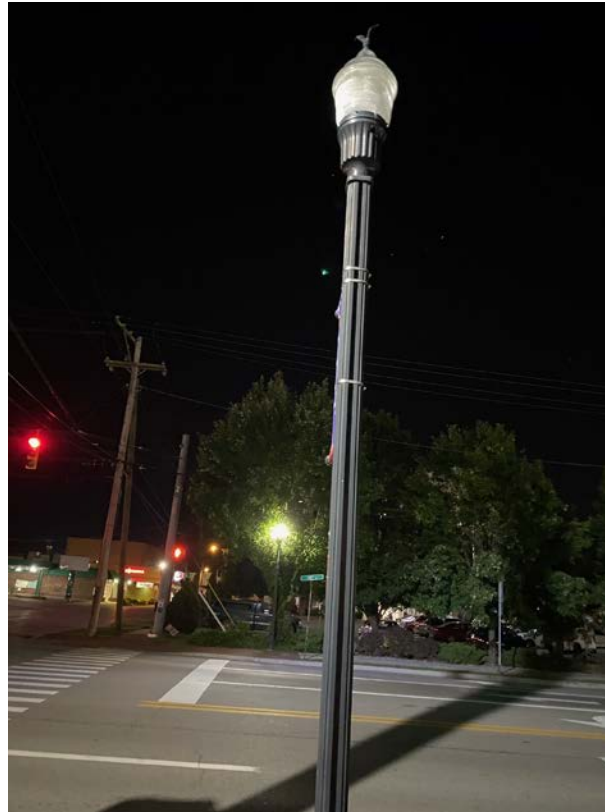
10th Street between Myers and Grosscup

Install signage at 10th
Street and Myers
Avenue signal



10th Street between Myers and Grosscup

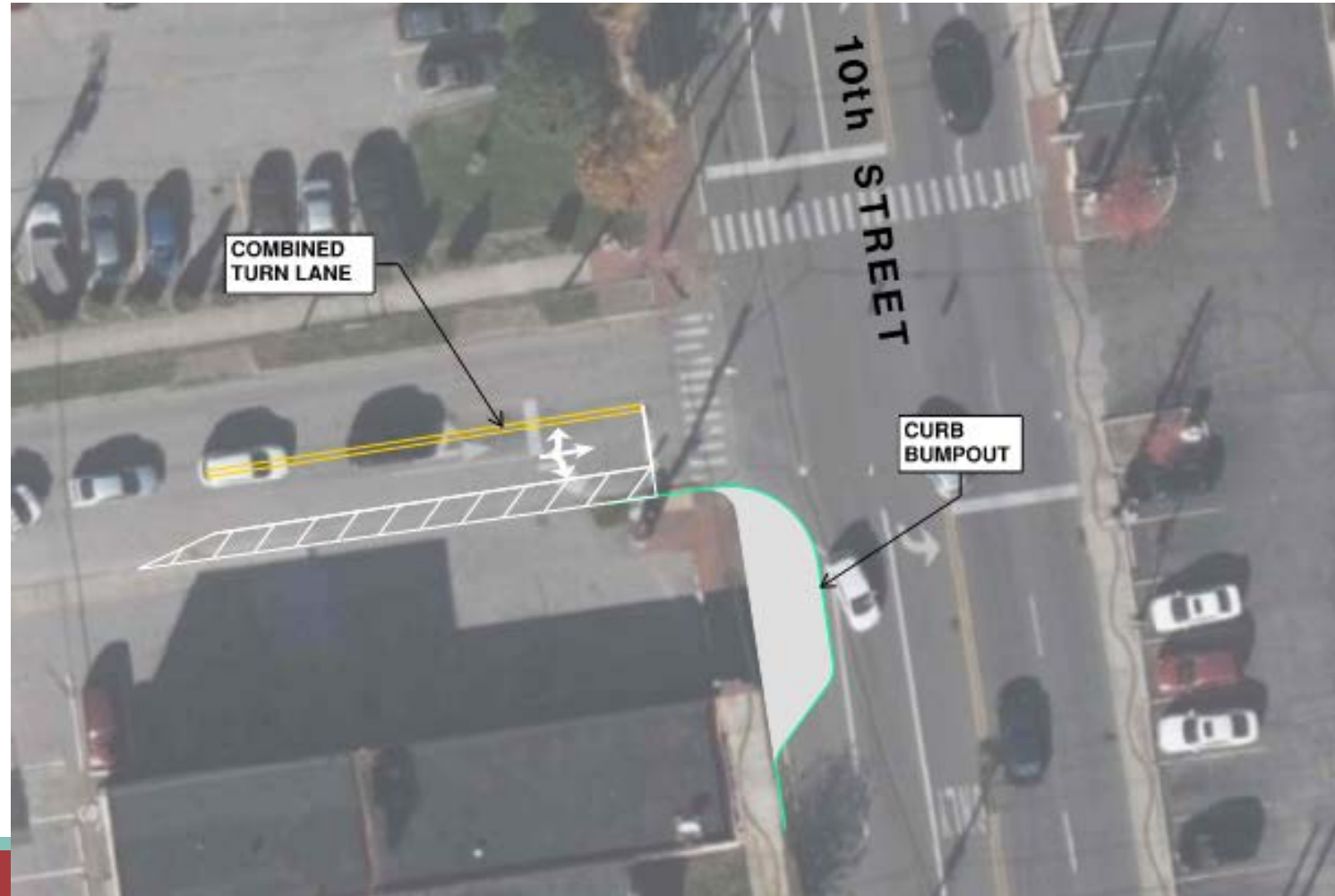
Improve
Lighting in
Corridor



10th Street between Myers and Grosscup

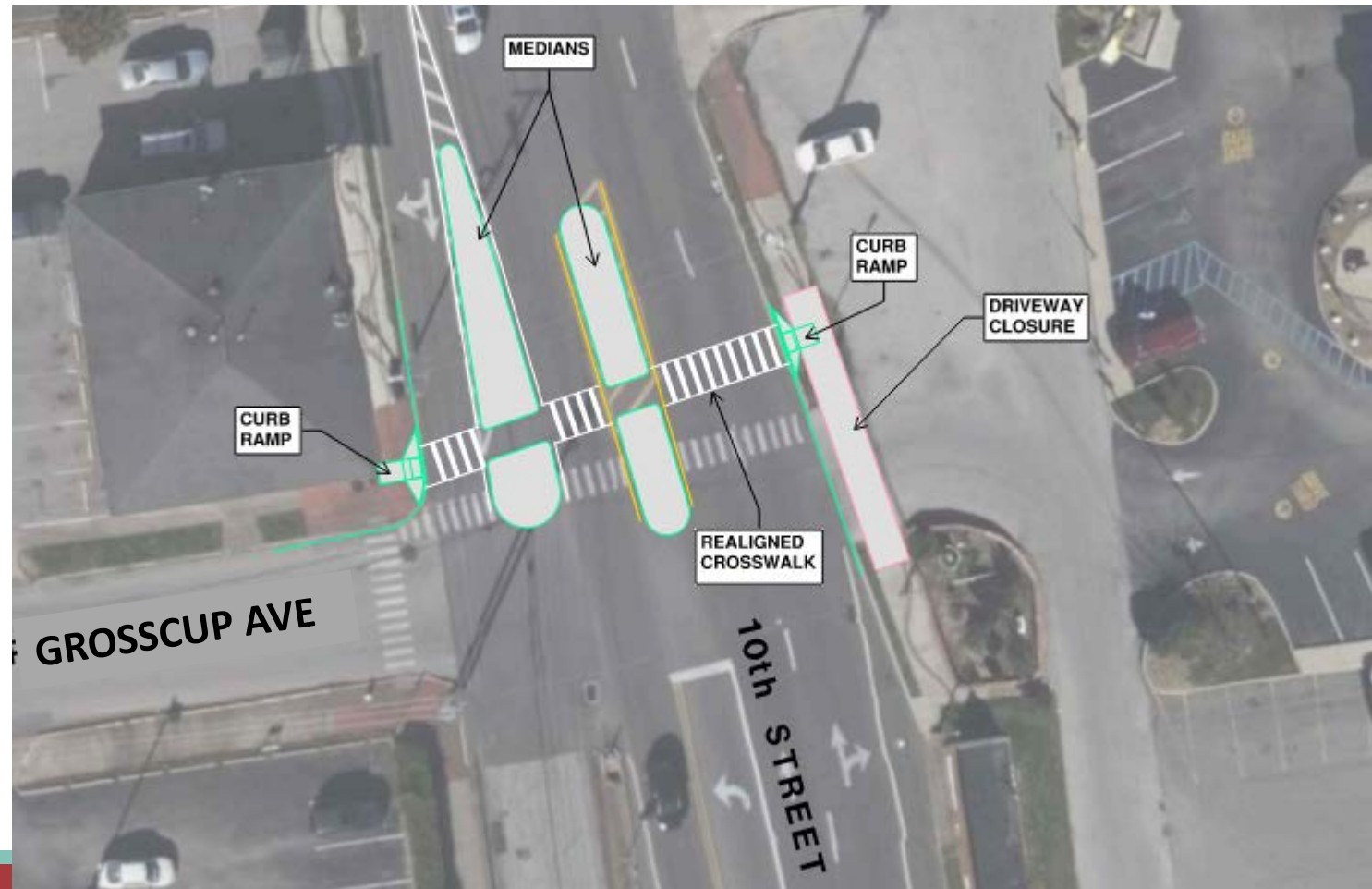
Install curb
extension

Consider
relocating
crosswalk



10th Street between Myers and Grosscup

Install medians,
realign
crosswalk



10th Street between Myers and Grosscup

