



A central graphic with a blue background and a white border. It features three yellow icons: a cyclist, a pedestrian, and a person in a wheelchair. Below the icons, the text "WEST VIRGINIA" is written in large, bold, blue letters. Underneath that, "VULNERABLE ROAD USER ASSESSMENT" is written in yellow and white letters. At the bottom of the graphic, there are several white diagonal lines.



NOVEMBER 2023

A MESSAGE FROM WEST VIRGINIA'S GOVERNOR



As the leader of our great state, ensuring the safety of every individual navigating West Virginia's roads is not just a priority—it is my unwavering commitment. Our transportation system serves as a lifeline, yet it's clear that Vulnerable Road Users—those without the protective shield of a vehicle—are exceptionally susceptible to grave outcomes in accidents. Whether commuting by bike, enjoying a leisurely walk, or boarding a bus, it is imperative that each person arrives at their destination safely. Sadly, the rising statistics on fatal and serious injury crashes involving pedestrians and cyclists, both nationally and in West Virginia, demand immediate and transformative action.

In close coordination with federal, state, local, and private partners, my administration has meticulously crafted a comprehensive assessment to reverse this troubling trend. My vision is resolute—we aim not merely to reduce but to eliminate fatalities from our roads by 2050. To achieve this, we are setting an immediate goal of reducing fatalities by 4% annually, marking a significant step toward our overarching objective.

These partnerships have been pivotal in our past safety achievements and will continue to drive our future success. Our strategies encompass proven engineering solutions, robust educational campaigns to instill awareness and responsible driving habits, and uncompromising enforcement to uphold traffic safety laws.

The responsibility to effect change doesn't rest on one entity alone; it's a collective duty for every resident and visitor. I extend my heartfelt appreciation to the instrumental agencies and individuals who contributed to shaping this robust Vulnerable Road User Assessment and Safety Plan. My call to action is for everyone to remain vigilant and display mutual consideration while traversing our incredible state.

Sincerely,

Governor Jim Justice

A handwritten signature in blue ink, reading "Jim Justice". The signature is fluid and cursive, with a prominent "J" and "J" at the beginning and end.

FORWARD FROM WEST VIRGINIA'S SECRETARY OF TRANSPORTATION



As a compliment to West Virginia's multidisciplinary Strategic Highway Safety Plan, this Vulnerable Road User (VRU) Assessment identifies the specific challenges for those who walk, bike, roll or skate along and across our roads. Without the benefit of the steel frame of a vehicle around them, these users of our transportation network are disproportionately represented as victims of fatal as serious injury crashes. Not everyone has access to a personal car or the ability to operate one, yet these individuals still deserve equitable consideration.

Many West Virginians live in rural areas – more than the national average, and these residents may have to travel longer distances for daily activities than if they lived in a city. While our mountainous terrain is one of our State's greatest treasures, narrower, steeper roads can be more difficult for Vulnerable Road Users to traverse without sidewalks and bikeways. Additionally, we have identified the areas around the State where our aging population has been involved in higher numbers of crashes involving people walking or biking. Yet overall, it is younger males who are overwhelmingly both the drivers and the victims in these crashes.

The goal of the West Virginia VRU Assessment is to work cooperatively to improve roadway safety, eliminating fatalities and serious injuries through coordinated efforts of enforcement, education, emergency medical services, and engineering. Reinforcing what was identified in the Strategic Highway Safety Plan, we must continue to be vigilant in our efforts to change the mindset that distractions, speeding and aggressive driving are acceptable. Increasing awareness of the laws for all road users, such as where pedestrian crossings are safe and legal and when motorists are expected to yield to them will lead to better outcomes. We will focus on priority corridors to improve roadways by implementing proven safety countermeasures that encourage safe speeds and accommodate all road users. Everyone – officials, designers, first responders, and the public all play a part in achieving the goal of eliminating fatal and serious injury crashes. I look forward to the commitment and hard work presented in this plan to make West Virginia the best place in which to live, work, and travel.



Jimmy Wriston, P.E.
WVDOT Secretary/WVDOH Commissioner

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EXECUTIVE SUMMARY



What is a Vulnerable Road User Assessment?

A vulnerable road user (VRU) includes persons not protected from the outer shell of a vehicle, including pedestrians, cyclists, and those using mobility assistance devices. The VRU Assessment determines existing conditions for VRUs and develops countermeasures aiming to increase safety.



Vision and Goal for Vulnerable Road User Safety

This document seeks to build off of the West Virginia Strategic Highway Safety Plan (SHSP), aiming to eliminate fatalities and reduce serious injuries by 4% annually, accomplished through a coordinated multidisciplinary approach.



Safe System Approach and Culture Change

The Safe System Approach (SSA) guides this document, focusing on a multidisciplinary approach for safer people, safer speeds, safer roads, and post-crash care.



Document Review

Safety and bike and pedestrian plans from across the state were analyzed to understand the more specific safety data and determine the current state of bike and pedestrian conditions in that region.



Data Trends and Priority Areas

Data analyzed for this assessment encompassed the years 2012 through 2021 and focused on fatal and serious injury VRU crashes. In this timeframe, 663 VRU fatalities and serious injuries occurred. Crashes trend higher between the hours of 5:00 PM and 11:00 PM and males under the age of 40 are demographically most often the victim and the driver of fatal and serious injury VRU crashes in West Virginia. A majority of crashes occurred at the mid-block, not at intersections.

Identifying Underserved Communities



Several indicators were used to develop an equity analysis. This included median household income, percentages of rural population, zero car households, and elderly population. Additionally, the USDOT Safe Streets and Roads For All (SS4A) Underserved Communities census tracts were reviewed to determine where there may be the most need for safety improvements. Bi-variate maps were created to understand equity factors compared to the proportion of fatal and serious injury VRU crashes in that county.

Public and Stakeholder Engagement



Five in-person meetings were held throughout the state to attempt to reach communities without regular Internet access. These occurred in September 2023 in Morgantown, Martinsburg, Beckley, Charleston, and Huntington. A public survey was conducted in August through September to gather a larger volume of public opinion and reach people from all parts of the state. This survey asked for opinions on safety conditions for different modes of transportation and had an optional map-based comment section. A stakeholder group was formed including representatives from throughout the state across disciplines of engineering, planning, and design, transit, advocacy and outreach, education, policy, emergency medicine, and enforcement. The stakeholder group met twice over the course of the plan development.

Implementation Plan



The Implementation Plan identifies strategies to reduce fatal and serious injury crashes involving VRUs. The strategies are broken up into the five elements of the Safe System Approach (SSA) – Safe Roads, Safe Road Users, Safe Speeds, Safe Vehicles, and Post Crash Care.

Conclusion and Next Steps



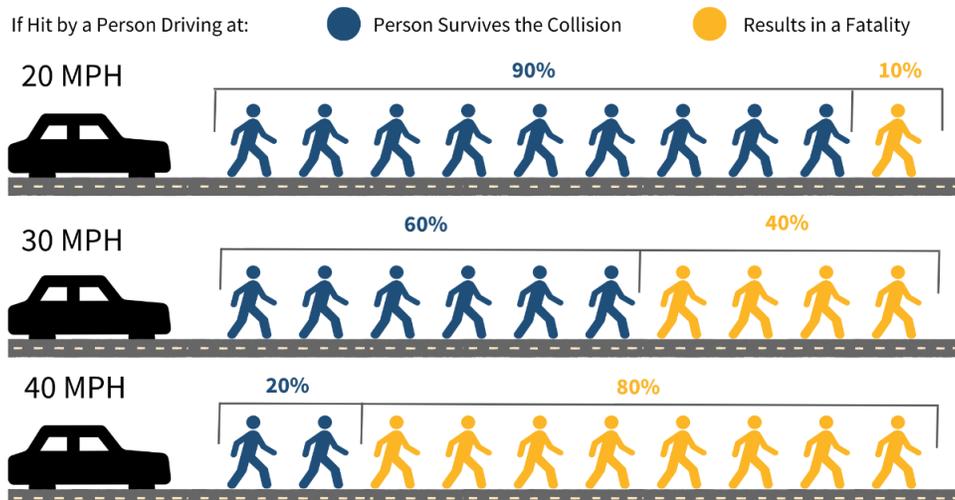
While the assessment is completed, this is a working document that will be re-evaluated and monitored to ensure that goals are being met. Implementation of this plan will require collaboration across many agencies and continued support throughout the state.



Background

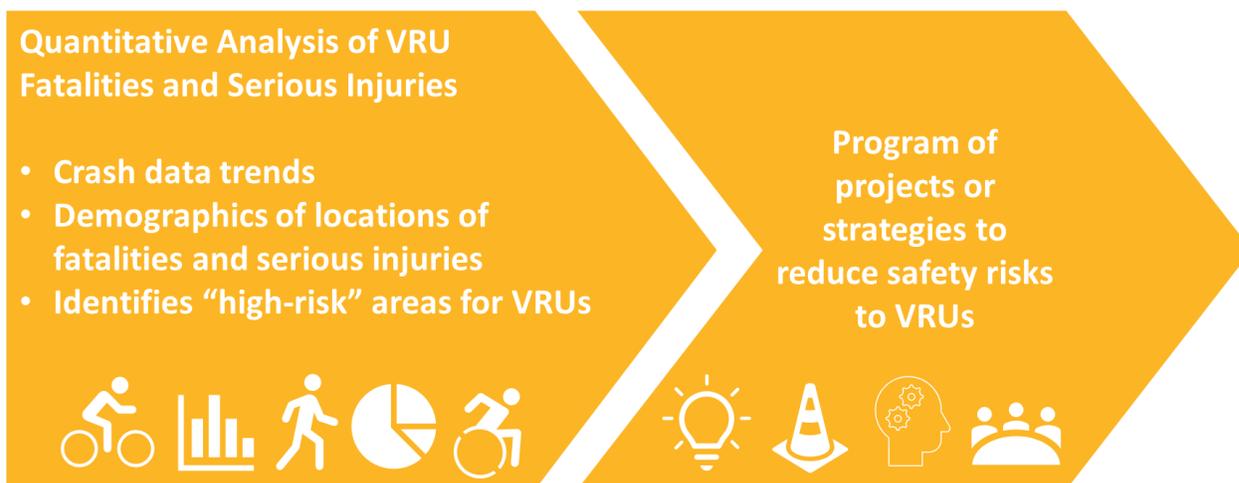
What is a Vulnerable Road User Assessment?

A Vulnerable Road User (VRU) is a non-motorist including a: pedestrian, cyclist, or a person using a mobility assistance device (ex: wheelchair). For the purposes of this assessment, a motorcycle is not considered a VRU. The term **vulnerable** road user is used mainly to describe those **unprotected** by an outside shield, as they sustain a **greater risk of injury** in any collision with a vehicle and are therefore highly in need of protection against such collisions.



Data source: US Department of Transportation, Literature Reviewed on Vehicle Travel Speeds and Pedestrian Injuries. March 2000.

A VRU Assessment analyzes crashes involving a pedestrian or bicyclist to determine data trends and identify problems or "high-risk areas". Using information learned from data analysis and public engagement, recommendations are created with the goal of eliminating or reducing VRU crashes.



This document fulfills the federal requirements of a VRU Safety Assessment as described in 23 U.S.C. 148(l), as amended by the Infrastructure Investment and Jobs Act (IIJA) (Pub. L. 117-58, also known as the "Bipartisan Infrastructure Law" (BIL)). All States are required to develop a VRU Safety Assessment as part of their Highway Safety Improvement Program (HSIP) in accordance with 23 U.S.C. 148(l). This document builds off of the [West Virginia Strategic Highway Safety Plan \(SHSP\)](#), delving further into VRU safety. This document specifically coincides with the Pedestrian Emphasis Area in the SHSP, building on the analysis and strategies identified.

Vision and Goal for Vulnerable Road User Safety

Across the country, pedestrian fatalities and serious injuries are rising, and West Virginia has observed this same trend. Pedestrian fatalities and serious injuries made up nine percent of fatalities and six percent of serious injuries on the roadways. This rose from six percent of fatalities and three percent of serious injuries in the previous study period. A five-year rolling average studying the years between 2016 and 2020 showed that 84 pedestrians were fatally or seriously injured. The goal is to reduce fatalities and serious injuries by at least four percent annually over the next five (5) years, from 84 to 65 for pedestrians and from nine (9) to seven (7) for bicyclists. This document is written in conjunction with the West Virginia SHSP and aims to accomplish the same goals. The VRU Assessment and the Pedestrian Emphasis Area Plan within the SHSP are essentially synonymous, as they share common objectives and aligned strategies. Both initiatives prioritize enhancing the safety of individuals who are most at risk on the road.

Pedestrians	2017-2021 SHSP '06-'15 Crashes	2022-2026 SHSP '16-'20 Crashes	Trend
% of Total Fatalities	6%	9%	▲
% of Total Serious Injuries	3%	6%	▲

Data source: West Virginia 2022-2026 SHSP

Bicyclists	'12-'15 Crashes	'16-'21 Crashes	Trend
% of Total Fatalities and Serious Injuries	0.4%	0.7%	▲

GOAL

The goal of the West Virginia VRU Assessment is to work cooperatively to improve roadway safety, eliminating fatalities and serious injuries through coordinated efforts of enforcement, education, emergency medical services, and engineering.



OVERALL OBJECTIVE

The objective of the 2023 VRU Assessment is to achieve zero fatalities by 2050 and ultimately zero serious injuries on our roadways, by reducing fatalities and serious injuries 4% annually over the next five years.

Safe System Approach and Culture Change

This document is guided by the Safe System Approach (SSA), a multidisciplinary approach with the following principles:

- Death/Serious Injury is unacceptable
- Humans make mistakes
- Humans are vulnerable
- Responsibility is shared
- Safety is proactive
- Redundancy is crucial



The SSA operates under the idea that severe crashes occur for a multitude of reasons, and by collaborating with transportation and safety practitioners with diverse backgrounds and perspectives, it is possible to think more holistically about solutions.

The goal of this Assessment is rooted in the belief that it is necessary to collaborate with a variety of safety professionals aiming for safer people, safer speeds, safer roads, and post-crash care.



Plan Review

The following planning documents developed at the local level were reviewed to determine the overlaps in these efforts with the State's VRU Assessment.

Title	Year	Agency	Goals	Strategies	Data	Application to the 2023 VRU Assessment
Wood County Bicycle and Pedestrian Safety Study	2019	WWW MPO	The goal of this study was to improve safety for bicycles and pedestrians, encourage local and state governments to develop and adopt complete streets policy and designs, and create sustainable facilities for all modes of transportation.	<ul style="list-style-type: none"> • Map crashes to determine hot spots and patterns • In depth look at why crashes occurred and characteristics of hot spot corridors 	<ul style="list-style-type: none"> • 49 pedestrian crashes 2015-2017 • 30 bicycle crashes 2015-2017 • Crash types by mode of walking or biking • Hot spot corridors in Wood County • Road characteristics • Proposed countermeasures 	This study can be used to provide more in-depth knowledge about bike and pedestrian crash characteristics in Wood County and reasons they may have occurred.
Cabell and Wayne Counties Safety Study	2020	KYOVA	The goals of this plan were to create a safer transportation network for both motorized and non-motorized modes of transportation, identify crash trends and high crash locations, recommend, and prioritize infrastructure improvements and other strategies.	<ul style="list-style-type: none"> • Improve pedestrian facilities: install sidewalks, crosswalk markings, curb ramps, and pedestrian signals • Focused on urbanized areas of Cabell and Wayne 	<ul style="list-style-type: none"> • 213 pedestrian crashes 2013-2017: three (3) fatal, one (1) serious injury • 67 bicycle crashes 2013-2017: one (1) serious injury • Pedestrian volumes and crossing distance 	This plan identifies pedestrian needs and makes recommendations based on crash analysis and observations in Cabell and Wayne counties, with a greater emphasis in Cabell County.

Title	Year	Agency	Goals	Strategies	Data	Application to the 2023 VRU Assessment
Morgantown Regional Bike and Pedestrian Transportation Plan	2020	MMMPO	Improve safety and connectivity of bike and pedestrian infrastructure. Develop stronger local policies that promote walking and biking, improve public health, and promote economic development.	<ul style="list-style-type: none"> • Identify gaps in existing bike and pedestrian infrastructure • Develop a demand analysis that determines equity needs and composite demand 	<ul style="list-style-type: none"> • Locations of fatal pedestrian crashes, bike and pedestrian injuries, and bike and pedestrian crashes with no injury in Morgantown 2013-2017 • Pedestrian networks and recommendations • Impacts of safety countermeasures 	The demand analysis in this plan can be used to determine bike and pedestrian areas of focus within the VRU Assessment for Morgantown. The identified bike and pedestrian crashes can help with reviewing crash trends over time.
HEPMPO Safety Study	2020	HEPMPO	The goal of this study was to develop a process to monitor safety and identify areas for further safety studies.	<ul style="list-style-type: none"> • Identify bike and pedestrian priority corridors • Conduct Road Safety Audits in identified locations 	<ul style="list-style-type: none"> • Two fatal pedestrian crashes 2013-2017 • One fatal bicyclist crash 2013-2017 	This plan serves as a stepping stone for further analysis of safety conditions in identified corridors in Berkeley and Jefferson counties.
Kanawha-Putnam Bicycle and Pedestrian Plan	2020	RIC	The goal of this plan was to provide bike and pedestrian facility recommendations that improve safety and provide multimodal options. The plan outlined an intent to	<ul style="list-style-type: none"> • Conduct surveys to determine the best and worst locations for bicycling • Analyze congestion and crashes 	<ul style="list-style-type: none"> • Survey results indicated that 89% of respondents find the largest challenge for bicycle safety to be no space to ride on roadways 	This bicycle and pedestrian plan for the RIC Region outlines the safety issues in Putnam and Kanawha Counties for bicyclists and pedestrians, which will be factored into the VRU

Title	Year	Agency	Goals	Strategies	Data	Application to the 2023 VRU Assessment
			<p>focus on Complete Streets and foster the adoption of further bike and pedestrian infrastructure in the RIC region in the future.</p>	<ul style="list-style-type: none"> • Determine generators and connections to existing trails 	<ul style="list-style-type: none"> • A majority of survey participants indicated that a lack of designated crosswalks and sidewalks was the highest contributing factor for road conditions negatively affecting walking 	<p>Assessment. This plan compiles existing facilities and proposes new connections, which can be used to analyze the likelihood of VRU crashes when there are dedicated facilities.</p>
<p>FRMPO 2045 Long Range Transportation Plan (LRTP)</p>	<p>2021</p>	<p>FRMPO</p>	<p>The LRTP Bicycle and Pedestrian System section has a goal of attracting visitors from national parks to downtown business districts through active transportation networks, as well as expanding the local residents' ability to travel between communities. The plan has a goal of improving safety for all users of the transportation system.</p>	<ul style="list-style-type: none"> • Complete, repair, and maintain the sidewalk network that serves the area's transit routes • Expand the bicycle and pedestrian network to better link neighborhoods and commercial centers to existing major trails • Build and improve bicycle and pedestrian connections from gateway communities 	<ul style="list-style-type: none"> • Existing bike and pedestrian facilities • Proposed community links to trail • 10 fatal pedestrian crashes 2008-2012 • Two fatal bicyclist crashes 2008-2012 	<p>The Bicycle and Pedestrian system section of the plan provides insight into the conditions of bikes and pedestrians in Fayette and Raleigh counties.</p>

Title	Year	Agency	Goals	Strategies	Data	Application to the 2023 VRU Assessment
Morgantown Pedestrian Safety Study	2022	MMMPO	The goal of this study was to specifically focus on pedestrian crash trends in Morgantown and provide suggested next steps for reducing pedestrian crashes.	<ul style="list-style-type: none"> • Select 10 high pedestrian crash locations for further study • Recommend high priority corridors for Pedestrian Road Safety Audits • Medium priority corridors reviewed for low-cost pedestrian improvements 	<ul style="list-style-type: none"> • 134 pedestrian crashes between 2014-2019 • Six (6) fatal crashes • 20 serious injury crashes • Further analysis of trends and key facts for pedestrian crashes 	This study emphasizes the need to focus on Morgantown in the VRU assessment because it has high level of pedestrian crashes. The data and analysis in this study provides extensive data analysis of pedestrian crashes in Morgantown and potential causes.
KYOVA 2050 Metropolitan Transportation Plan (MTP) (Bike and Pedestrian Chapter)	2022	KYOVA	The KYOVA MTP bike and pedestrian goal was to analyze existing conditions of the infrastructure and enhance multimodal connections in the region.	<ul style="list-style-type: none"> • Examine existing bicycle and pedestrian facilities to find gaps, generators, and connections • Analyze crash data for hot spots • Develop recommendations based on other non-motorized transportation plans 	<ul style="list-style-type: none"> • High-priority intersections for safety improvements in each county determined by benefit/cost ratio, the potential need for right-of-way, and total cost • Existing and proposed infrastructure GIS data 	This plan gives an overview of the entire transportation network and provides recommendations for bike and pedestrian infrastructure and safety improvements. Data from this plan can be used to analyze the likelihood of VRU crashes when there are dedicated facilities.

Title	Year	Agency	Goals	Strategies	Data	Application to the 2023 VRU Assessment
RIC Comprehensive Safety Action Plan	2023	RIC	The overarching goal of the plan is to reduce fatal and serious injury crashes (FSI) by 25% in five years. Pedestrians are at a higher risk of serious or fatal injury in the event of a crash, so this was chosen as an emphasis area.	<ul style="list-style-type: none"> • Identified several engineering strategies to prevent pedestrian crashes • Provide education and enforcement on the personal responsibility of safe driving 	<ul style="list-style-type: none"> • 76 pedestrian FSI crashes between 2017-2021 • Further analysis of trends and key facts for FSI pedestrian crashes 	Pedestrian crashes were an emphasis area of this plan, making it especially applicable to the VRU assessment. The key VRU crash trends and strategies in this plan will provide more in-depth knowledge for Kanawha and Putnam counties.
HEMPO Regional Bicycle and Pedestrian Plan	2023	HEMPO	This plan has three main goals: leverage economic benefits and improve development, system preservation, and expand the bicycle/pedestrian network, and enhance connectivity.	<ul style="list-style-type: none"> • Map and understand existing pedestrian and bicycle facilities in the region • Create a Hexbin demand and safety score based on crash severity, public comment data, and 2050 roadway volumes. 	<ul style="list-style-type: none"> • 145 bicycle crashes and 497 pedestrian crashes in 2017-2021 (Note: these crashes include geographies outside of West Virginia) • Locations of existing and planned bicycle and pedestrian facilities 	This plan creates scoring criteria for bicycle and pedestrian safety, giving a visual representation of where there are safety issues based on more than just crash data in Berkeley and Jefferson Counties.



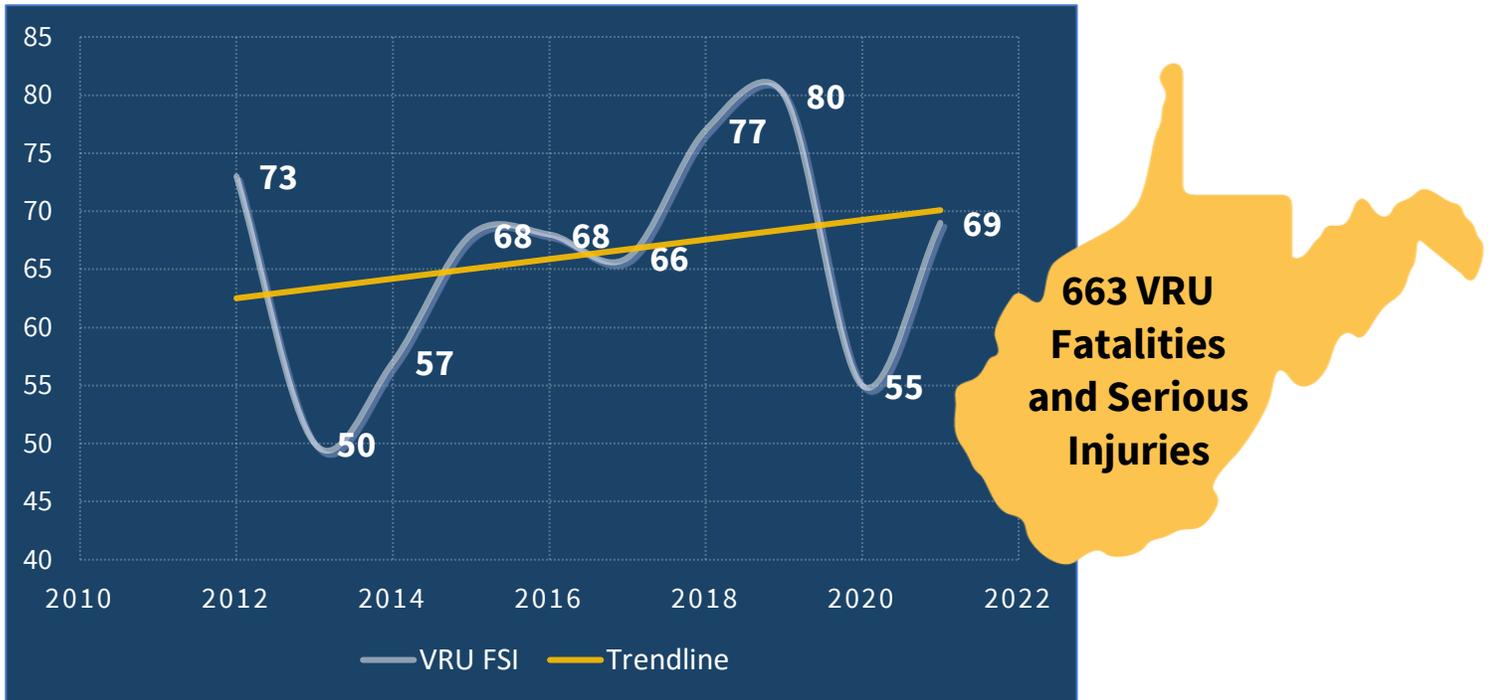
Data Trends And Priority Areas

This assessment studies data from the years 2012 to 2021. This full ten-year period was included in order to provide a more robust dataset, enhancing the statistical reliability of the findings. This timeframe allows for a comprehensive examination of VRU crashes and ensures that the resulting insights are grounded in a substantial amount of data, making it possible to develop effective strategies. Pedestrian and bicyclist crashes were not separated because there was not a large enough number of fatal or serious injury bicycle crashes to conduct a robust analysis or find statistically significant data trends.

Additionally, this assessment studies mainly fatal and serious injury crashes, as opposed to all VRU crashes of lesser severity. By prioritizing these high-severity incidents, the analysis aims to pinpoint specific areas and factors contributing to the most severe traffic incidents, ultimately aiding policymakers and stakeholders in developing targeted interventions to enhance road safety and save lives.

The following information details this crash data, painting a picture of the overall system and existing conditions of VRU crashes and their attributes for **fatal and serious injury (FSI) VRU crashes from 2012 through 2021** unless otherwise noted.

Statewide Overview



Mode Breakdown of Fatal and Serious Injury Crashes

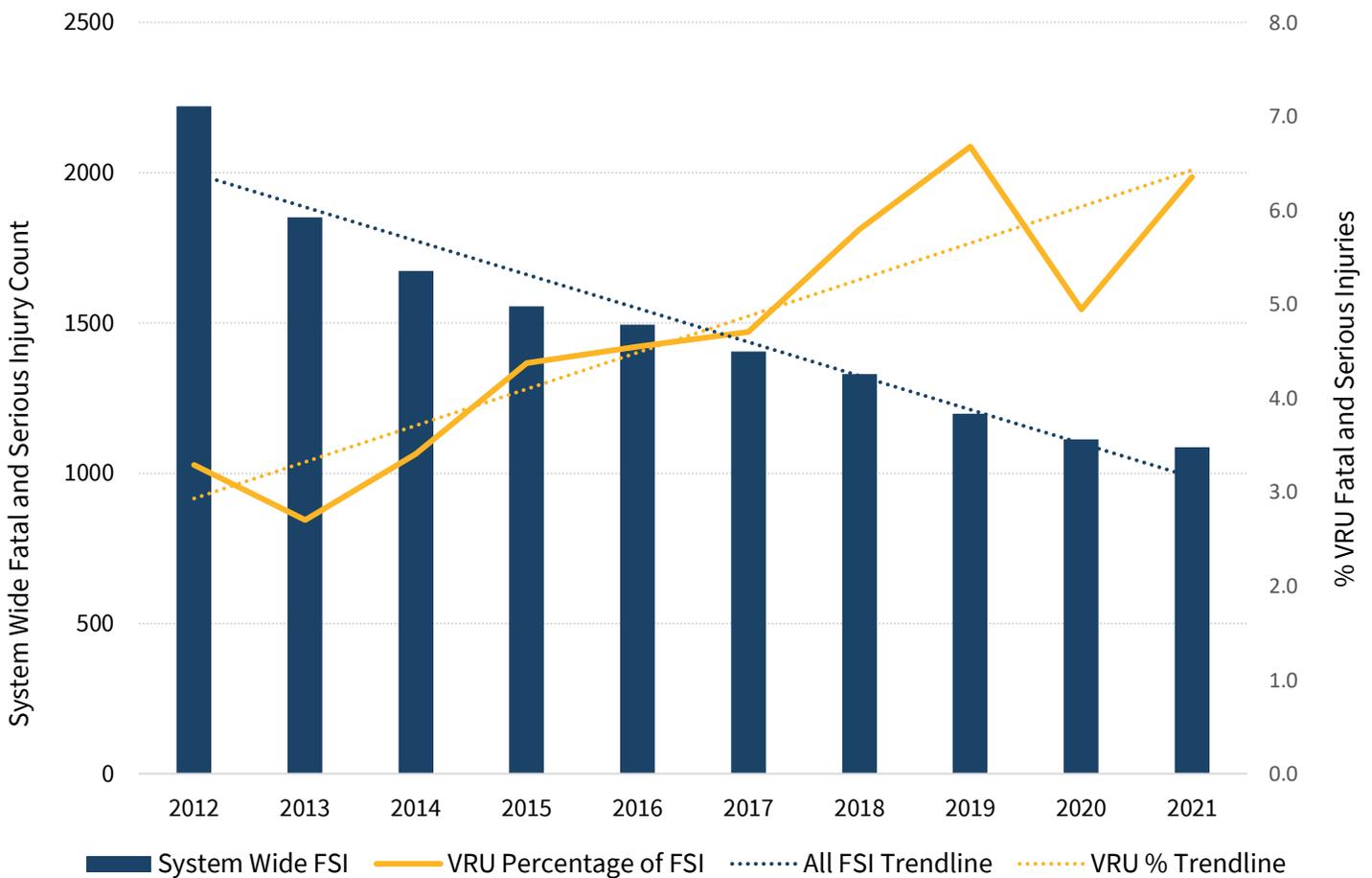


580 Pedestrian Fatalities and Serious Injuries



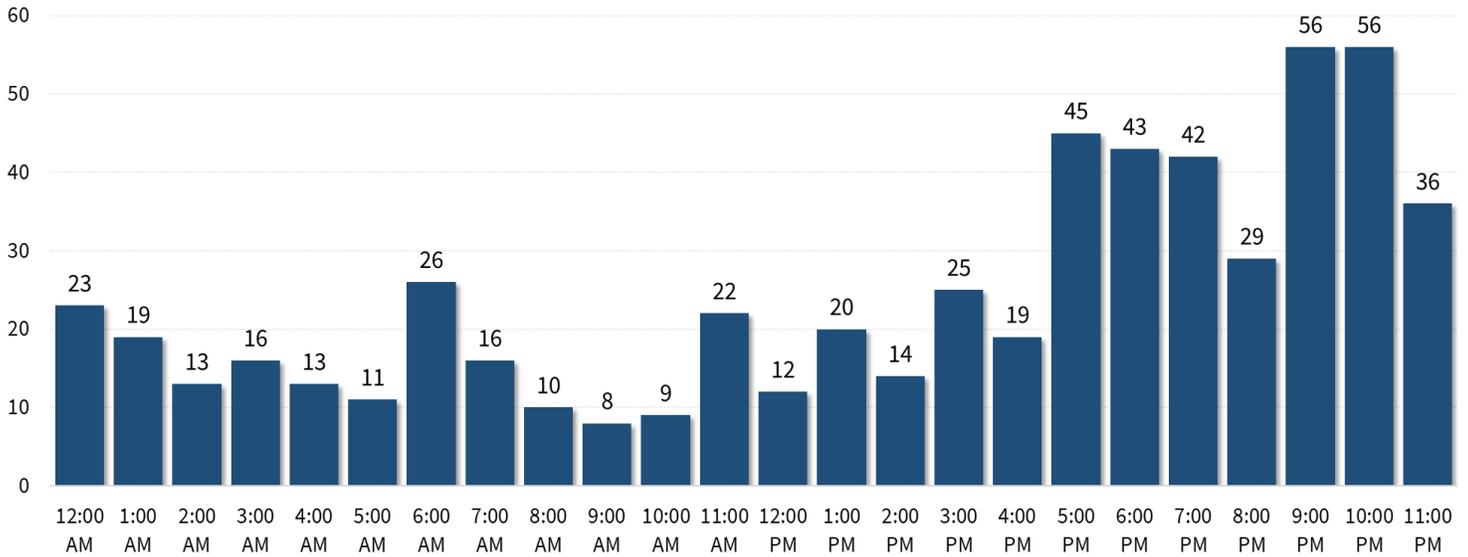
83 Bicycle Fatalities and Serious Injuries

Year	System Wide Fatalities and Serious Injuries	VRU Fatalities and Serious Injuries	VRU Percentage of Fatalities and Serious Injuries		Five-Year Rolling Average
			Annual Percentage	Five-Year Rolling Average	
2012	2,221	73	3.3%	--	
2013	1,851	50	2.7%	--	
2014	1,673	57	3.4%	--	
2015	1,556	68	4.4%	--	
2016	1,495	68	4.5%	3.6%	
2017	1,404	66	4.7%	3.9%	
2018	1,329	77	5.8%	4.5%	
2019	1,198	80	6.7%	5.1%	
2020	1,112	55	4.9%	5.3%	
2021	1,086	69	6.4%	5.7%	



When Are Crashes Occurring?

Time of Day



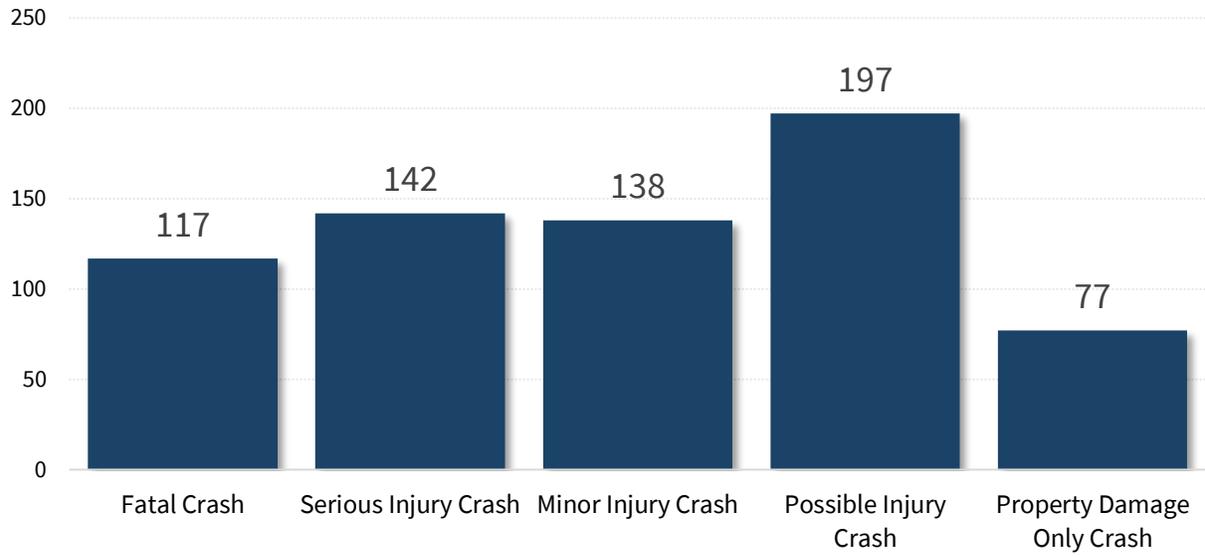
Day of Week and Month of Year

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday		
January	9	7	6	11	9	12	4	January	58
February	4	3	10	8	6	7	0	February	38
March	4	5	6	5	8	2	7	March	37
April	4	2	8	9	5	5	6	April	39
May	3	4	7	3	3	9	6	May	35
June	11	7	7	5	9	10	6	June	55
July	3	4	3	5	8	7	5	July	35
August	6	5	8	5	12	18	8	August	62
September	6	5	8	11	10	9	9	September	58
October	9	5	12	7	17	10	7	October	67
November	3	7	10	5	10	6	5	November	46
December	8	8	10	2	4	9	12	December	53
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday		
	70	62	95	76	101	104	75		

More Frequent Less Frequent

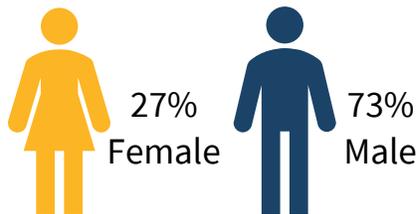
All VRU Night Crashes *2016-2021

44% of all VRU Crashes

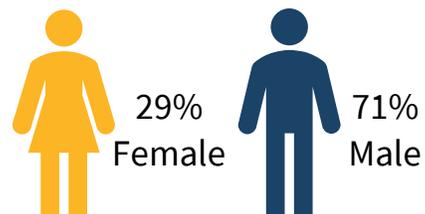


Who is Involved?

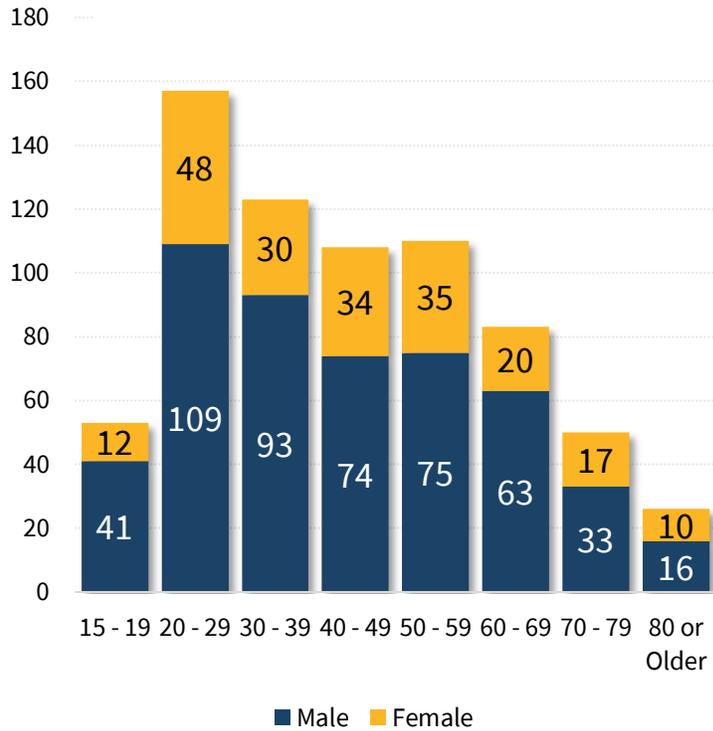
Gender of VRU Victim



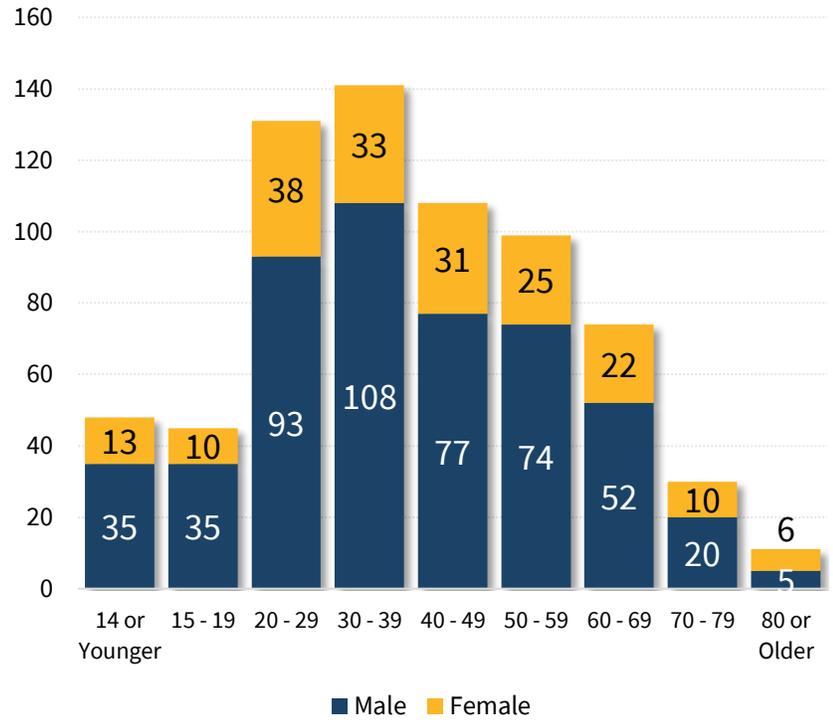
Gender of Driver Involved in Crash



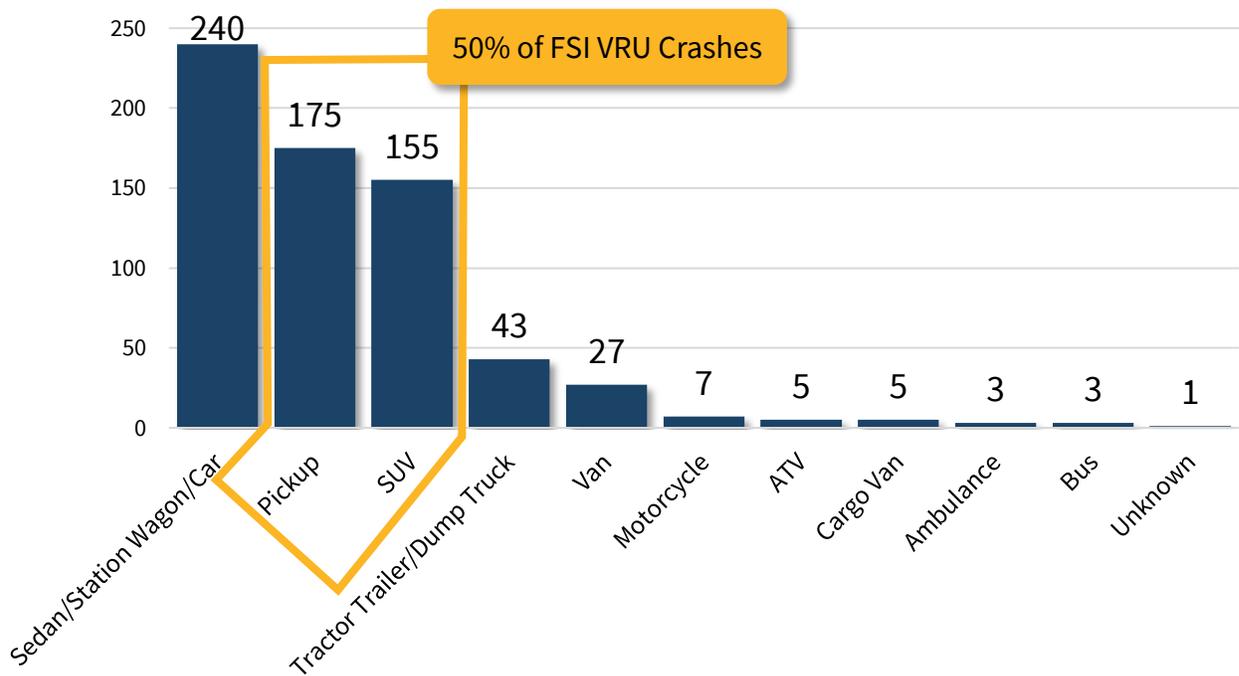
Driver Involved in VRU Crash



VRU Victim

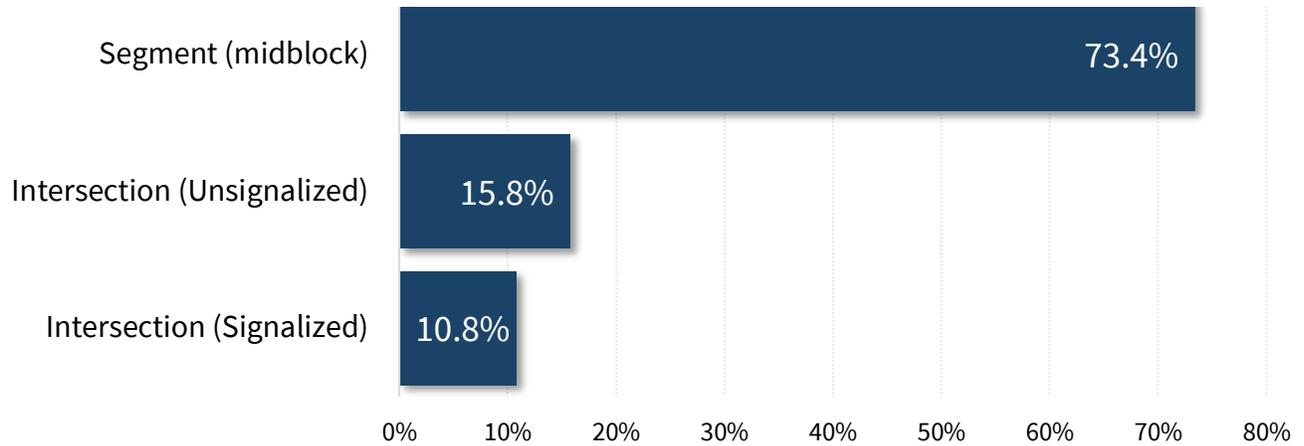


Vehicle Type in VRU Crash

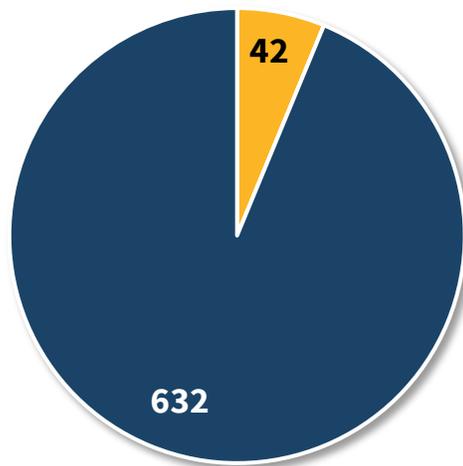


Where Are Crashes Occurring?