Install
Rectangular
Rapid Flashing
Beacon



Washington Street between Dooley Lane and Patrick Street



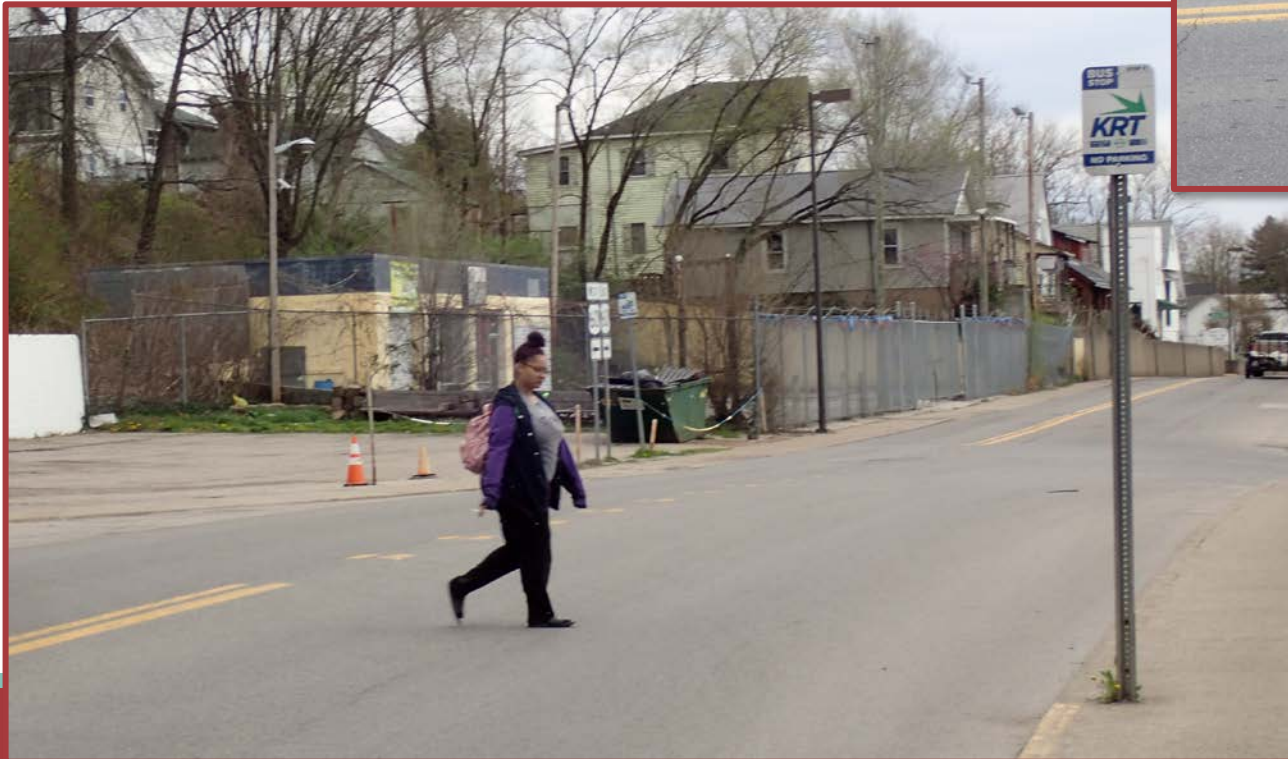
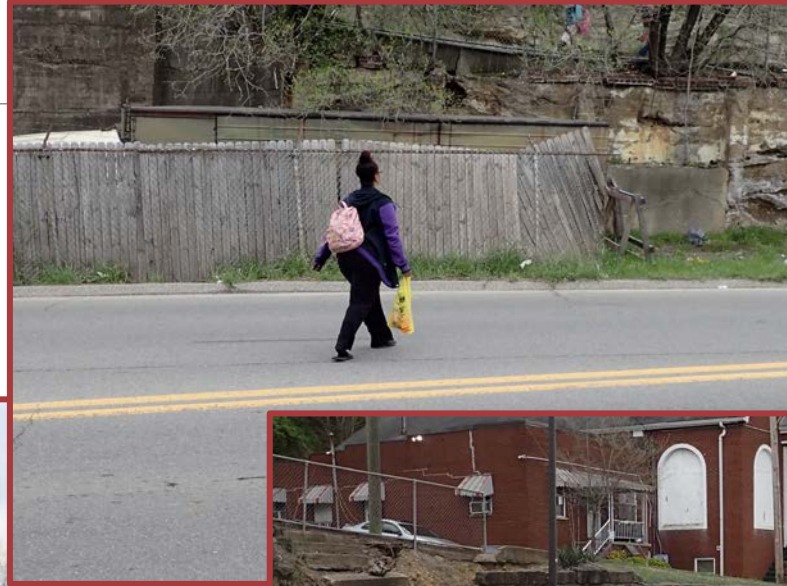
Washington Street between Dooley Lane and Patrick Street



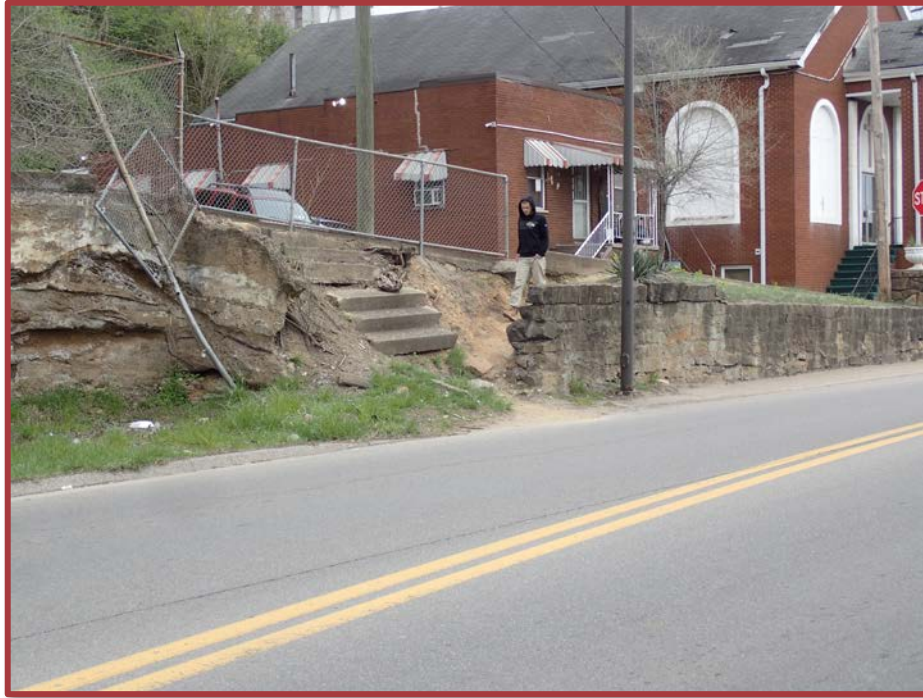
Washington Street between Dooley Lane and Patrick Street



Washington Street between Dooley Lane and Patrick Street



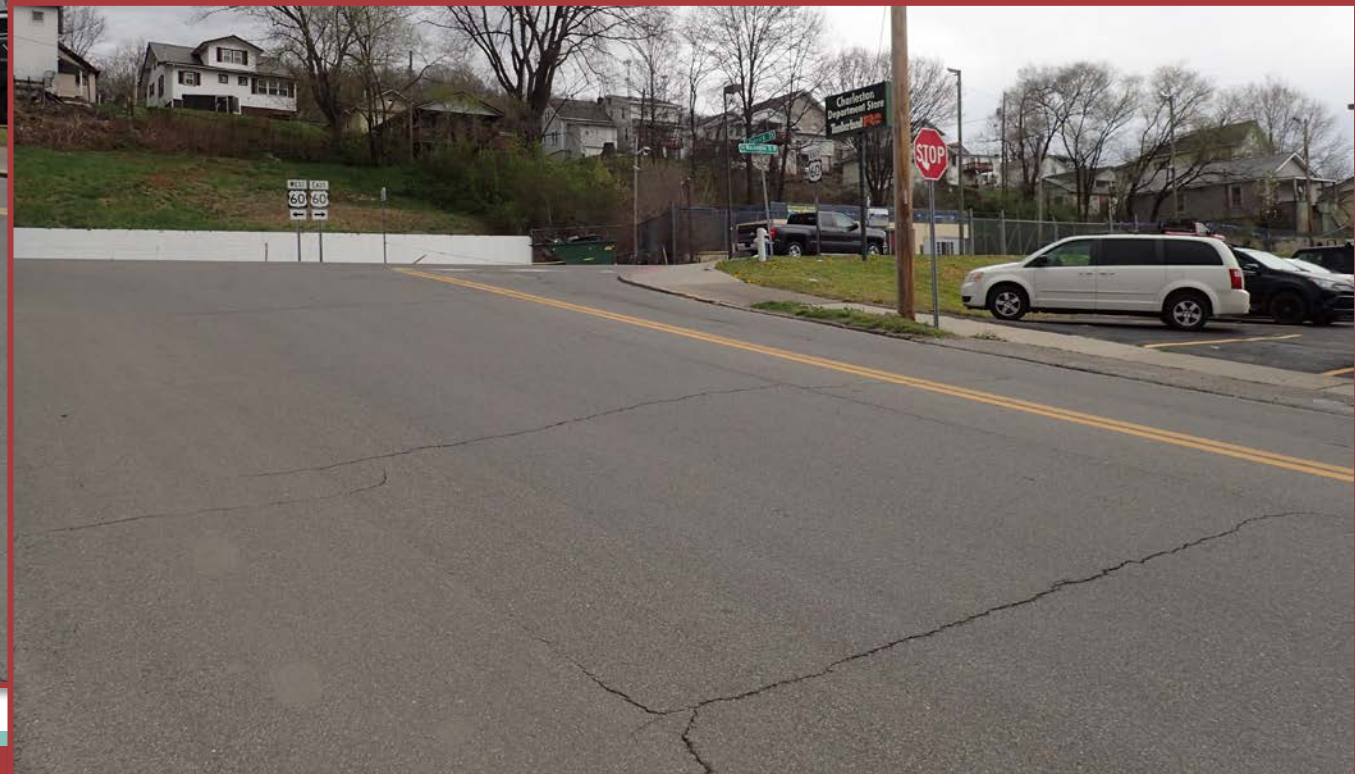
Washington Street between Dooley Lane and Patrick Street



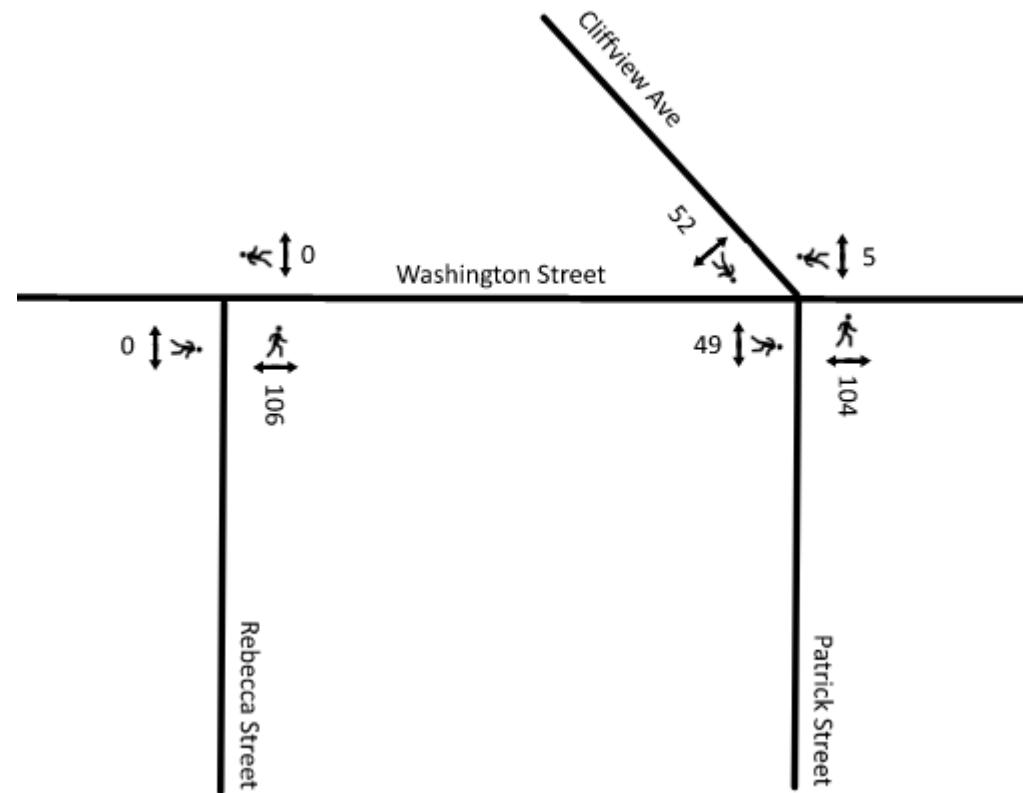
Washington Street between Dooley Lane and Patrick Street



Washington Street between Dooley Lane and Patrick Street



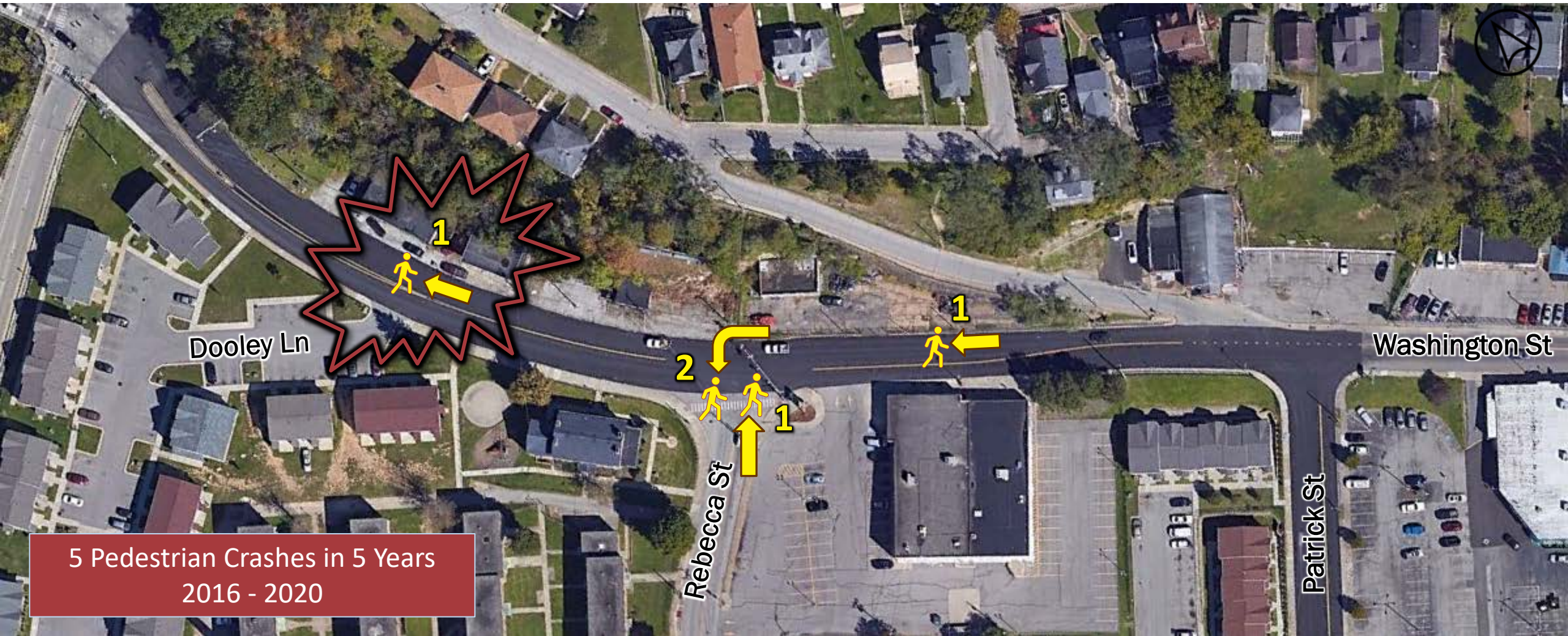
Washington Street between Dooley Lane and Patrick Street



6 AM to 6 PM (12 Hours)



Washington Street between Dooley Lane and Patrick Street



5 Pedestrian Crashes in 5 Years
2016 - 2020

Washington Street between Dooley Lane and Patrick Street

Short-Term Countermeasures

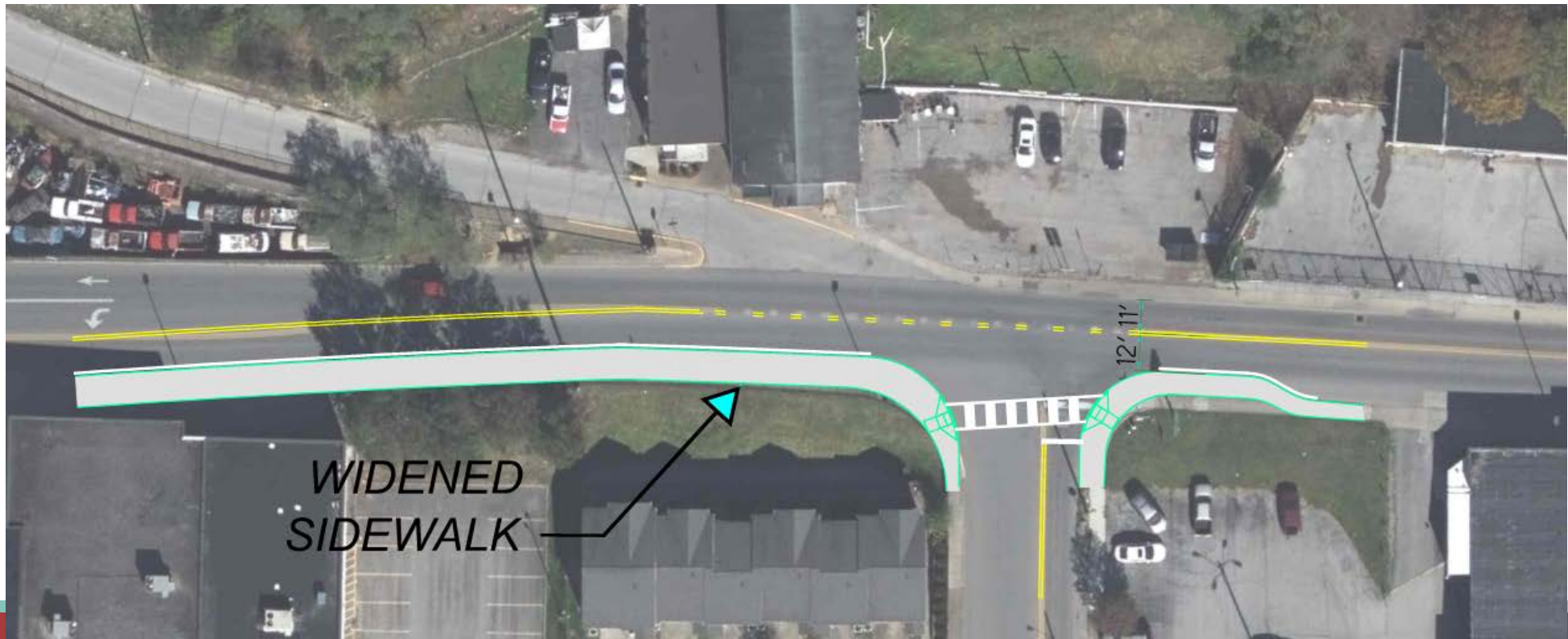
- Add signage to Rebecca Street Signal
- Restripe High Visibility Crosswalk at Rebecca Street
- Coordinate with Kanawha County Schools to Relocate Bus Stop