Crash Locations



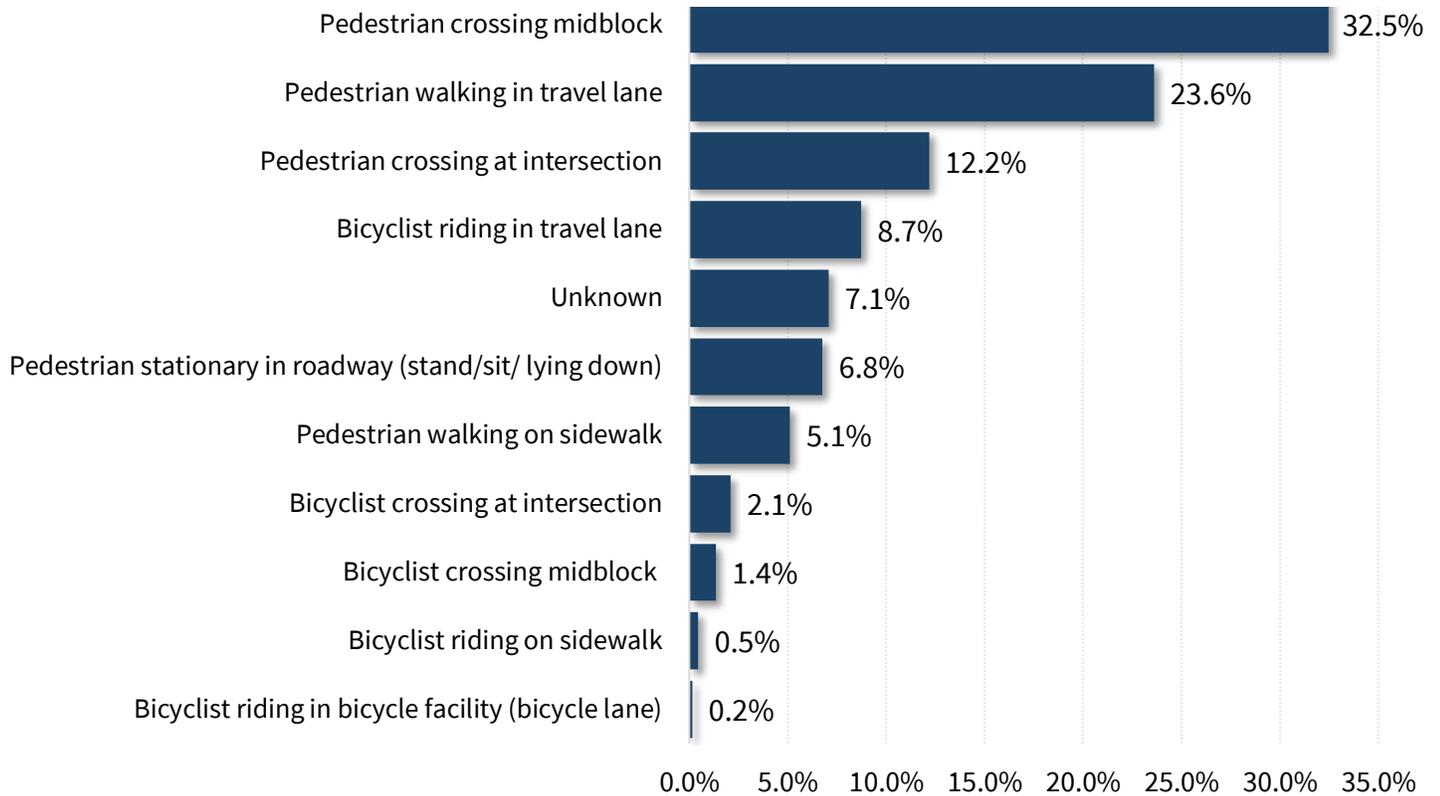
Interstate and Non-Interstate Crashes



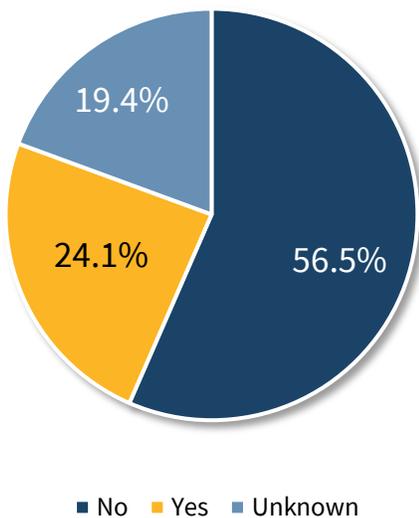
■ Interstate ■ Non-Interstate

What Are the Contributing Factors?

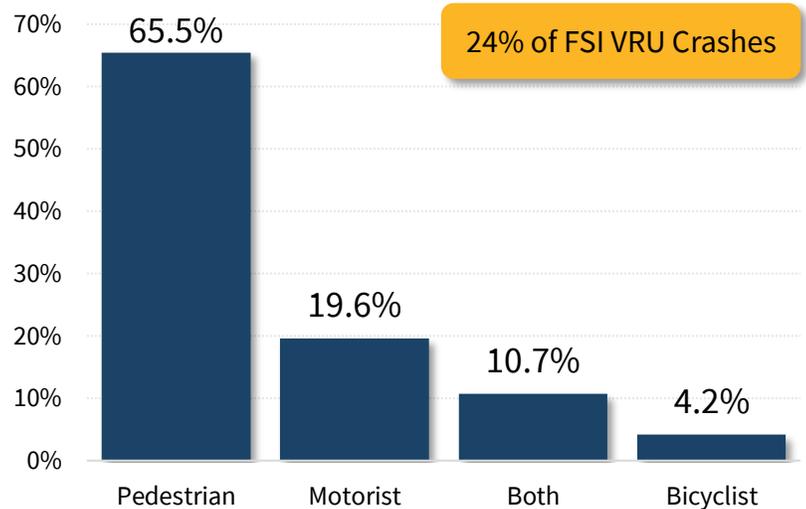
What was the VRU's Action?



Was Impairment Involved?



Who was Impaired?



High Injury Network Analysis

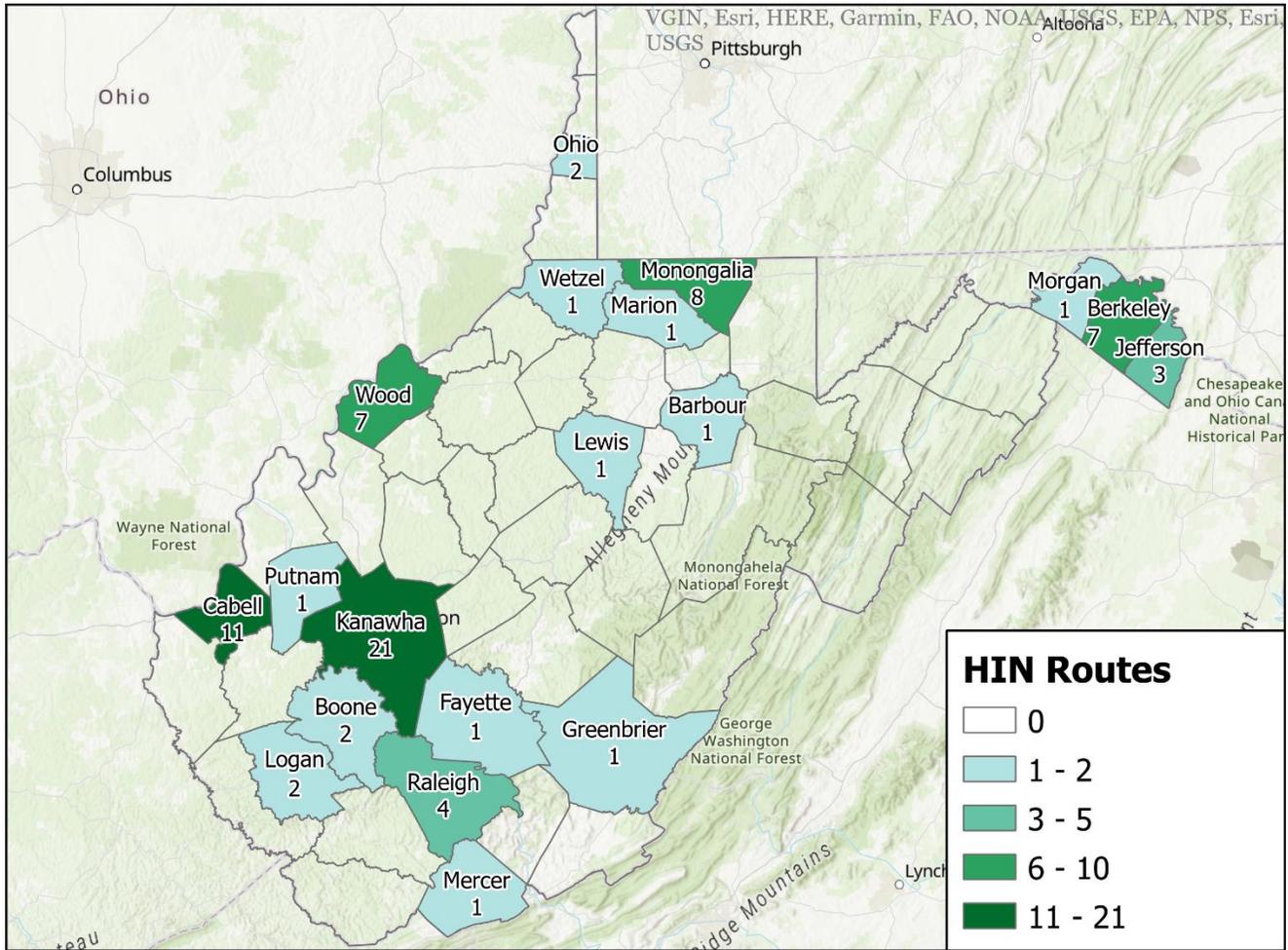
A High Injury Network (HIN) analysis seeks to identify segments of roadway where the highest concentrations of VRU crashes, and specifically fatal or serious injury VRU crashes are occurring. This HIN methodology leveraged data from the AASHTOWare Safety platform, employing a comprehensive approach to assess roadway safety. Each route was evaluated based on two factors: the frequency of VRU involved crashes and the severity of each incident, quantified by the Equivalent Property Damage Only (ePDO) index. These factors were individually ranked and summed to create a composite route score across the network. This composite score was then used to rank the routes once more, creating a final HIN rank, with a score of one (1) indicating the most hazardous route in the network.

The table below indicates the street, city and county of the Top 20 HIN roadway segments. Specific details about the length and exact location of each of these segments can be found in APPENDIX A. Additionally, the top 75 segments in the network are ranked in APPENDIX A.

Street Name	Approximate Limits	City	County	Rank
Dunbar Toll Bridge/10th Street	Dunbar Ave to Dunbar Toll Bridge	Dunbar	Kanawha	1
Patteson Drive/ (WV 705)	Baldwin St to Beechurst Ave	Morgantown	Monongalia	2
Washington Street E (US 60)	Brooks St to Ruffner Ave	Charleston	Kanawha	2
Robert C Byrd Drive	Prince St to City Ave	Beckley	Raleigh	4
US 60	Roxbury Ave to Rock Lake Dr	South Charleston	Kanawha	5
5th Avenue and 31st Street (US 60)	5th Ave to 7th Ave	Huntington	Cabell	6
US 60	River Rd to Martin Dr	Barboursville	Cabell	7
3rd Avenue	18th St to 20th St	Huntington	Cabell	8
Charleston Road	Etta St to Truett St	Poca	Putnam	9
Washington Street W (US 60)	6th Ave to Washington St W	Charleston	Kanawha	9
Rogers Avenue	Woodrow St to CR 857	Morgantown	Monongalia	11
Lee Street E (US 60)	Clendenin St to Court St	Charleston	Kanawha	12
Pond Fork Road	Hickory St to Spring St	Madison	Boone	13
US 340	Jefferson Terrace Rd to Somerset Village Rd	Charles Town	Jefferson	14
Williamsport Pike	Hinton Ct to Warm Springs Ave	Martinsburg	Berkeley	15
Robert C Byrd Drive	Trieste Ave to Hubbard St	Beckley	Raleigh	16
MacCorkle Avenue SW (US 60)	Broyles Blvd to Park Ave	South Charleston	Kanawha	16
Lee Street E	Summer St to Brooks St	Charleston	Kanawha	18
Grand Central Avenue	12th St to 16th St	Vienna	Wood	19
Washington Heritage Trail (US 522)	Market St to Union St	Berkeley Springs	Morgan	20

This map below illustrates the number of HIN routes located in each county across the State, of the top ranked 75 segments. Kanawha County has the most HIN routes with 21 of the top 75 segments located within that county.

Number of HIN Routes by County of the Top 75



Systemic Analysis

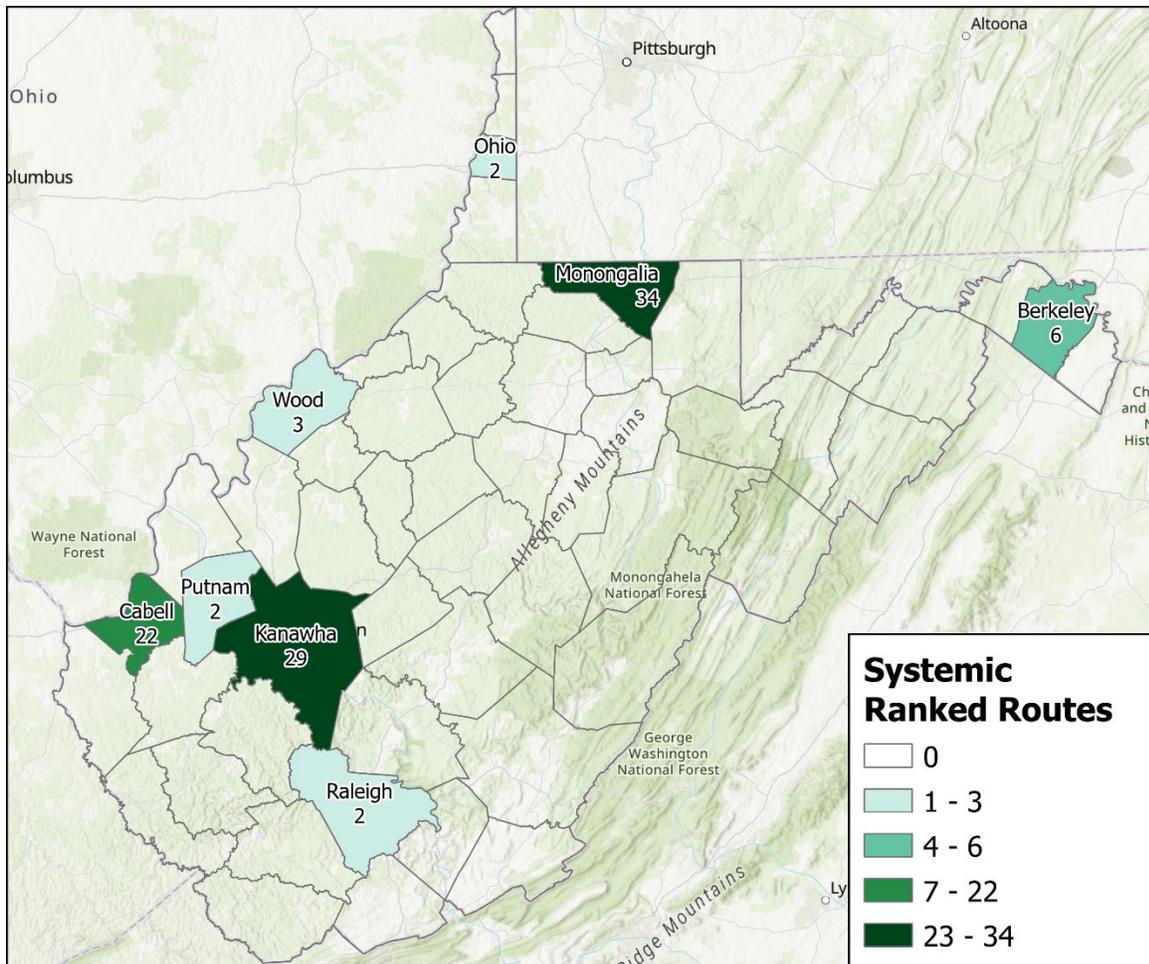
A Systemic analysis adopts a proactive approach to safety by focusing not on roads that have already experienced crashes, but on identifying routes that, based on statistical analysis, exhibit characteristics leading to a higher risk for VRU involved crashes. For this approach two key elements were examined: network characteristics and VRU volumes along each route. By analyzing these aspects, routes with inherent risk factors were identified, thereby enabling targeted interventions to mitigate potential VRU crashes before they occur.

The table below indicates the street, cross street, city and county of the Top 25 ranked systemic roadway segments. Details about the length and exact location of each of these segments can be found in APPENDIX B. Additionally, the top 100 segments in the network are ranked in APPENDIX B. An online map summarizing these locations can be accessed [here](#).

Street Name	Approximate Limits	City	County	Rank
Beechurst Ave	8th St to University Ave	Morgantown	Monongalia	1
University Ave	WV 705 to 8th St	Morgantown	Monongalia	2
University Ave	North St to College Ave	Morgantown	Monongalia	2
College Ave/ University Ave	Willey St to Jacob St	Morgantown	Monongalia	4
Evansdale Dr	University Ave to Rawley Ave	Morgantown	Monongalia	5
Campus Dr	Beechurst Ave to University Ave	Morgantown	Monongalia	6
8th Ave	8th St to 13th St	Huntington	Cabell	7
N Willey St (US 119)	Spruce St to Monongalia Ave	Morgantown	Monongalia	8
Willey St (US 119)	N High St to Spruce St	Morgantown	Monongalia	9
3rd Ave	Hal Greer Blvd to 22nd St	Huntington	Cabell	9
Evansdale Dr	Beechurst Ave to Rawley Ave	Morgantown	Monongalia	11
University Ave (US 119)	Pleasant St to Court St	Morgantown	Monongalia	12
5th Ave	10th St to 11th St	Huntington	Cabell	13
University Ave/ Beechurst Ave	Wall St to Fayette St	Morgantown	Monongalia	14
Court St	Virginia St E to Donnally St	Charleston	Kanawha	15
Kanawha Blvd E	Brooks St to Greenbrier St	Charleston	Kanawha	16
Virginia St E	Pennsylvania Ave to Dunbar St	Charleston	Kanawha	16
3rd Ave	22nd St to 24th St	Huntington	Cabell	18
3rd Ave	24th St to 29th St	Huntington	Cabell	19
8th Ave	6th St to 8th St	Huntington	Cabell	20
5th Ave	Hal Greer Blvd to 29th St	Huntington	Cabell	21
Grand Central Ave	9th St to Grand Central Mall	Parkersburg	Wood	22
Willowdale Rd	Northwestern Ave to Ira Errett Rodgers Dr	Evansdale	Monongalia	23
10th St	8th Ave to 11th Ave	Huntington	Cabell	24
6th Ave	8th St to 8th St	Huntington	Cabell	25

The map below illustrates the number of top 100 Systemic analysis routes located in each county across the State. Monongalia County has the most high-risk routes with 34 of the top 100 segments located within that county followed closely by Kanawha with 29 high risk routes.

Number of Top 100 ranked Systemic Routes by County



The contrasts between the HIN analysis and the Systemic analysis offer distinct and complementary insights into statewide roadway safety. The HIN analysis focuses on locations where crashes have already occurred, providing a reactive perspective that identifies and ranks the most dangerous routes using historical data. The Systemic analysis adopts a proactive approach, identifying potential high-risk areas based on factors like road characteristics and expected VRU volume before crashes occur. The results of this analysis tend to concentrate around areas of high population density, particularly in regions with broader roads and significant VRU traffic. Notably, this includes areas around large universities such as West Virginia University in Morgantown and Marshall University in Huntington, as well as the urban core of downtown Charleston. The Systemic approach, therefore, highlights potential future hotspots for VRU-involved incidents, drawing attention to areas where preventive measures might be most effectively deployed.



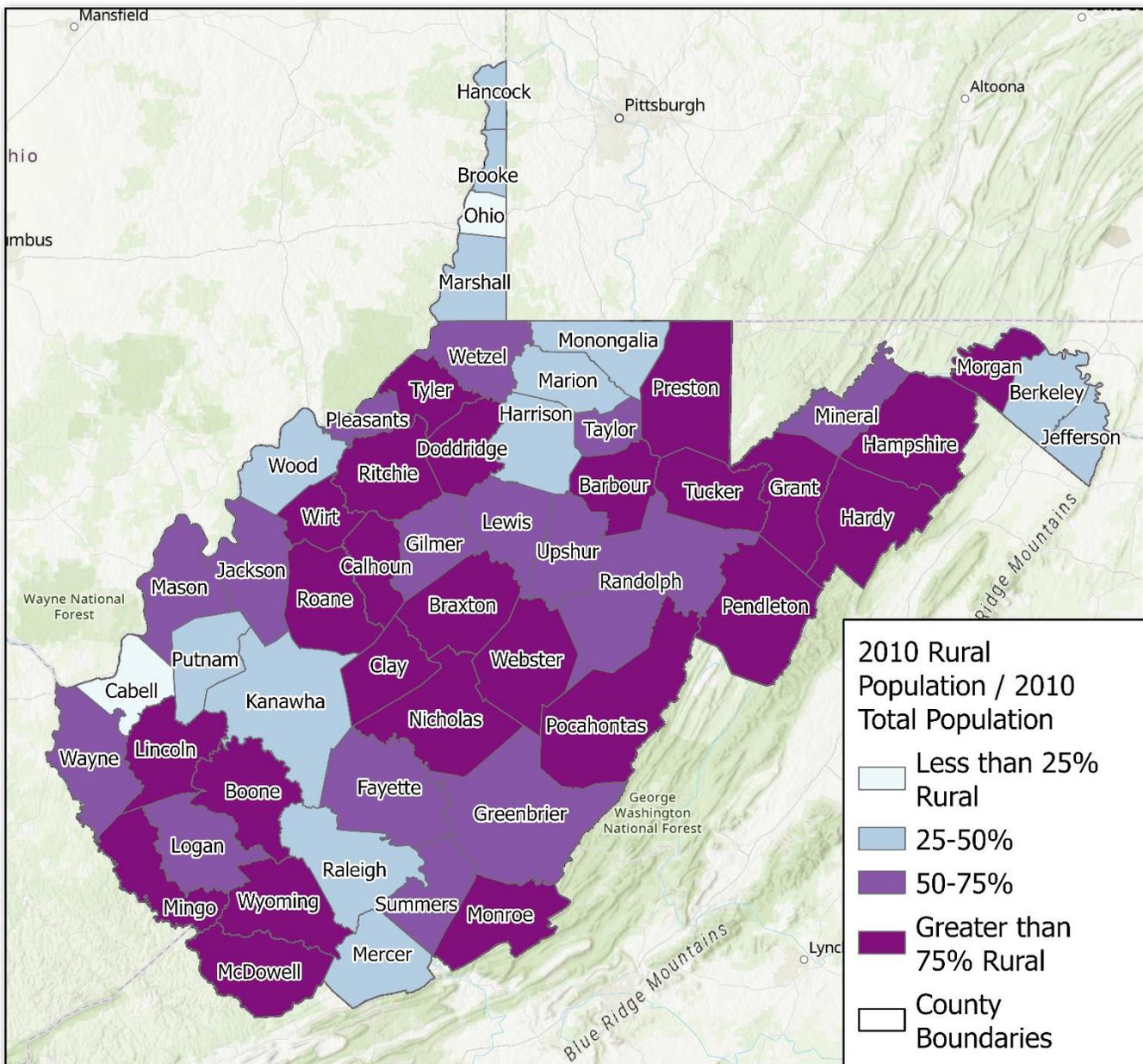
Equity Considerations

About **2.6%** of households in West Virginia **do not have access to a vehicle** according to the American Community Survey (ACS) 2022 estimates. **The median household income in West Virginia is \$50,884 and the poverty rate is 17.9%.** In comparison, the US median household income is \$69,021 and the poverty rate is 11.5%. The 2010 US Census estimates that **48.7%** of West Virginia residents live in an **urbanized area**, drastically lower than the US average of 80.0%. This poses unique challenges for VRUs because typically those living in rural locations have to travel longer distances than those in urban areas and rural roads typically do not have pedestrian or bicycle facilities. Coupled with this, the geography of West Virginia is one of the most mountainous in the country, meaning that many roads are narrow and hilly and not easily traversable for VRUs without appropriate accommodations.

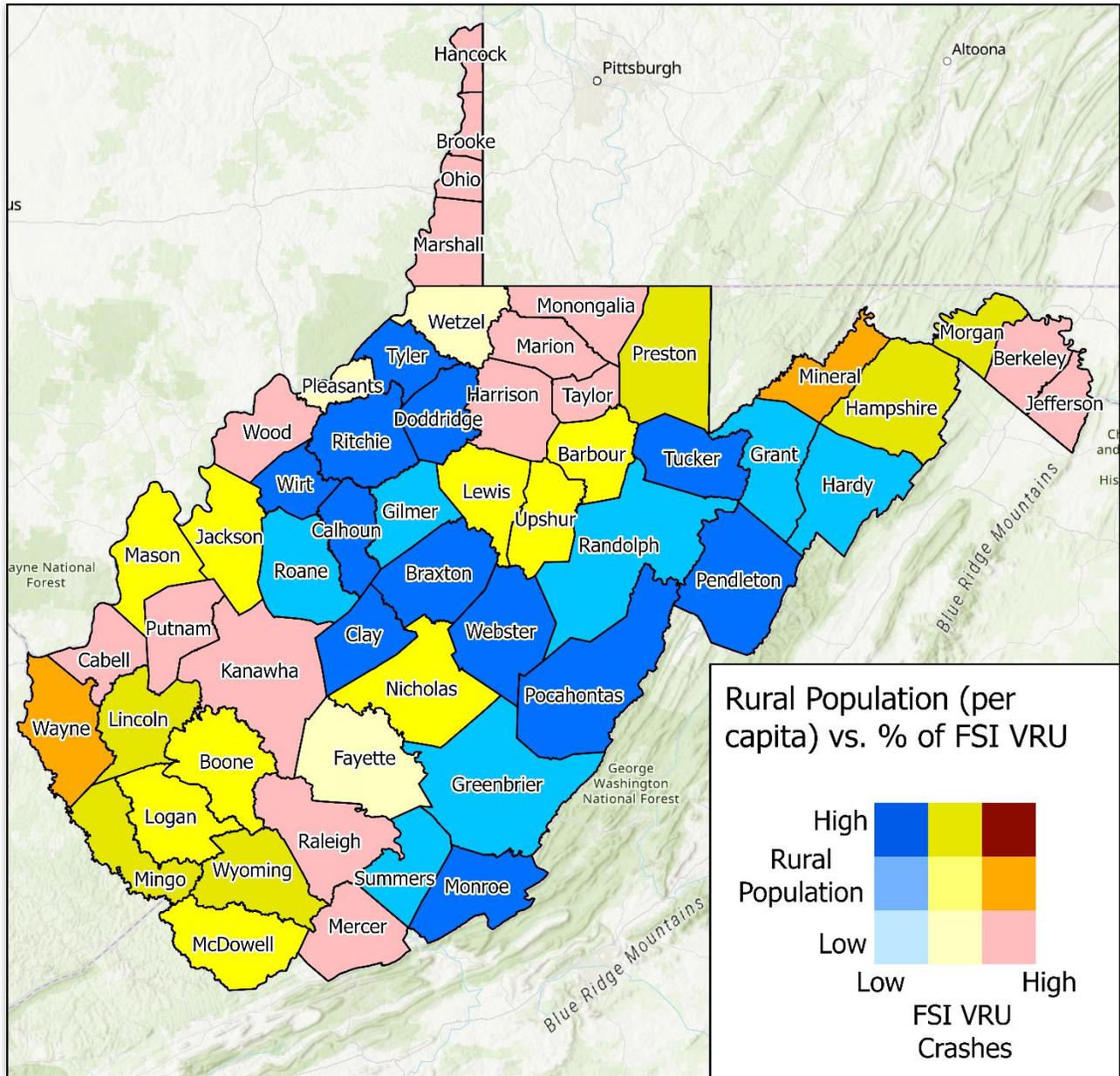
Rural Population

In West Virginia, the population in 40 out of the 55 counties is considered more than half rural, as shown below. While oftentimes a majority of pedestrian and bicyclist crashes occur in urban environments, it is important to recognize that pedestrians are present in rural environments and may require different types of countermeasures to prevent VRU crashes. 2010 Census Data was used because 2020 rural population data was not available.

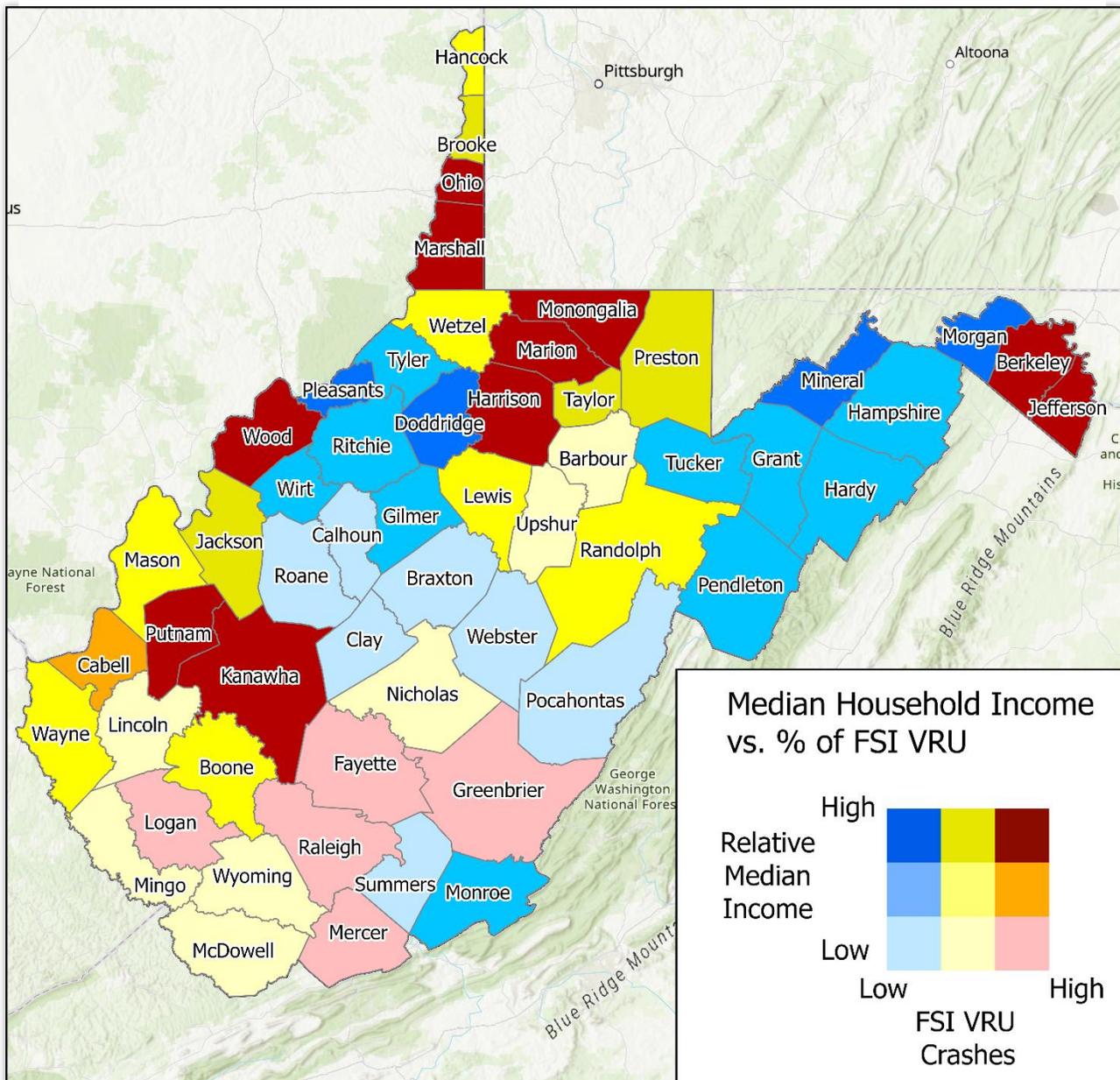
Percentage of Rural Population



Bi-Variate Map of Rural Population vs. the Percent Distribution of VRU Fatal and Serious Injuries per County



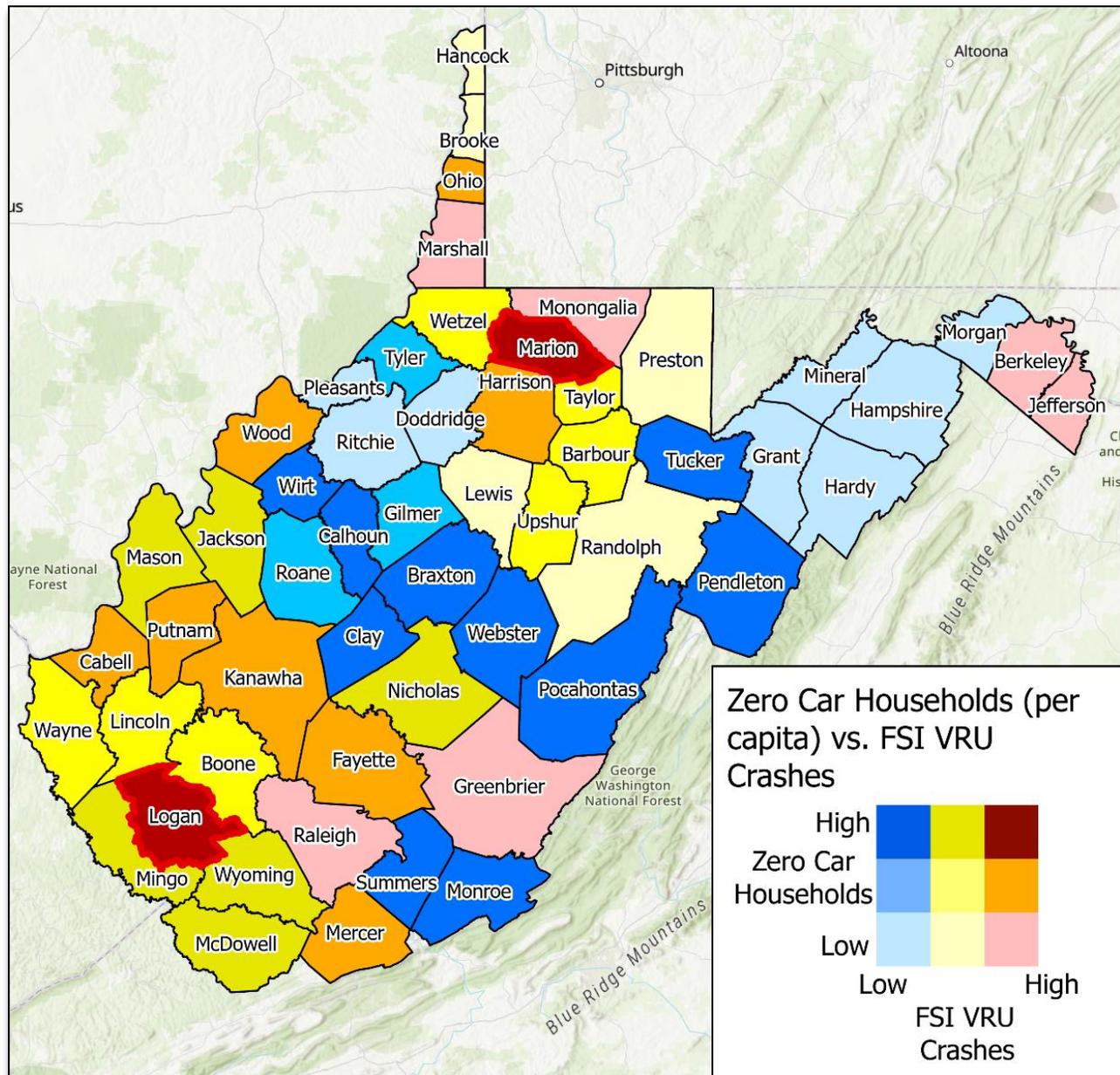
Bi-Variate Map of Relative Median Household Income vs. the Percent Distribution of VRU Fatal and Serious Injuries per County



Zero Car Households

Studying zero car households is essential for a VRU Assessment because this is a population of people that are likely to be VRUs. A geographical analysis by county shows the percentage of zero-car households per capita compared with fatal and serious injury (FSI) VRU crashes. This analysis illustrates that in comparison to the rest of the State, Marion and Logan counties have a higher number of FSI VRU crashes and more zero car households. There are several counties that have comparatively high number of zero car households and a medium amount of FSI VRU crashes. Notably, many of these counties have a 50% or higher rural population.

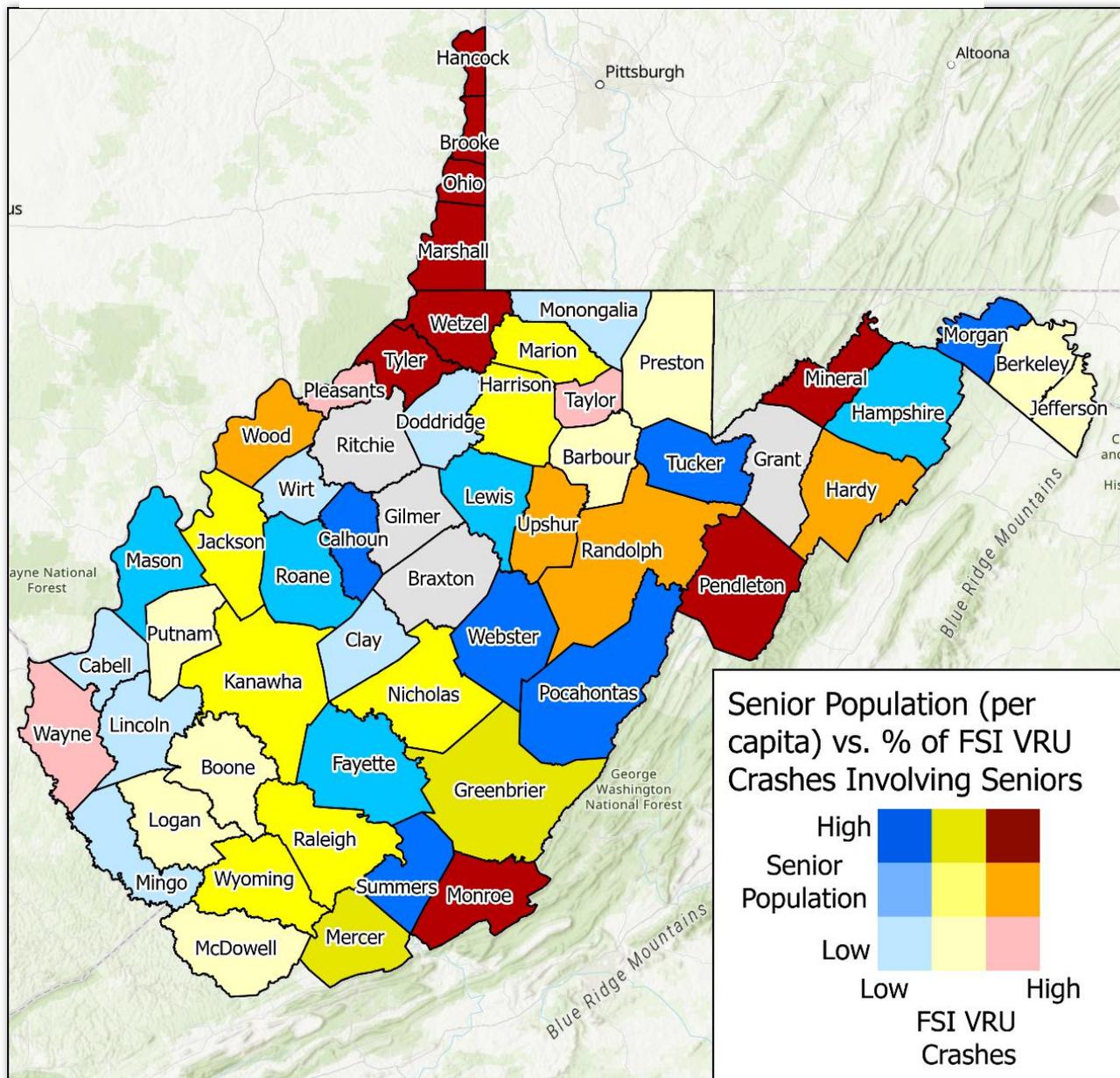
Zero Car Households vs. VRU FSI Crashes



Elderly Population

It is important to consider senior population (ages 65 and over) when planning for VRU safety because often times as people age they become unable to drive, requiring them to seek another form of transportation, either active transportation (walking or biking) or a form of public transportation. A majority of West Virginia counties have a senior population that exceeds 17.6% of the population in that county. Furthermore, of those counties, about half have a senior population that exceeds 20%. This is above the US average of 15.2%. There are several counties that have a comparatively high senior population and number of FSI VRU crashes with either the VRU or the driver being over the age of 65: Hancock, Brooke, Ohio, Marshall, Wetzel, Tyler, Mineral, Pendleton, and Monroe.

Elderly Population vs. VRU FSI Crashes



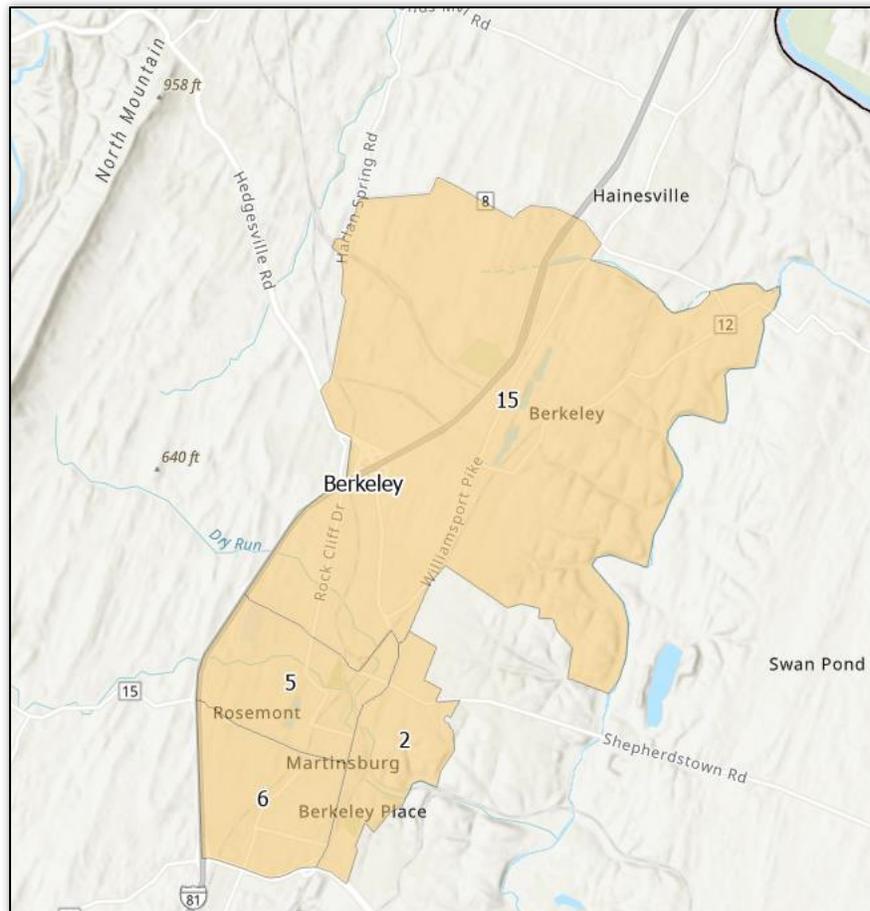
SS4A Underserved Communities

In addition to analysis of Census data, the Department of Transportation’s Safe Streets and Roads for All (SS4A) Underserved Communities Census Tracts were reviewed. This analysis identifies highly disadvantaged communities by analyzing indicators for historically disadvantaged, transportation, health, economy, equity, resilience, and environmental disadvantaged. These communities make up 7.8% of the State's population, 9.6% of the area, and 13.9% of fatal and serious injuries, meaning that these areas are overrepresented for the number of FSI per population and geographic area.

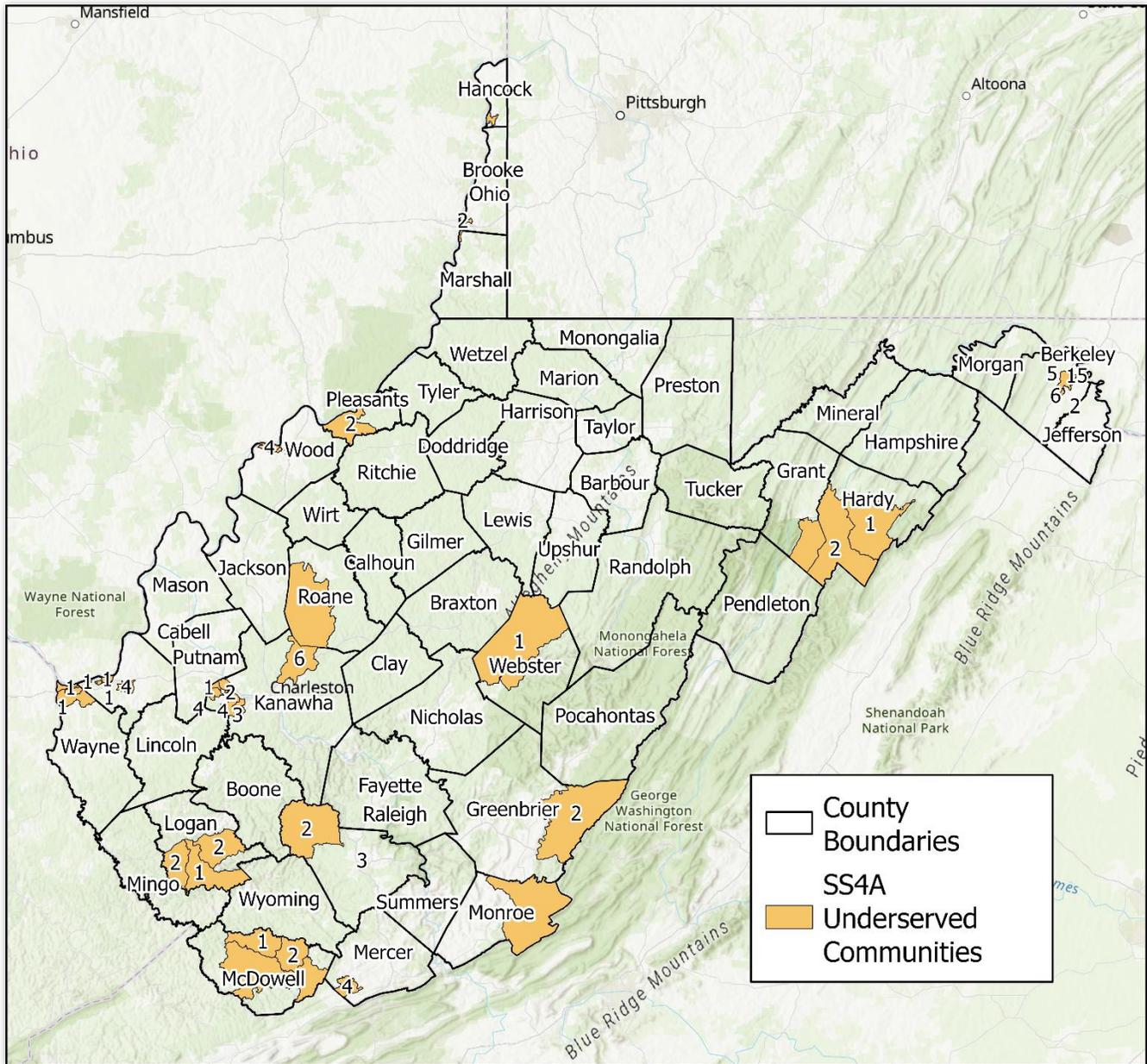
Population	7.8%
Area	9.6%
FSI	13.9%

Below is a map of these underserved communities. Each Census Tract is labels with the number of VRU fatal or serious injuries that occurred in that tract. Those without a number label had zero fatal or serious injuries. Berkeley County had the largest number of fatal or serious injuries that occurred within underserved communities there, with 15 fatal or serious injuries occurring in one area and a combined total of 28 fatal or serious injuries. That area is shown below.

Berkeley County Underserved Community VRU FSI Crashes



SS4A Underserved Communities





Public and Stakeholder Engagement

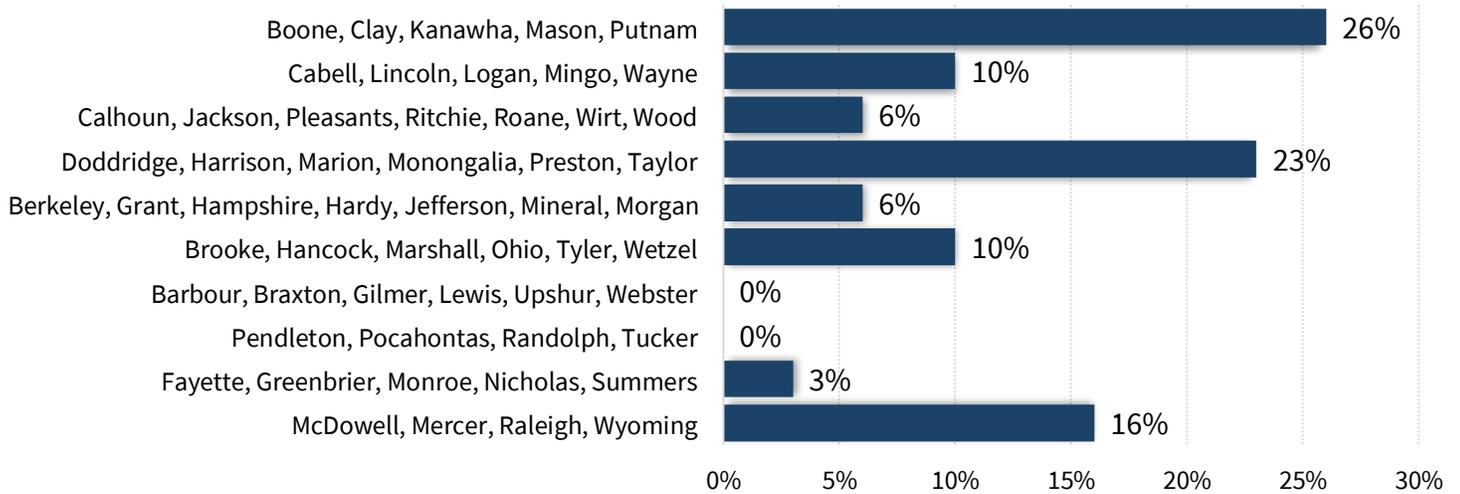
Stakeholder Engagement

A stakeholder group was formed to ensure that the planning and implementation of VRU safety measures involves all relevant parties, addresses various perspectives and concerns, and maximizes the chances of success. This group included individuals from throughout the State representing disciplines such as engineering, planning, and design, transit, advocacy and outreach, education, policy, emergency medicine, and enforcement.

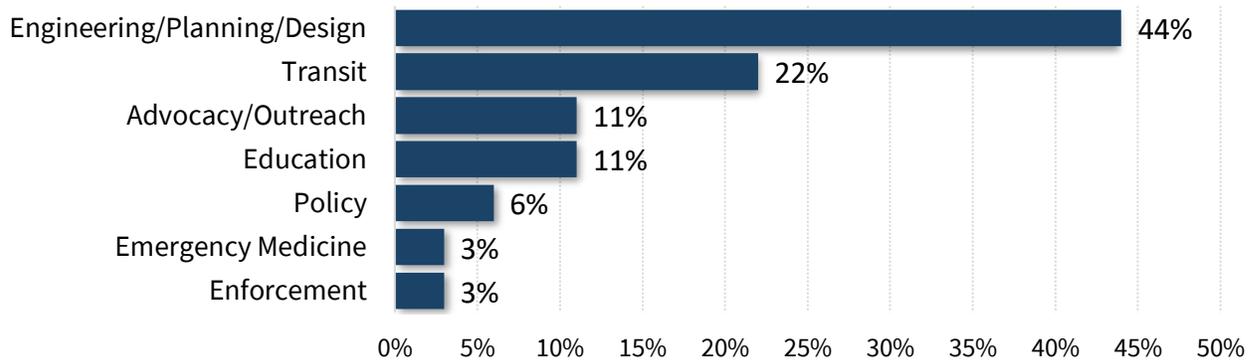
The first stakeholder meeting introduced the definition of a VRU, the VRU assessment, and its purpose. Preliminary crash data was presented, and the stakeholder group was invited to share what existing successes and challenges there are in the areas they represent. The second stakeholder meeting further developed this crash analysis, including a presentation on initial high-injury network findings. The stakeholder group was informed about how the first two

public meetings went and preliminary public survey data. Summaries and presentations from the stakeholder meetings are provided in **Appendix B**.

Stakeholder Representation by County



Stakeholder Representation by Discipline



Public Survey

An online survey was conducted to gather public opinion on walking and biking conditions and behaviors across the State. The survey was advertised through the networks of the Metropolitan Planning Organizational areas in the State (MPOs). The MPOs exercised a variety of tactics to advertise the survey including paid social media advertising, flyers hung across the region, posters on buses, at libraries, and other areas that may have a high volume of active transportation users.

The survey had two parts: part one asked questions about walking and biking habits and opinions on safety, and part two asked participants to place a point on a map for where a safety issue is and explain what that issue is, this second portion of the survey allowed people to add multiple points/comments on the map. During the survey period from August 2023 to the end of September 2023, 648 respondents participated in the survey and provided 211 location-based comments.

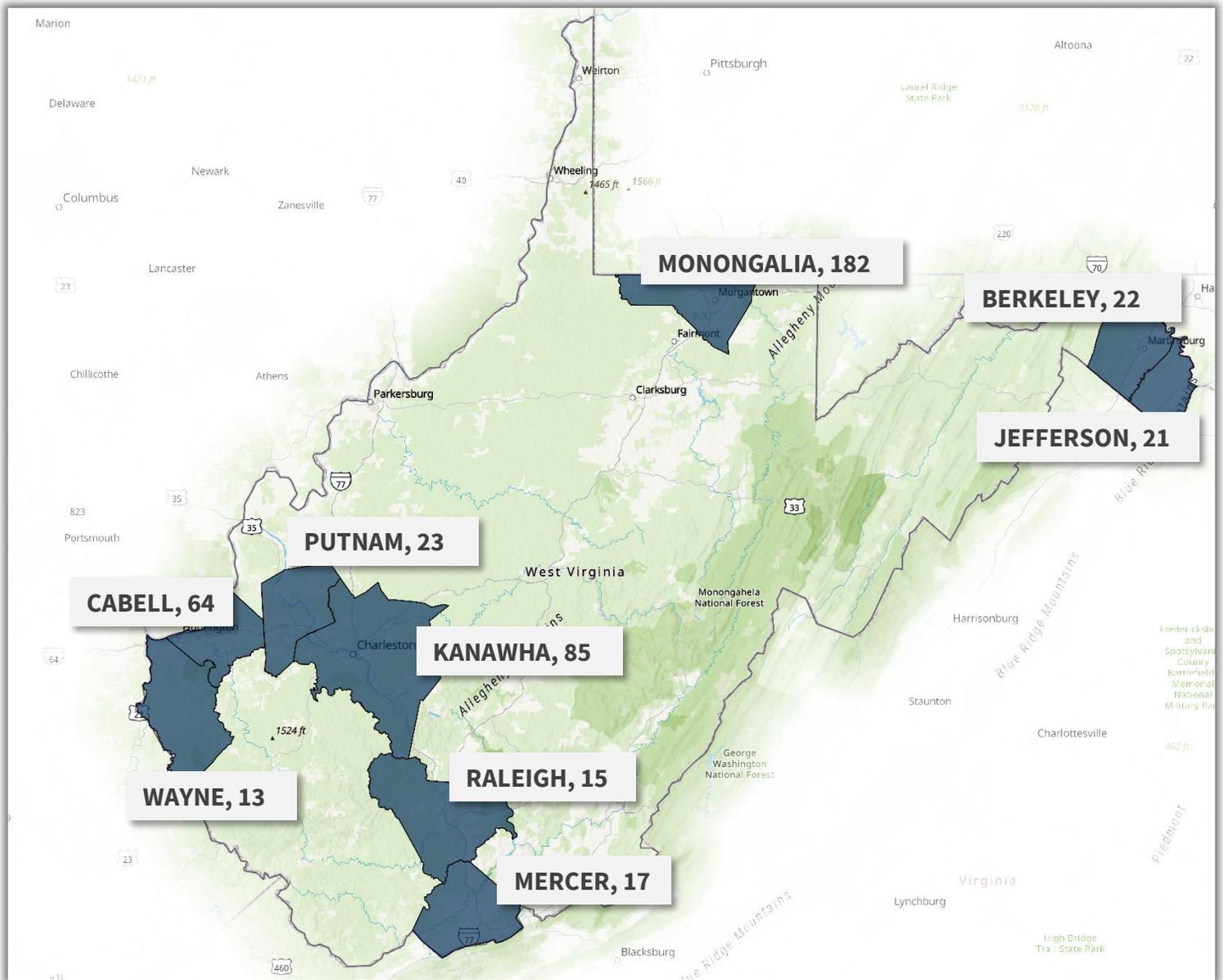
The following summarizes the survey results received:

648 RESPONDENTS, 211 MAP BASED-COMMENTS

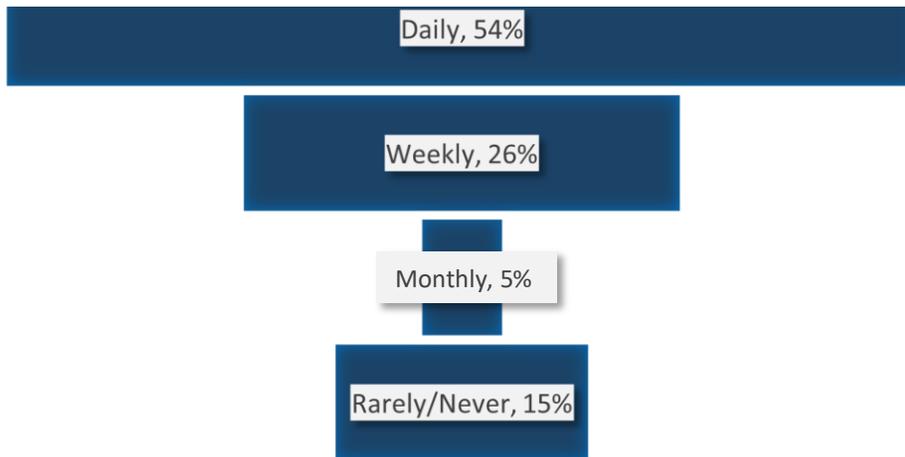


**98% OF SURVEY
RESPONDENTS LIVE IN WEST
VIRGINIA.**

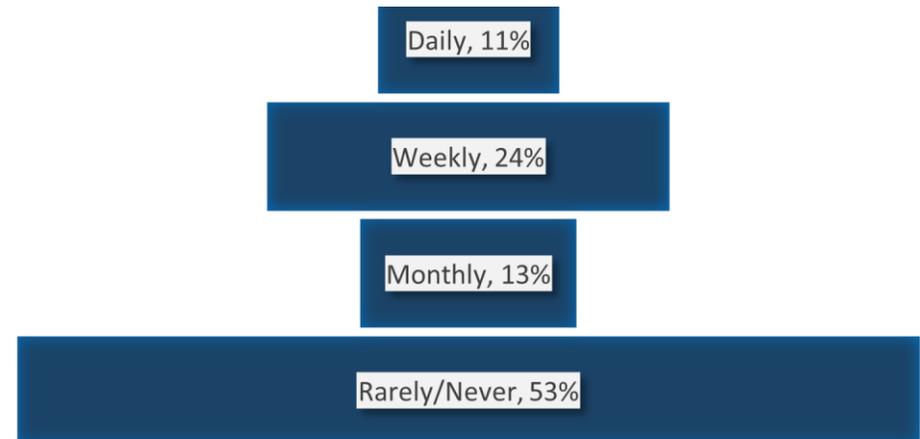
Top Survey Response County Location



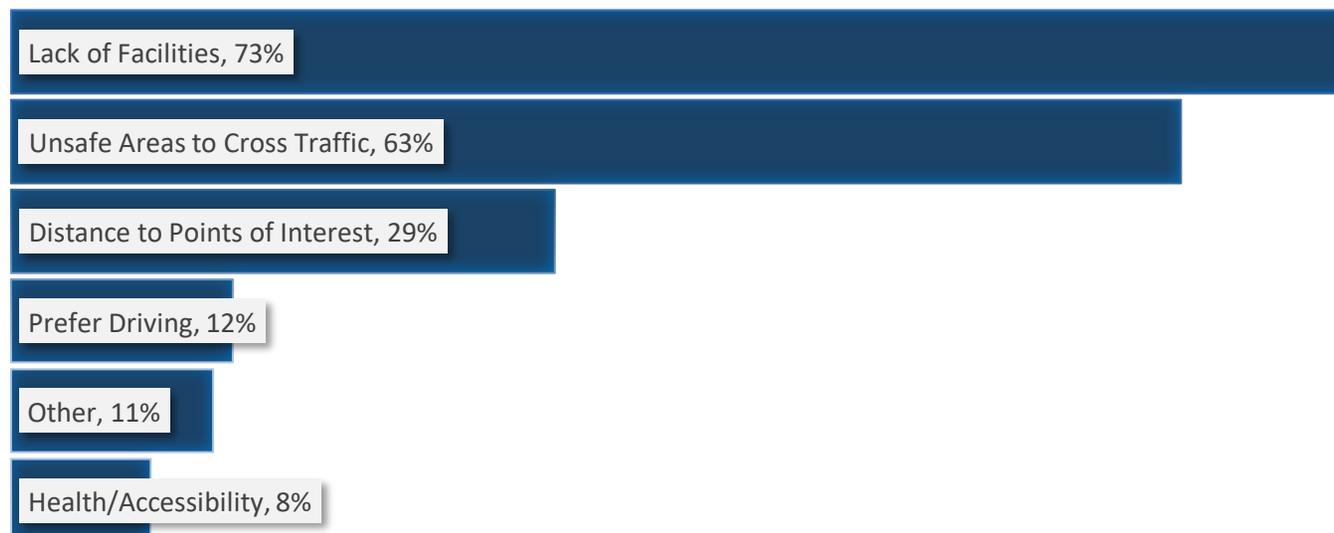
How Often Do You Walk?



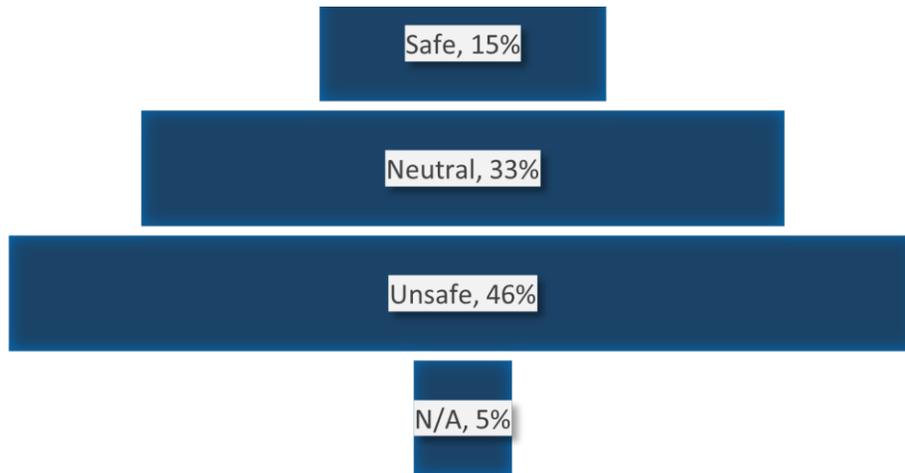
How Often Do You Bike?



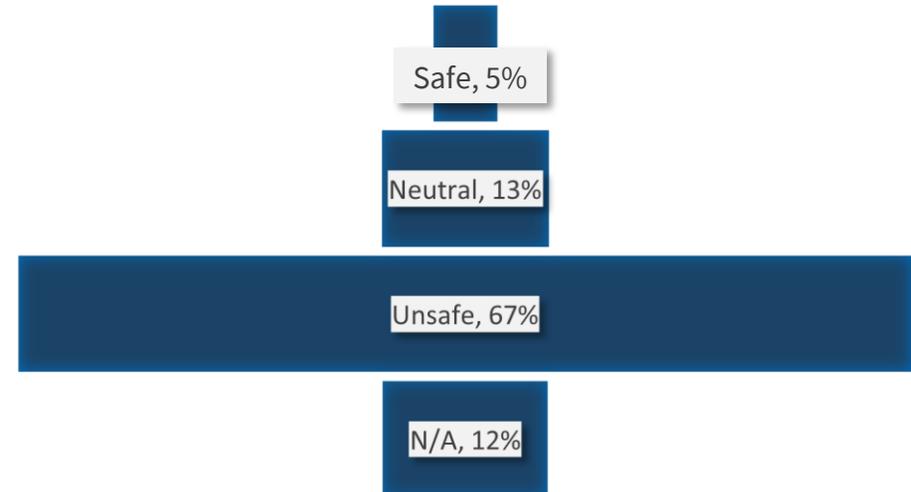
What Barriers Discourage You from Walking or Biking?



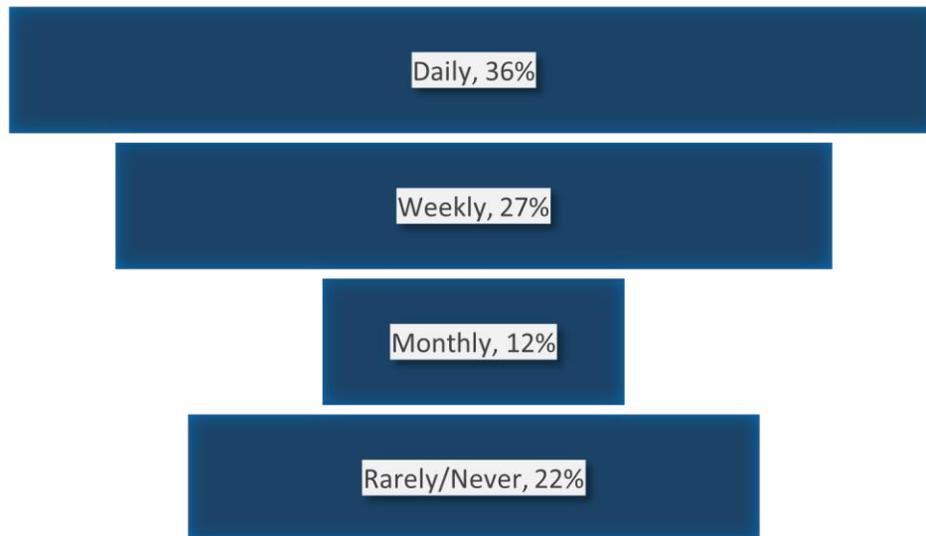
How Safe Do You Feel as a Pedestrian?



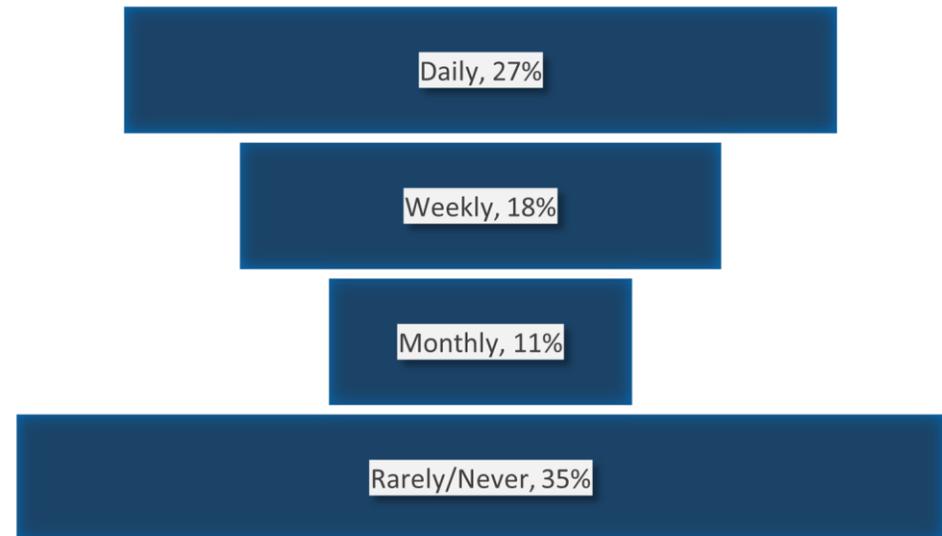
How Safe Do You Feel as a Cyclist?



How Often Do You Feel Unsafe Walking Near Motorized Traffic?

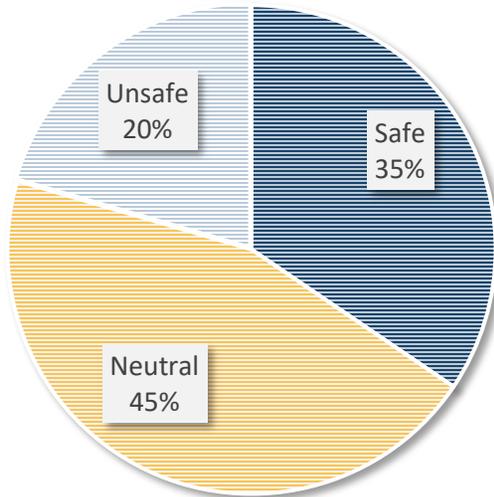


How Often Do You Feel Unsafe Cycling Near Motorized Traffic?

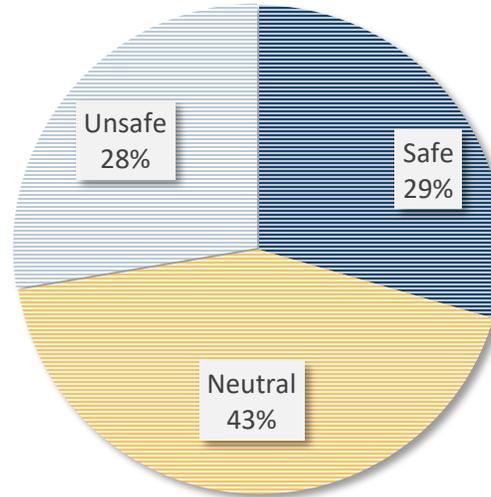


When driving, how would you rate the behavior of MOST drivers, pedestrians, or bicyclists?

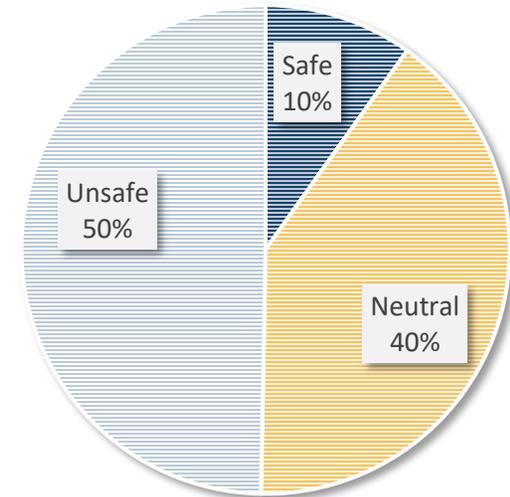
Pedestrians



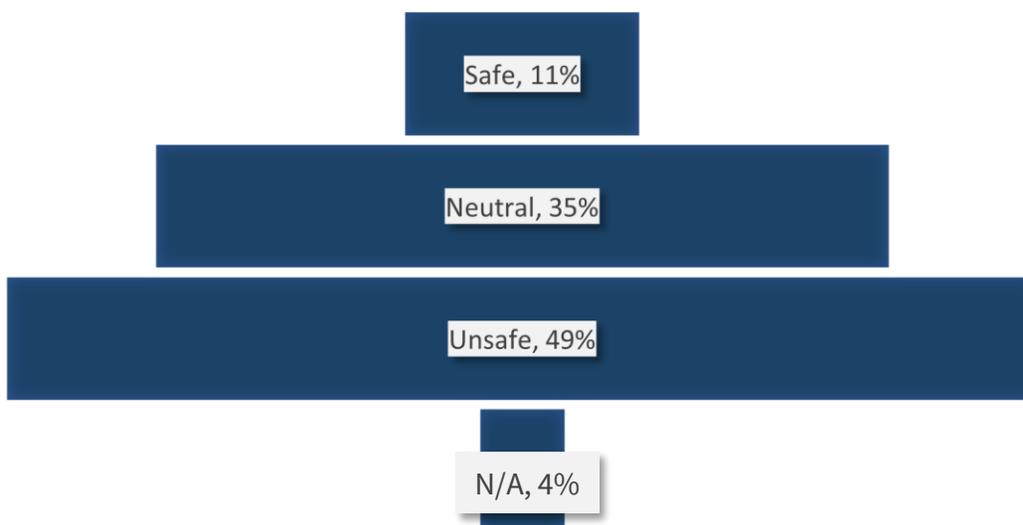
Cyclists



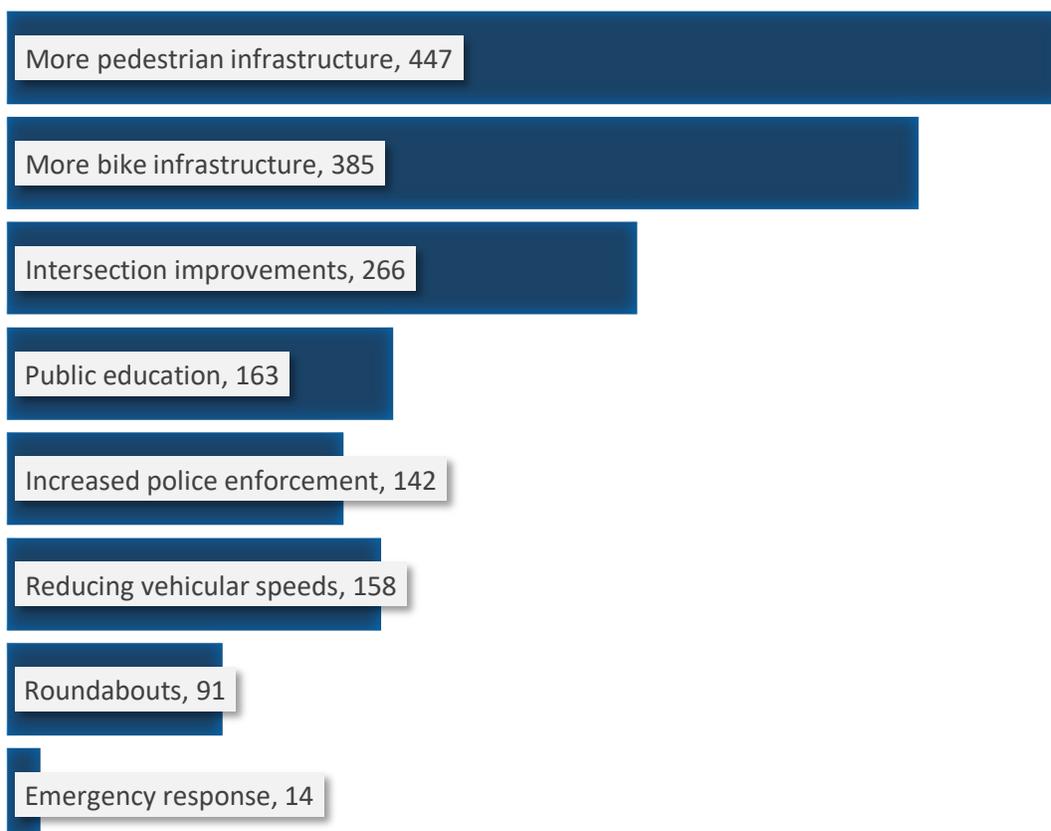
Other Drivers



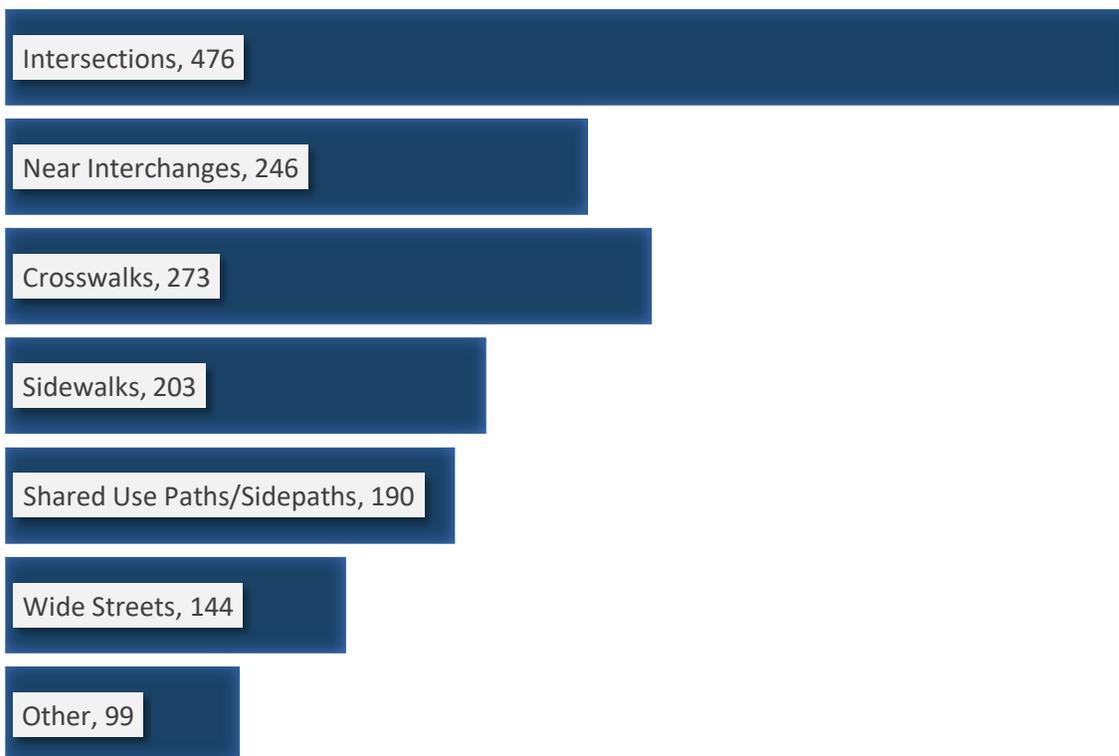
When You Walk or Bike, How Would You Rate the Behavior of MOST Drivers?



What Do You Think are The Most Promising Investments for Road Safety?



When Walking or Biking Which of These Street Elements are Most Stressful with Respect to Traffic Safety?



OTHER VALUES ANSWERED:

- Bridges
- Lack of crosswalks and sidewalks
- Viaducts
- High volume of truck traffic
- Speeding vehicles
- Winding roads/country roads
- Roads with no shoulder
- Lack of lighting
- Driver awareness of pedestrians, bicycle passing laws, etc.
- Debris in road for cyclists

Do you have any additional comments about road safety in your community or the State as a whole?

FACILITIES COMMENTS:

- Bike lanes are unsafe/not protected
- Both urban and rural areas lack pedestrian infrastructure
- Sidewalk gaps that leave pedestrians in dangerous places
- 55 mph roads have no pedestrian or cyclist facilities
- Sidewalks are not ADA accessible: by design, utility poles in the middle of sidewalks, and poor condition
- Unsafe crossings
- No lighting

ENGINEERING COMMENTS:

- Traffic calming measures: lane reductions, street shrubs, chicanes, speed tables, and raised pedestrian crossings
- Curb or delineator post protected bicycle lanes
- Curb protections for bicyclists at intersection
- Painted bicycle crossings
- Bicycle signals at intersections
- Poor road conditions for cyclists
- Add roundabouts
- Unpainted road markers

DRIVER EDUCATION COMMENTS:

- Bicyclists permitted on roadways (share the road)
- Hostility towards cyclists
- Cyclist passing laws
- Pedestrians using shoulder and roadway
- Pedestrians crossing (at signal or midblock)

DRIVER BEHAVIOR COMMENTS:

- Distracted driving
- Aggressive driving, threat to pedestrians crossing at intersections
- Don't stop at crosswalks
- Speeding

ENFORCEMENT COMMENTS:

- Lack of enforcement of dangerous driving behavior: speeding, running red lights, distracted driving, failing to yield to pedestrians
- Educate law enforcement about pedestrian and cyclist dangers and right-of-way

POLICY COMMENTS:

- New housing developments do not have sidewalks
- Most funding goes to vehicle infrastructure, no taxes directly go to pedestrian or cyclist infrastructure

Public Meetings

Over the month of September 2023, five public meetings were held throughout the State, gathering over 60 individuals for discussion about bike and pedestrian safety. Five priority areas were identified in the West Virginia SHSP, Berkeley, Monongalia, Raleigh, Kanawha, and Cabell Counties. Meetings were held in each of these priority areas in conjunction with the local MPO to gather meaningful feedback in these areas of focus.

Each meeting was held in an Open House format with a welcome station, a data and existing conditions station, an interactive safety countermeasures station, a station describing the anatomy of a dangerous roadway, and an area for attendees to fill out an end survey.

Morgantown

The meeting was held on September 7th, 2023, at the Mountain Line Transit Authority meeting room. This meeting was advertised on the Mountain Line buses, and through the Morgantown Monongalia Metropolitan Planning Organization (MMMPO) networks, including paid social media advertisement. There were nineteen attendees including representatives from the pedestrian safety board, Mountain Line Transit, Morgantown City Council, the Morgantown Mayor, and citizens concerned about bicycle and pedestrian safety.

The End Survey asked participants what concerns they have about walking and biking in their community and what thoughts they have on the safety countermeasures.

What concerns do you have walking in your community?

Respondents indicated there is a lack of a sidewalk network or a safe shoulder, especially on state roads and many sidewalks are in poor condition. Many respondents have concerns about the heavy truck traffic, which create disrepair on the road and drive very close or sometimes on the sidewalks.

What concerns do you have biking in your community?

Respondents are concerned about the narrowness of the roadways and the speed of vehicles as well as the lack of bicycle facilities. There is a lack of knowledge from drivers about safe passing laws and general biker’s rights on the roadway. Many roads have potholes and blind turns which further create hazards for bikers.



Martinsburg

The meeting was held on September 8th, 2023 at the Martinsburg Police Department. It was advertised through the networks of the Hagerstown Eastern Panhandle MPO and included attendance from the local media. There were 12 attendees who provided input about where and why they feel unsafe walking and biking, but they did not return any comment forms.



Beckley

The meeting was held on September 19th, 2023, at the Beckley City Hall Council Chambers. This meeting was advertised through West Virginia Tech University (WVU Tech) networks,

particularly the School of Engineering, and also through the Fayette Raleigh MPO. Twelve attendees signed in during this meeting including local municipality representatives, students, faculty, and facilities directors from WVU Tech, and walking and biking advocates.

The End Survey asked participants what concerns they have about walking and biking in their community and what thoughts they have on the safety countermeasures. Two end surveys were received at this meeting.

What concerns do you have walking in your community?

Respondents indicated there is a lack of bike and pedestrian infrastructure and connectivity. Some challenges noted included vehicle speed, lack of lighting, lack of sidewalks, lack of bike lanes, lack of public transit and other multimodal opportunities. A specific location noted was walking on WVU Tech's campus on Kanawha Street, Church Street, and Minnesota Avenue.



Beckley WVU Tech Presentation

B&N was invited to present on the WV VRU Assessment at WVU Tech. There were about 40 attendees, comprised primarily of engineering students at the university as well as some faculty. Kendra Schenk from B&N presented what a VRU is, and why it is important to research how to prevent crashes from occurring. She described the SSA and Vision Zero, illustrating how important it is to look at reducing crashes through a multidisciplinary approach and to aim for a goal of zero road deaths or serious injuries.



She then went over the data that has been collected thus far including crash characteristics such as time of day and maps depicting the crash rate versus population in each county. Students asked questions throughout the lecture and afterward. There were questions about how increased lighting could help reduce crashes and some students made comments about how unsafe they think walking is in the area. These students were encouraged to take the online public survey to give more input about specific concerns.

Charleston

The meeting was held September 20th, 2023, at the Kanawha County Main Public Library in Downtown Charleston. This meeting was advertised with signage posted on utility poles or similar features throughout the county as well as through the Regional Intergovernmental Council (RIC). Ten attendees signed in during this meeting including local municipality

representatives, local bike and transit rider advocates, a Business Improvement District representative, and civically engaged citizens.

The End Survey asked participants what concerns they have about walking and biking in their community and what thoughts they have on the safety countermeasures. Three end surveys were received at this meeting. The following comments include verbal feedback gathered at the meeting as well as written survey responses.

What concerns do you have walking in your community?

Respondents expressed concerns about the dangers of walking in their communities on the shoulders of the road. There are many sidewalk gaps, a general lack of sidewalks and a need for road diets in the downtown Charleston area.

What concerns do you have biking in your community?

Respondents indicated the desire for more protected bike lanes and road diets. There is heavy traffic on some roads people bike on and a general lack of bike parking.



Huntington

The meeting was held September 21st, 2023, at the KYOVA Interstate Planning Commission office in Huntington. This meeting was advertised through the networks of KYOVA and Marshall University connections, specifically through the engineering department. Eight attendees signed in during this meeting including representatives from the City of Huntington, local bike and transit rider advocates, students from Marshall University, and civically engaged citizens. Attendees discussed the need for road diets in Huntington to combat speeding in the areas where the speed limit was changed to 25 mph. There were conversations about the new RRFB that was installed on Marshall University’s campus and the difficulty of biking around Huntington. Participants agreed that there is a lot of potential for bicycle and pedestrian improvements.



Each meeting had a Proven Safety Countermeasures station where participants were given five dots to place on which countermeasures they thought would be best for their community. To the right is a photo of what these posters looked like and the overall total number of votes each countermeasure received.



Countermeasure	Number of Votes	Summarized Comments
Walkways	47	<ul style="list-style-type: none"> • Respondents said this is their number one priority. • There are many sidewalk gaps and many existing sidewalks are deteriorating and inaccessible. • Sidewalks should be wide enough for people to walk side-by-side comfortably.
Bicycle Lanes	42	<ul style="list-style-type: none"> • There is a large biking population that has a strong desire for more bike lanes, especially protected bike lanes and on uphill grades. • Without protection such as delineator posts or curb bike lanes will not deliver the comfortability needed for equitable use.
Road Diets	31	<p>There are differing opinions about road diets across the State:</p> <ul style="list-style-type: none"> • In some regions like the Charleston and Huntington areas, many roads are massively oversized, particularly in dense urban areas. road diets can be a helpful tool, but AADT and space need to be considered for them to be effective. • In the Beckley area, specific roadways were identified as potential candidates for reconfiguration. • Respondents in Morgantown commented that road diets are not very applicable to the area but would be good in some specific locations.
Crosswalk Visibility Enhancement	29	<ul style="list-style-type: none"> • Helpful, especially at midblock, and would need driver education. • Many crosswalks need to be shifted or re-engineered before visibility enhancement is done. Many crosswalks are faded. • Detectable warning surfaces that are maroon fade over time and begin to have poor contrast. <p>Bright green/yellow pedestrian yield signs could slow speeds and would be preferred.</p>
Medians and Pedestrian Refuge Islands	28	<ul style="list-style-type: none"> • On four-lane roads, some respondents think they cause problems in some locations. • Beckley would benefit from them, especially combined with road diets. • Respondents indicated they are definitely needed for bigger roads when feasible. • Smaller roads could use this to help calm traffic, slow speeds, and help strollers, the elderly, and the disabled. <p>These are valuable tools that should be implemented where feasible.</p>
Rectangular Rapid Flashing Beacons (RRFBs)	25	<ul style="list-style-type: none"> • More driver education is needed on these devices. <p>These would be helpful especially where multi-use path crossings are planned.</p>

Leading Pedestrian Interval	19	<ul style="list-style-type: none"> • This is important and needed systemwide, particularly for the elderly and disabled. • Currently, some intersections have conflicts with drivers allowed to turn while pedestrians have the walk signal. <p>This is a good idea when combined with other efforts, especially if demand-triggered.</p>
Education Campaigns	16	<ul style="list-style-type: none"> • This is needed, but how can “underground” people like bike and pedestrian advocates who don’t follow the rules/guidance be effectively reached. • A focused education campaign could be greatly beneficial to help reduce excessive traffic speeds. • Respondents indicated it is necessary for motorists to be educated on pedestrian and cyclist rights and safety. • Work with local leaders and include complete streets planning in all community and economic development.
Enforcement Tactics	14	<p>There were differing opinions on enforcement throughout the State:</p> <ul style="list-style-type: none"> • Some think it’s important for identifying people driving without a license or insurance. • It can be an effective deterrent, but realistically police resources are scarce and can be spent better elsewhere because it only deters while police are present. • Some think that police should do more speed enforcement and there needs to be enforcement for truck traffic for overweight loads and driving on the sidewalk. • Some thought positive reinforcement is better than negative such as speed signs flashing “thank you for driving safely”. • Some people think there should be more police on bikes, more citations for reckless driving and left lane cruising.
Pedestrian Hybrid Beacons	13	<ul style="list-style-type: none"> • There is a worry that these would either be ignored or confused as traffic lights. • The cost of these could be an issue and overstimulating drivers with excessive warnings dampens their effectiveness.
Reduced Speed Limits	12	<ul style="list-style-type: none"> • Many respondents thought just reducing speed limits was not enough; it should be combined with more enforcement and traffic calming measures.
Emergency Medical Services Collaboration	3	<ul style="list-style-type: none"> • It is necessary to evaluate the needs of EMS and design for them.



Implementation Plan

The Implementation Plan identifies strategies to reduce fatal and serious injury crashes involving VRUs. The strategies are broken up into the five elements of the SSA – Safe Roads, Safe Road Users, Safe Speeds, Safe Vehicles, and Post Crash Care. These strategies build upon those outlined in the 2022-2026 West Virginia SHSP. These shared strategies underscore a unified commitment to addressing safety concerns and promoting road safety for vulnerable users across both initiatives.

Safe Roads	Strategy: Perform site specific VRU Road Safety Assessments along the High Injury Network.	
	Example Efforts:	Partners:
	<ul style="list-style-type: none"> Perform an assessment to understand why a segment on the HIN has so many VRU crashes. Determine which countermeasures would be most effective at mitigating VRU crashes occurring along segments of the HIN. 	Local agencies (MPOs, Cities, Counties)
	Strategy: Install proven VRU countermeasures with road improvement projects.	
	Example Efforts:	Partners:
	<ul style="list-style-type: none"> Install sidewalk as part of a roadway widening project. Stripe a wider shoulder as part of a roadway resurfacing project (either through reduced lane widths or minor widening). 	Local agencies (MPOs, Cities, Counties)
Strategy: Proactively implement VRU countermeasures at segments and intersections identified in the systemic analysis.		
Example Efforts:	Partners:	
<ul style="list-style-type: none"> Develop a toolbox that summarizes proven safety countermeasures that could be implemented systemically. At intersections implement accessible curb ramps, curb extensions, high-visibility crosswalks, and/or leading pedestrian intervals. Along segments provide sidewalk and mid-block crossing locations with Rectangular Rapid Flashing Beacons (RRFBs) or Pedestrian Hybrid Beacons (PHBs). Prioritize VRU infrastructure in locations where there are more households without access to vehicles and aging populations. 	Local agencies (MPOs, Cities, Counties)	

Safe Roads	Strategy: Improve nighttime lighting conditions for VRUs, especially in underserved areas.	
	<p>Example Efforts:</p> <ul style="list-style-type: none"> • Install or improve pedestrian level-lighting. • Separate vehicles and VRUs by installing sidewalk, trail, or wider shoulders. 	<p>Partners:</p> <p>Local agencies (MPOs, Cities, Counties)</p>
	Strategy: Provide uniformity across West Virginia’s multimodal transportation system.	
Safe Road Users	<p>Example Efforts:</p> <ul style="list-style-type: none"> • Adopt policy/guidance on selecting pedestrian crossing treatments at uncontrolled crossing locations. • Prepare a Multimodal Design Guide for planners and designers implementing pedestrian and bicycle facilities and transit stops. • Update parking requirements for new developments. 	<p>Partners:</p> <p>Local agencies (Cities, Counties) and Complete Streets Advisory Board, Developers</p>
	Strategy: Ensure a connected and efficient multimodal network across West Virginia.	
	<p>Example Efforts:</p> <ul style="list-style-type: none"> • Create a statewide active transportation asset inventory. • Develop district-level maintenance programs for sidewalks, bike lanes, trails, and other multimodal elements. • Leverage the Safe Routes to School program to provide a multimodal network around schools. 	<p>Partners:</p> <p>Local agencies (Cities, Counties) and Complete Streets Advisory Board</p>
Safe Road Users	Strategy: Educate the public on VRU safety.	
	<p>Example Efforts:</p> <ul style="list-style-type: none"> • Targeted behavioral campaigns to students about safe walking and biking habits. • Social media messaging about proper awareness and visibility when walking or biking (e.g., texting, headphones, bike lights). • Require education on how to look out for VRUs in novice driver education training. 	<p>Partners:</p> <p>Governor’s Highway Safety Program, Local School Districts, Colleges/Universities, Drivers Education Programs, NHTSA, Transit Agencies, Health care workers/injury prevention agencies</p>

Safe Road Users	Strategy: Ensure VRU traffic laws are known and enforced.	
	<p>Example Efforts:</p> <ul style="list-style-type: none"> • Launch an educational campaign for motorists, pedestrians, and bicyclists about the rules of the road (e.g. where bikes are supposed to ride-street not sidewalk, where pedestrian crossings are legal and when motorists are expected to yield to them) • Provide law enforcement officers training, tools, and resources to enforce laws. 	<p>Partners:</p> <p>Governor’s Highway Safety Program, Law Enforcement Agencies, NHTSA</p>
	Strategy: Ensure safe use of bicycles and micromobility vehicles.	
	<p>Example Efforts:</p> <ul style="list-style-type: none"> • Provide guidance and legislation for the use of E-scooters within West Virginia. • Increase the visibility of bicycles by distributing bicycle lights or reflectors. • Promote bicycle helmet giveaways at community events. 	<p>Partners:</p> <p>Governors Highway Safety Program, Advocacy Groups, Policymakers</p>

Safe Speeds	Strategy: Slow speeds in areas where VRUs are present.	
	<p>Example Efforts:</p> <ul style="list-style-type: none"> • Install countermeasures like road diets, roundabouts, ITS/dynamic speed feedback signs, or speed humps/raised crosswalks in areas with high pedestrian and bicycle activity. • Re-evaluate posted speed limits on roadways along the High Injury Network and segments identified in the systemic analysis. • Develop guidance and standards for implementing speed reduction strategies on state routes through rural population centers. 	<p>Partners:</p> <p>Local agencies (MPOs, Cities, Counties), local law enforcement</p>

Safe Vehicles	Strategy: Stay up to date on latest vehicle technologies especially related to VRU safety	
	<p>Example Efforts:</p> <ul style="list-style-type: none"> • Explore participating in the Safer Fleets Challenge and install Intelligent Speed Assistance (ISA) on state vehicle fleets. • Consider the future of Vehicle to Infrastructure (V2I) and vehicle to VRU communications within West Virginia for the improvement of VRU safety. • Research technologies that could be adopted on local transit vehicles to improve VRU safety. 	<p>Partners:</p> <p>Governors Highway Safety Program, Policymakers, Transit Agencies, AAA, Insurance companies</p>

Post Crash Care	Strategy: Improve reporting of VRU crashes.	
	<p>Example Efforts:</p> <ul style="list-style-type: none"> • Provide education to law enforcement on filling out the crash report for VRU crashes. • Update the crash report form to provide additional information for VRU crashes. 	<p>Partners:</p> <p>Governors Highway Safety Program, Law Enforcement</p>
	Strategy: Provide transparency on the status of VRU safety in West Virginia.	
	<p>Example Efforts:</p> <ul style="list-style-type: none"> • Report VRU safety statistics, key safety improvements, and general efforts being conducted to mitigate or prevent VRU crashes. • Assemble a Safety Task Force that meets regularly to discuss VRU safety data and implementation efforts. 	<p>Partners:</p> <p>Governors Highway Safety Program</p>



Conclusion and Next Steps

VRUs, specifically pedestrians, are a focus for the State of West Virginia. This VRU Assessment will serve as the Pedestrian Emphasis Area Plan for West Virginia's 2022-2026 SHSP. The assessment has underscored the importance of implementing comprehensive strategies that focus on road design, infrastructure improvements, education, and awareness campaigns.