Washington Street between Dooley Lane and Patrick Street

Medium-Term Countermeasure

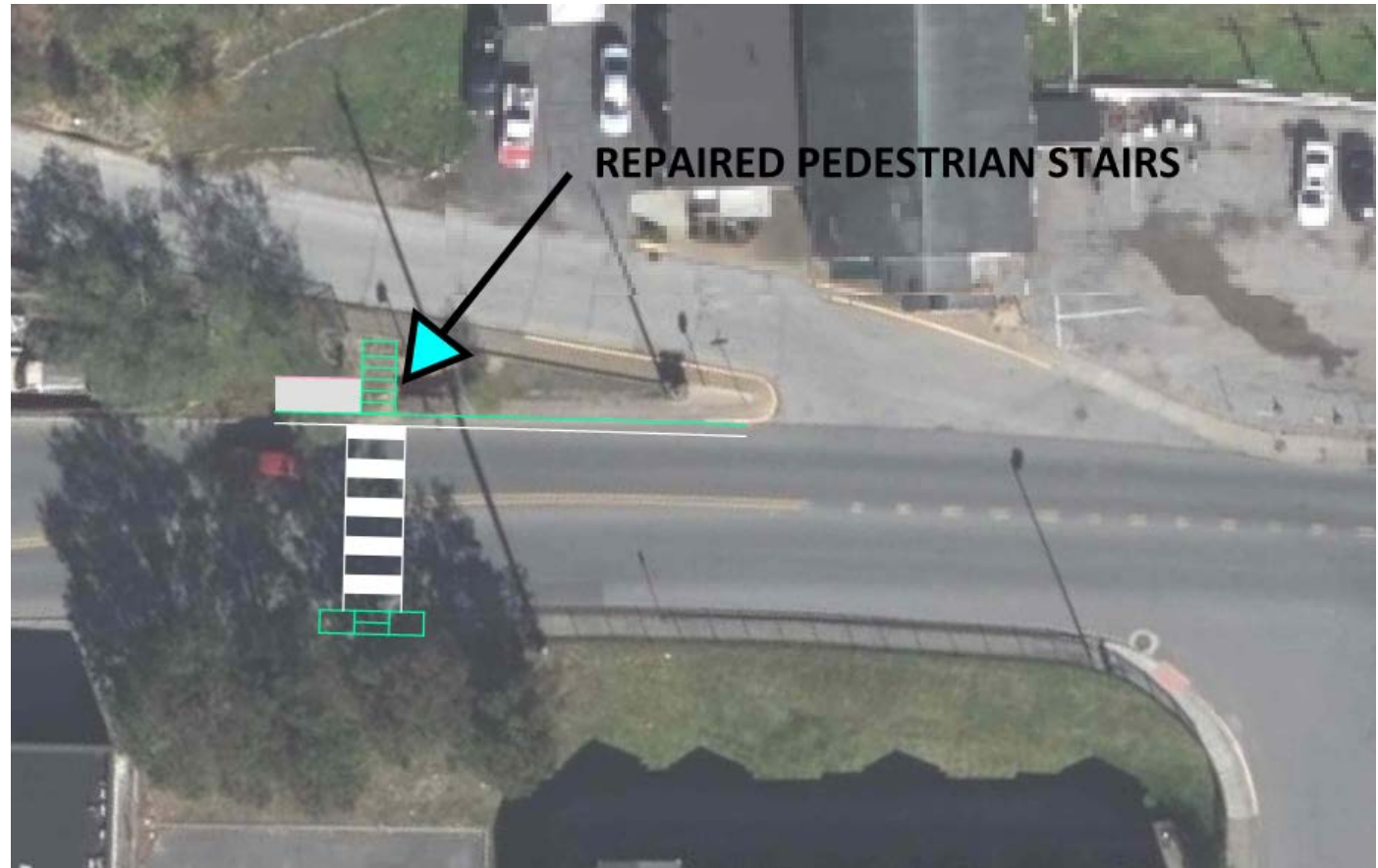
- Widen sidewalk at Patrick Street



Washington Street between Dooley Lane and Patrick Street

Medium-Term Countermeasure

- Repair pedestrian stairs near Patrick Street
- Install midblock crossing with Rectangular Rapid Flashing Beacon



Washington Street between Dooley Lane and Patrick Street

Long-Term Countermeasure

- Coordinate with WVDOT to improve pedestrian lighting



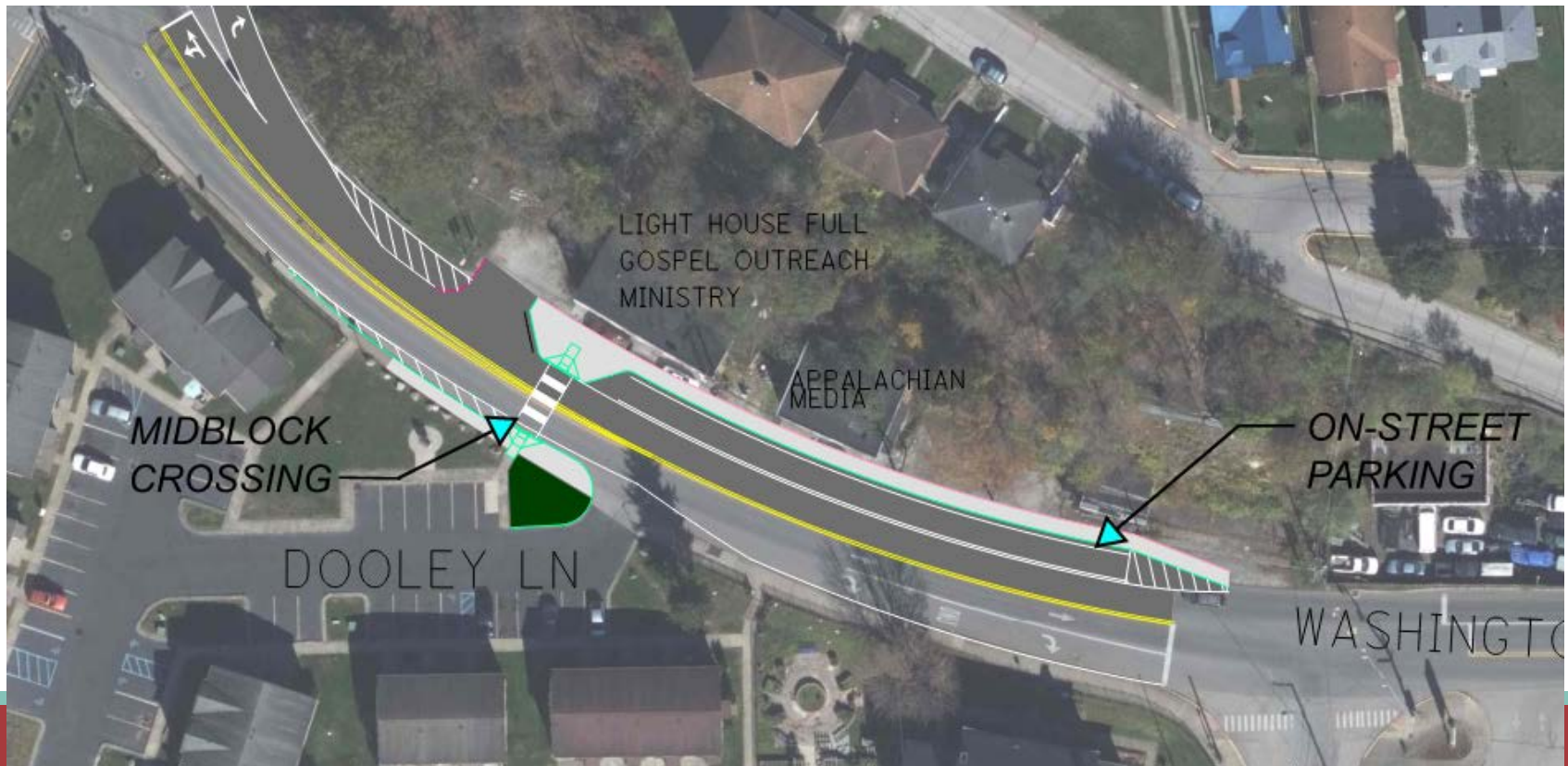
Source: FHWA.



Washington Street between Dooley Lane and Patrick Street

Long-Term Countermeasure

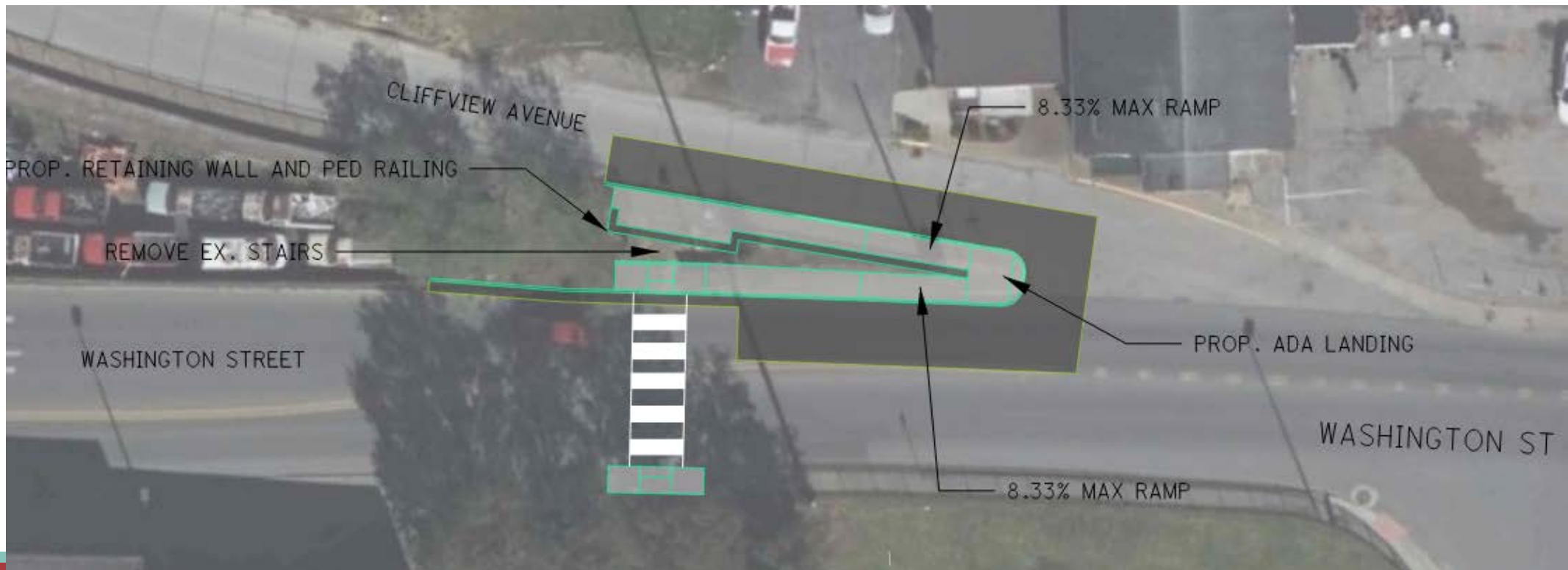
- Add sidewalk and crossing between Dooley Lane and Rebecca Street