Collaboration between government agencies, law enforcement, advocacy groups, and the community is essential to bring about lasting change in road safety. Together, we can work to promote a culture of responsibility and shared respect among all road users. In the years ahead, it is imperative to continue to monitor and assess the safety of VRUs, adapting strategies as needed to respond to evolving challenges. With this VRU Assessment and the Pedestrian Emphasis Area in the SHSP, the West Virginia DOT is committed to tracking progress toward the goals through bi-annual reviews of VRU crash data and the status of strategy implementation. By doing so, West Virginia can move closer to the goal of a road system that is safe and inclusive for **EVERYONE**.

Summary of FHWA Requirements

Category	FHWA Requirement	Location in WV VRU Document
Overview of Vulnerable Road User Safety Performance	Present historical trends for vulnerable road user fatalities and serious injuries over the past five years (or longer)	Data Trends and Priority Areas
	Disaggregate trends by user type	Data Trends and Priority Areas
	Compare vulnerable road user safety performance to overall safety performance	Data Trends and Priority Areas
	Describe progress towards meeting or making significant progress toward meeting safety performance targets for nonmotorized users	Vision and Goal for Vulnerable Road User Safety
Summary of Quantitative Analysis	Describe data, methodology and time-period of analysis used to identify high-risk areas to vulnerable road users	High Injury Network Analysis
	Describe how demographics were considered as part of the quantitative analysis	Equity Considerations
	Provide a list of the high-risk areas to vulnerable road users identified based on the data and demographics information	Equity Considerations, Implementation Plan
Summary of Consultation	Describe the process used to consult with required entities and other stakeholders about high-risk areas	Stakeholder Engagement
	Provide a summary of the outcomes (i.e., safety concerns and potential solutions) of the consultation for each high-risk area	Implementation Plan
Program of Projects or Strategies	Identify the program of projects and strategies to reduce the safety risks for vulnerable road users in high-risk areas. States may consider developing an online interactive map identifying high-risk areas and proposed projects or strategies to address them	Implementation Plan
Safe System Approach	Describe how the Safe System Approach was considered as part of the Vulnerable Road User Safety Assessment	Safe System Approach and Culture Change



APPENDIX A

Additional Data



High Injury Network (HIN) Analysis

High Injury Network Results



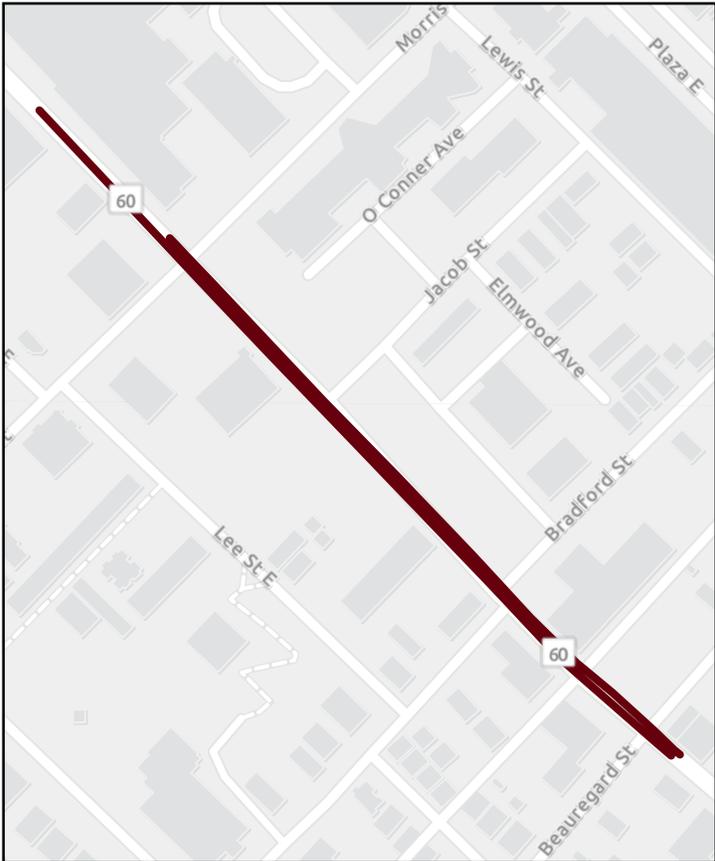
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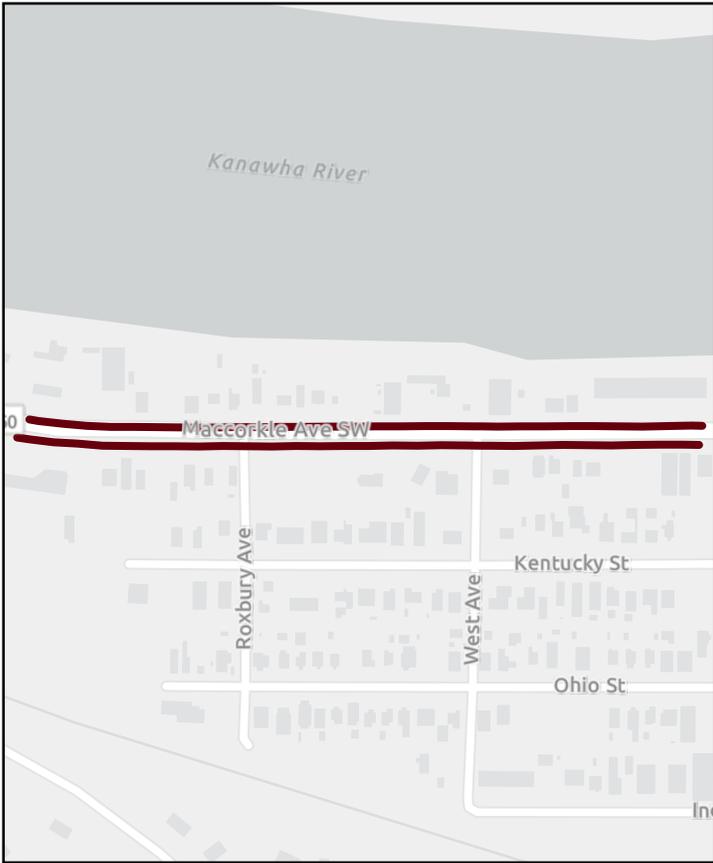
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Kanawha County - Rank: 2
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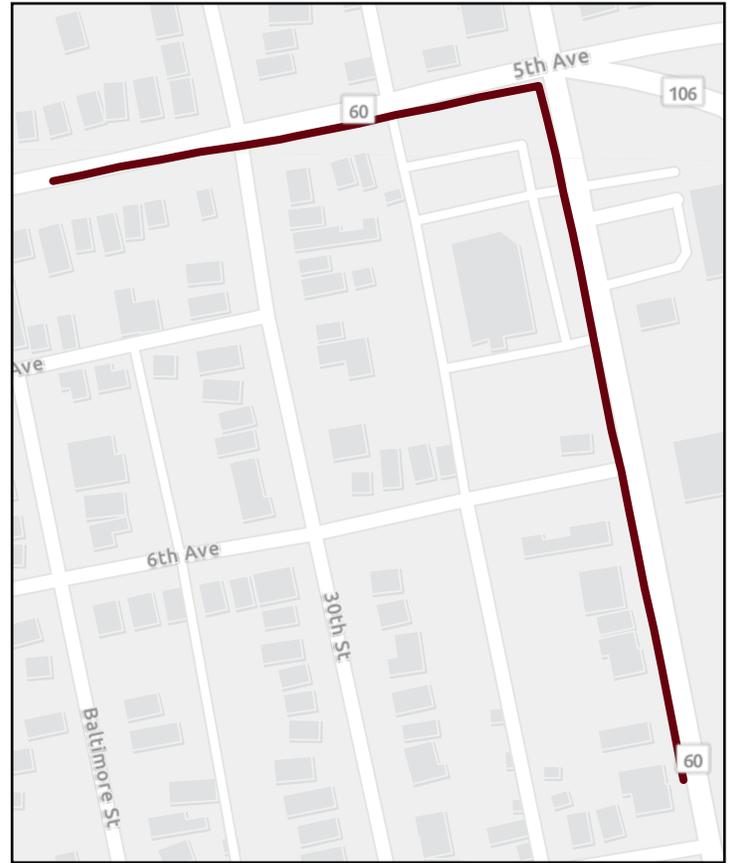
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High Injury Network Results



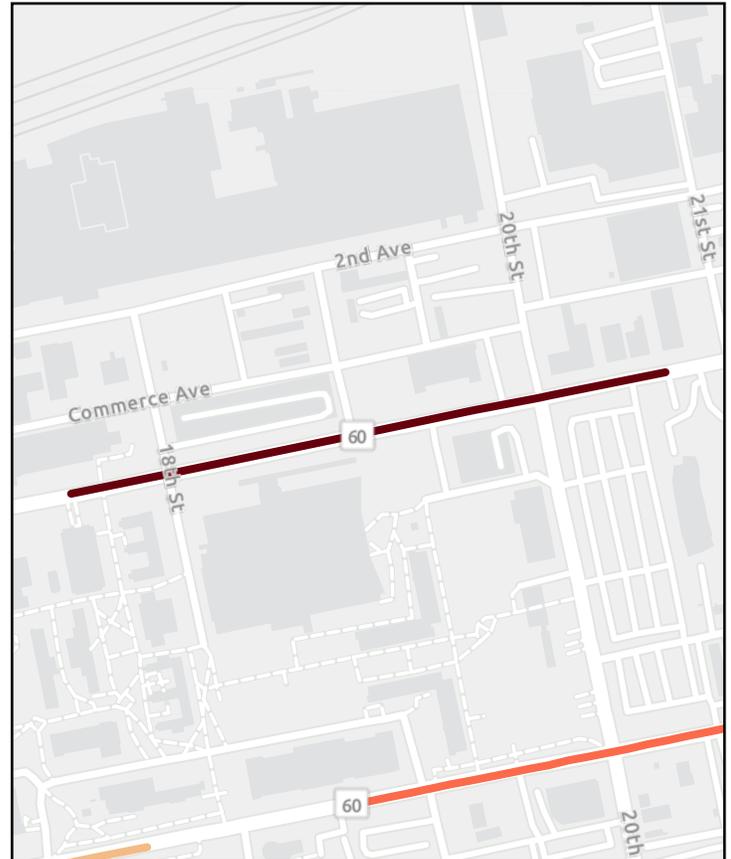
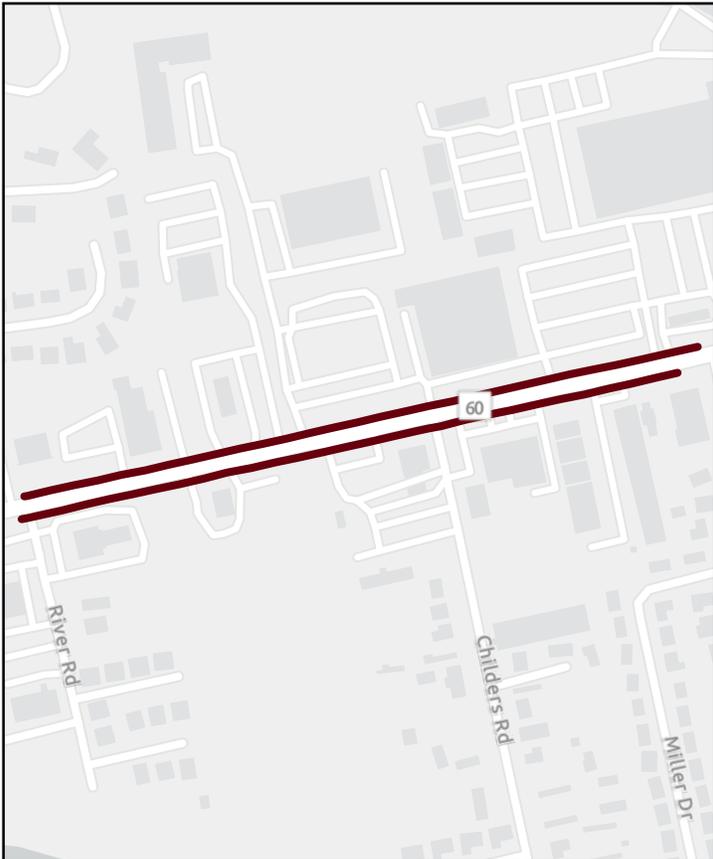
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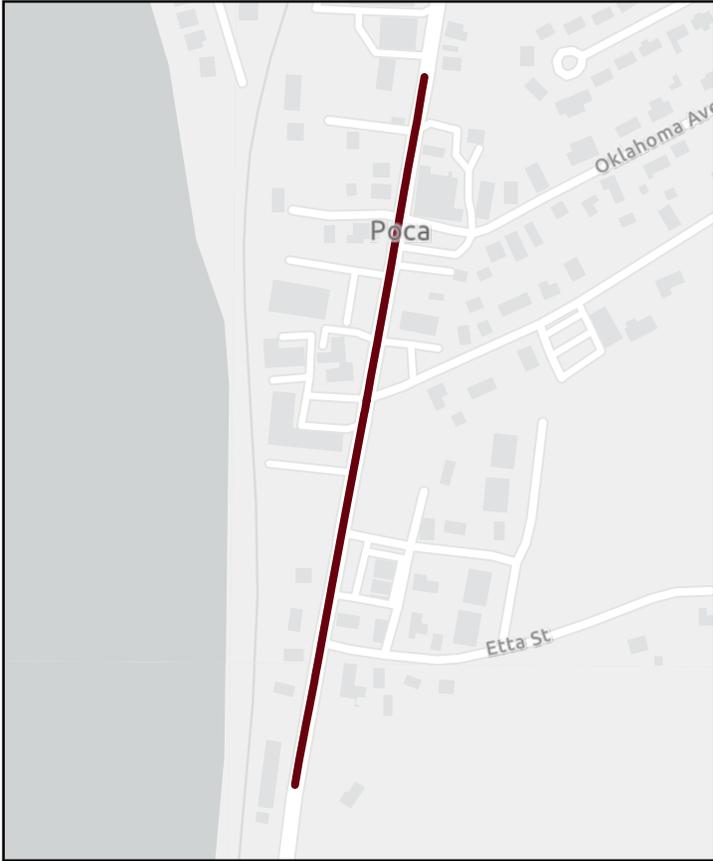
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High Injury Network Results



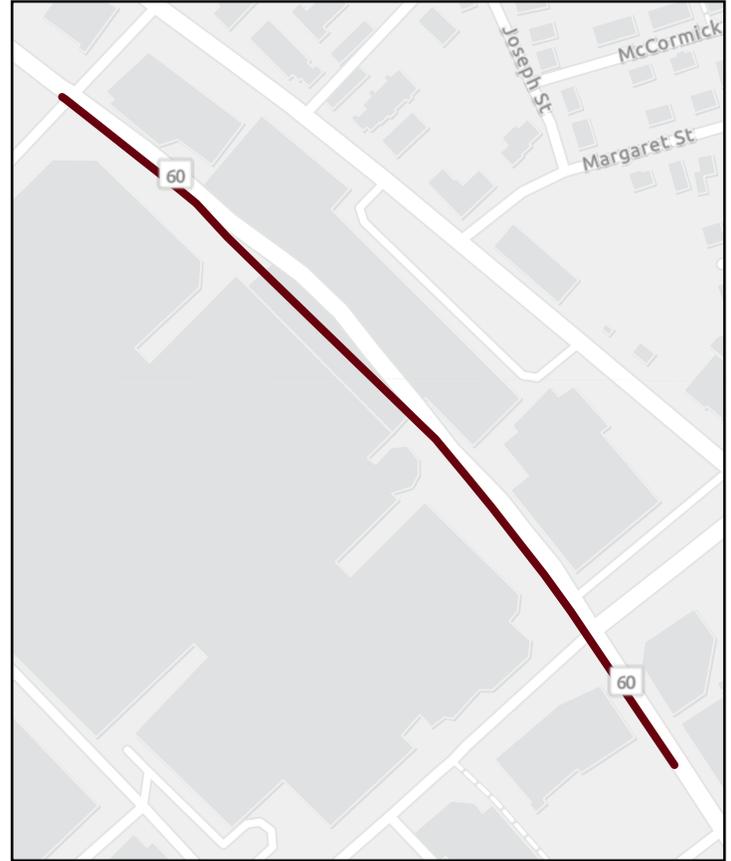
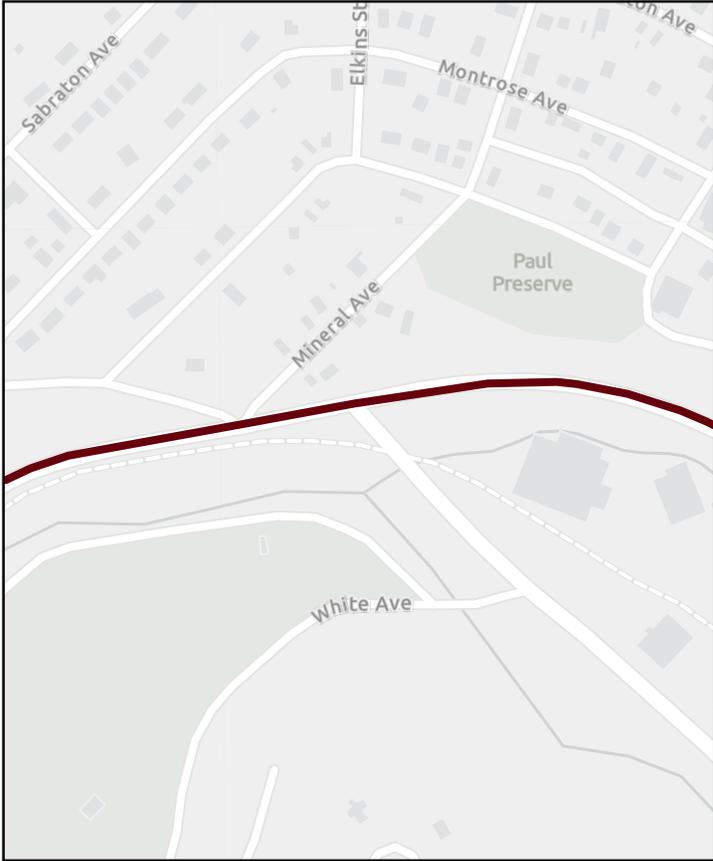
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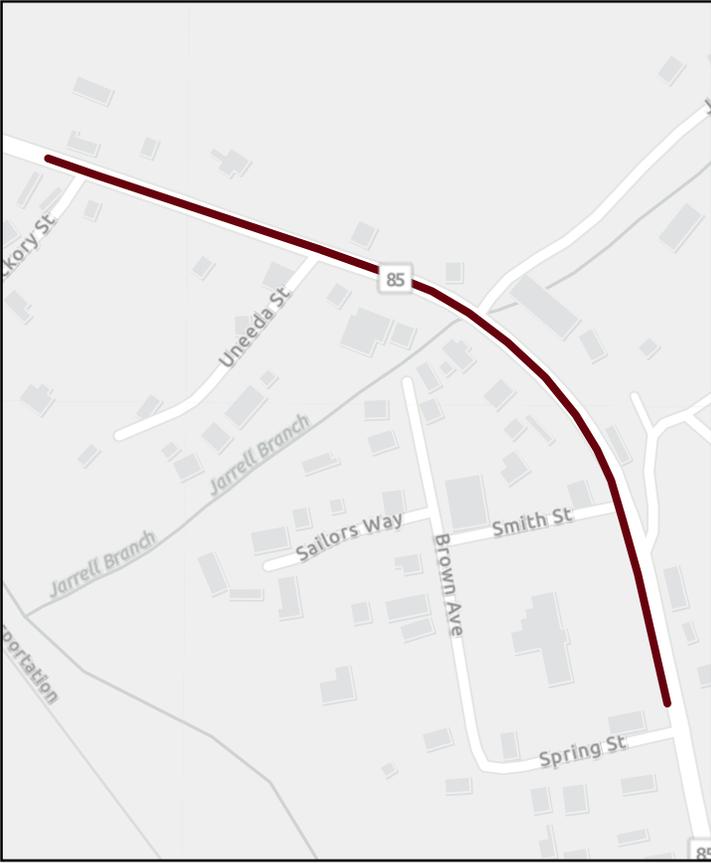
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Monongalia County - Rank: 11
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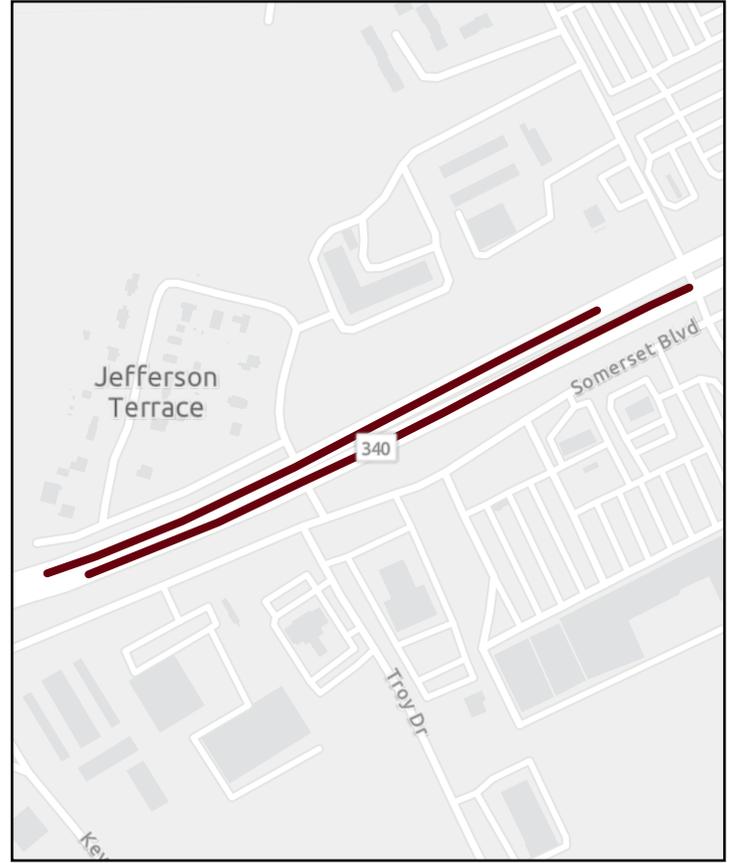
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High Injury Network Results

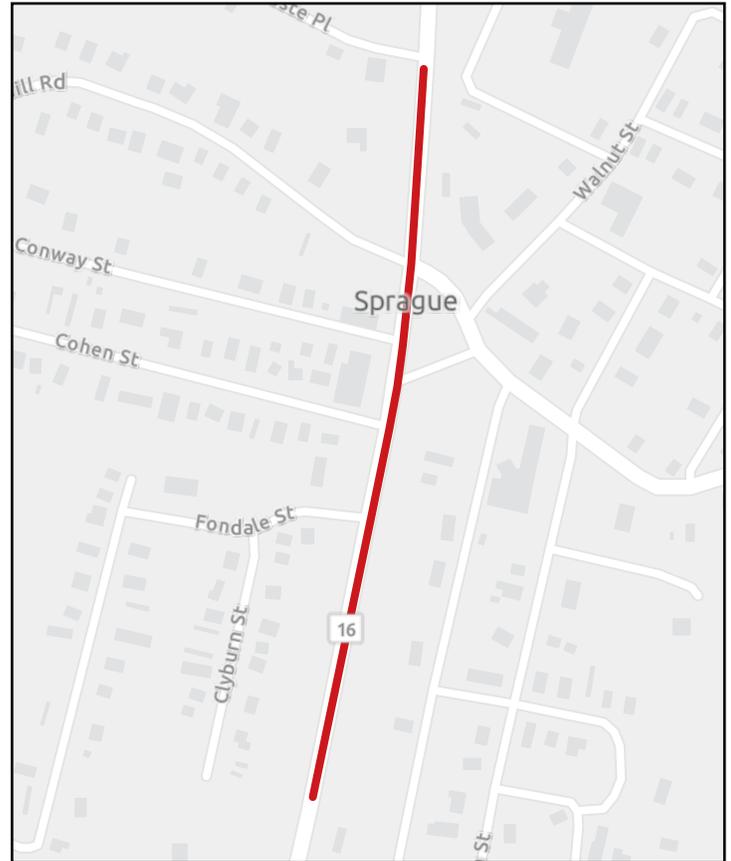
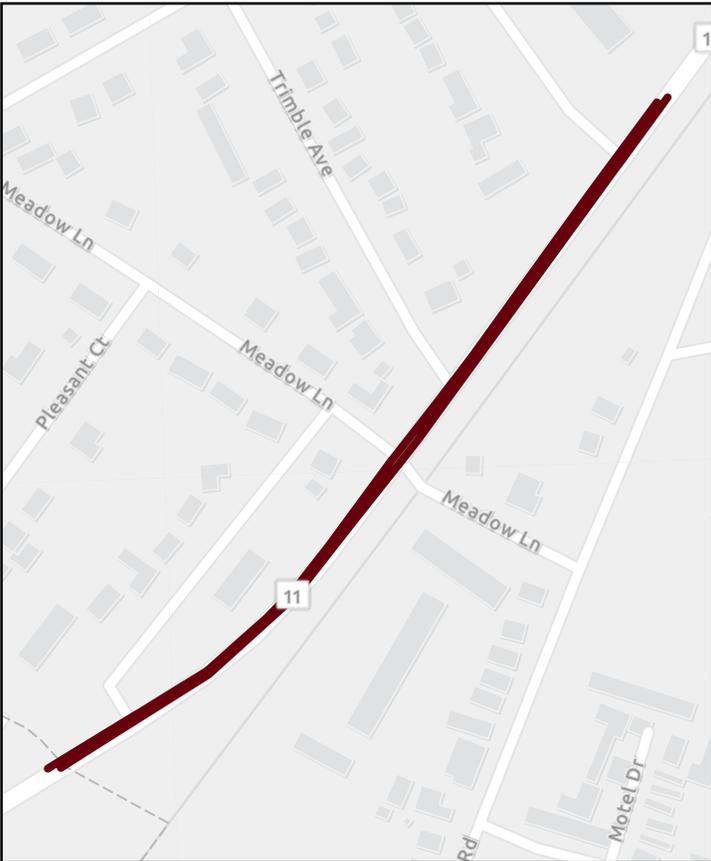


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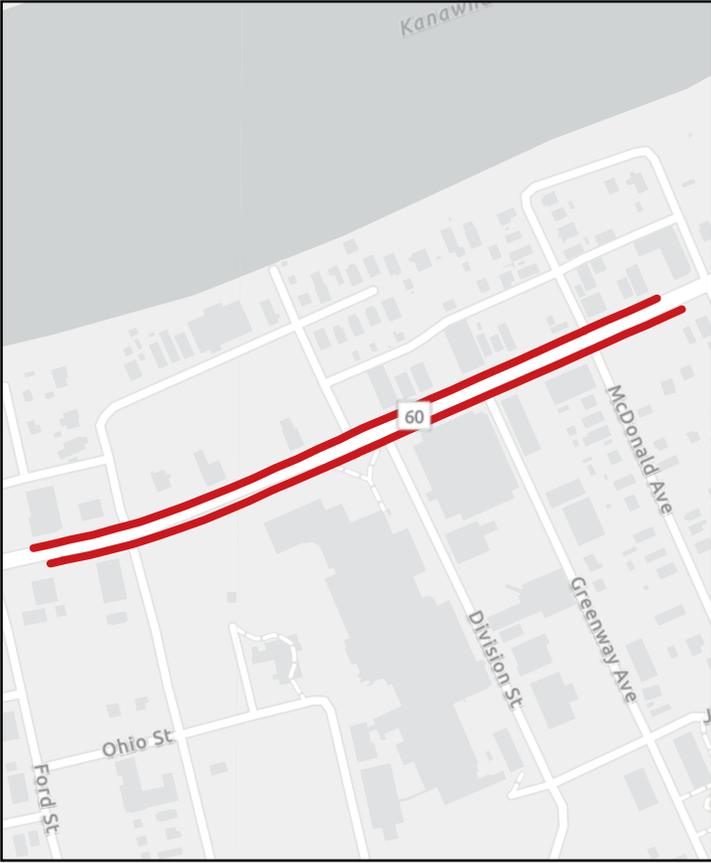
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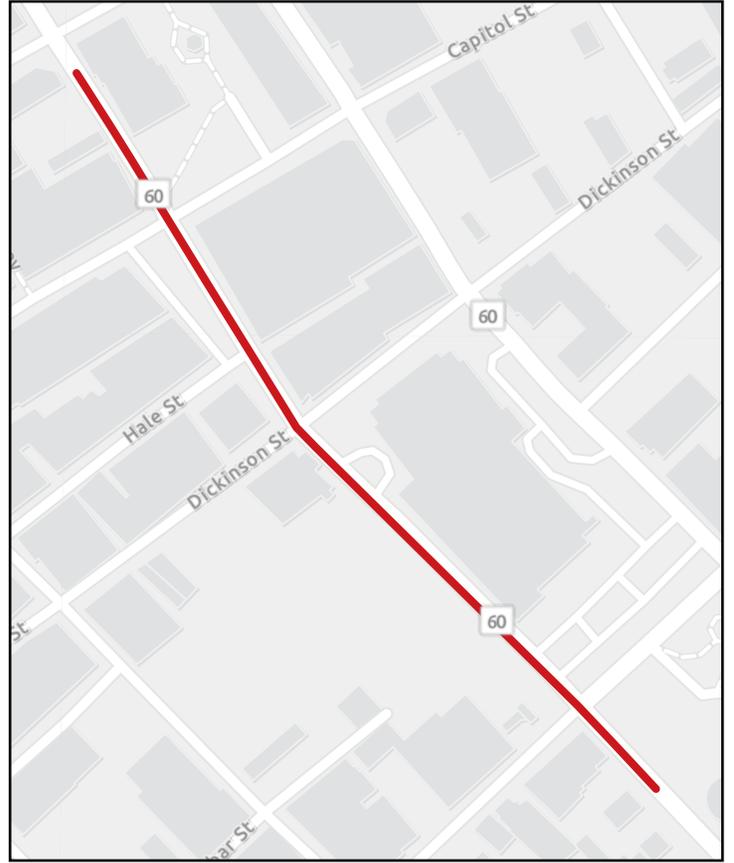


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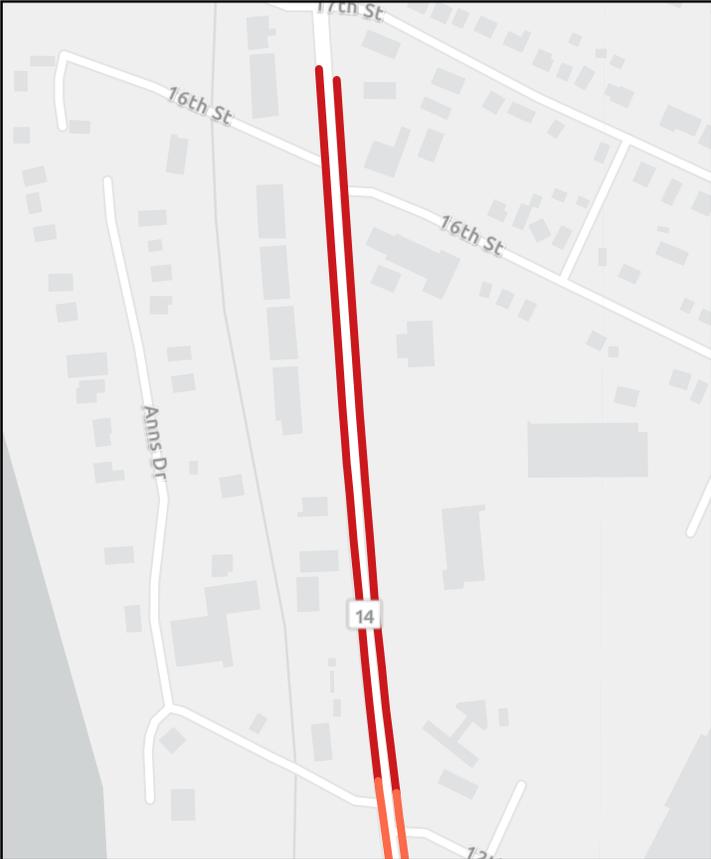


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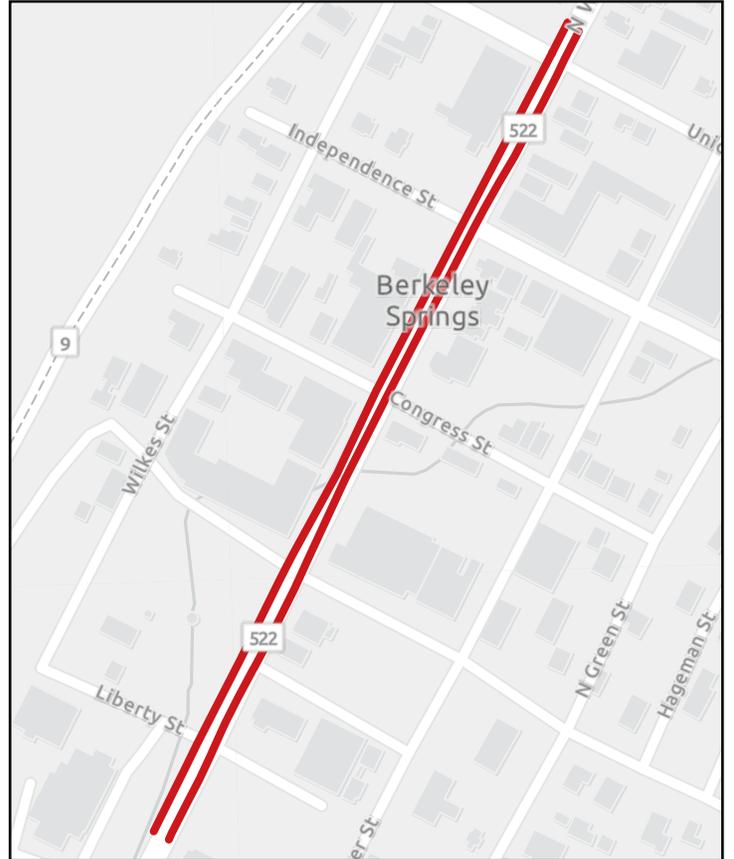


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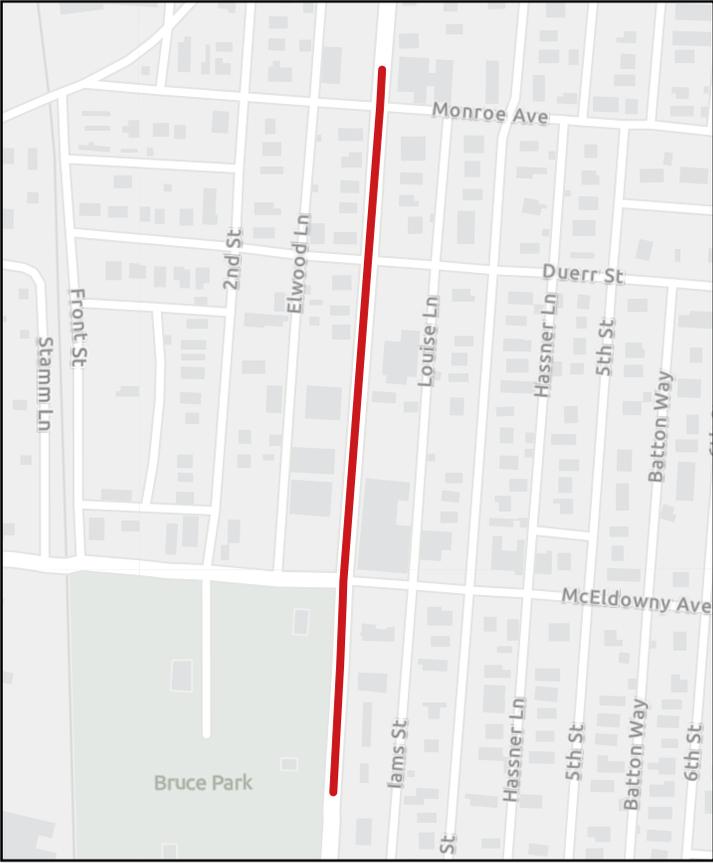
Wood County - Rank: 19
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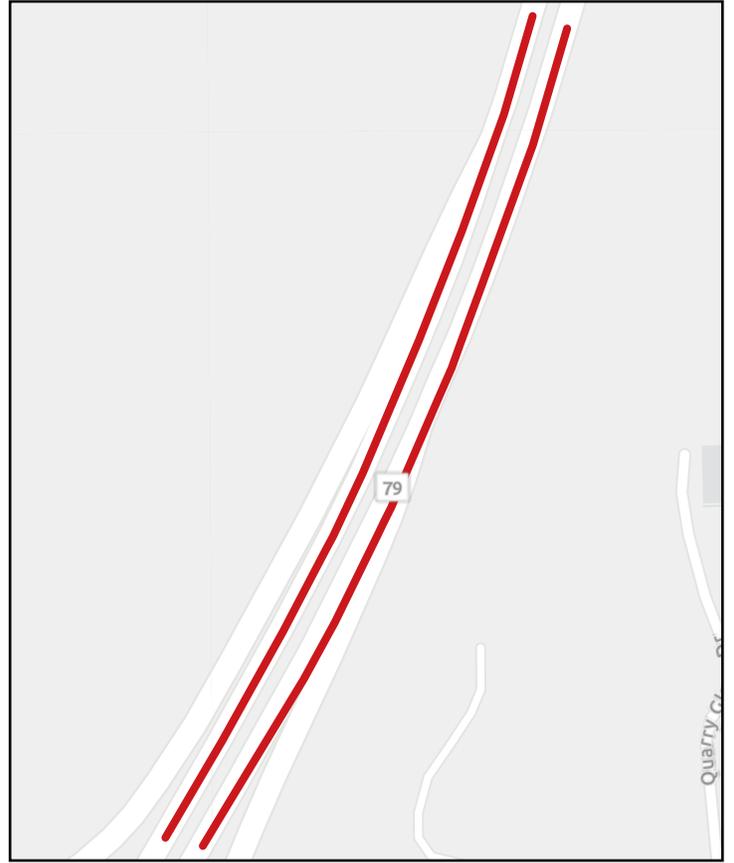
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High Injury Network Results

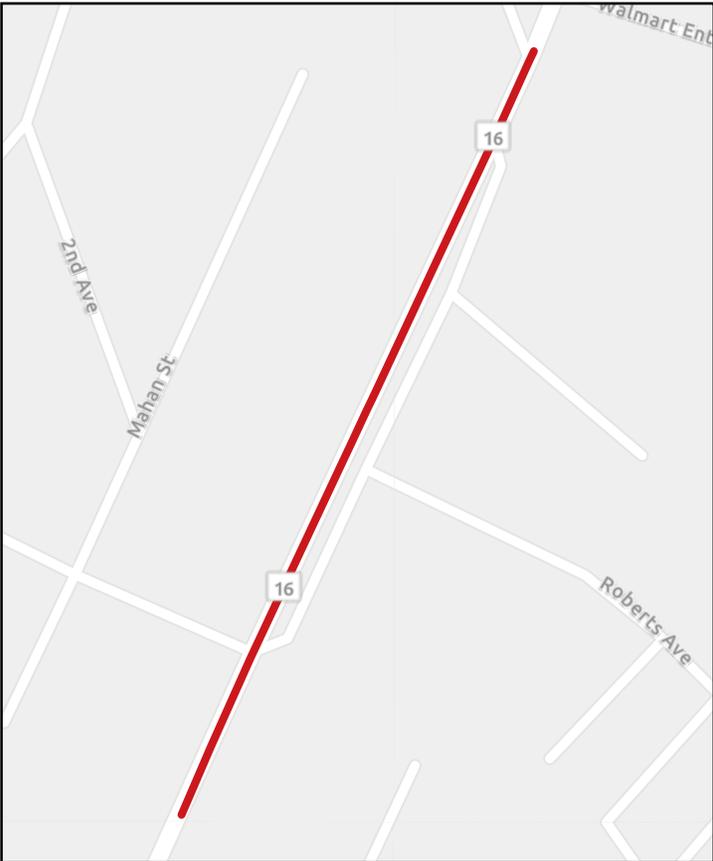


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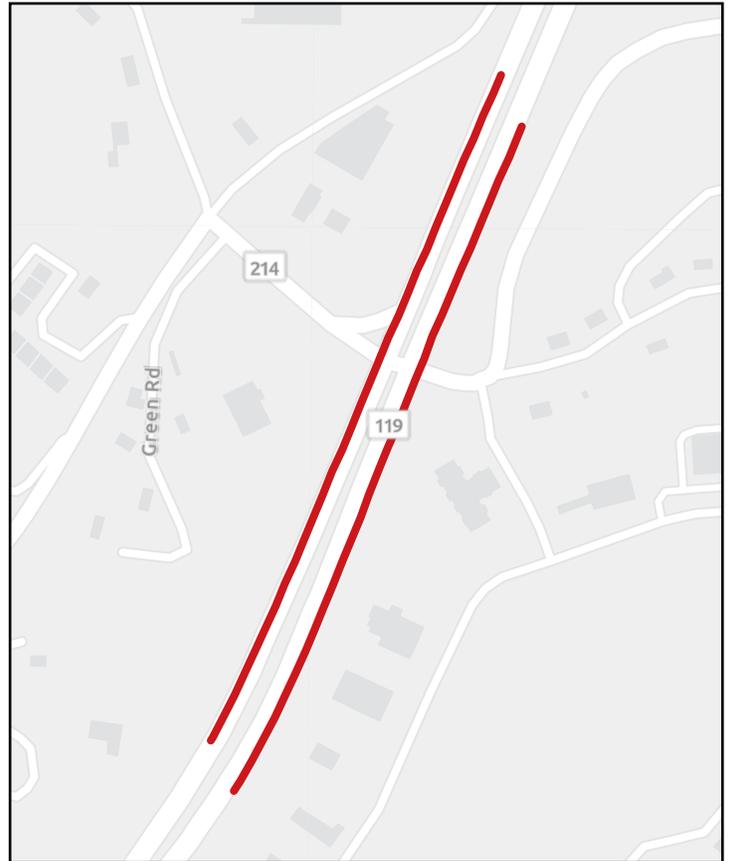


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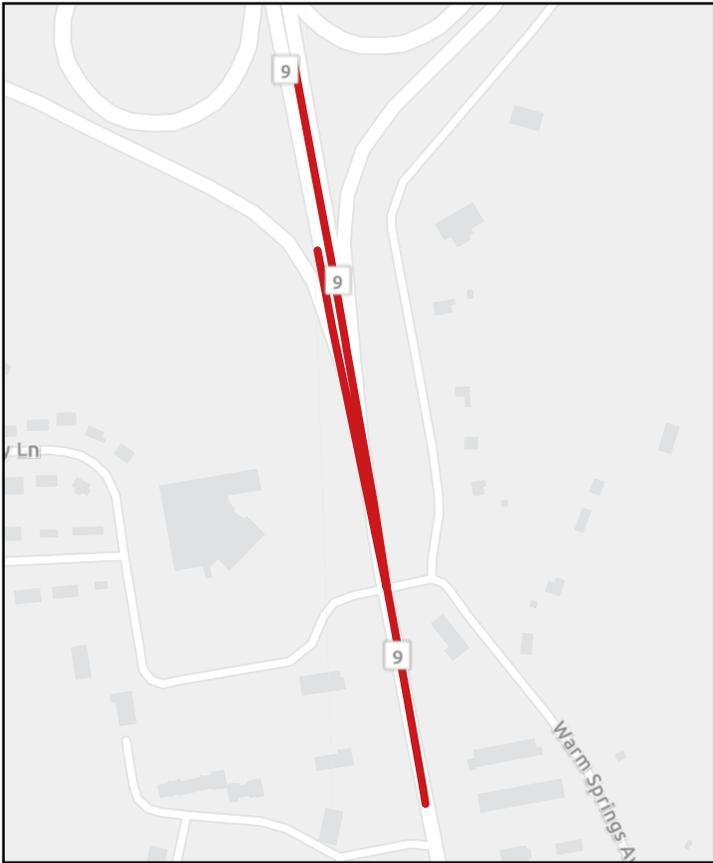
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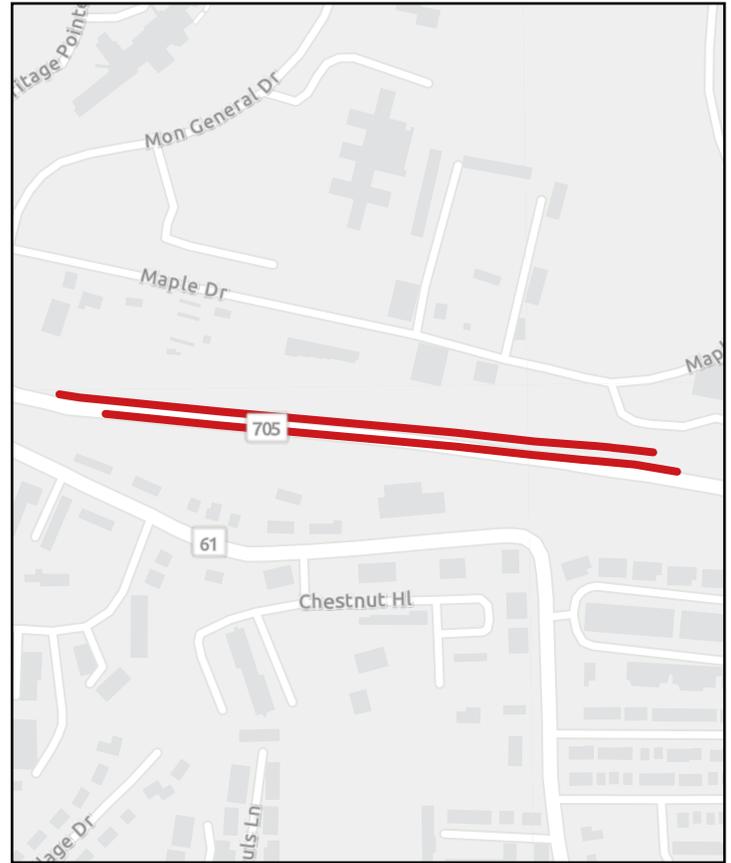
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High Injury Network Results

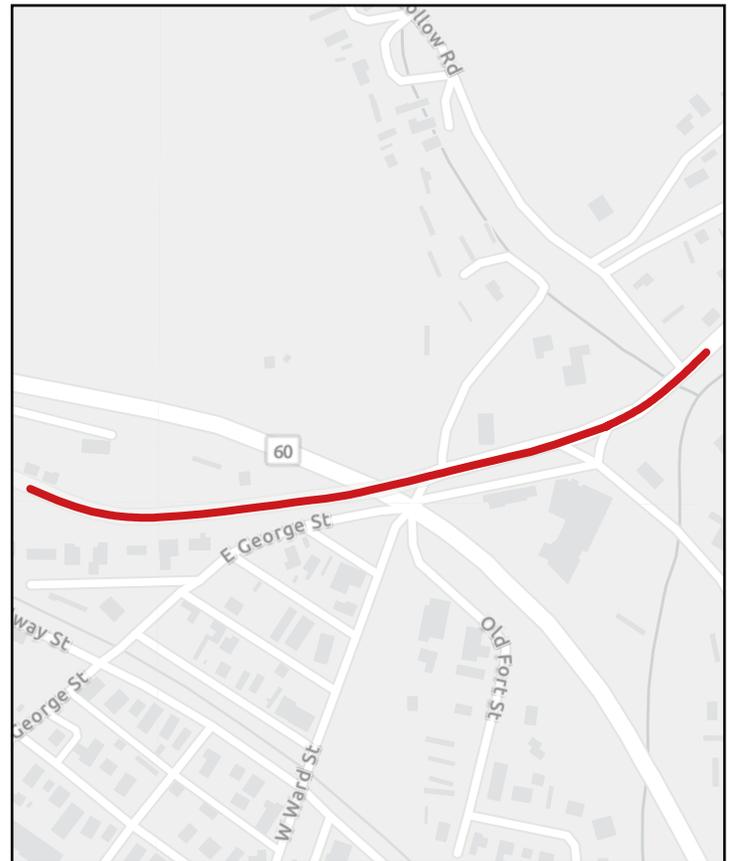
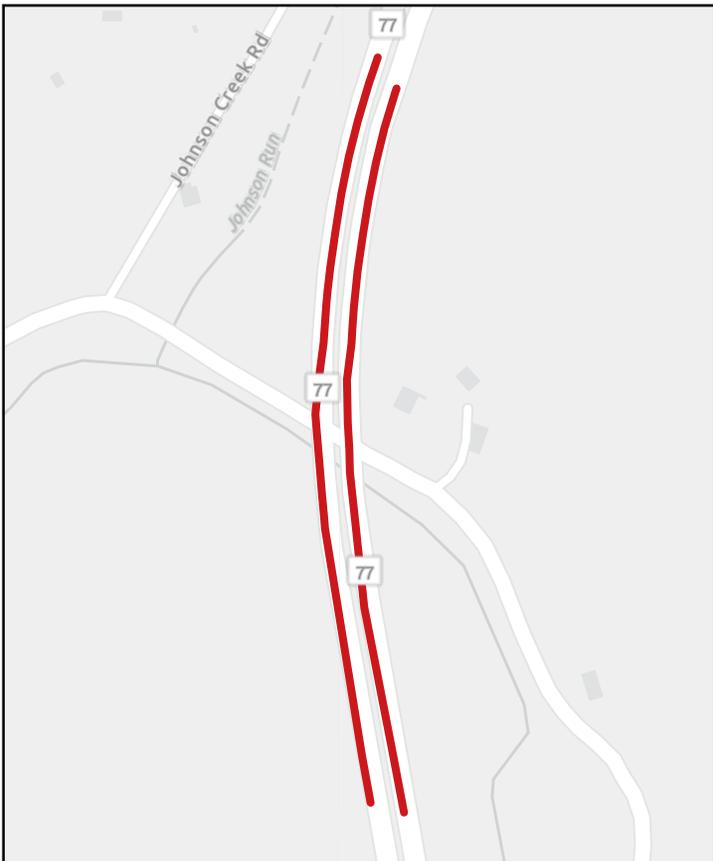


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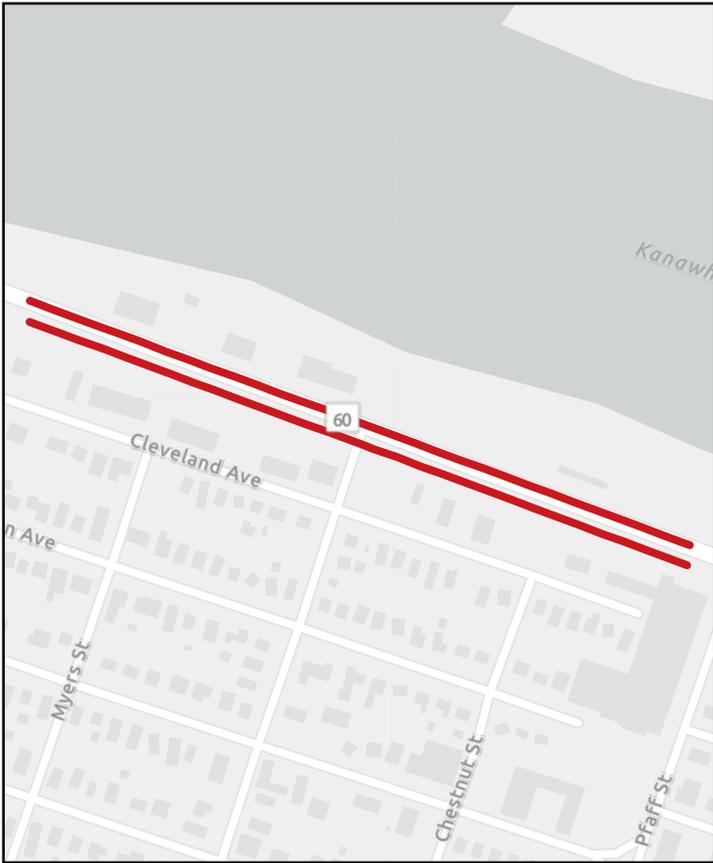
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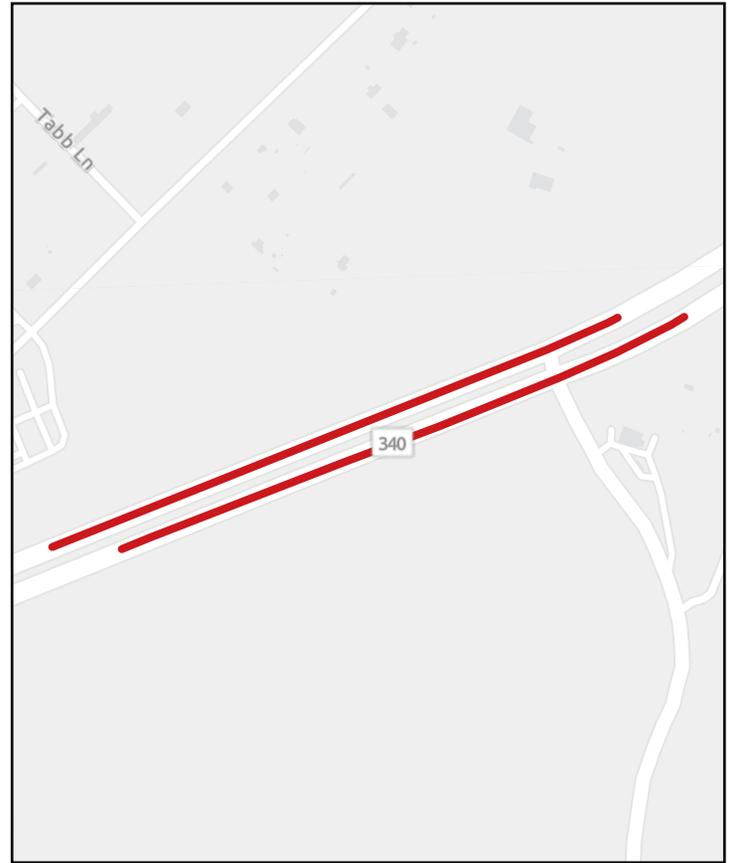


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High Injury Network Results

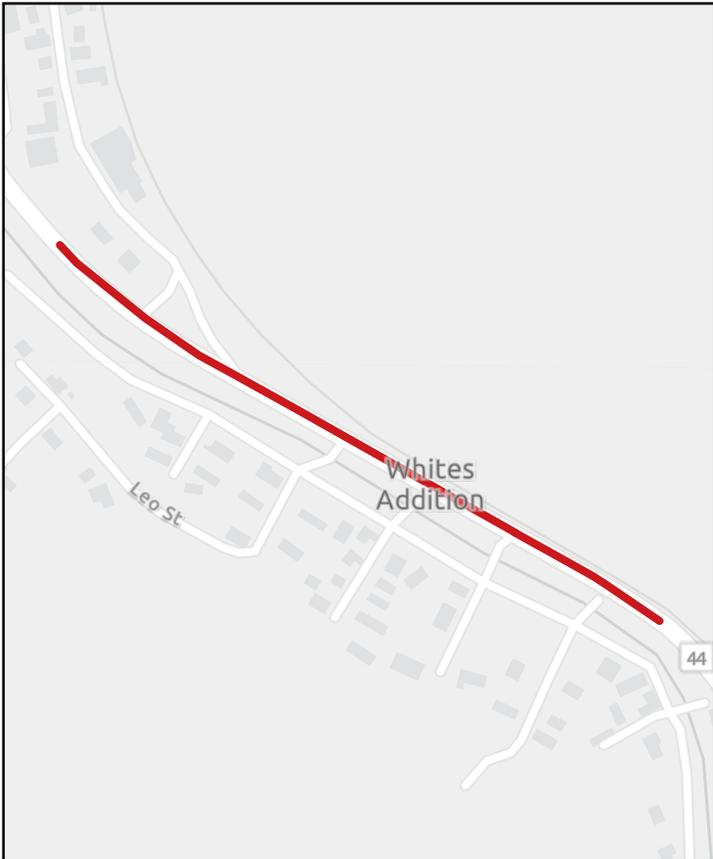


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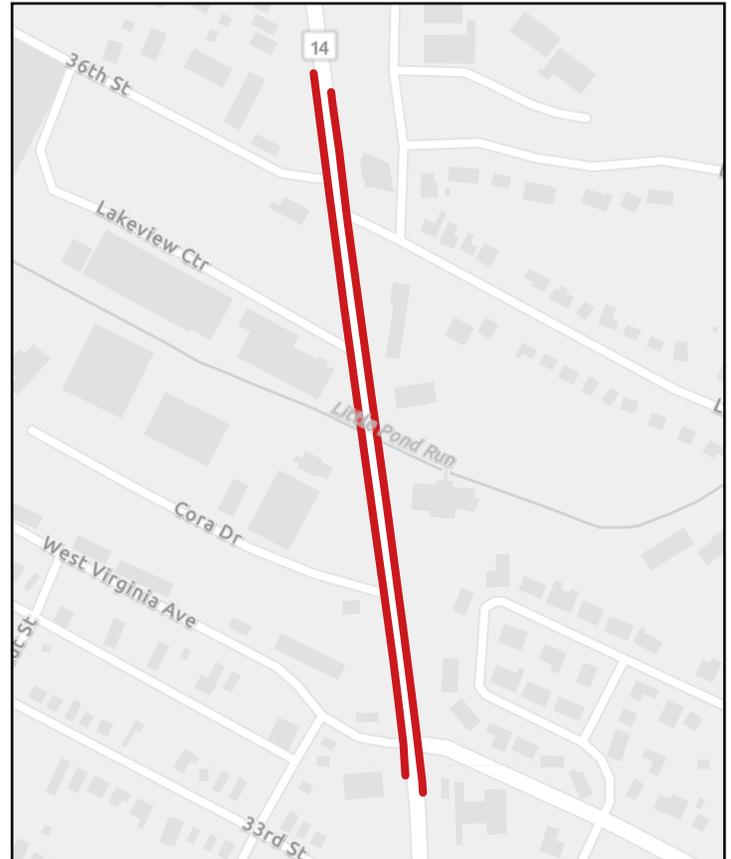


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Logan County - Rank: 28
Route ID: 23300440000 / 16.4 - 16.7



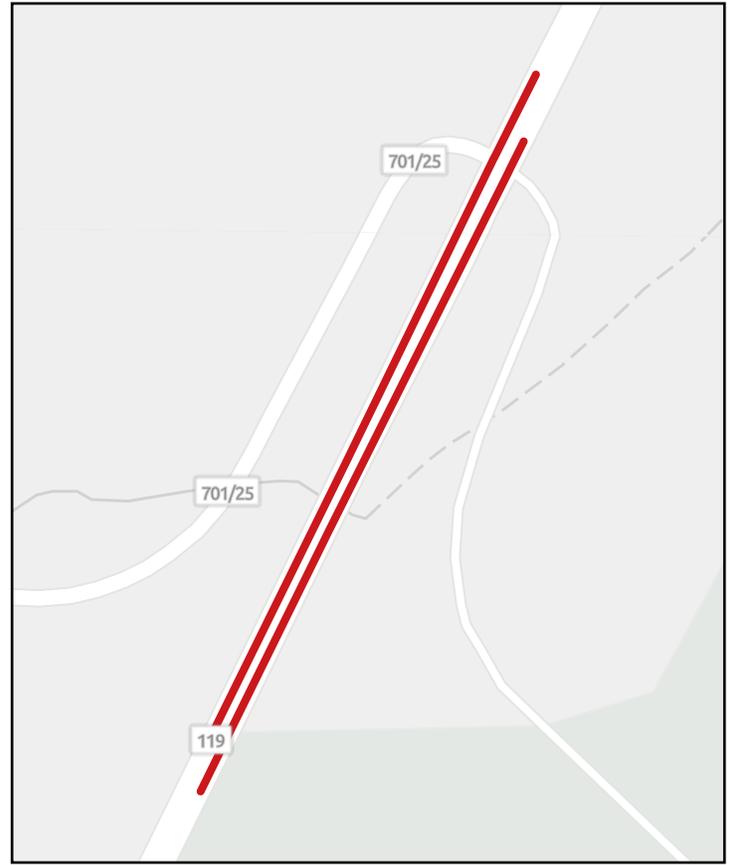
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High Injury Network Results



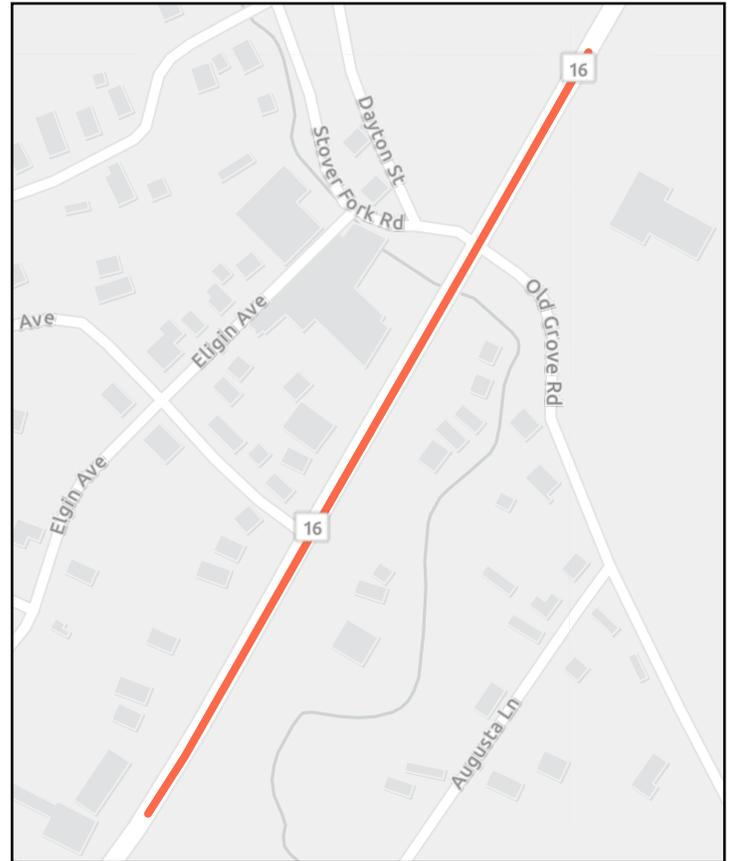
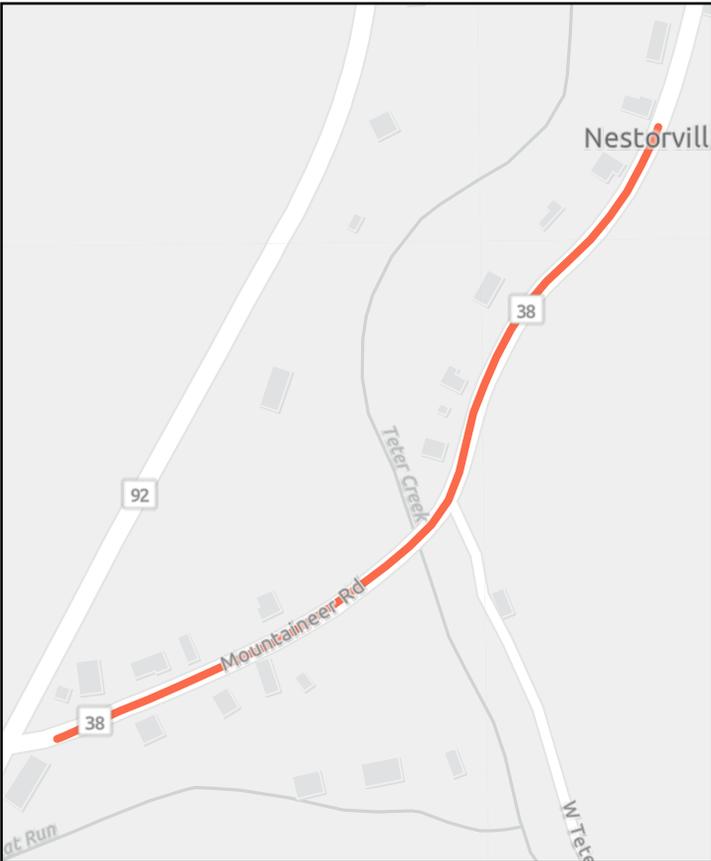
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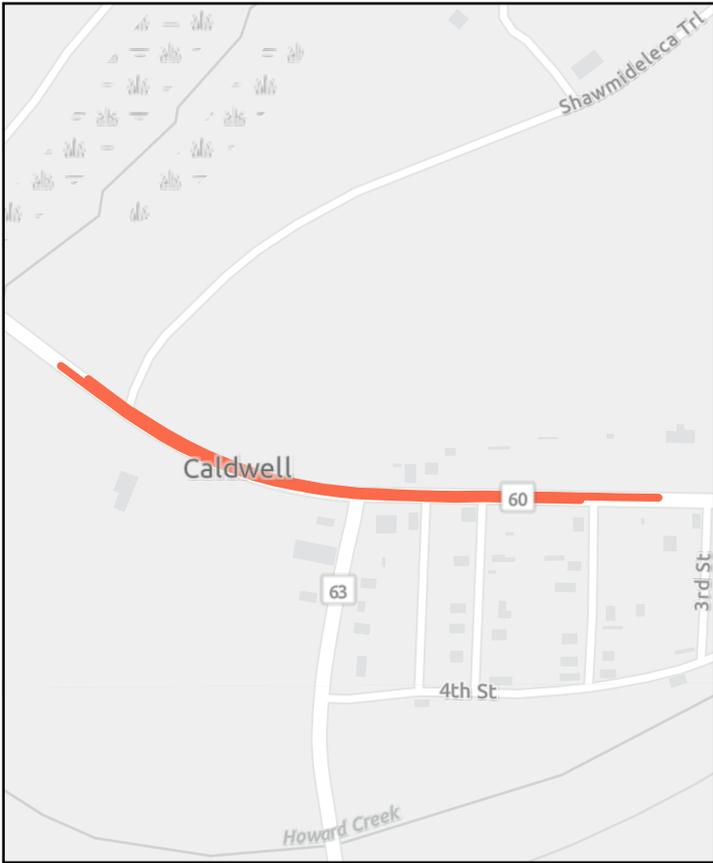
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Barbour County - Rank: 35
Route ID: 01300380000 / 6.7 - 7

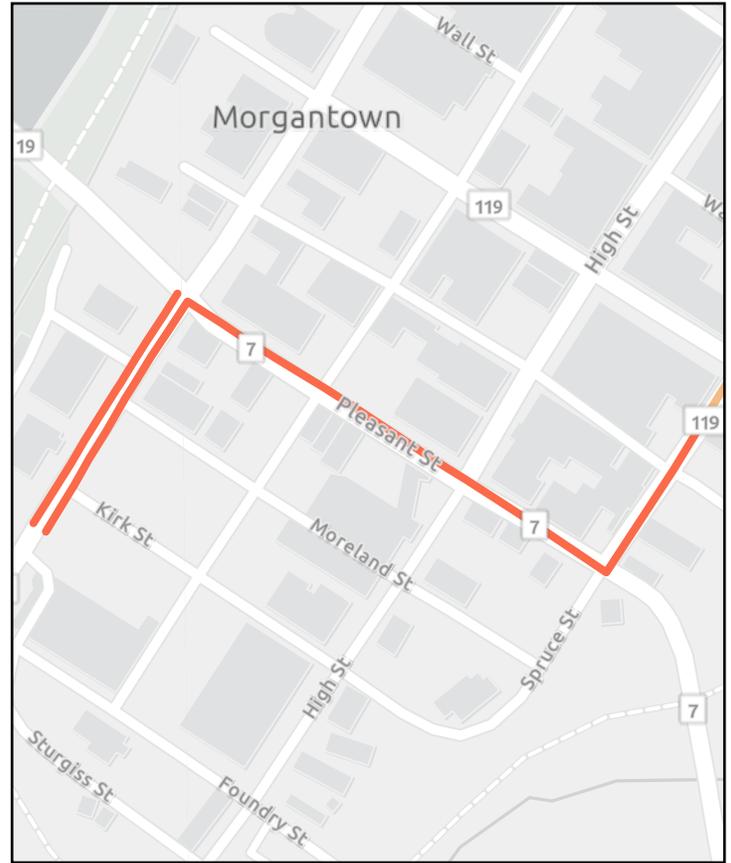
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High Injury Network Results

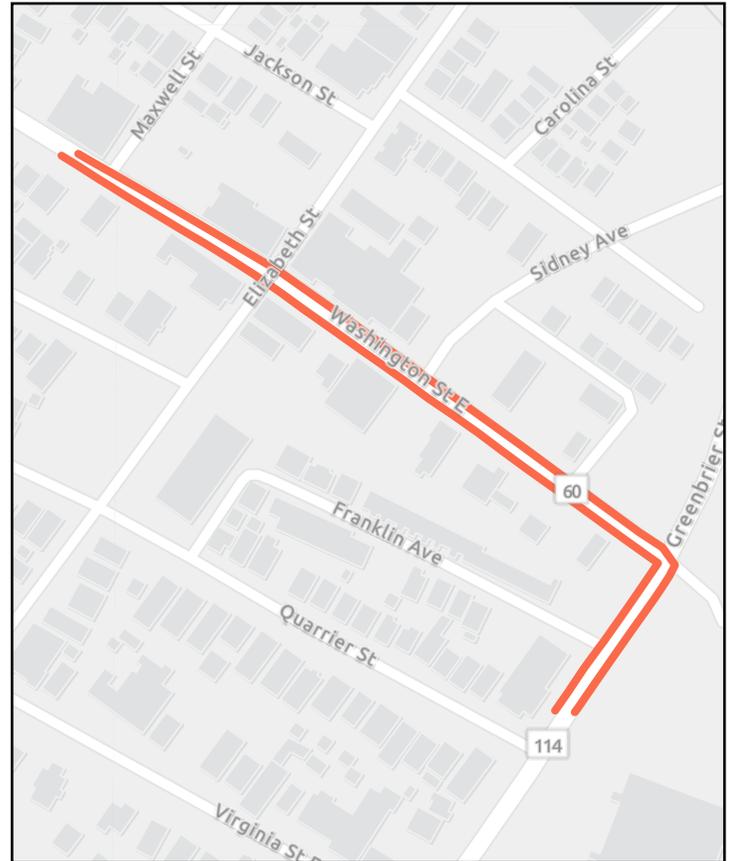
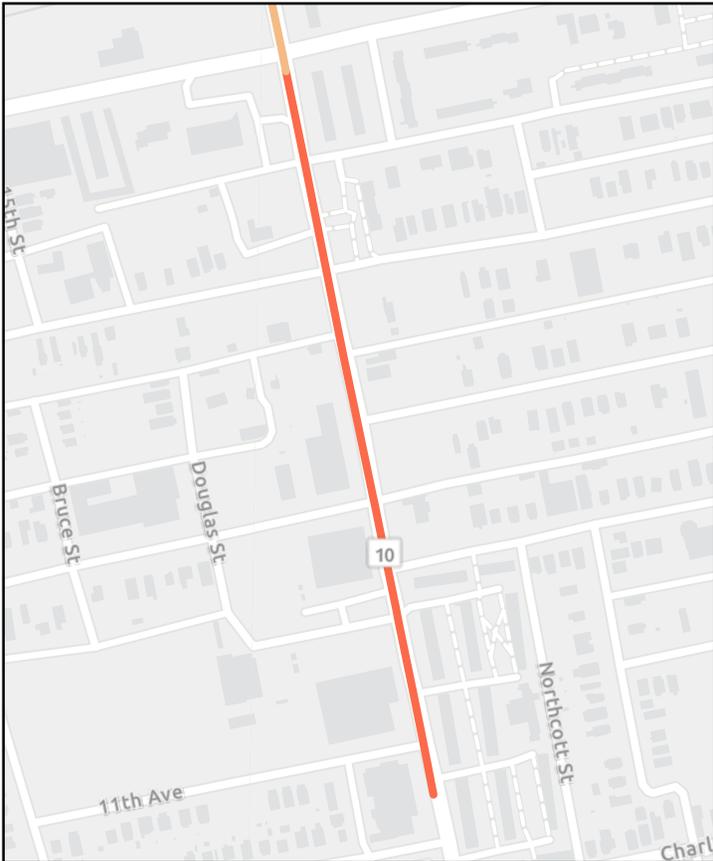


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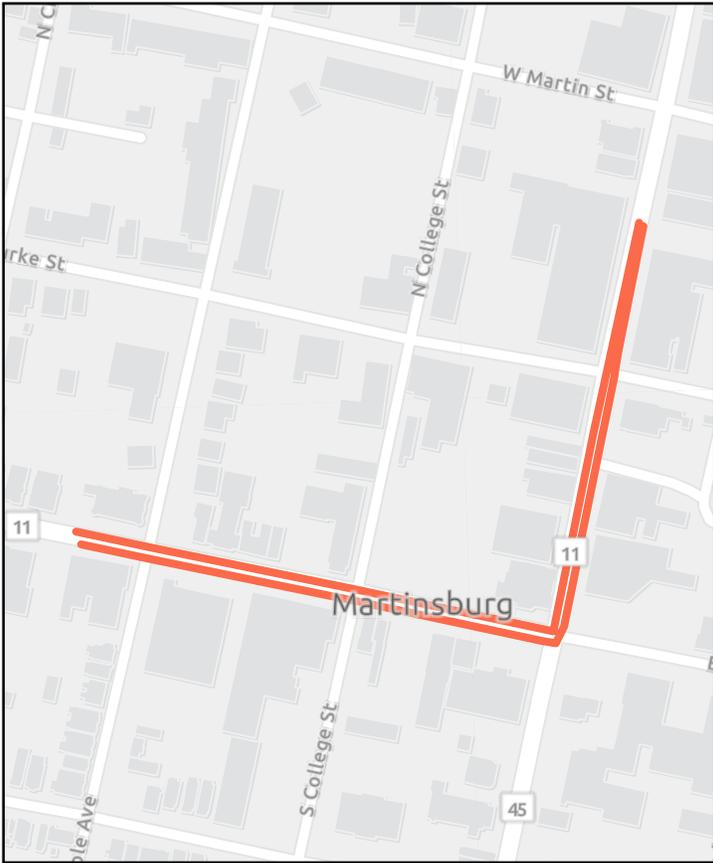
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Cabell County - Rank: 39
Route ID: 06300100000 / 17.8 - 18.1

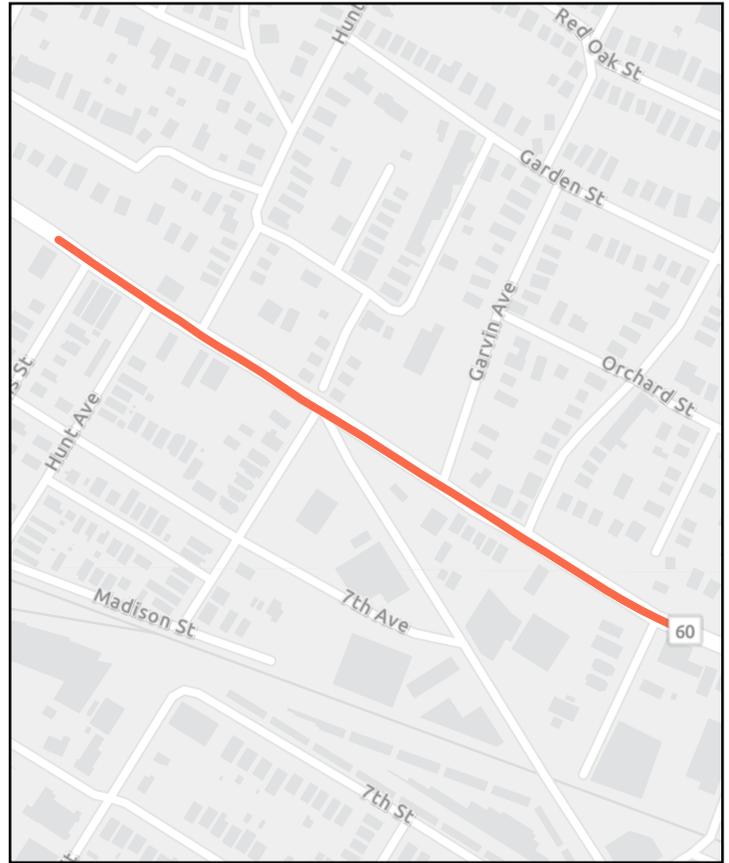


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High Injury Network Results

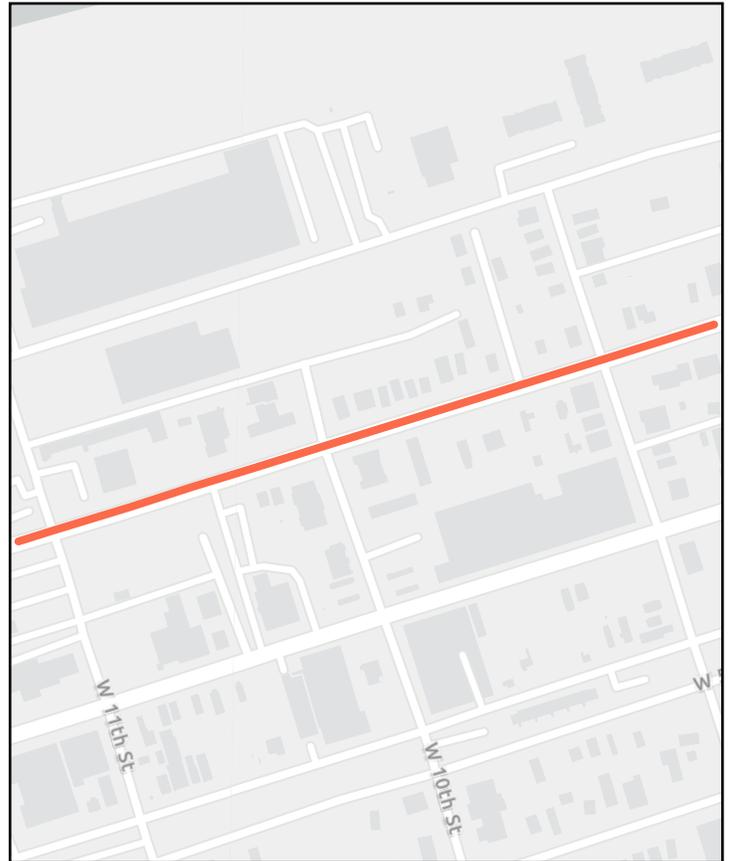
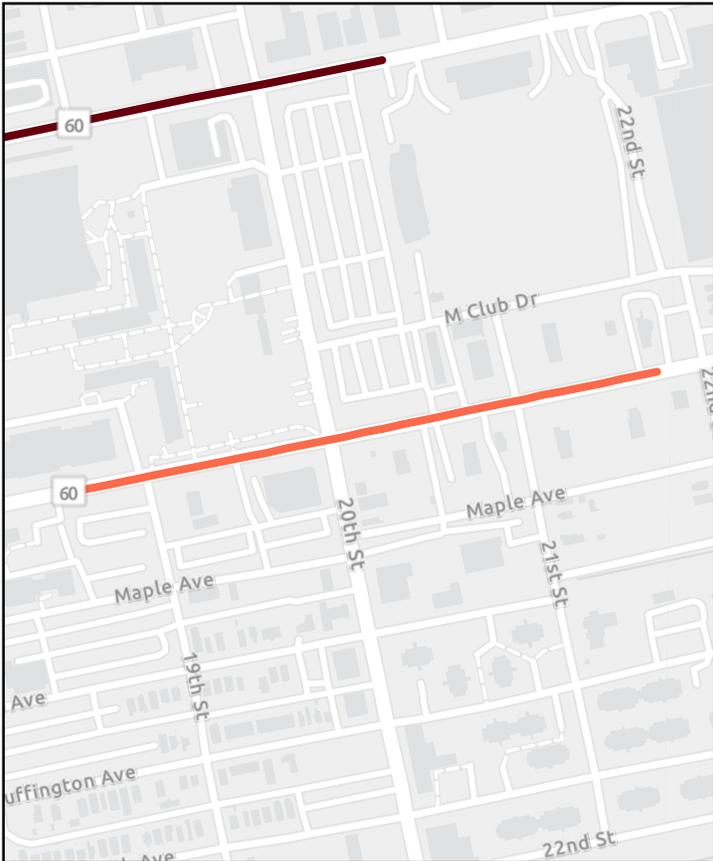


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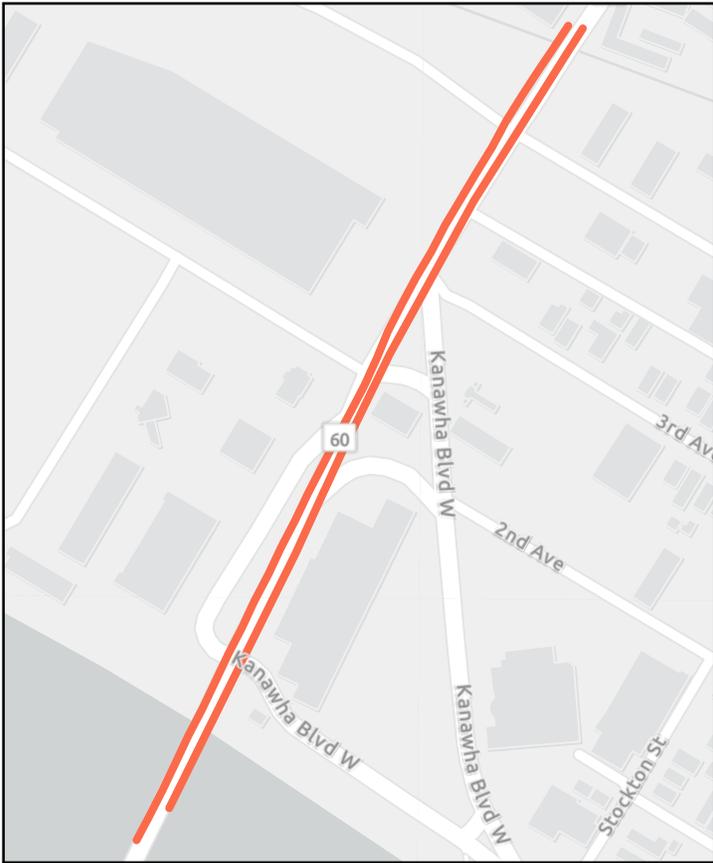
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Cabell County - Rank: 43
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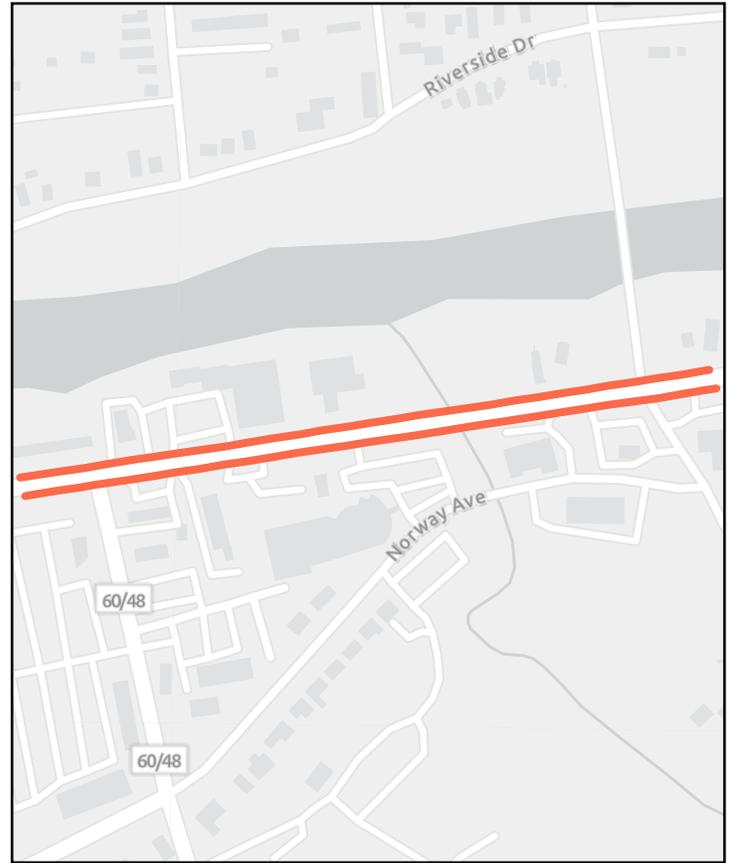


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High Injury Network Results



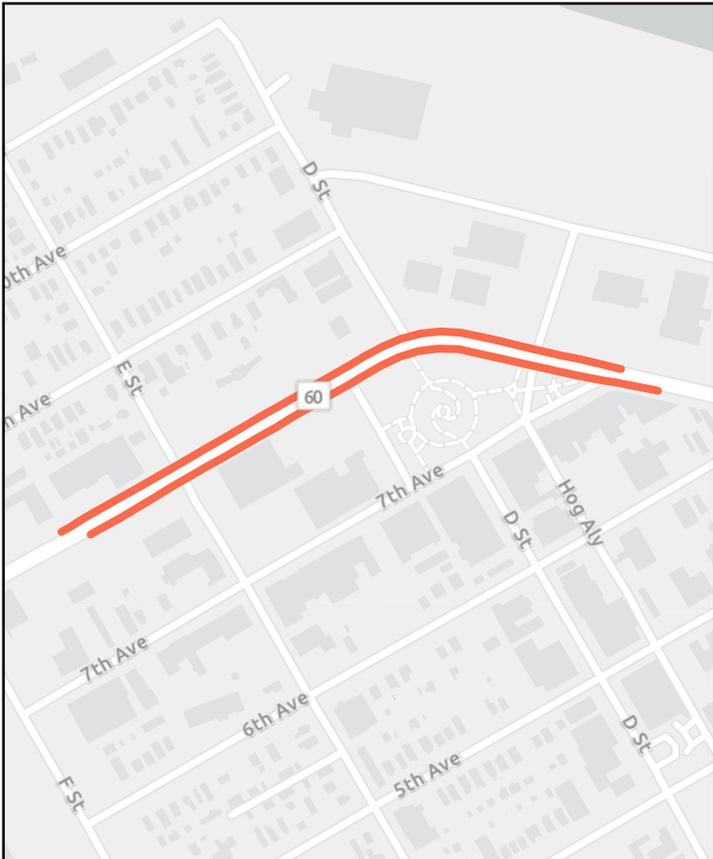
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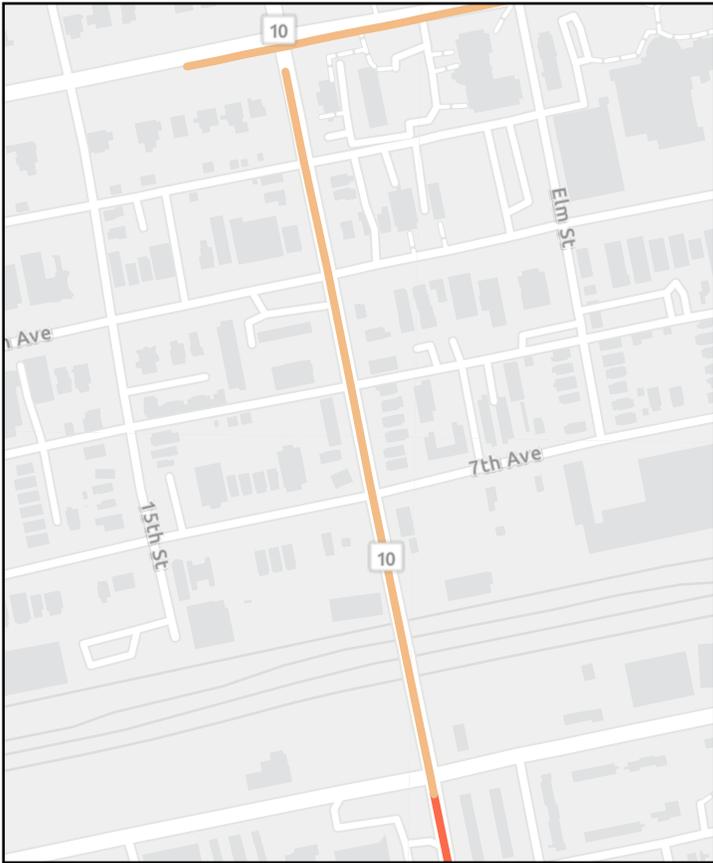
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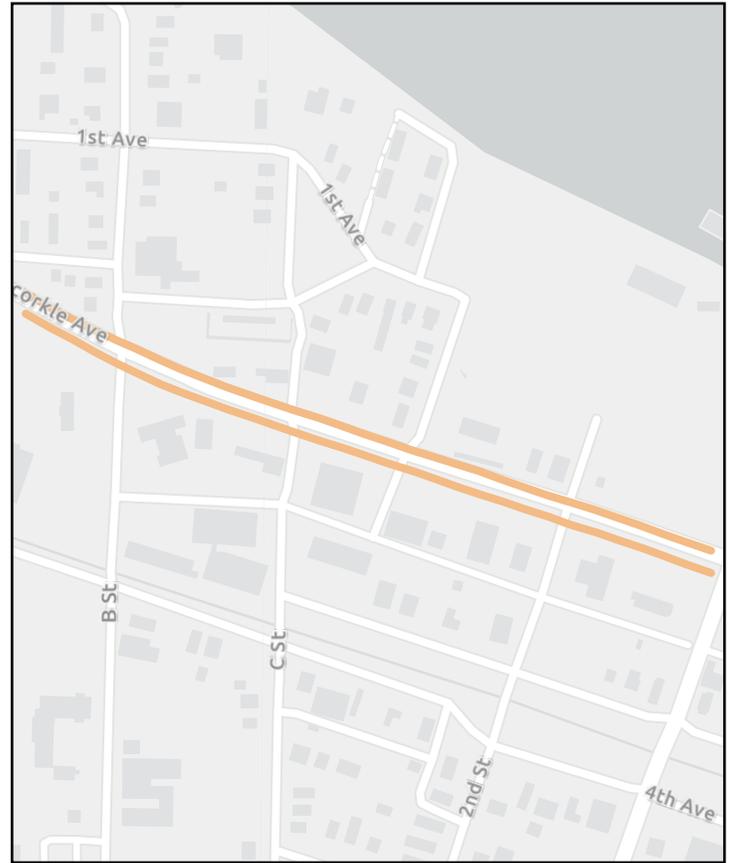
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High Injury Network Results

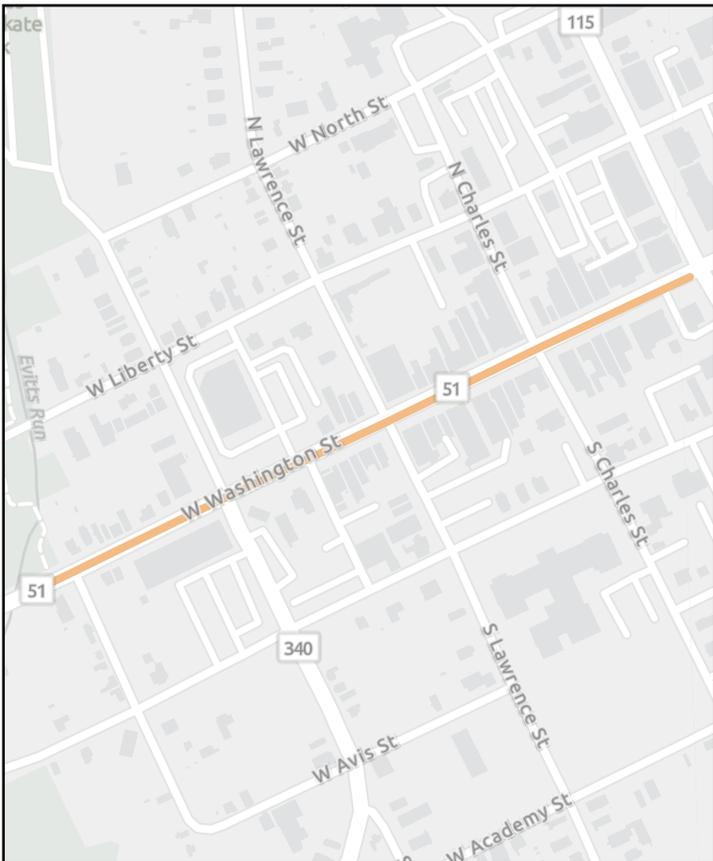


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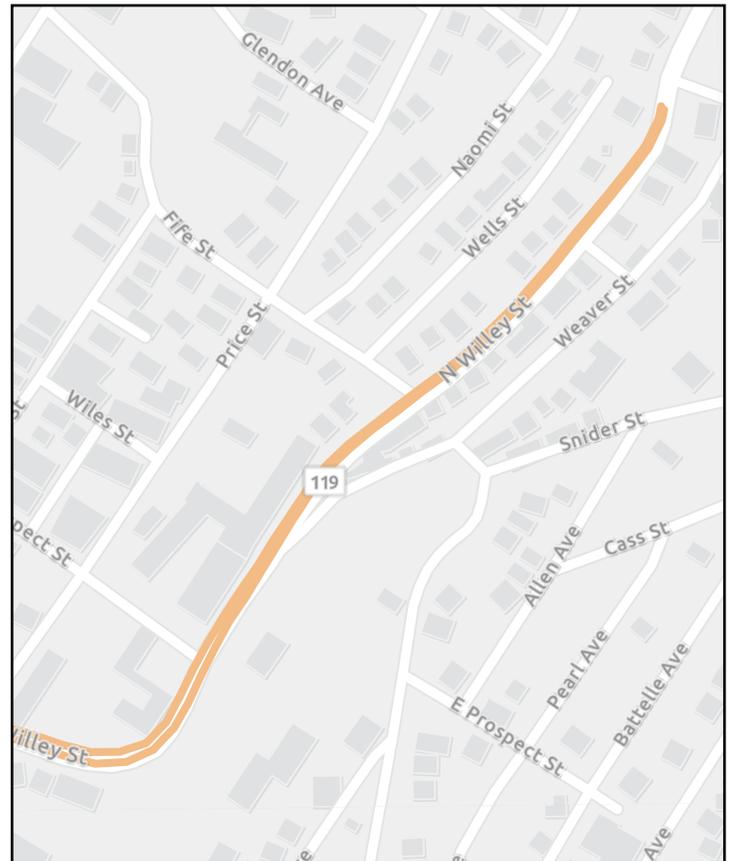