Washington Street between Dooley Lane and Patrick Street

Long-Term Countermeasure

- Improve ADA accommodations at Cliffview Avenue





**Washington Street East from Leon
Sullivan Way to Ruffner Avenue**

**Lee Street from Leon Sullivan
Way to Brooks Street**

Washington Street and Lee Street



Washington Street and Lee Street





Washington Street and Lee Street



Washington Street between Morris Street and
Bradford Street



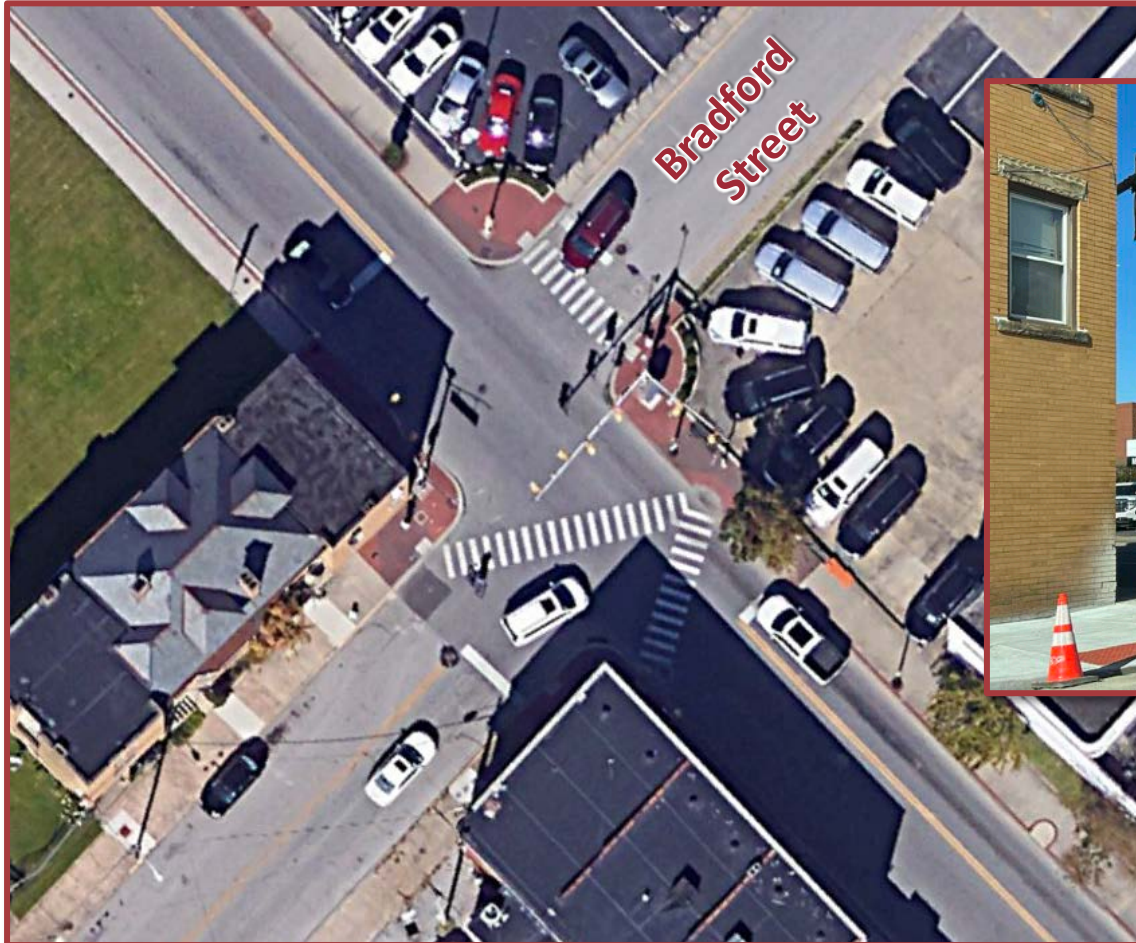
Washington Street between Bradford Street and Ruffner
Avenue