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Jefferson County - Rank: 51
Route ID: 19300510000 / 7.4 - 7.7



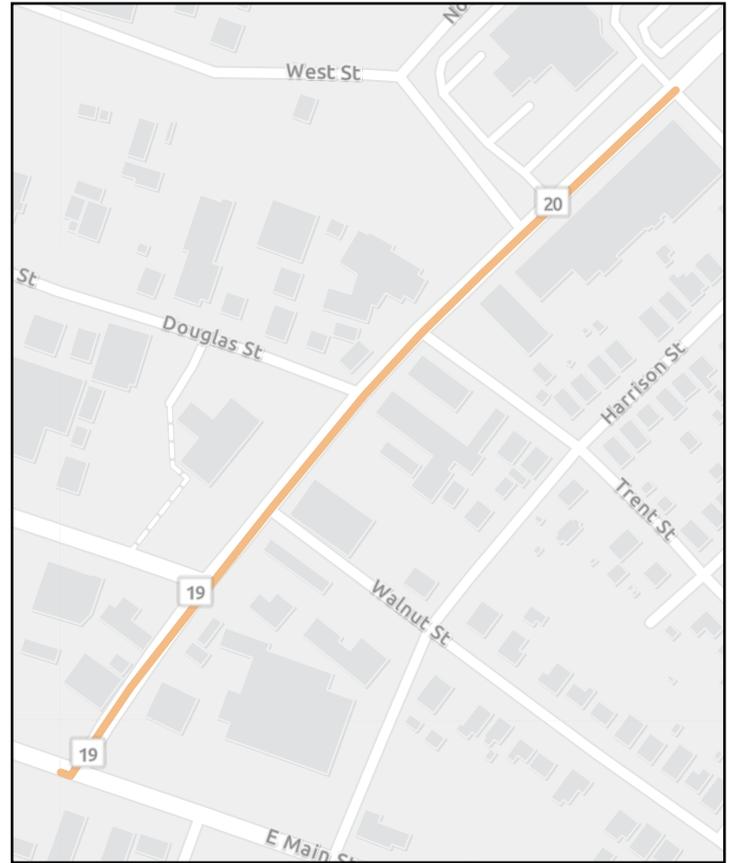
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High Injury Network Results



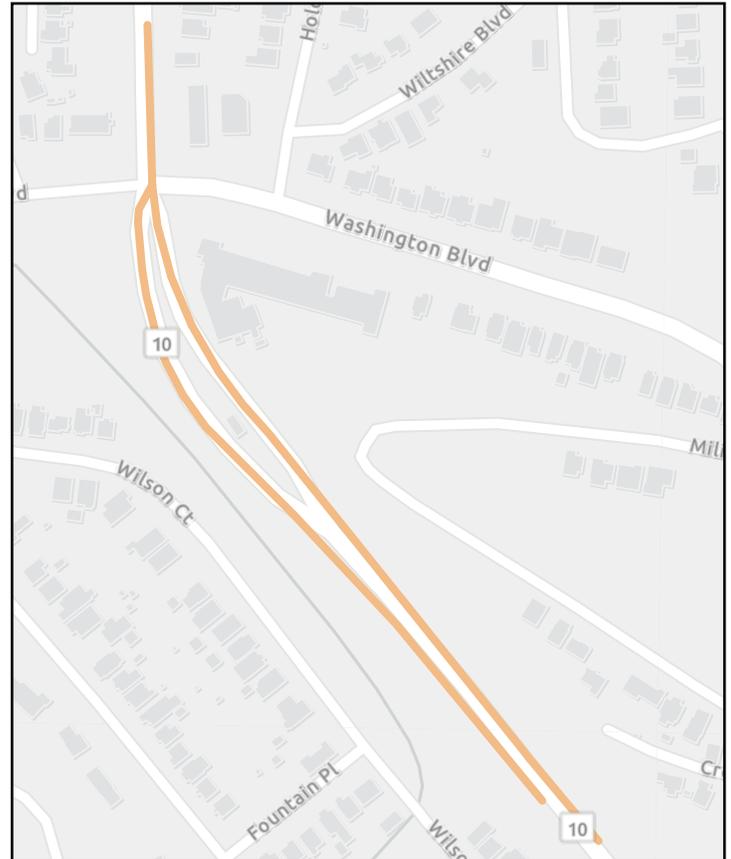
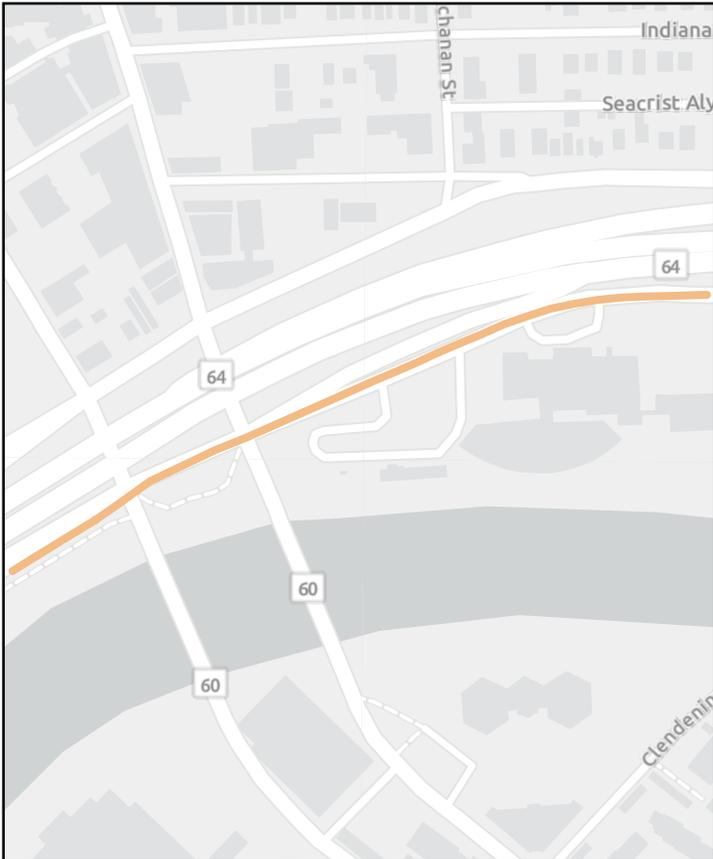
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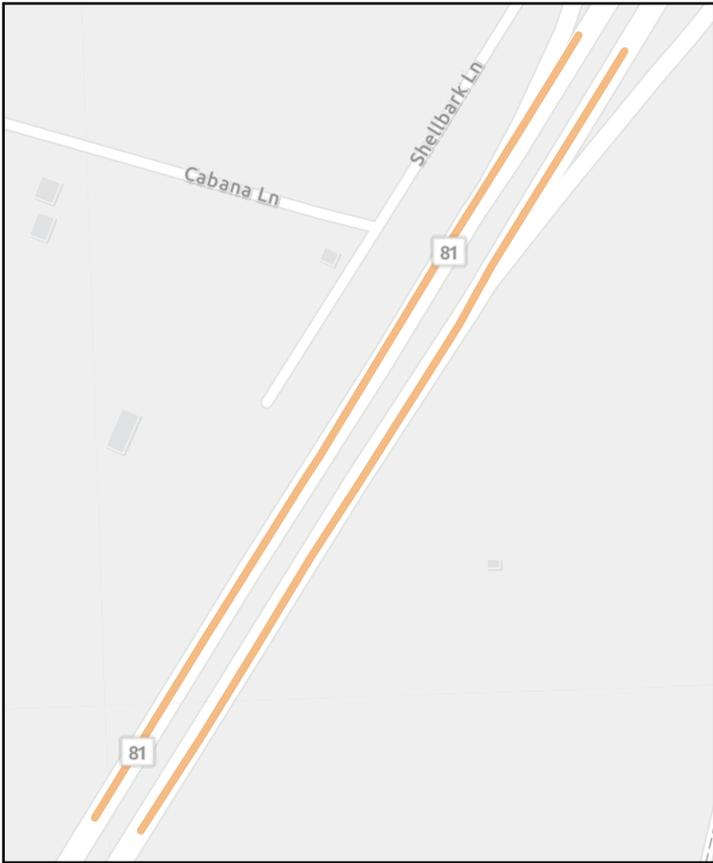
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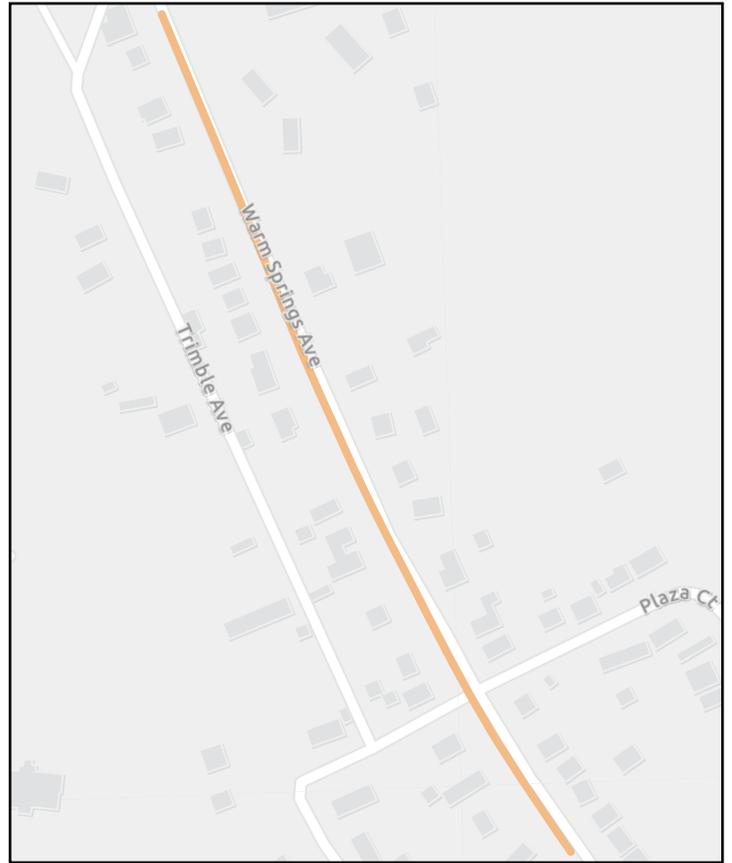
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High Injury Network Results

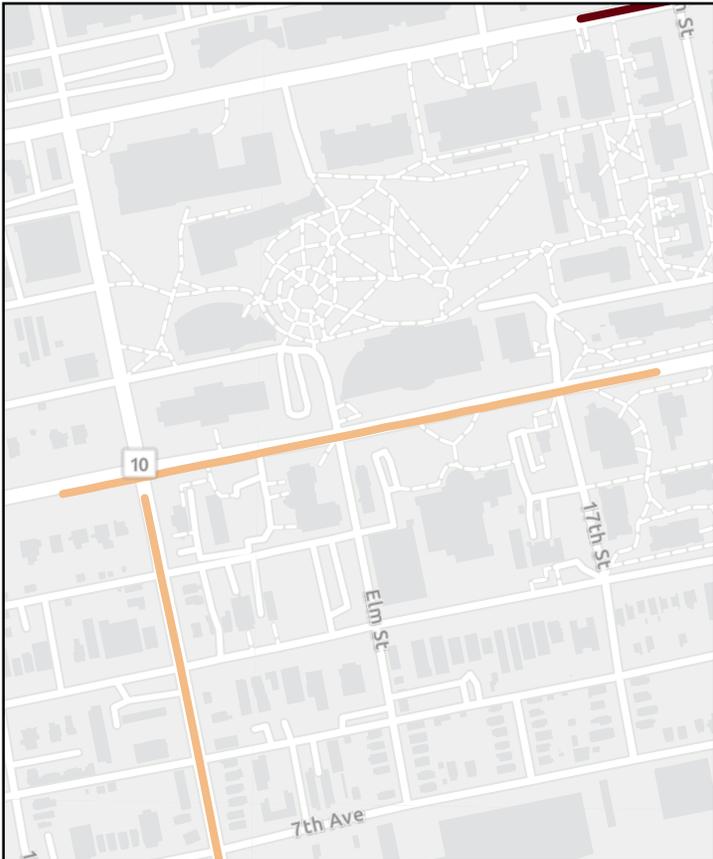


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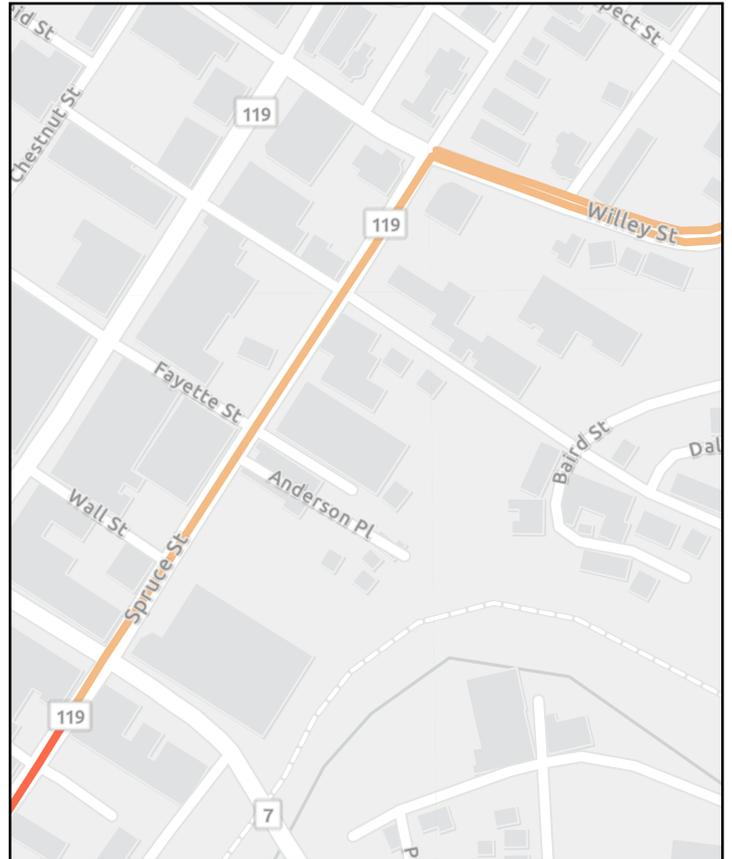


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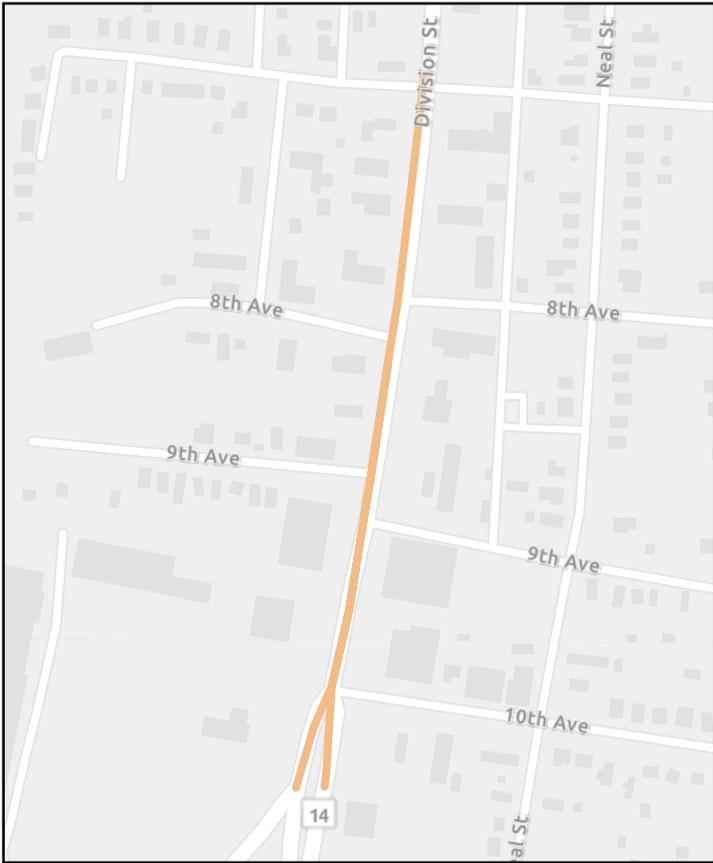
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High Injury Network Results

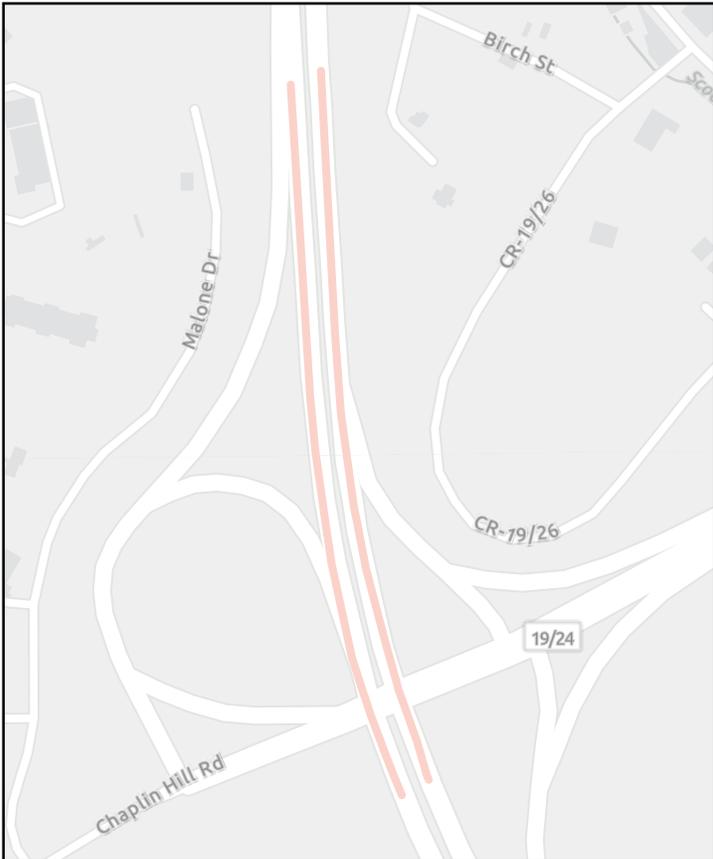


Wood County - Rank: 61
Route ID: 54300140000 / 12 - 12.3

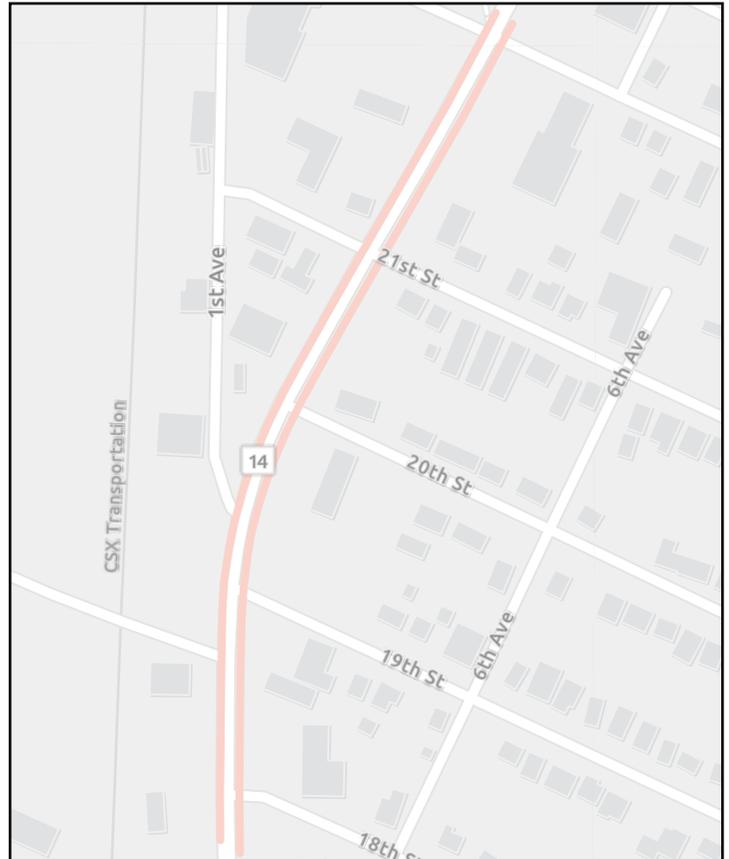


Cabell County - Rank: 61
Route ID: 06200600000 / 5.3 - 5.6

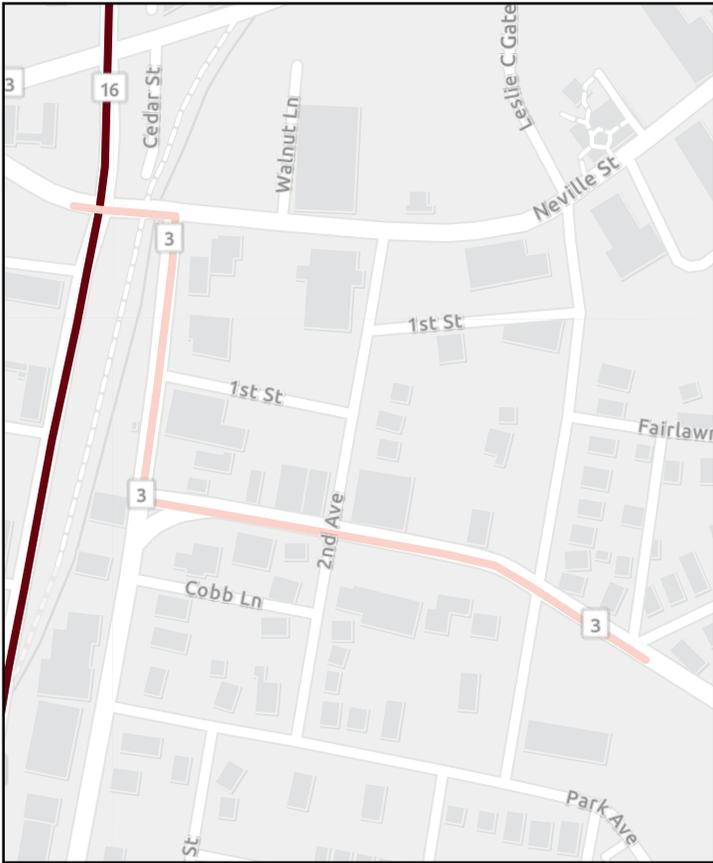
Monongalia County - Rank: 63
Route ID: 31100790000 / 154.8 - 155.1



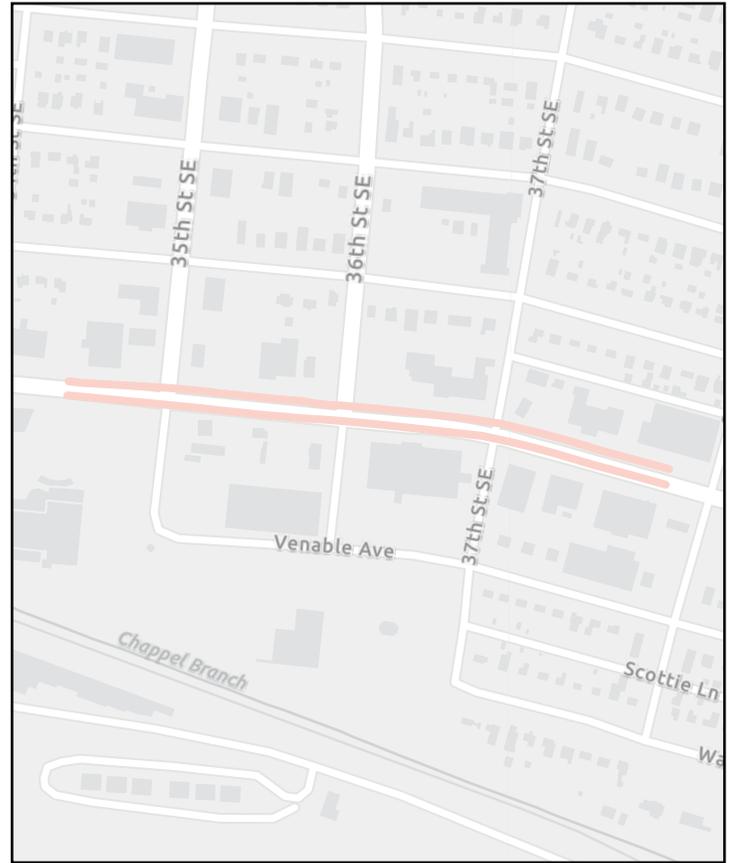
Wood County - Rank: 64
Route ID: 54300140000 / 17.3 - 17.6



High Injury Network Results

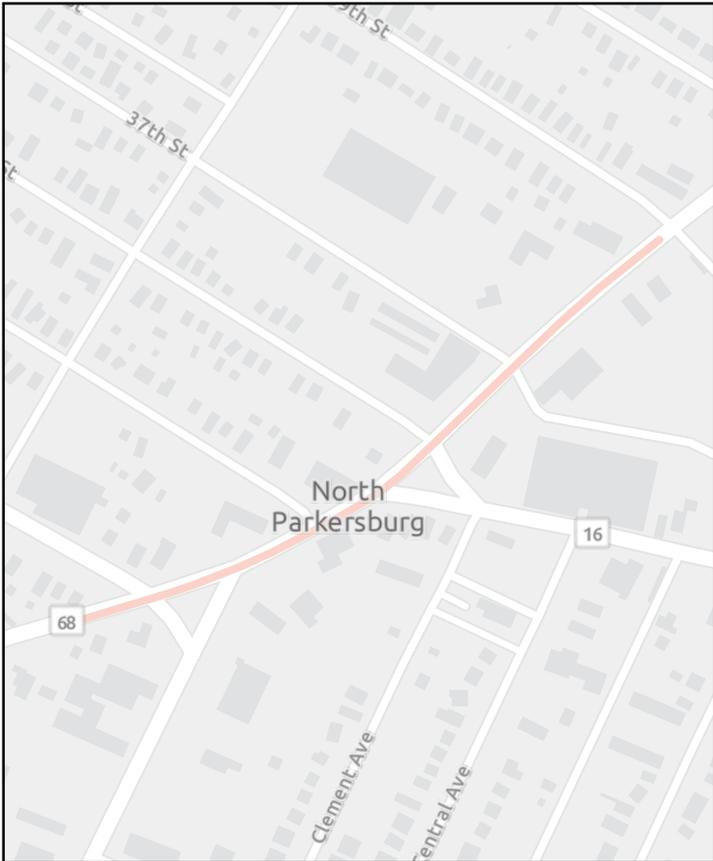


Raleigh County - Rank: 64
Route ID: 41300030000 / 38.1 - 38.4



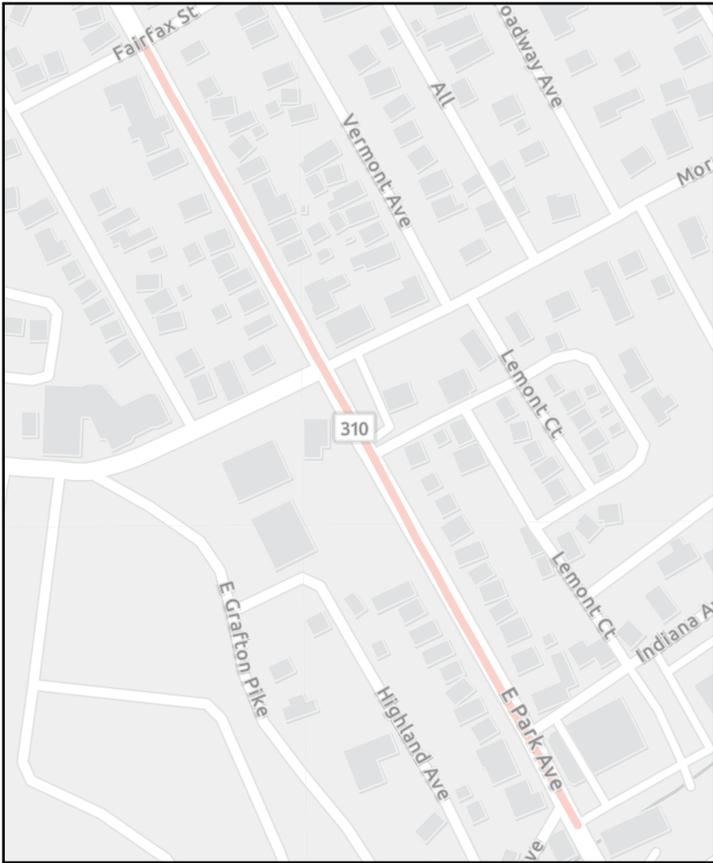
Kanawha County - Rank: 66
Route ID: 20300610000 / 23.5 - 23.8

Wood County - Rank: 67
Route ID: 54300680000 / 19.1 - 19.4

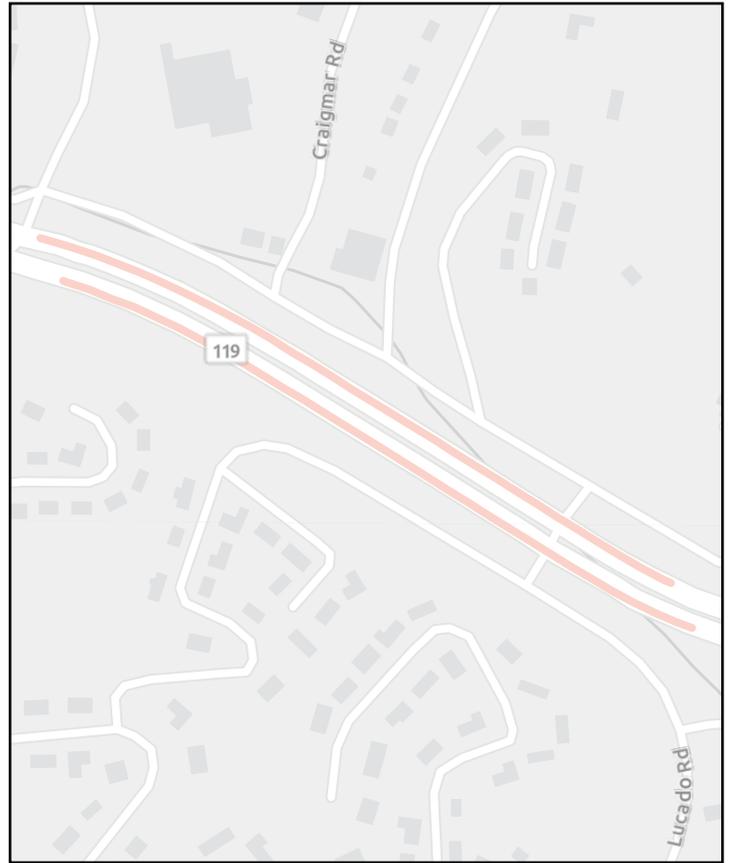


Monongalia County - Rank: 68
Route ID: 31200190000 / 13.1 - 13.4

High Injury Network Results

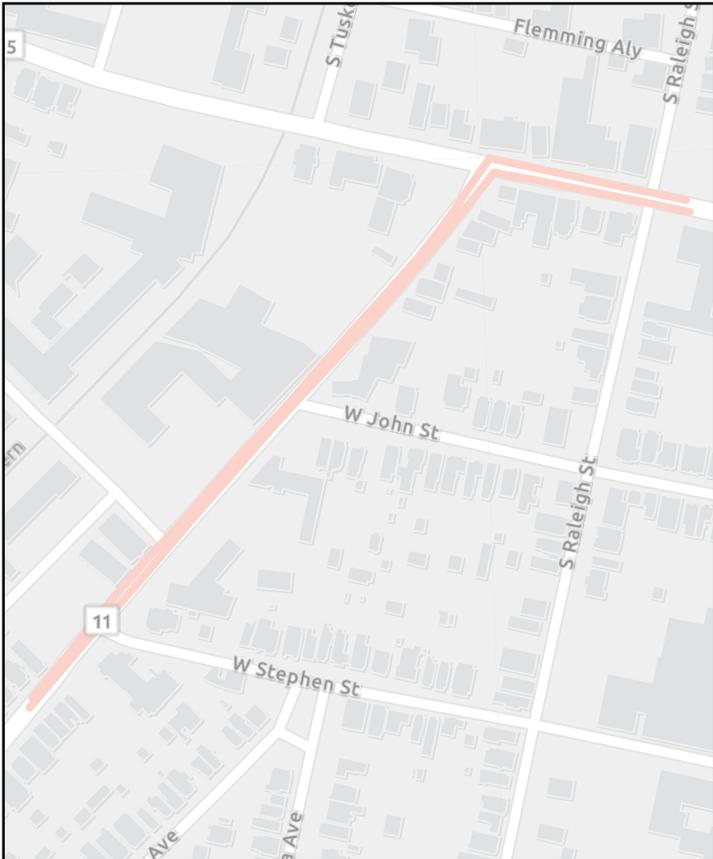


Marion County - Rank: 68
Route ID: 25303100000 / 8.5 - 8.8

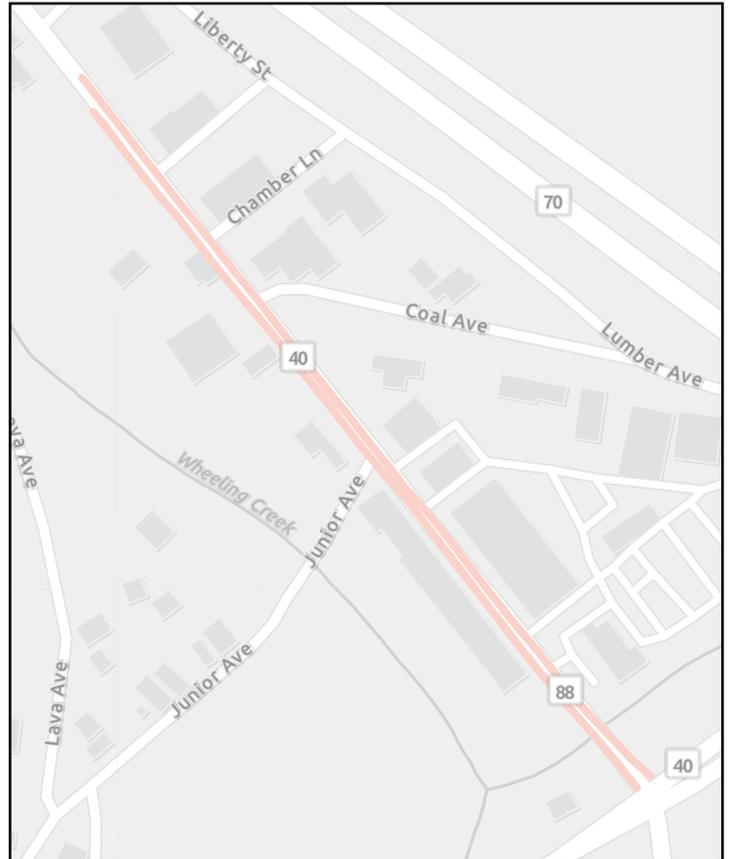


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Route ID: 20201190000 / 15.8 - 16.1

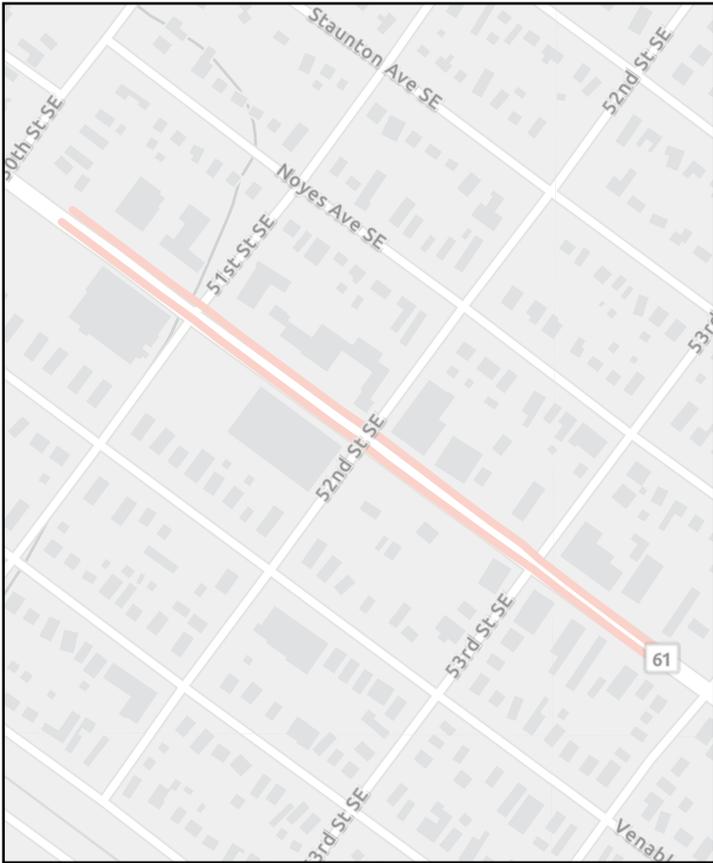
Berkeley County - Rank: 71
Route ID: 02200110000 / 12.7 - 13



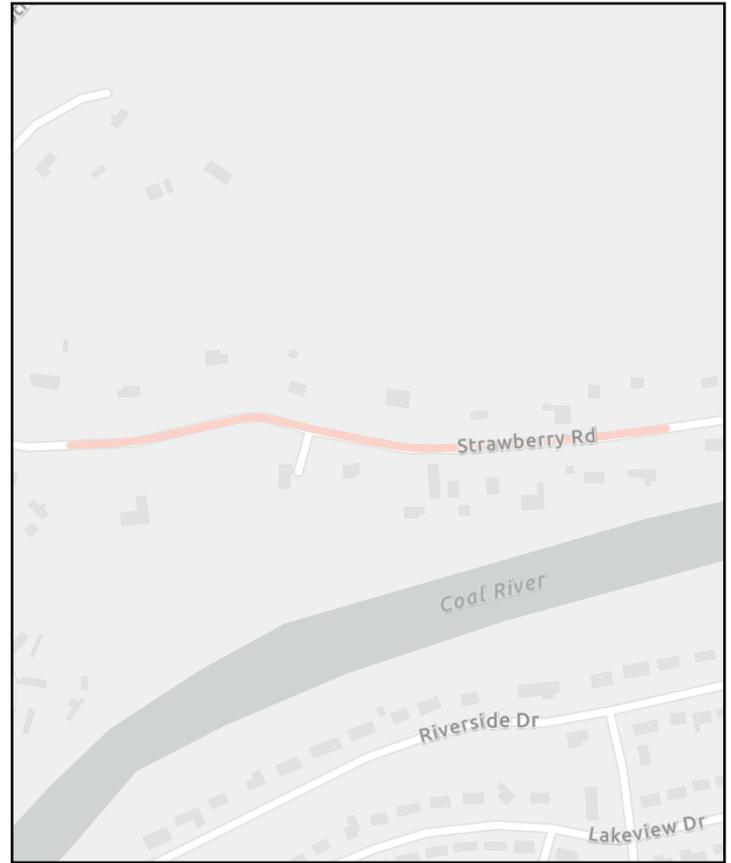
Ohio County - Rank: 72
Route ID: 35200400000 / 6.4 - 6.7



High Injury Network Results



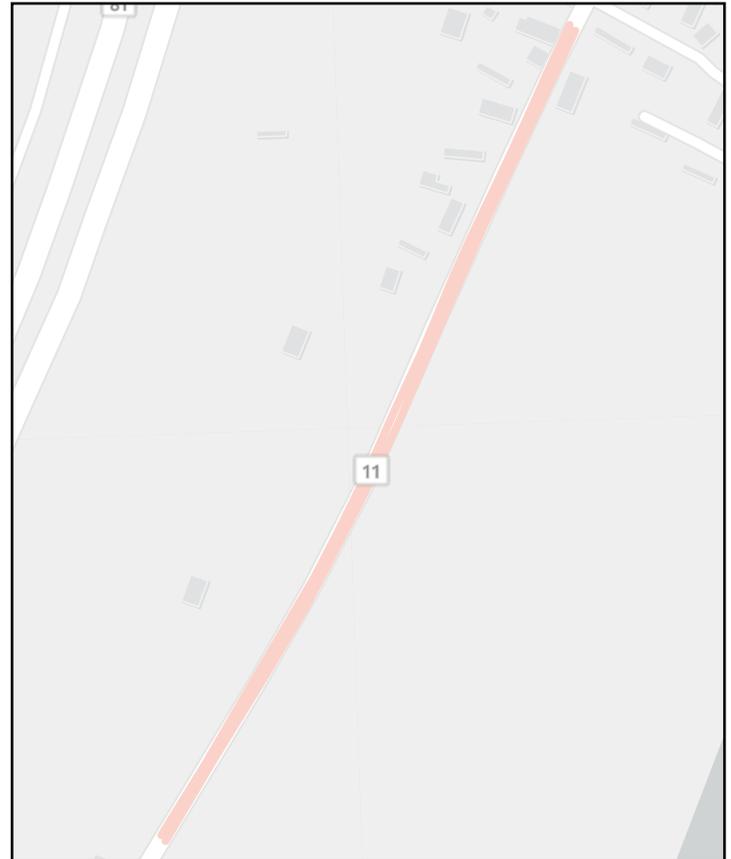
Kanawha County - Rank: 72
Route ID: 20300610000 / 22.1 - 22.4



Kanawha County - Rank: 74
Route ID: 20400600200 / 2.2 - 2.5

Kanawha County - Rank: 74
Route ID: 20400730000 / 6.7 - 7

Berkeley County - Rank: 74
Route ID: 02200110000 / 17.6 - 17.9





Systemic Analysis

Systemic VRU Analysis Methodology

VRU safety is a critical concern in both urban and rural areas, where people walk or bike as part of their daily routines. To improve VRU safety, researchers and policymakers need accurate data and tools to identify high-risk areas and implement targeted interventions. In this study, the project team aimed to develop a VRU risk model using a variety of data sources to estimate the risk of VRU-related crashes based on transportation network characteristics and VRU volume. Statistical analysis was used to identify the most significant predictors of VRU crashes. Indicators were assigned weights to develop an overall risk score for each transportation network segment. The resulting model can help transportation planners and policymakers prioritize resources and interventions to improve VRU safety in the studied area.

Data Collection

Data on the characteristics of the transportation network and VRU volume were collected from a variety of sources. Network characteristics, obtained from the statewide LRS, included the following information for each segment of the network:

- Functional classification
- Roadway width
- Speed limit
- Rural vs. Urban classification
- Total annual vehicle volume

VRU volume was collected for a portion of the network using StreetLight Pedestrian and Bike volume data. Over 50,000 segments were analyzed using the average volume from April to October of 2021. Once collected, the Pedestrian and Bike volumes were summed together to get an overall VRU volume. For the rest of the network, the following VRU volume proxies were collected:

- Population density of the census tract.
- The number of businesses such as liquor stores, gas stations, grocery stores, bars and restaurants, and daycare services within half a mile of a segment (SafeGraph).
- The number of public attractions including museums, historical sites, zoos, and parks within half a mile of a segment (Data Axle; NAICS code 7127).
- The number of public and private schools within half a mile of a segment (HIFLD).

Indicator Selection

Three criteria were established to ensure inputs into the model were meaningful for predicting VRU-related crashes. First, each indicator had to have an intuitive relationship with the number of VRU crashes. For example, wider road might lead to more VRU crashes due to it taking longer to cross the road. Additionally, each indicator had to be available for the entire

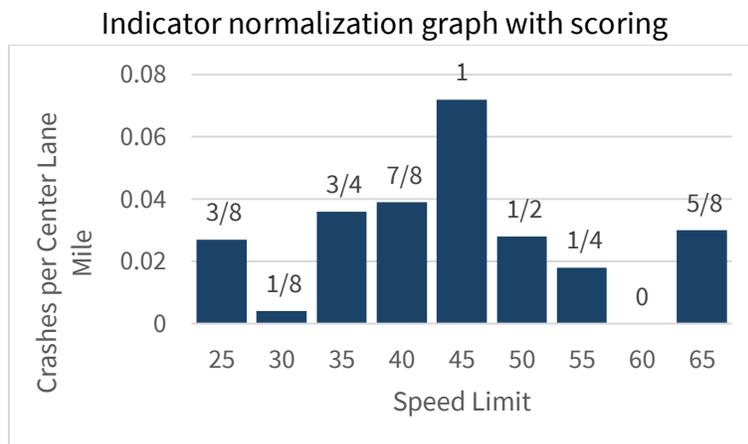
statewide network. This criterion ensured that we were equitably comparing the network and not favoring regions that may have more robust data within the state. It is important to note that this also represents a limitation where mitigating factors like sidewalk inventories were unable to be incorporated into the model due to data coverage. Finally, each indicator had to show a statistically significant correlation with the number of VRU-related crashes. Due to overdispersion in the data, establishing a statistically significant relationship was done using a negative binomial distribution model between the indicators and VRU crashes. By using these criteria, the project team aimed to select indicators that would provide valuable insights into VRU safety risks across the transportation network.

Data Normalization

Network Characteristics

Each selected indicator was normalized to determine which characteristics of the transportation network are disproportionately contributing to VRU-related crashes. Generally, network characteristic indicators were normalized by calculating the number of crashes per mile for a given indicator value. This calculation was done by dividing the total number of crashes that occurred for a given indicator value ($crashes_i$) by the sum of the total miles for a given indicator value ($miles_i$), as shown in the equation below. For example, the expected crashes per mile for 45mph roads was calculated by dividing the total number of crashes that occurred on any 45mph road in the network by the total number of miles of 45mph roads within the network. Each indicator value was then ranked based on the expected number of crashes per mile and divided by the total number of possible values for a given indicator, resulting in a normalized indicator score. An example of the results of this normalization is shown in the graph below. For continuous network characteristics – such as Total Annual Volume – values were sorted into discreet bins and normalized using the same calculation. For lane width, min-max normalization (described in the next section) was used.

$$Expected\ Crashes\ per\ Mile = \frac{\sum crashes_i}{\sum miles_i}$$



VRU Volume

To estimate VRU volume for segments of the transportation network not covered by StreetLight data, we employed a neural network machine learning approach. This method allowed us to leverage the previously collected VRU volume proxies—such as population density—as inputs to the model. The neural network was trained using segments where VRU volumes were known, allowing it to learn the complex, nonlinear relationships between these proxies and actual VRU volume. This innovative approach enabled us to create a comprehensive and more accurate representation of VRU volumes across the entire network, ensuring that no segment was left unanalyzed due to data limitations. By integrating this model, we significantly enhanced our ability to assess and address the needs of vulnerable road users across the entire transportation network.

VRU volume was normalized using a simple min-max normalization, shown in the equation below where x'_i is the normalized value and x_i is the indicator value for a given network segment.

$$x'_i = \frac{x_i - \min(x)}{\max(x) - \min(x)}$$

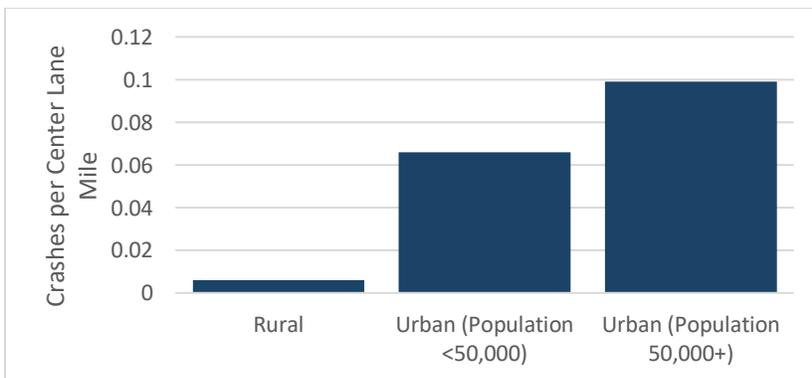
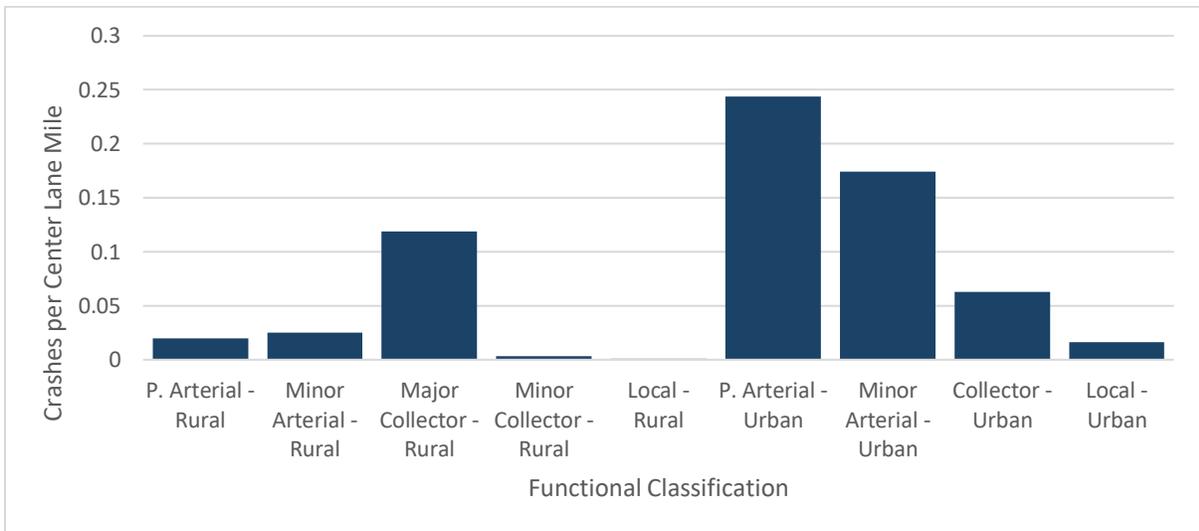
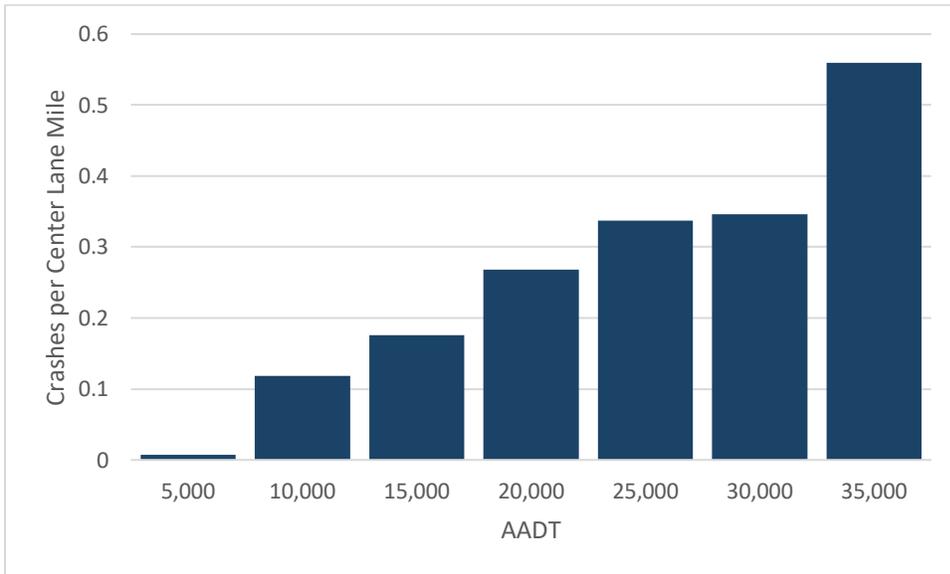
Indicator Weighting

Once each indicator was normalized, weights were assigned to them so that the weights would sum up to 1 within each theme. A theme score was then calculated for each segment by summing up the weighted indicators within each theme. Next, each theme was assigned a weight and summed to calculate an overall VRU risk score. Finally, each segment was ranked according to its VRU risk score, with a rank of 1 indicating the segment with the highest VRU risk score in the transportation network.

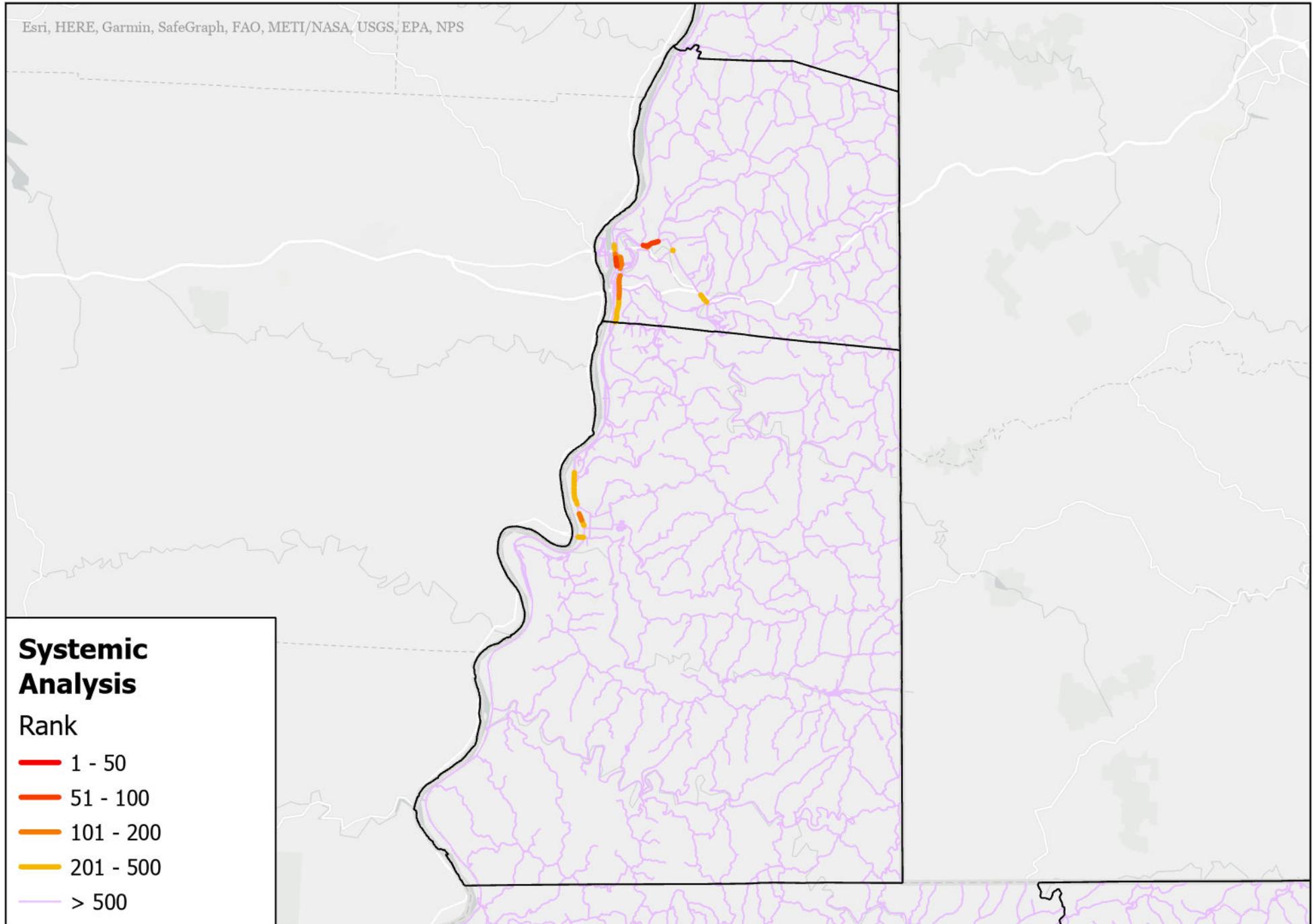
Conclusion

The methodology presented in this study provides a comprehensive approach to assessing VRU risk in West Virginia. By considering both network characteristics and VRU volumes, this methodology provides a more complete understanding of the factors contributing to VRU crashes. Assigning weights to each indicator allows stakeholders familiar with the region to easily adjust the model and better prioritize known risk multipliers, reflecting on-the-ground conditions. Ranking segments based on their VRU risk score allows transportation planners and decision-makers to identify areas in need of intervention to improve VRU safety. The findings from this study can be used to inform policy decisions and target resource allocation to reduce VRU-related crashes and ultimately save lives.

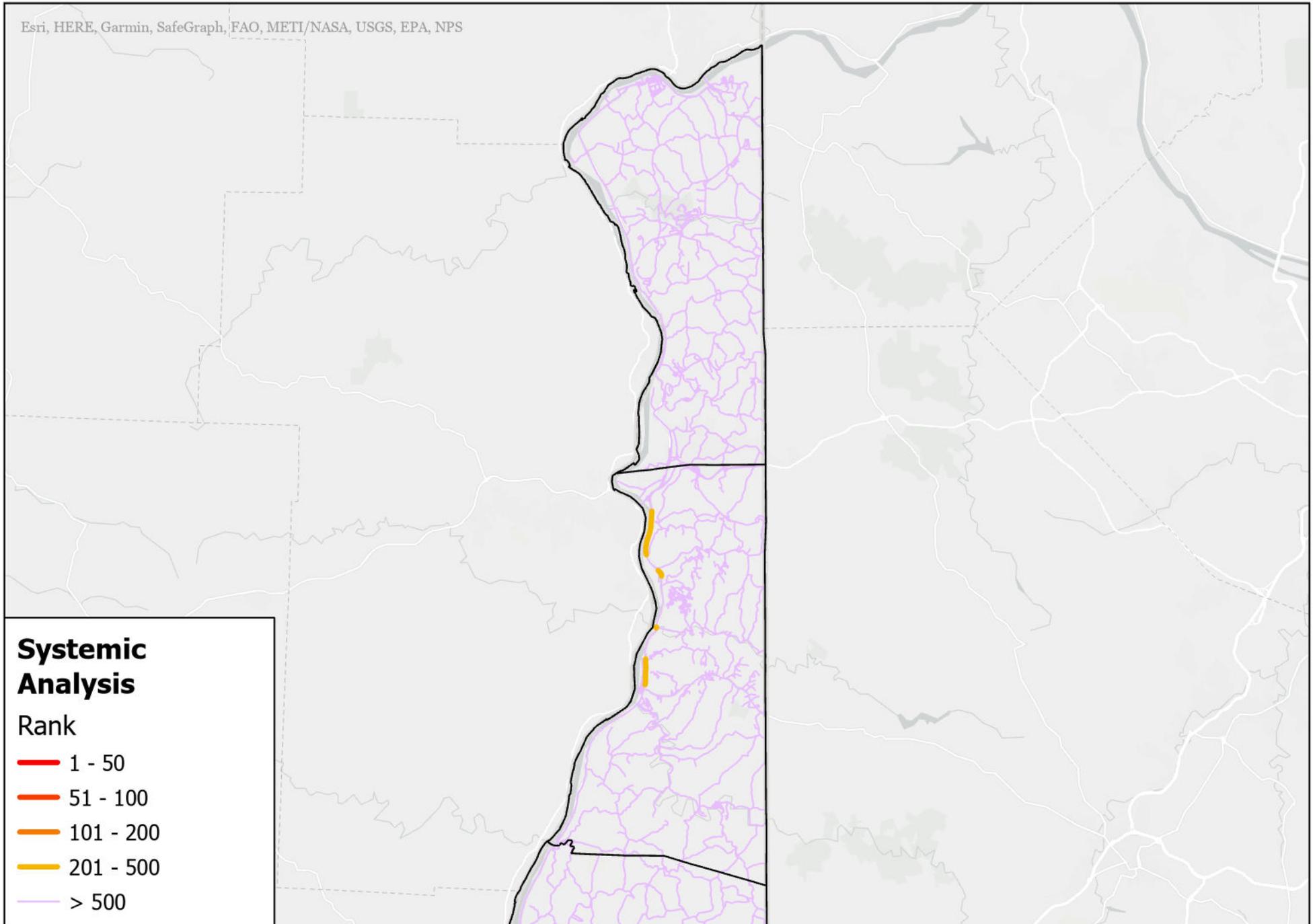
Additional Scoring Graphs



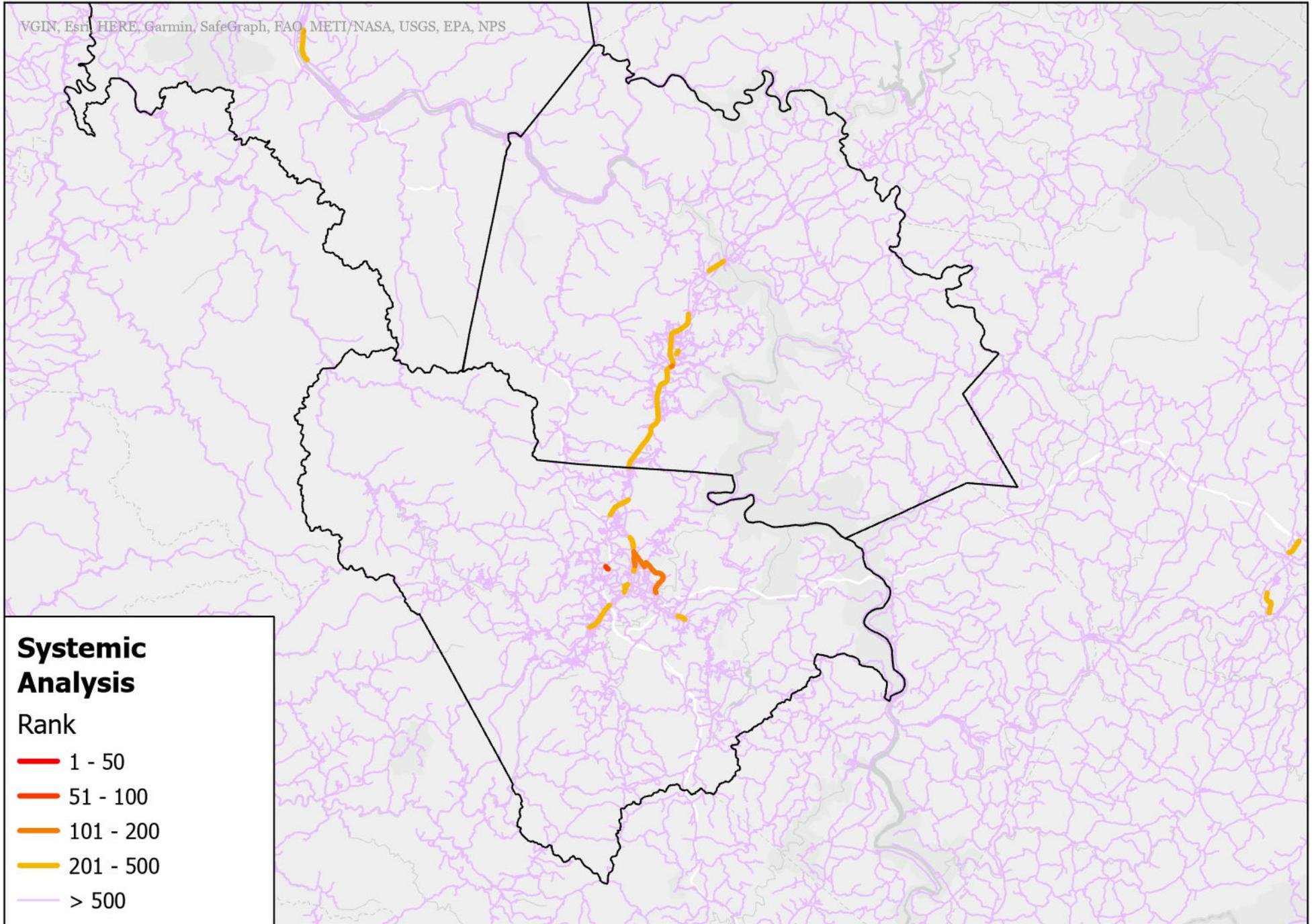
Statewide Systemic Analysis - BELOMAR



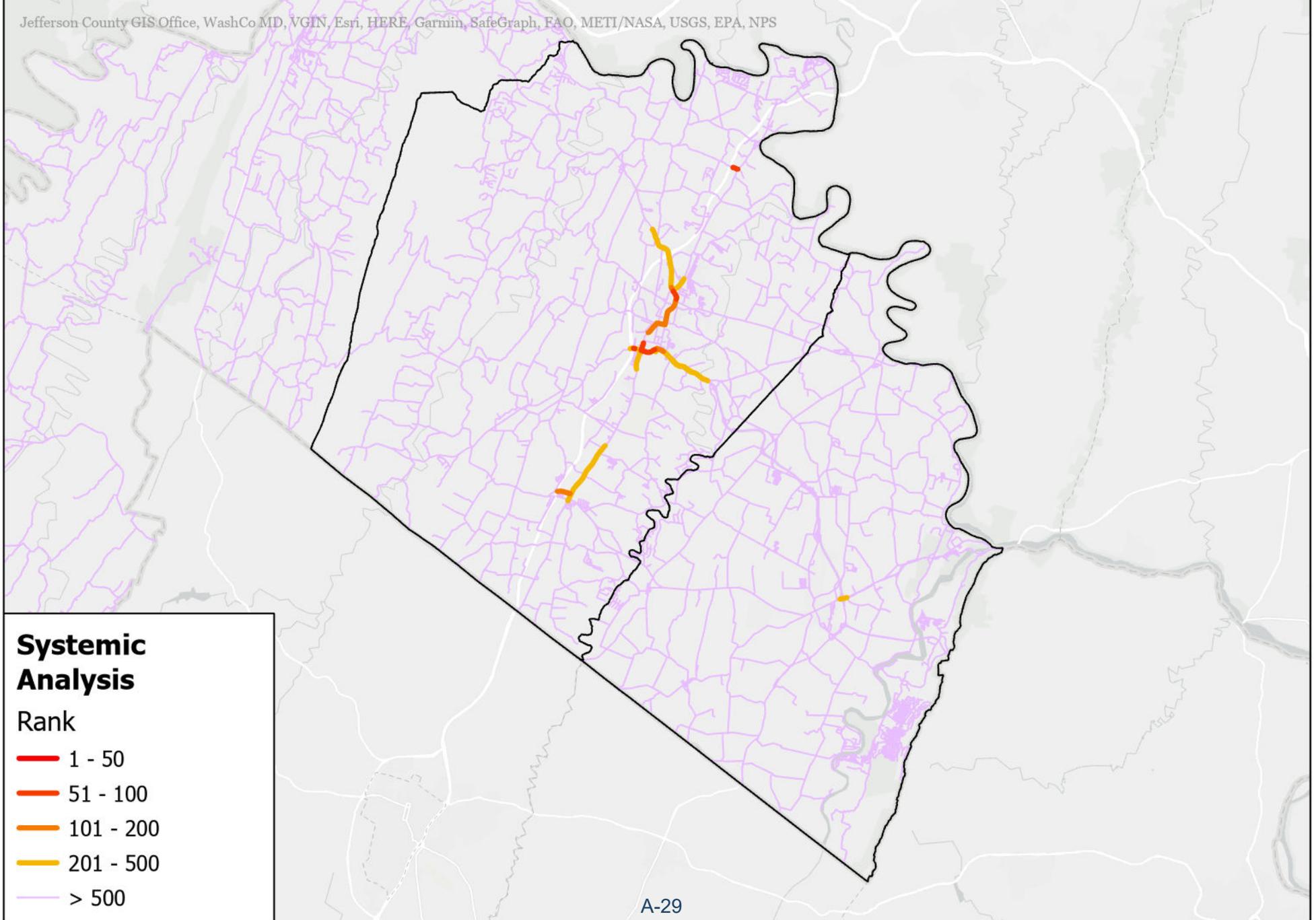
Statewide Systemic Analysis - BHJ-MPC



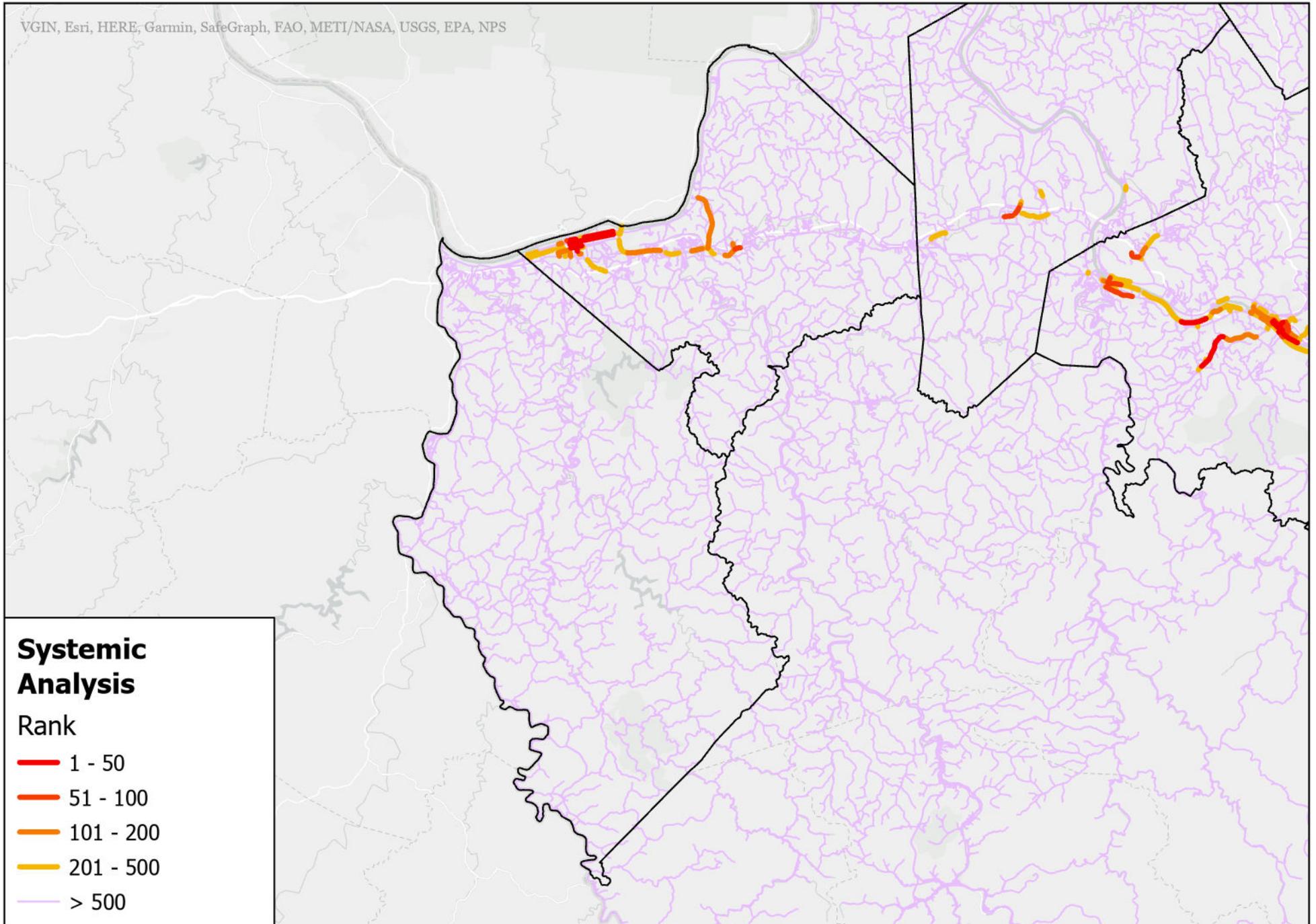
Statewide Systemic Analysis - FRM



Statewide Systemic Analysis - HEPMPO

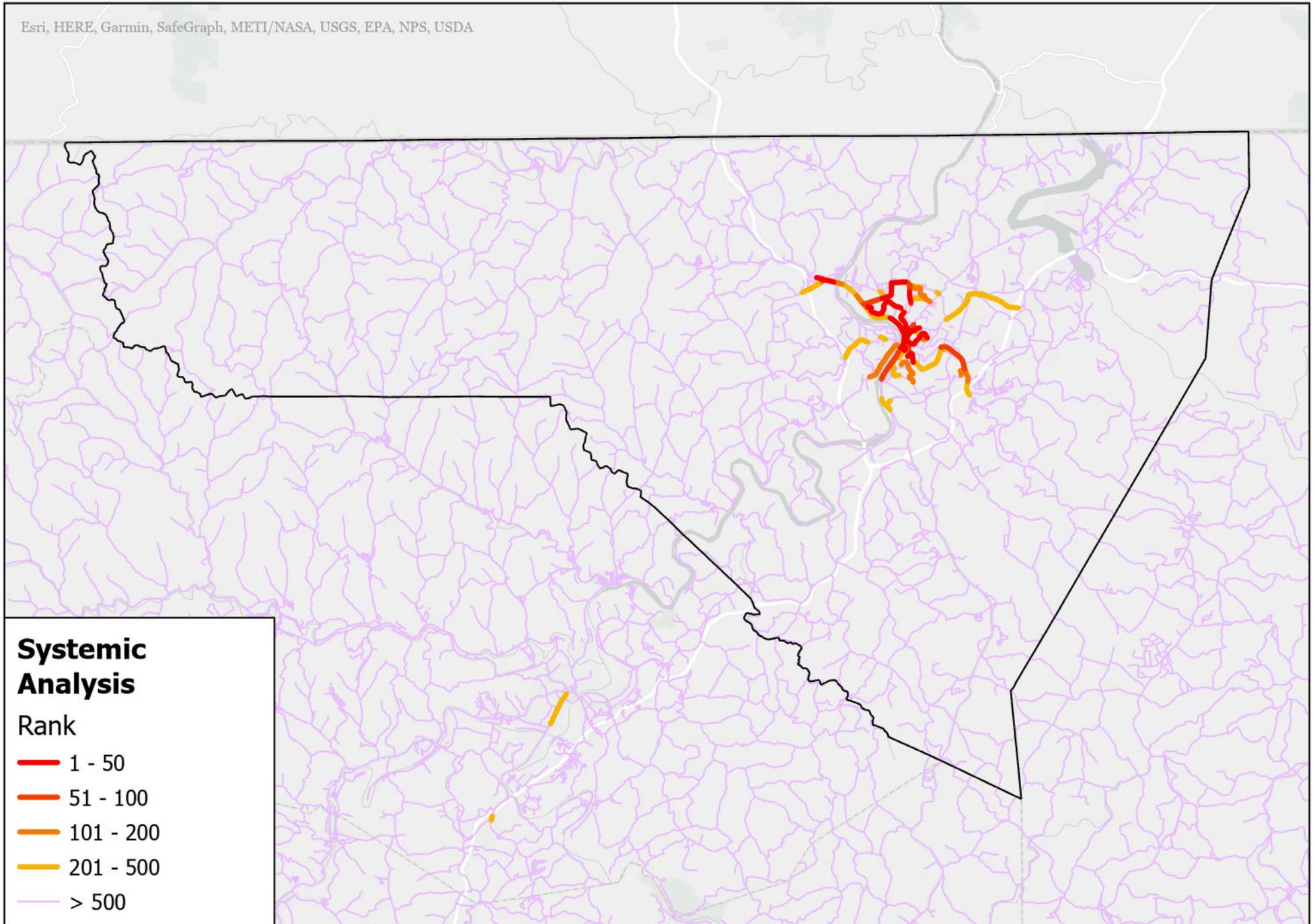


Statewide Systemic Analysis - KYOVA

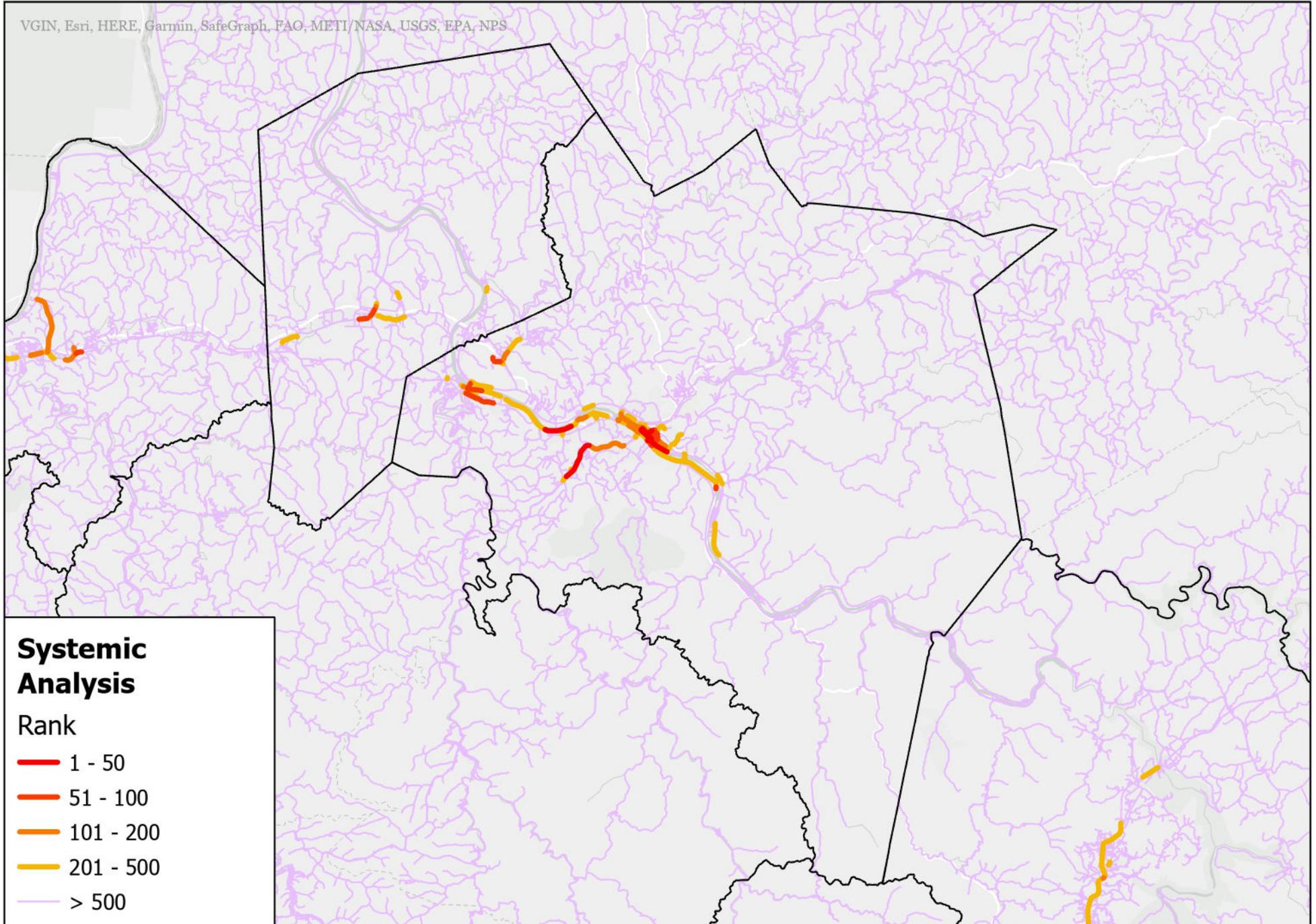


Statewide Systemic Analysis - MMMPO

Esri, HERE, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA

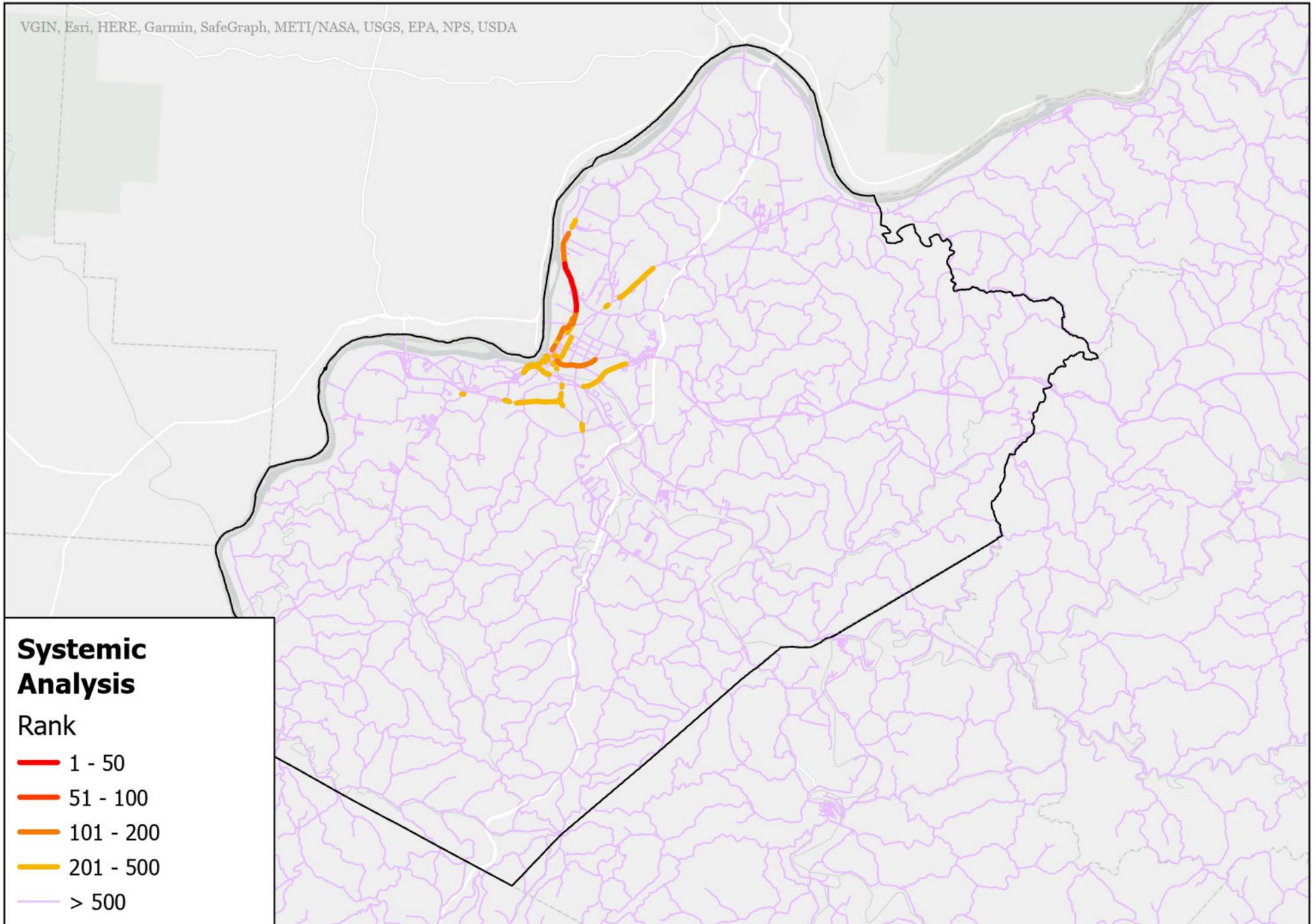


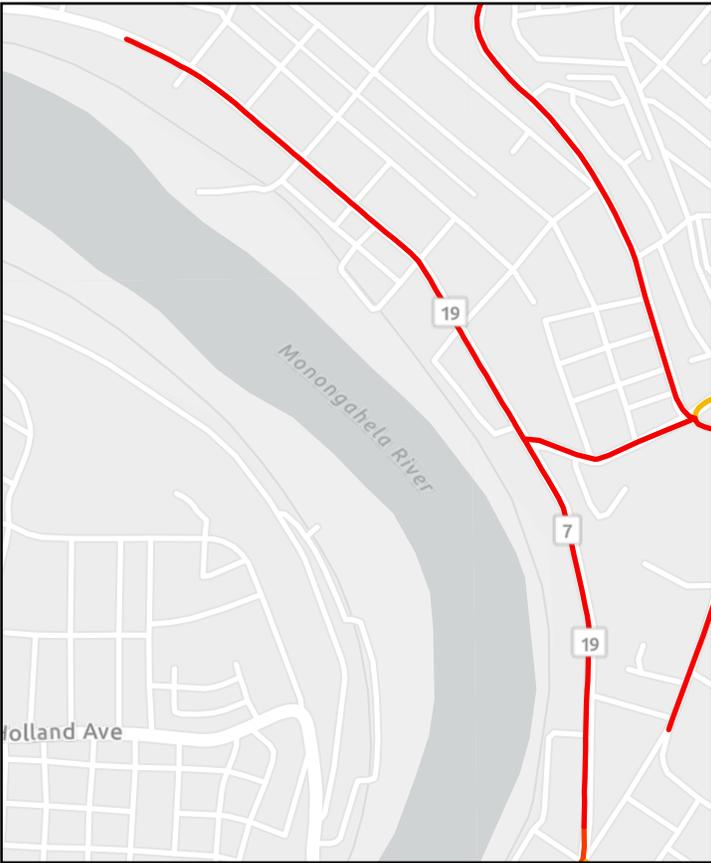
Statewide Systemic Analysis - RIC



Statewide Systemic Analysis - WWWW

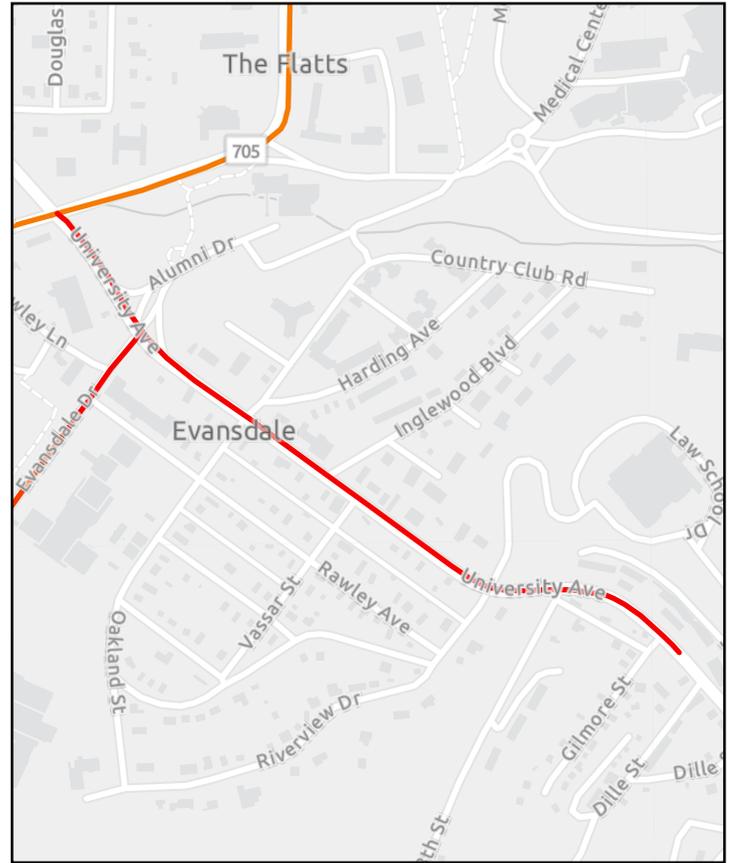
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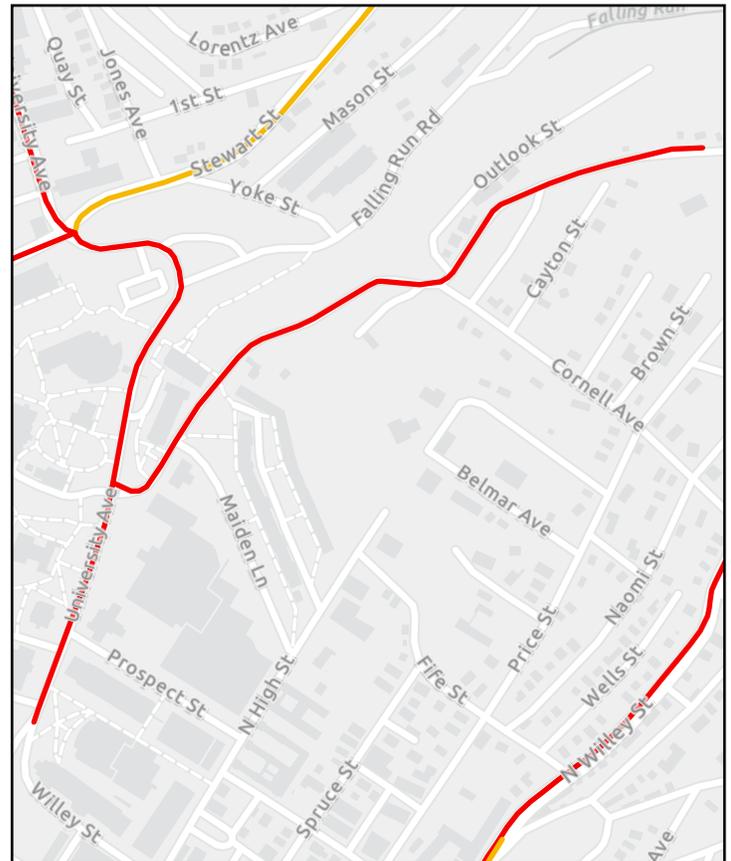
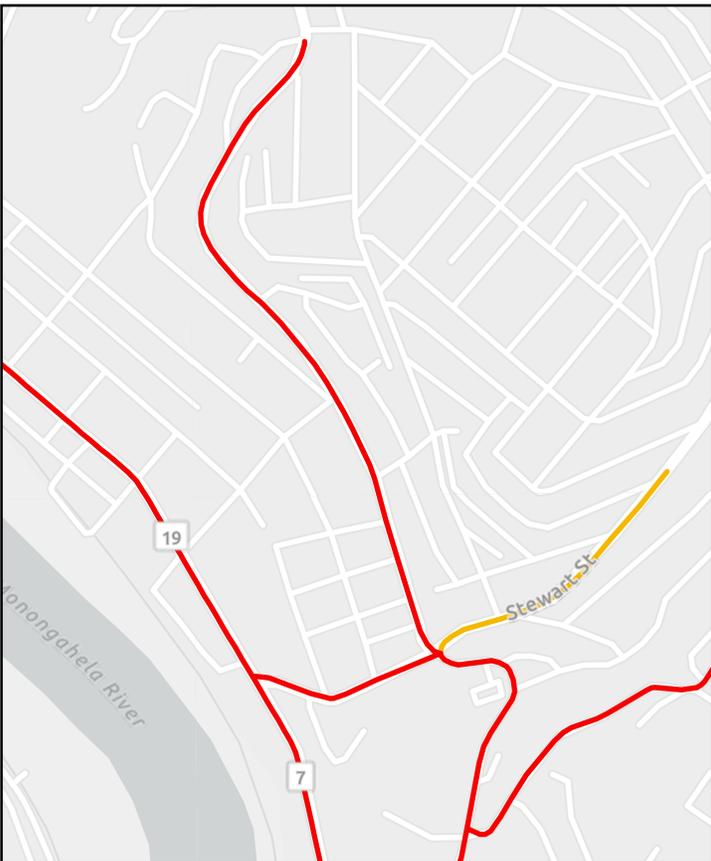
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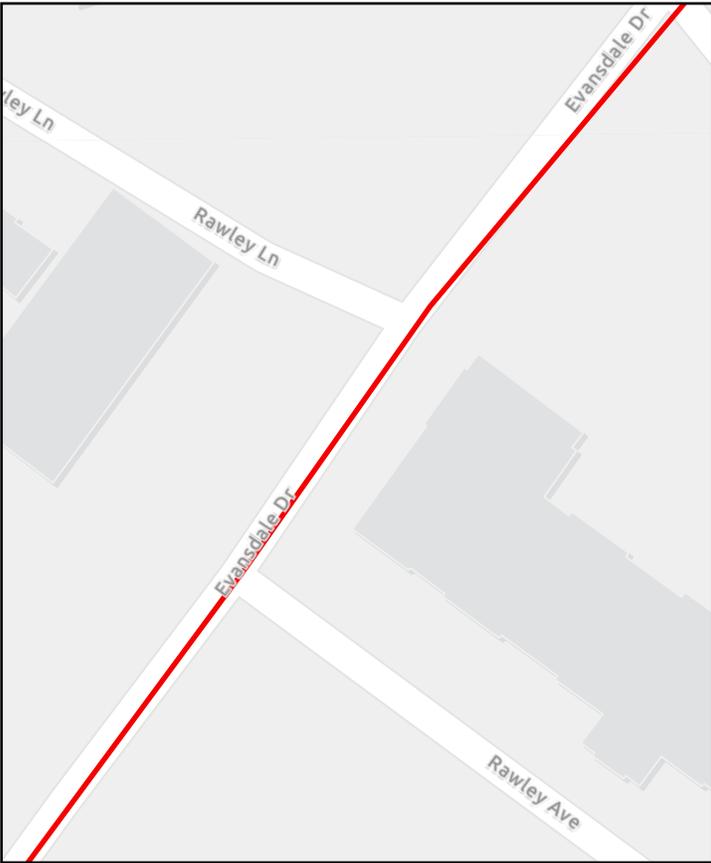
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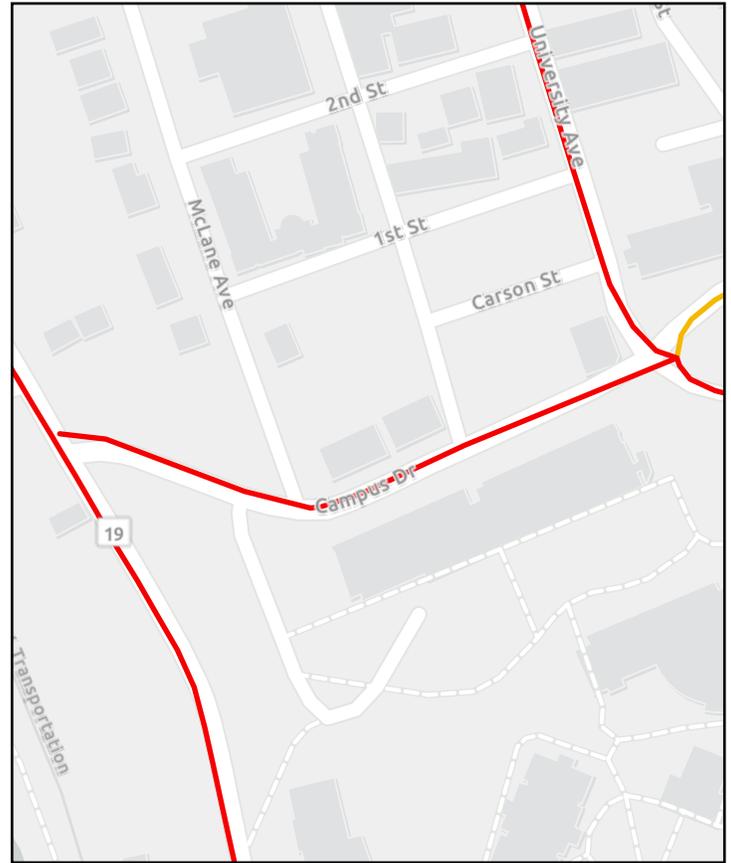
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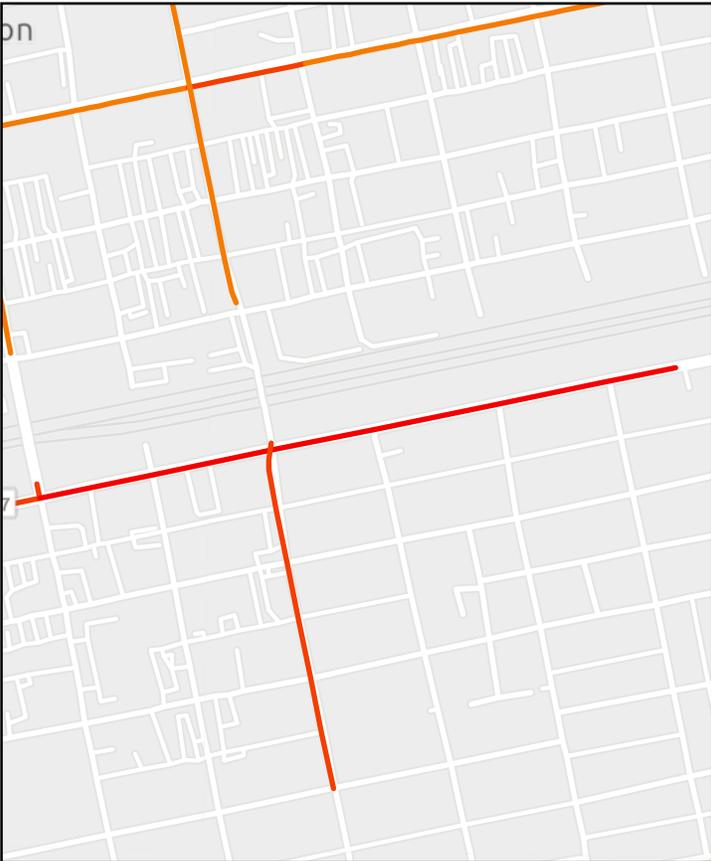