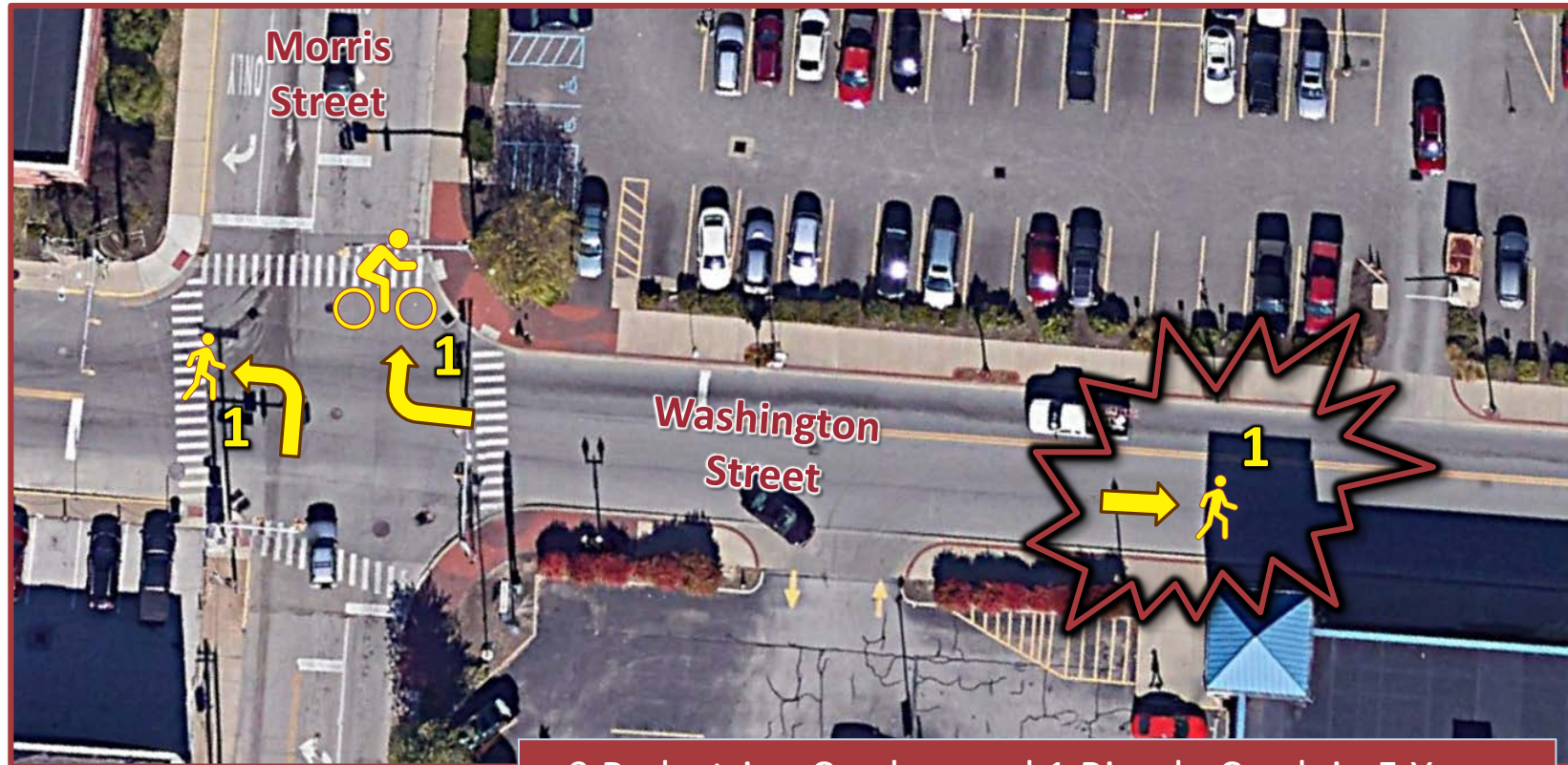
Washington Street and Lee Street



Washington Street and Lee Street



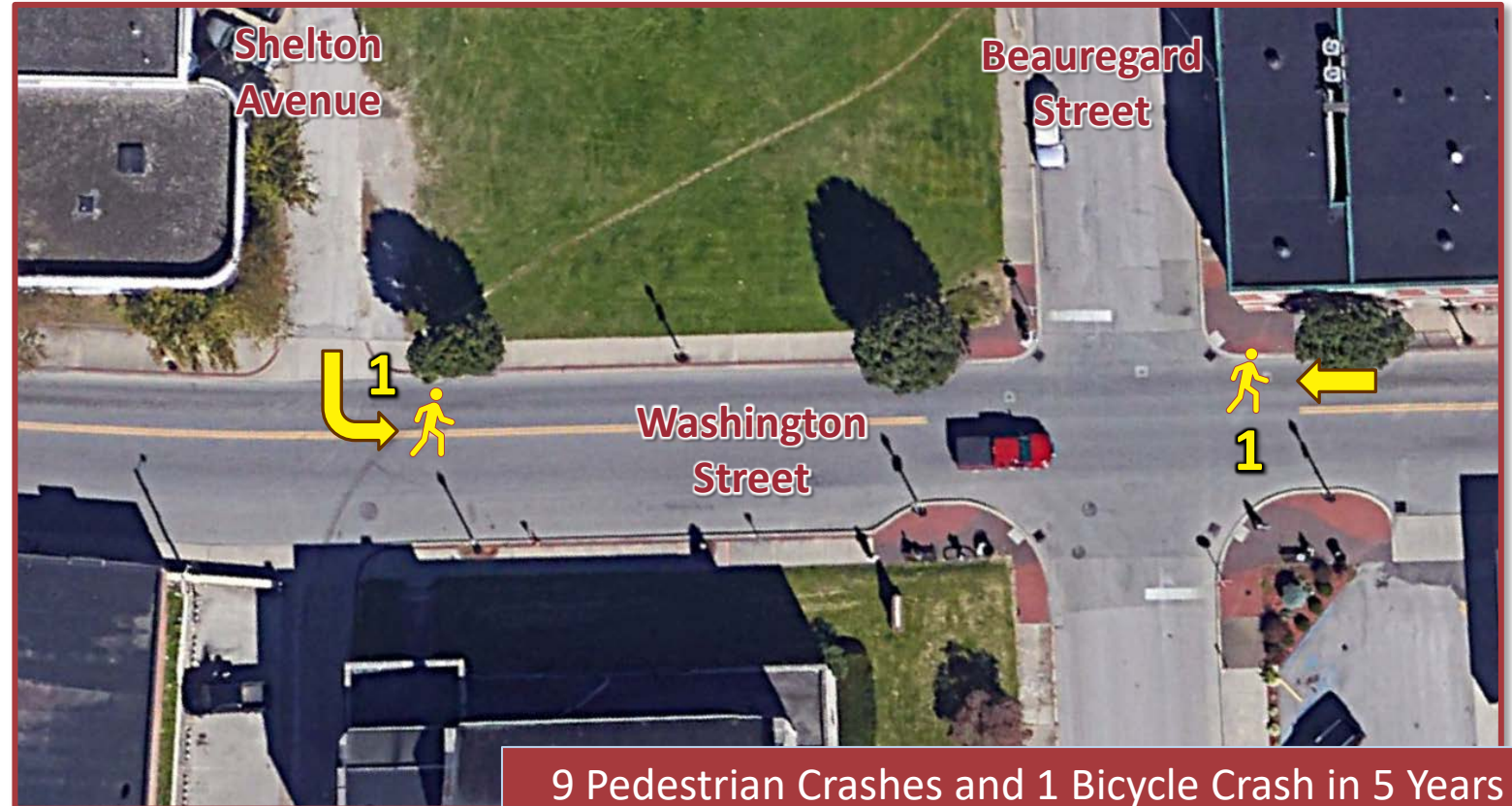
Washington Street and Lee Street



9 Pedestrian Crashes and 1 Bicycle Crash in 5 Years
2017 - 2021



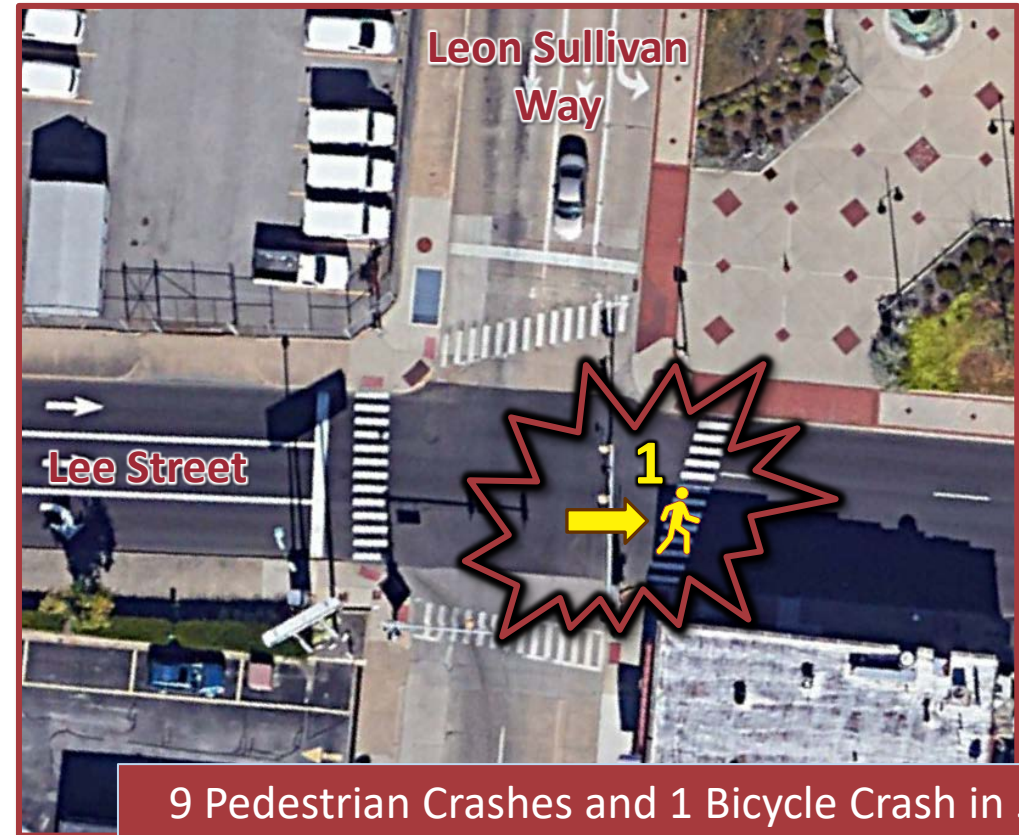
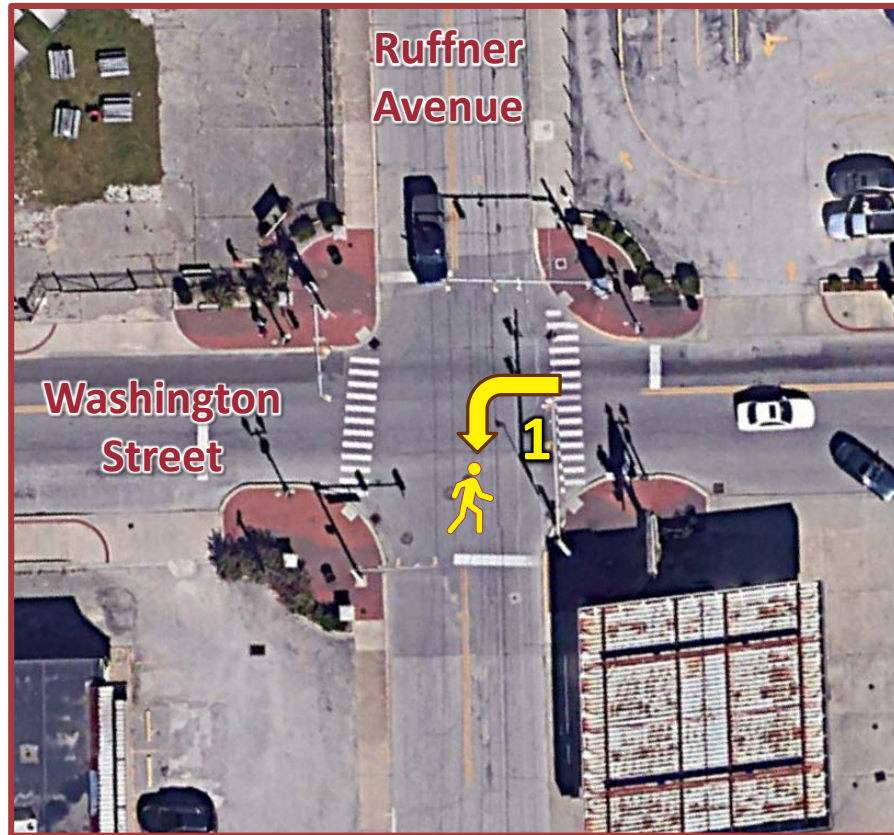
Washington Street and Lee Street



9 Pedestrian Crashes and 1 Bicycle Crash in 5 Years
2017 - 2021



Washington Street and Lee Street



9 Pedestrian Crashes and 1 Bicycle Crash in 5 Years
2017 - 2021



Washington Street and Lee Street

Short-Term Countermeasure

- ADA Pedestrian Buttons
 - Repeating tone indicating location of pushbutton
 - Tone, click or spoken "WAIT" indicating button was pushed
 - Tone or spoken "WALK" message providing name of street to be crossed

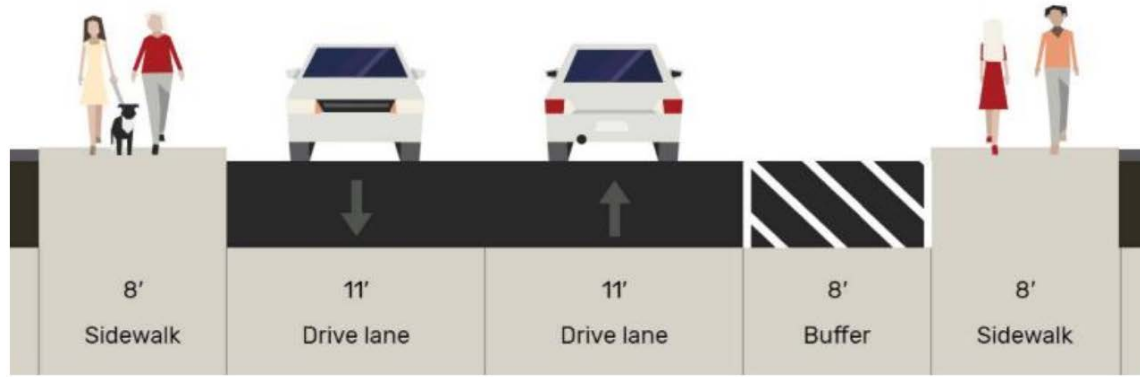


A pedestrian push button provides allows pedestrians to activate a pedestrian signal and reassure pedestrians that they will receive a crossing indication. Source: pedbikeimages.com - Dan Burden (2006)

Washington Street and Lee Street

Short-Term Countermeasure

- Stripe narrower lane between Morris Street and Ruffner Avenue



Buffer Zone Treatment Ideas (Planters, Flexible Post and Temporary Curb):



Washington Street and Lee Street

Medium-Term Countermeasure

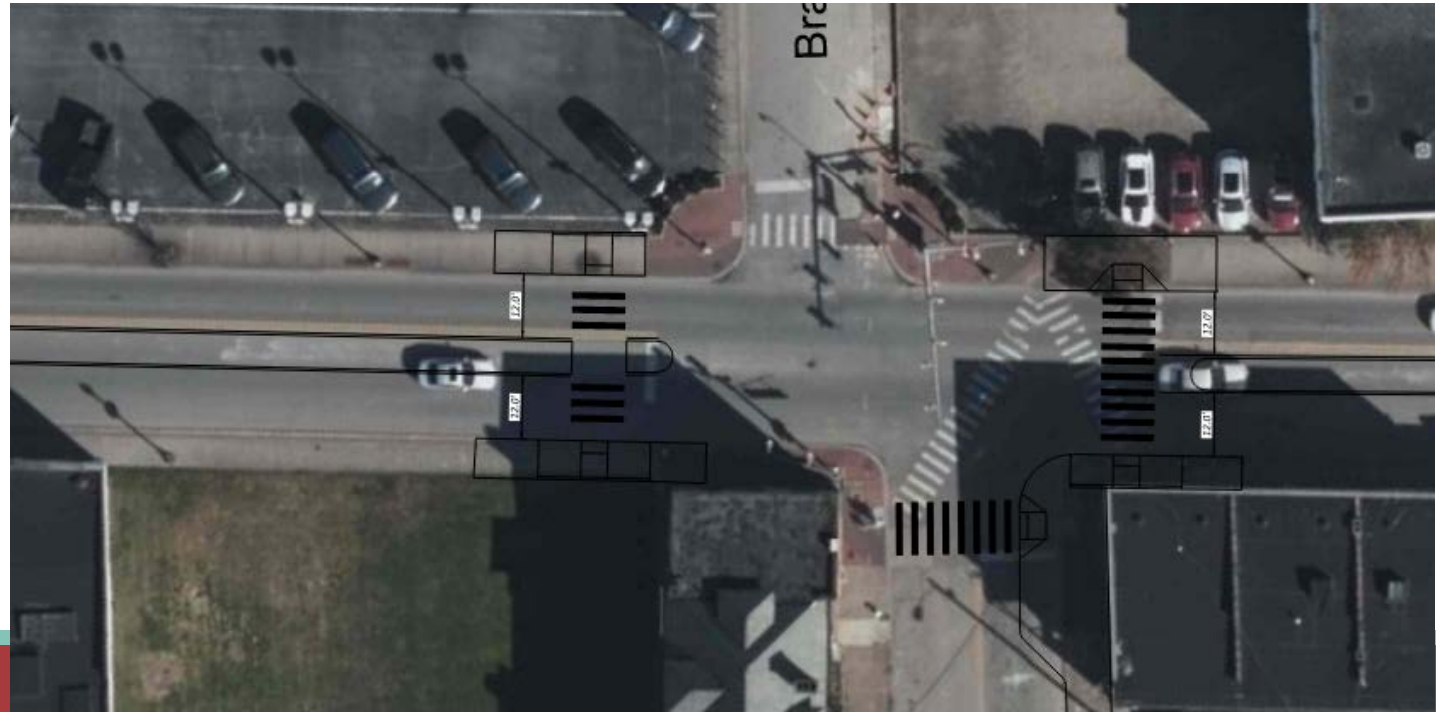
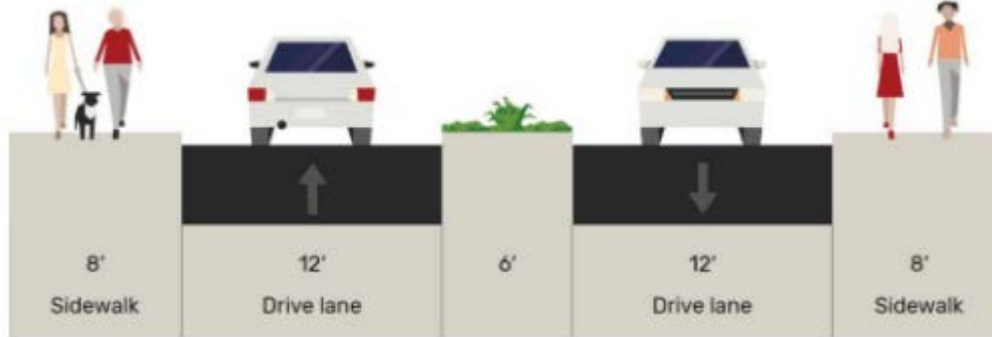
- Provide Pedestrian Accommodations at Ruffner Avenue



Washington Street and Lee Street

Long-Term Countermeasure

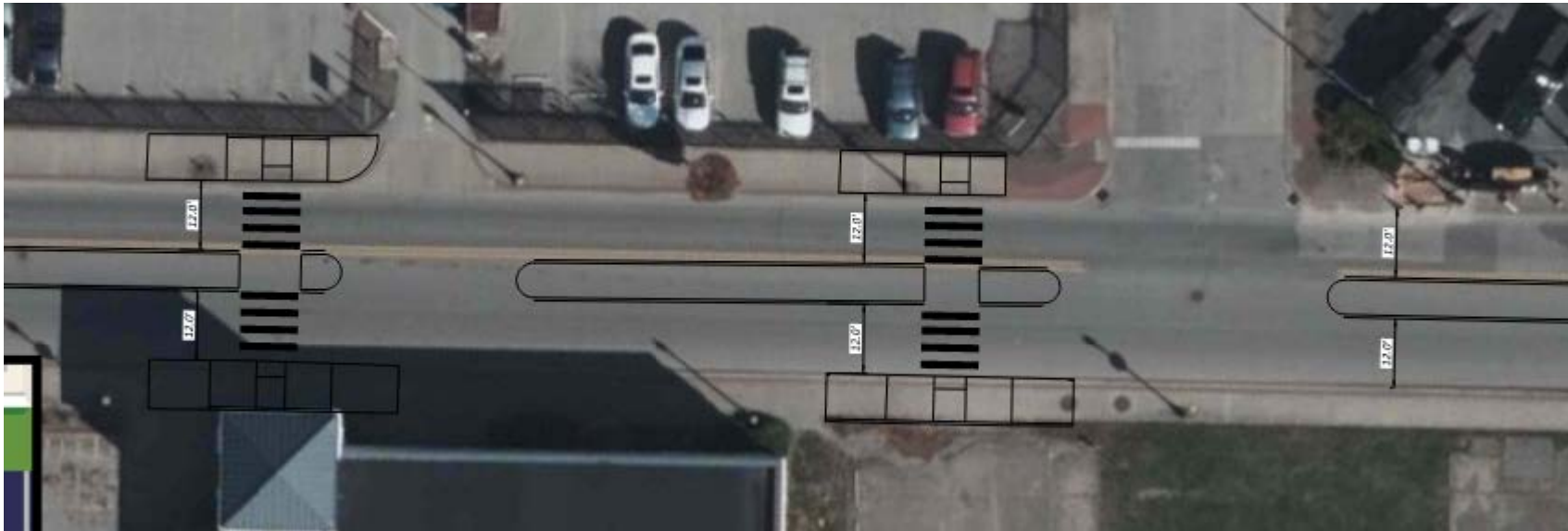
- Construct median along Washington Street between Morris Street and Ruffner Avenue



Washington Street and Lee Street

Long-Term Countermeasure

- Construct crossing locations with median refuge islands and RRFBs at select locations





VRU Resources

VRU Countermeasures

OFFICE OF SAFETY
Proven Safety
Countermeasures

Pedestrian/Bicyclist



[Bicycle Lanes](#)



[Crosswalk Visibility Enhancements](#)



[Leading Pedestrian Interval](#)



[Medians and Pedestrian Refuge Islands in Urban and Suburban Areas](#)



[Pedestrian Hybrid Beacons](#)



[Rectangular Rapid Flashing Beacons \(RRFB\)](#)



[Road Diets \(Roadway Reconfiguration\)](#)



[Walkways](#)



VRU Countermeasures

PEDSAFE

Pedestrian Safety Guide and Countermeasure Selection System

Guide: Background | Statistics | Analysis | Implementation | Countermeasures: List | Tool | Matrices | Case Studies | Resources

Performance Objective Matrix

View the Crash Type Matrix [here](#).

Objective Type	Along Roadway	Crossing Locations
Reduce Speed of Motor Vehicles	X	X
Improve Sight Distance and Visibility for Motor Vehicles and Pedestrians		X

BIKESAFE

Bicycle Safety Guide and Countermeasure Selection System

Guide: Background | Statistics | Analysis | Implementation | Countermeasures: List | Tool | Matrices | Case Studies | Resources

Performance Objective Matrix

View the Crash Type Matrix [here](#).

Objective Type	Shared Roadway	On-Road Bike Facilities	Intersection Treatments	Maintenance	Traffic Calming	Trails/Shared Paths	Markings, Signs & Signals	Other Measures
Provide safe on-street facilities/space for bicyclists	X	X		X	X		X	X
Provide off-road paths or trails for bicyclists				X		X	X	X

FHWA-SA-18-041
September 2018

Toolbox of Pedestrian Countermeasures and Their Potential Effectiveness

Introduction

This issue brief documents estimates of the crash reduction that might be expected if a specific countermeasure or group of countermeasures is implemented with respect to pedestrian crashes. The crash reduction estimates are presented as Crash Modification Factors (CMFs). Some of the crash reduction estimates are also presented in terms of left-turn crashes, certain crash severities, or total crashes.

Traffic engineers and other transportation professionals can use the information contained in this issue brief when asking the following types of question: What change in the number of pedestrian crashes (and/or other crash types) can be expected with the implementation of the various countermeasures?

Crash Modification Factors (CMFs)

A CMF is the proportion of crashes that are expected to remain after the countermeasure is implemented. For example, an expected 20 percent reduction in crashes would correspond to a CMF of $(1.00 - 0.20) = 0.80$. In some cases, the CMF is negative, i.e. the implementation of a countermeasure is expected to lead to a percentage increase in crashes.



VRU Funding Opportunities

- Discretionary Grants
 - Safe Streets and Roads for All (SS4A)
 - Rebuilding America's Infrastructure for Sustainability and Equity (RAISE)
 - Active Transportation Infrastructure Improvement Program (ATIIP)
 - Reconnecting Neighborhoods (RCN)
- Formula Funding
 - Surface Transportation Block Grant (STBG)
 - Transportation Alternatives
 - Carbon Reduction Program (CRP)
 - Transportation Alternatives
 - Highway Safety Improvement Program (HSIP)
 - Transportation Alternatives
 - Congestion Mitigation and Air Quality (CMAQ)
 - Transportation Alternatives



Can Federal Match Federal?

9. Q: Can HSIP funds be used as match for Transportation Alternatives (TA) funds?

A: Yes. 23 U.S.C. 133(h)(7)(B)(i) allows HSIP funds to be credited toward the non-Federal share of the costs of a TA Set-Aside project if the project is an eligible HSIP project as described in 23 U.S.C. 148(e)(1). Also, as generally with all HSIP projects, that project would need to be consistent with the State's SHSP (23 U.S.C. 148(a)(4)(A)), identified through a data-driven process (23 U.S.C. 148(c)(2)(B)), and contribute to a reduction in fatalities and serious injuries on public roads (23 U.S.C. 148(b)(2)). Crediting HSIP funds to the non-Federal share of a project allows an individual project to functionally have a Federal share of up to 100 percent (23 U.S.C. 133(h)(7)(B)(iii)). The average annual non-Federal share of the total costs of all TA Set-Aside projects in a State for a fiscal year must not be less than the average non-Federal share of the costs of the projects that would otherwise apply (23 U.S.C. 133(h)(7)(A)). In addition, States may only credit HSIP funds toward the non-Federal share of the costs of a TA Set-Aside project if the State has adequate financial controls, as certified by FHWA, to account for this average non-Federal share (23 U.S.C. 133(h)(7)(C)). Transportation alternatives guidance can be found at [TA Guidance](#).



VRU Funding Opportunities



Pedestrian and Bicycle Funding Opportunities: U.S. Department of Transportation Highway, Transit, and Safety Funds

November 16, 2023

This table indicates likely eligibility for pedestrian and bicycle activities and projects under U.S. Department of Transportation surface transportation funding programs. Activities and projects need to meet program eligibility requirements. See notes and basic program requirements below, with links to program information. Project sponsors should integrate the safety, accessibility, equity, and convenience of walking and bicycling into surface transportation projects.

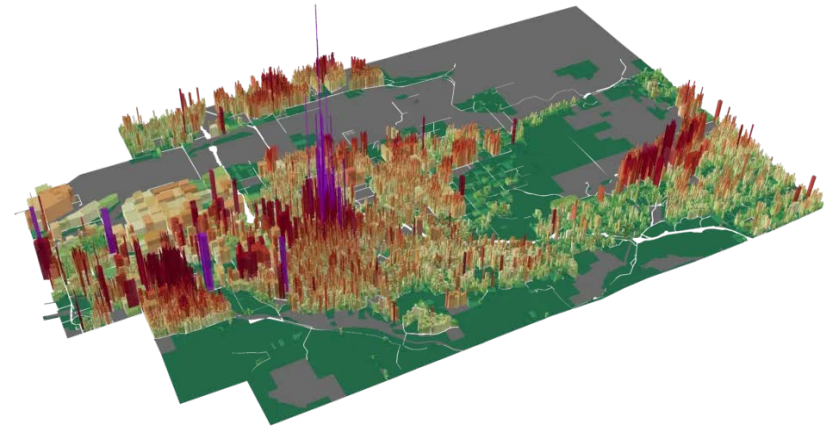
	Pedestrian and Bicycle Funding Opportunities: Highway, Transit, and Safety Funds																													
	Key: \$ = Activity likely eligible. Restrictions may apply, see program notes and guidance. ~\$ = Eligible, but not competitive unless part of a larger project.																													
	Federal Highway Administration														Federal Lands			OST Grant						OST Loan		FTA			NHTSA	
Activity or Project Type	ATIP	BRI	CRP	CMAQ	HSIP	RHCP	NHPP	PROT	STBG	TASA	RTP	SRTS	PLAN	NSBP	FLTP	TTP	TTPSF	INFRA	RAISE	RCN	SS4A	SMART	Thrive	RRIF	TIFIA	FTA	AoPP	TOD	402	405
Access enhancements to public transportation (benches, bus pads, lighting)	\$		\$	\$			\$	\$	\$	\$				\$	\$	\$		\$	\$	\$	~\$			~\$	~\$	\$				
Americans with Disabilities Act (ADA)/504 Self Evaluation / Transition Plan	\$		\$						\$	\$	\$		\$		\$	\$					\$		TA				\$	~\$		
Barrier removal for ADA compliance	\$	\$	\$				\$	\$	\$	\$	\$	\$		\$	\$	\$		\$	\$	\$	~\$			~\$	~\$	\$				
Bicycle plans	\$		\$					\$	\$	\$		\$	\$		\$	\$	\$			~\$	\$					\$	\$	~\$		
Bicycle helmets (project or training related)	~\$				\$				\$	SSRTS		\$				\$														\$
Bicycle helmets (safety promotion)	~\$				\$				\$	SSRTS		\$				\$														
Bicycle lanes on road	\$		\$	\$	\$	\$	\$	\$	\$	\$		\$		\$	\$	\$	\$	~\$	~\$	\$	\$			~\$	~\$	\$				
Bicycle parking (see Bicycle Parking Solutions)	\$		\$	\$			\$		\$	\$	\$	\$		\$	\$	\$		~\$	~\$	\$	~\$			~\$	\$	\$				
Bike racks on transit	\$		\$	\$					\$	\$					\$	\$			~\$	\$	~\$			~\$	~\$	\$				
Bicycle repair station (air pump, simple tools, electric outlets)	\$		\$						\$	\$					\$	\$			~\$	\$	~\$			~\$	~\$	\$				
Bicycle share (capital and equipment including charging stations and outlets; not operations)	\$		\$	\$			\$		\$	\$					\$	\$		~\$	~\$	\$	~\$			~\$	~\$	\$				
Bicycle storage or service centers (e.g. at transit hubs) including charging stations and outlets; not operations)	\$		\$	\$					\$	\$					\$	\$			~\$	\$	~\$			~\$	\$	\$				
Bridges / overcrossings for pedestrians and/or bicyclists	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$	\$			\$	\$	\$	\$	\$	\$	\$			~\$	~\$	\$				
Bus shelters and benches	\$		\$	\$			\$	\$	\$	\$				\$	\$	\$		\$	\$	\$	~\$			~\$	~\$	\$				
Charging stations for electric bicycles and scooters NEW	\$		\$	\$					\$	\$	\$				\$	\$						~\$		~\$	~\$					
Coordinator positions: State/local (CMAQ/STBG limited)				\$					\$	SSRTS		\$				\$					~\$									
Community Capacity Building (develop organizational skills and processes)	~\$												\$			\$				NAE	~\$		TA				~\$	~\$		
Crosswalks for pedestrians, pedestrian refuge islands (new or retrofit)	\$		\$	~\$	\$	\$	\$	\$	\$	\$	\$	\$		\$	\$	\$	\$	\$	\$	\$	\$			~\$	~\$	\$				
Curb ramps	\$	\$	\$	~\$	\$	\$	\$	\$	\$	\$	\$	\$		\$	\$	\$	\$	\$	\$	\$	\$			~\$	~\$	\$				



Next Steps

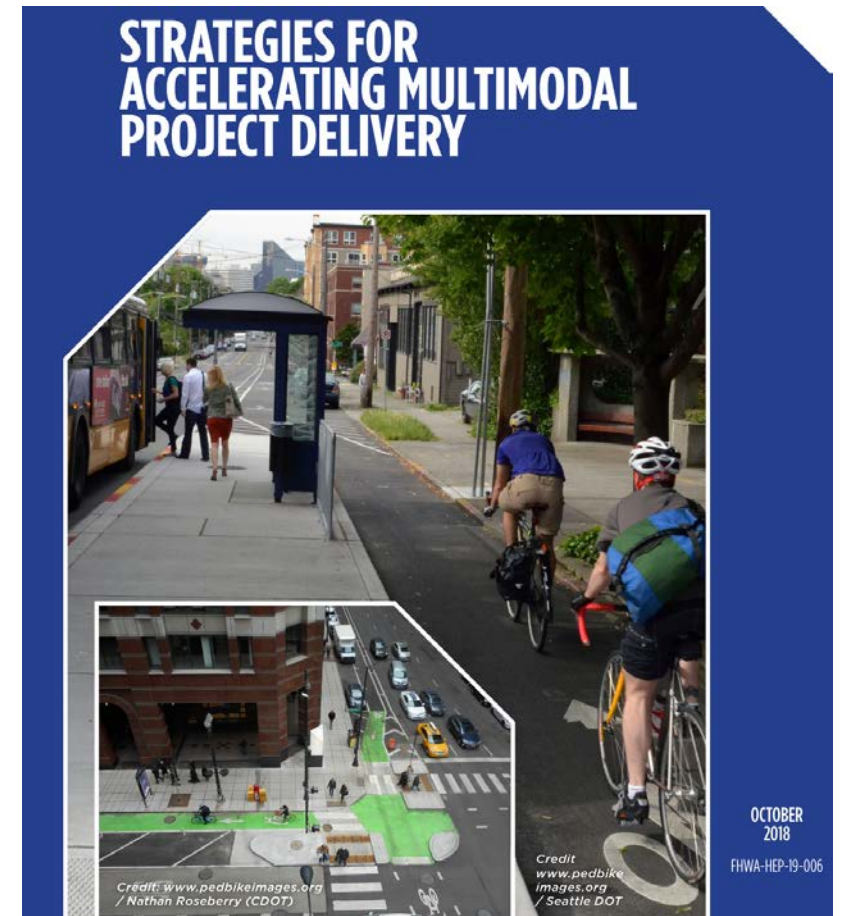
Next Steps

- Acquire Bike-Ped Data
 - Manually Verify Bike-Ped Data
- Study the relationship between land use revenue and complete streets
- Research a sidewalk condition and network gaps study
- Synthesize into a Complete Streets Prioritization Matrix
 - Include System Pedestrian Crash Risk Analysis in Prioritization Matrix
- Fuse results into a Complete Streets Prioritization Plan



Next Steps – More RIC Strategies

- Plan for project readiness
- Integrate strategies early in the planning process
- Advocate for the implementation of context-sensitive design standards
- Advocate for compliance with **23 USC §217(g)(1)**
 - *"Bicyclists and pedestrians shall be given due consideration in the comprehensive transportation plans developed by each metropolitan planning organization and State in accordance with sections 134 and 135, respectively. Bicycle transportation facilities and pedestrian walkways shall be considered, where appropriate, in conjunction with **all new construction** and reconstruction of transportation facilities, except where bicycle and pedestrian use are not permitted."*



Questions



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