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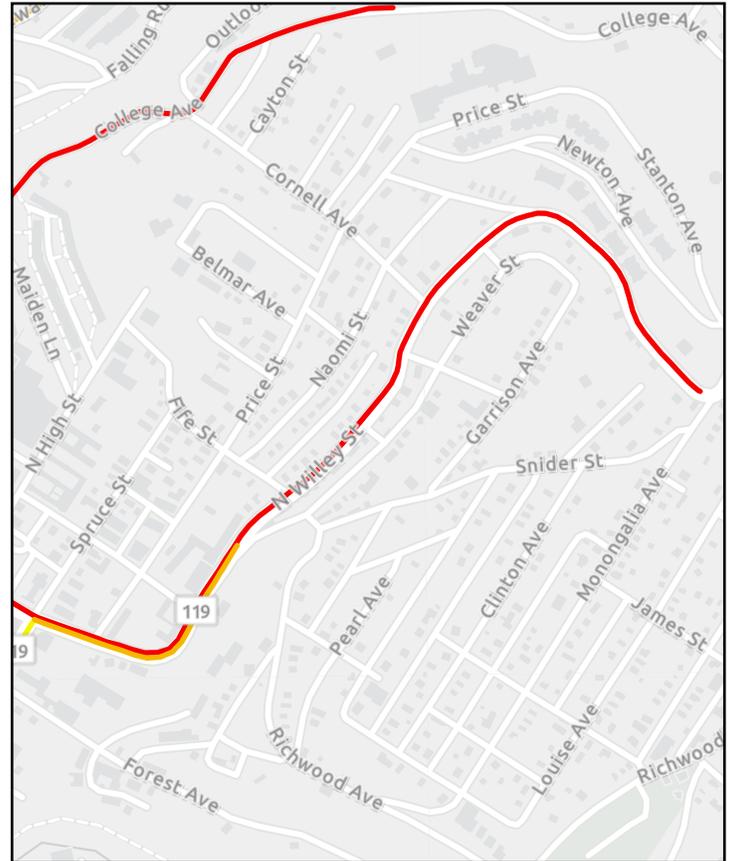


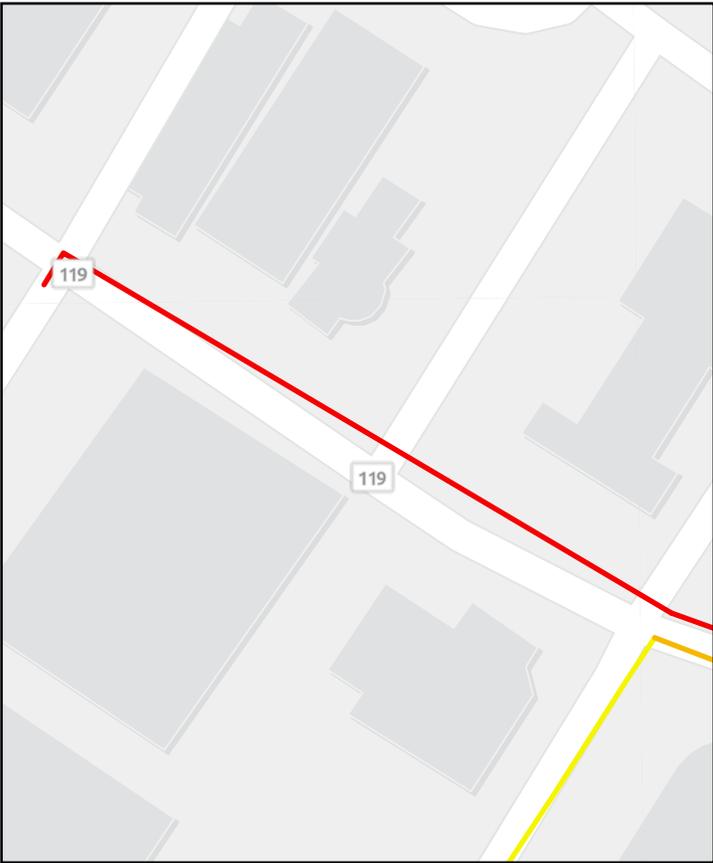
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Cabell County - Rank: 7
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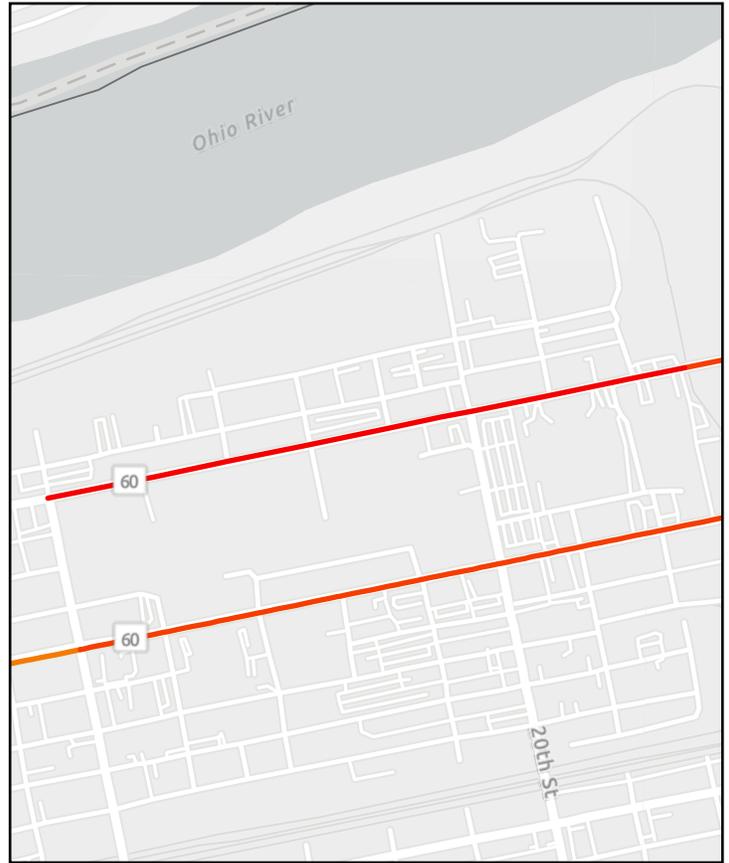
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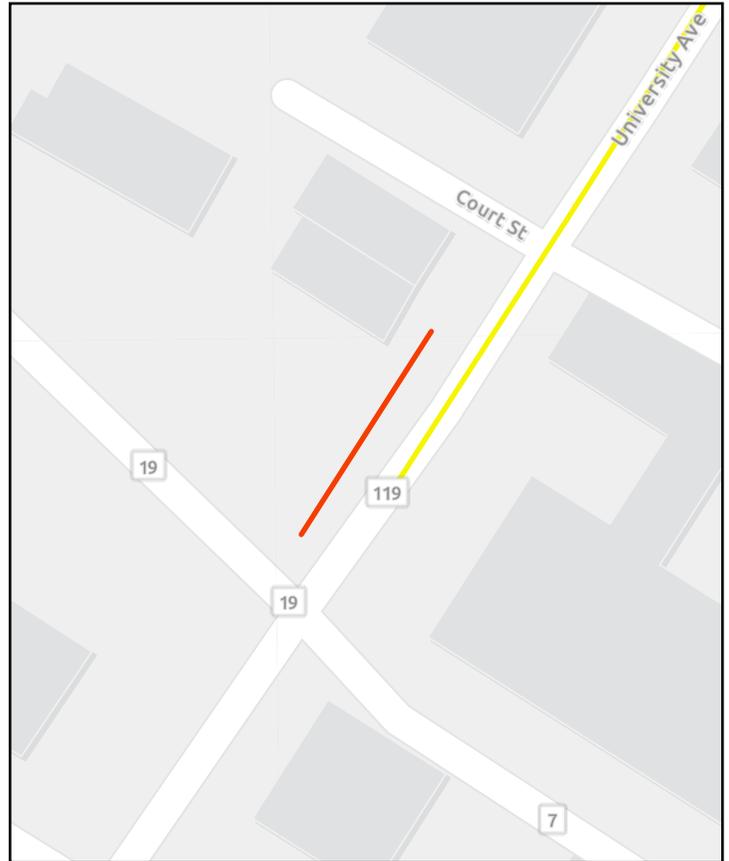
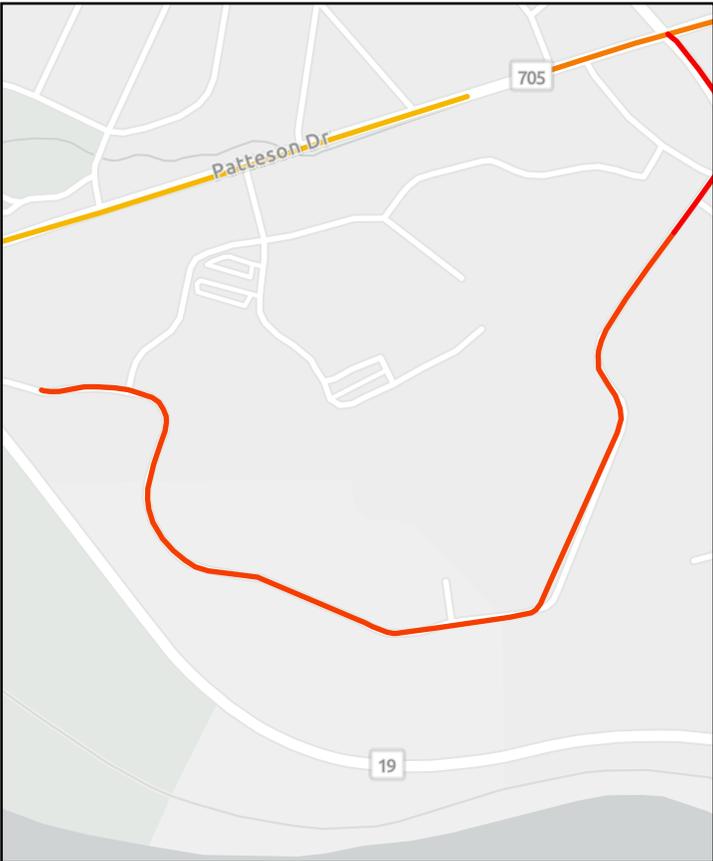
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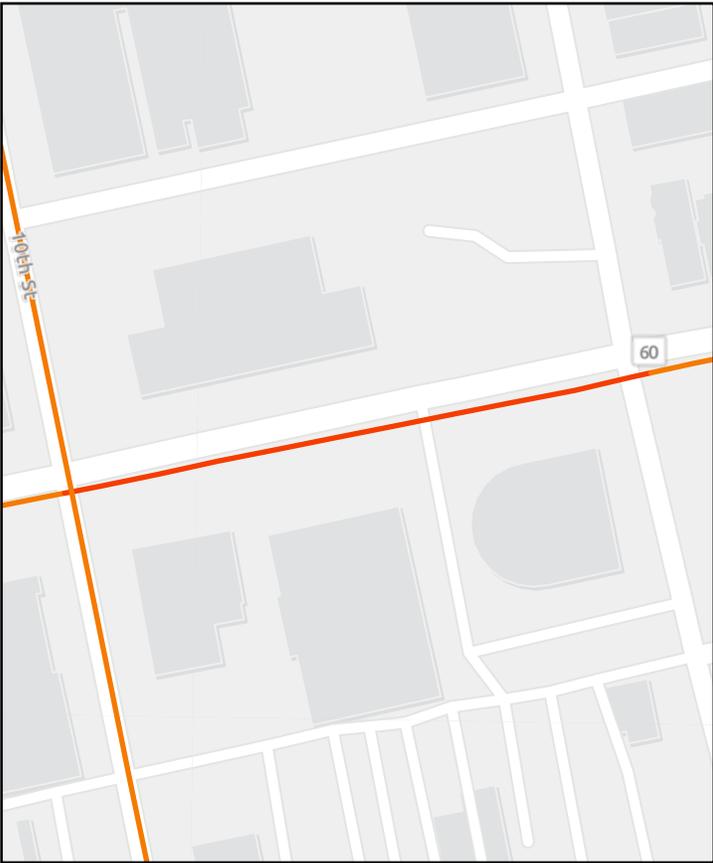
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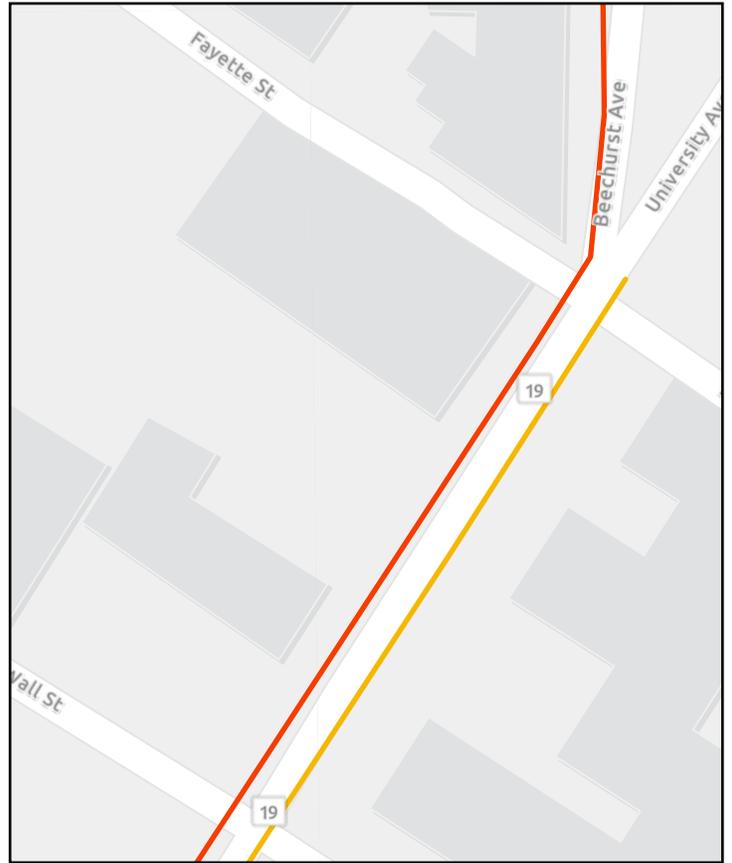
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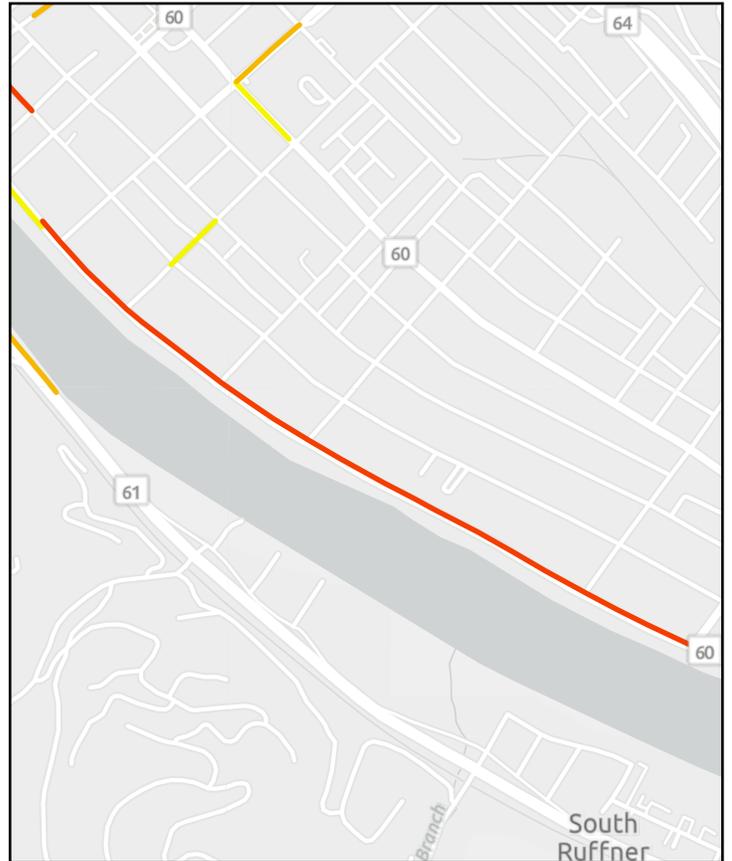
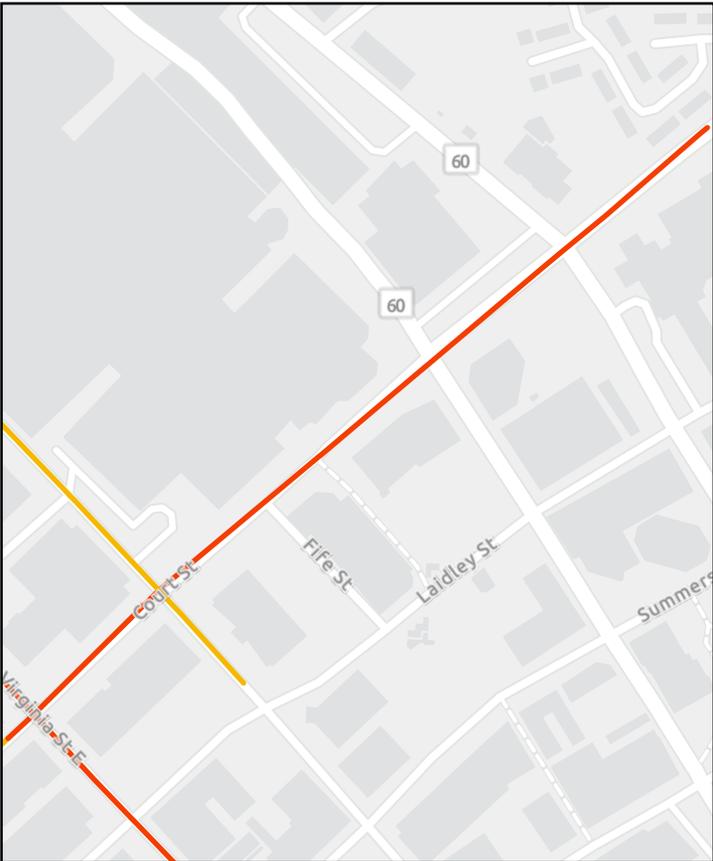
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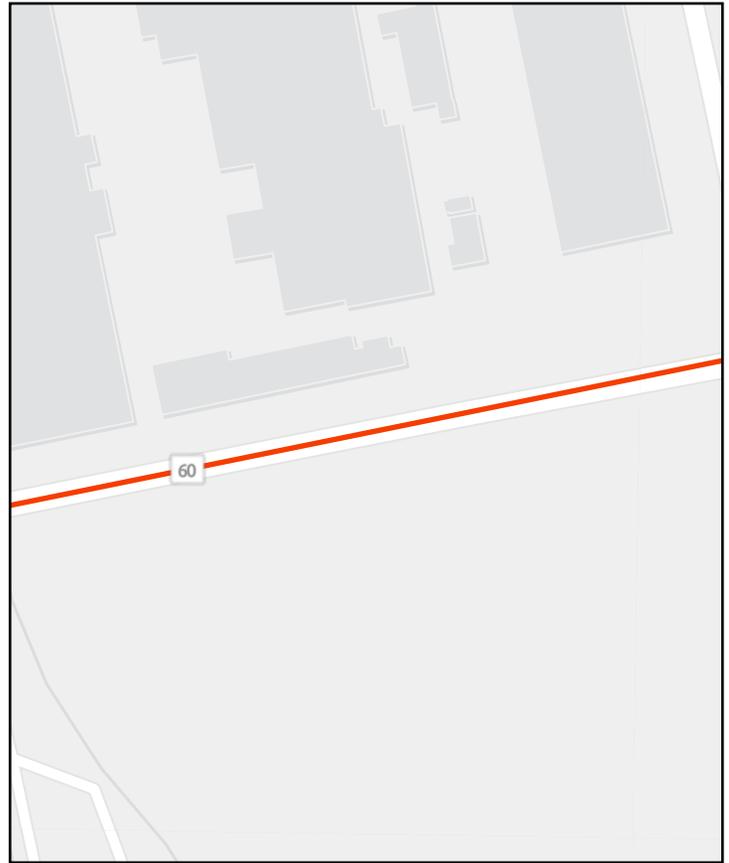
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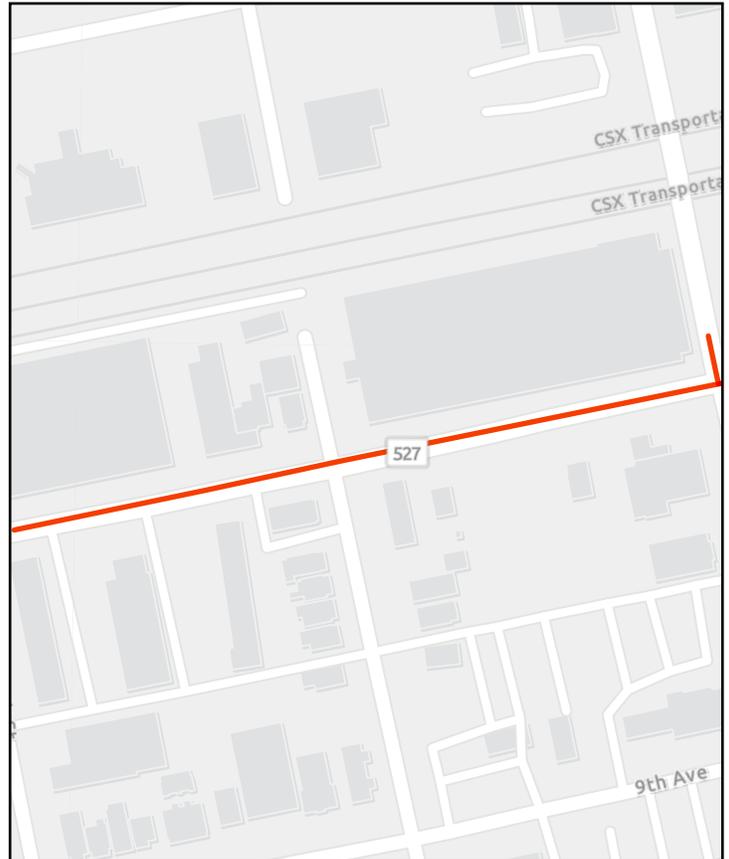
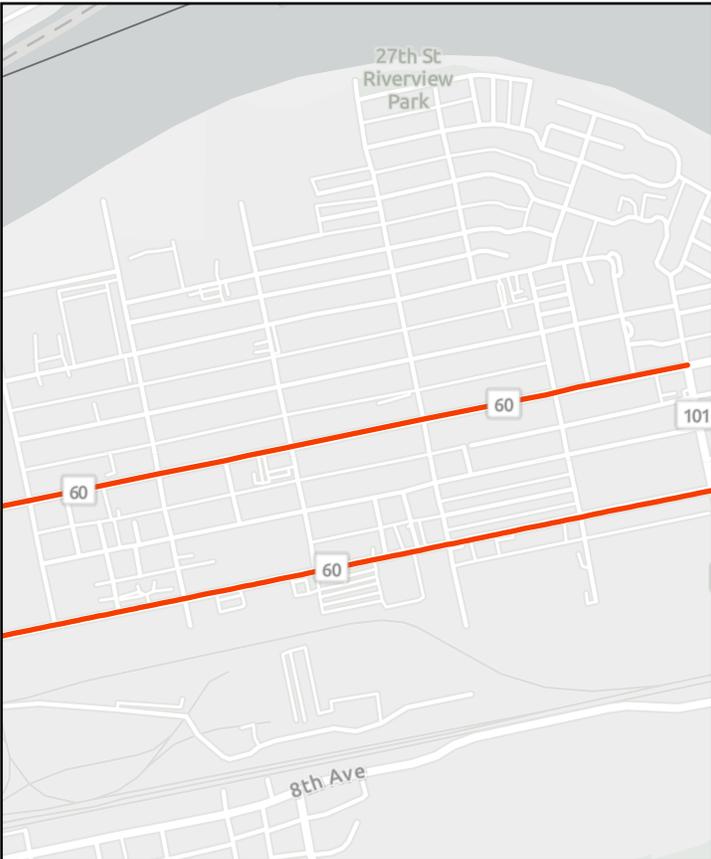
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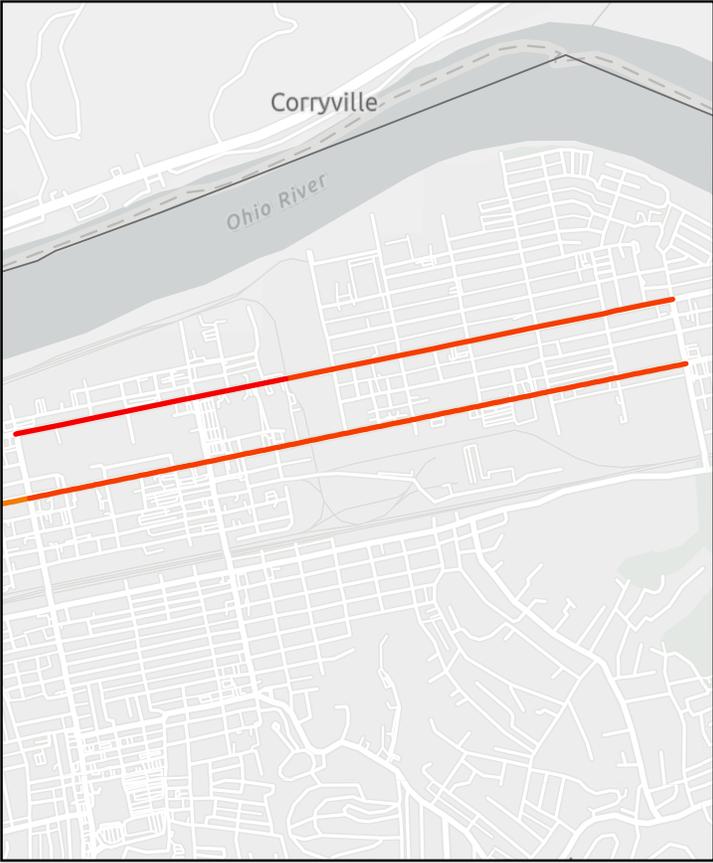


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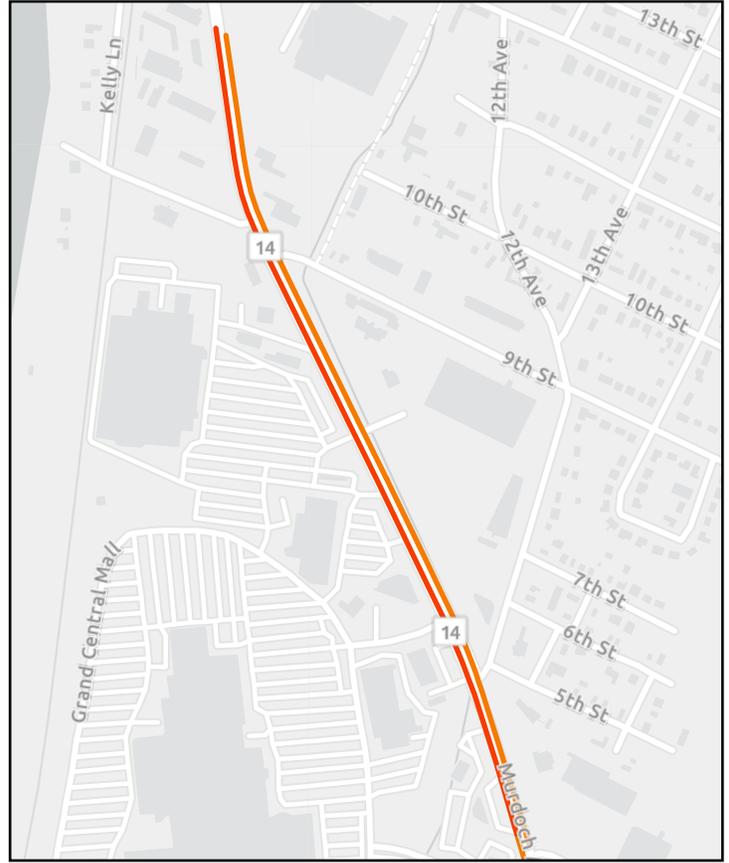
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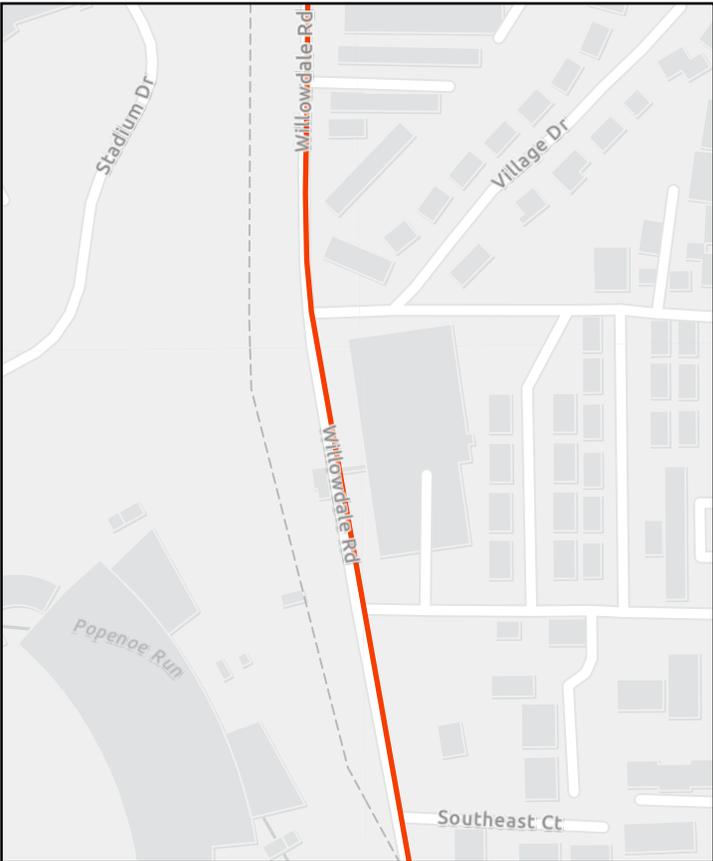
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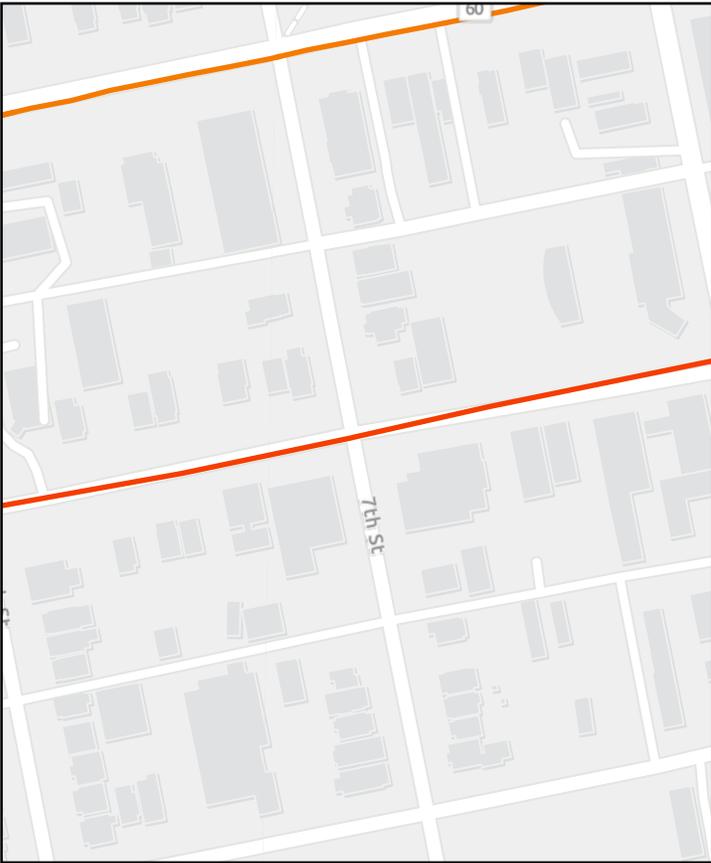


Wood County - Rank: 22
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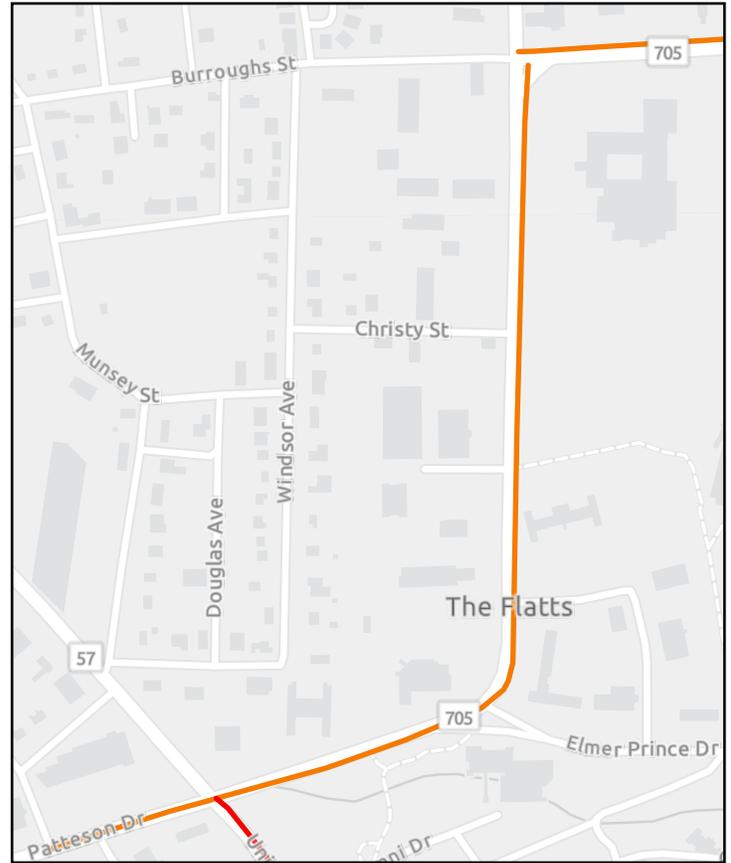
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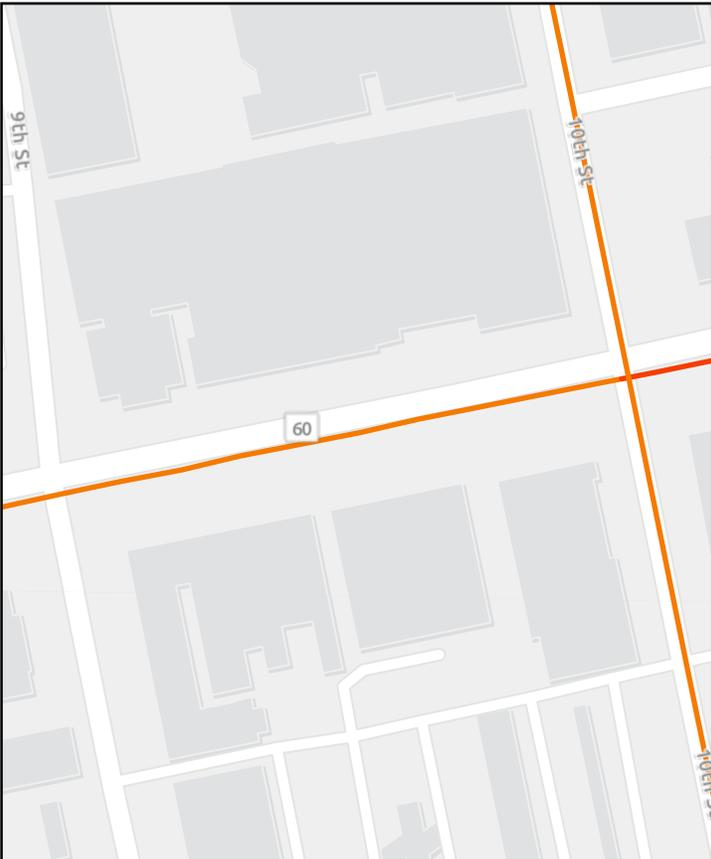
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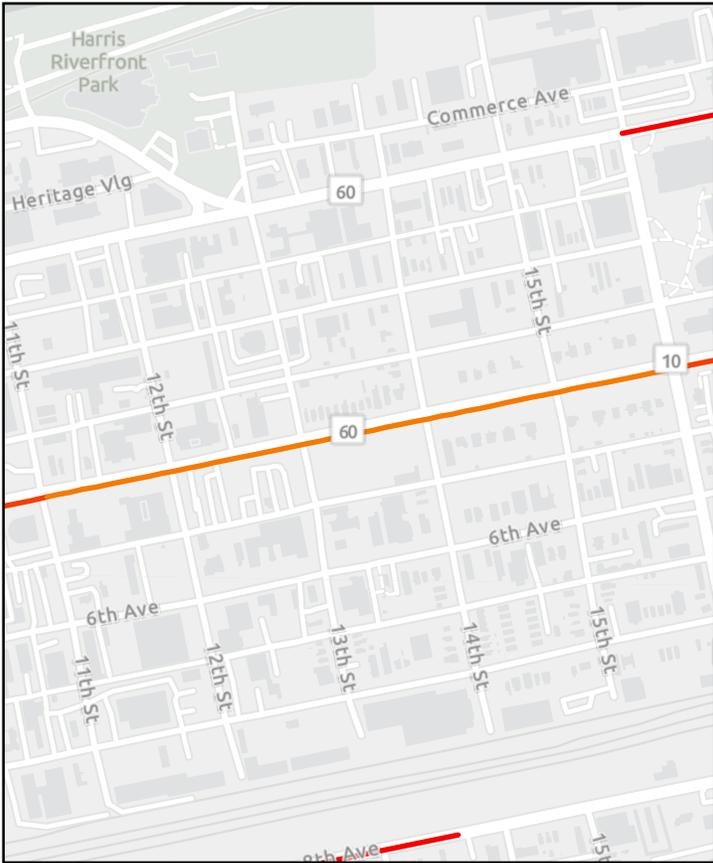
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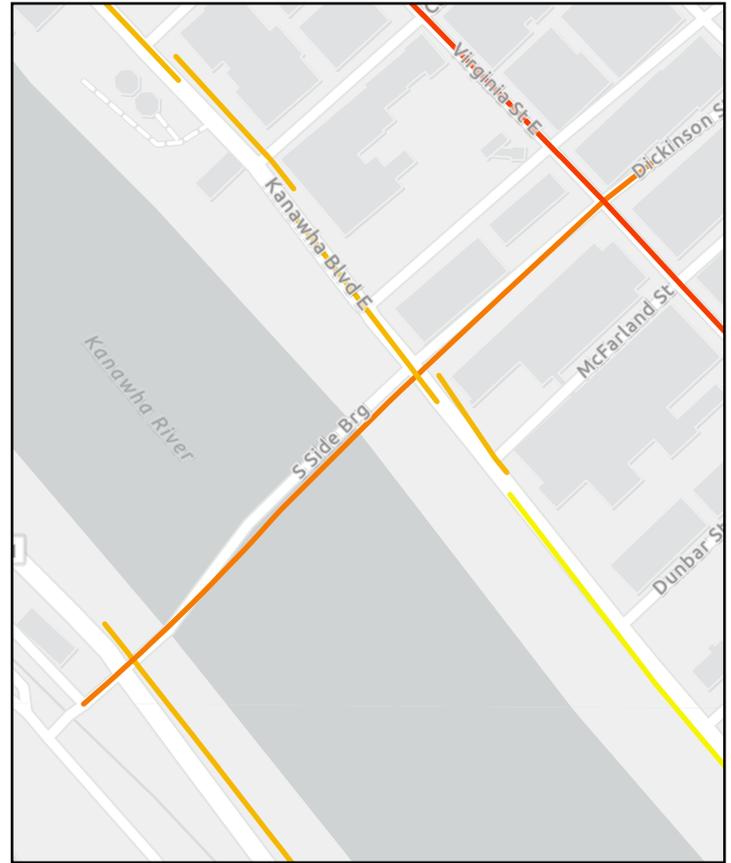
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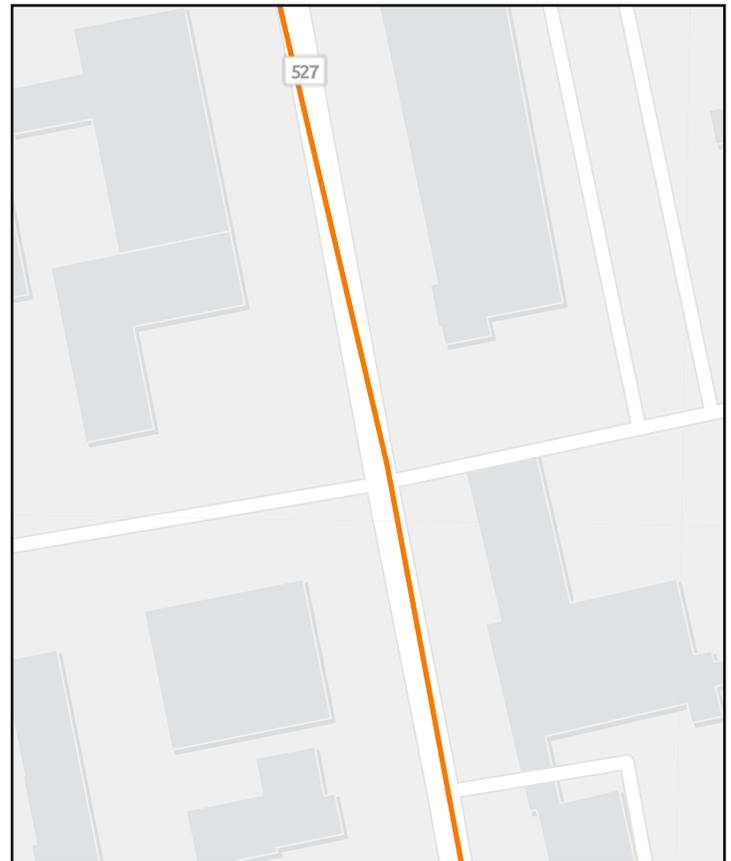
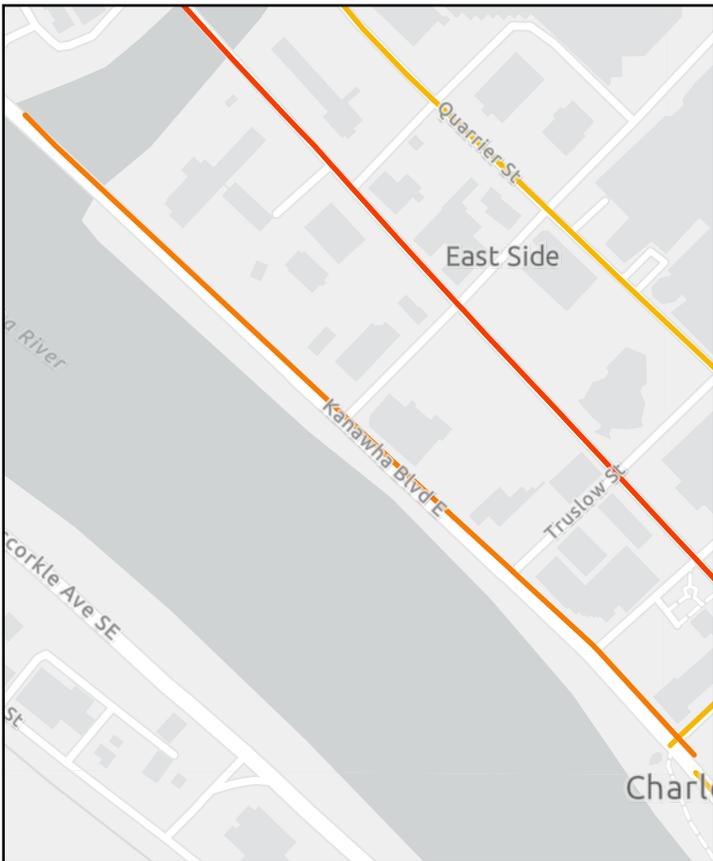
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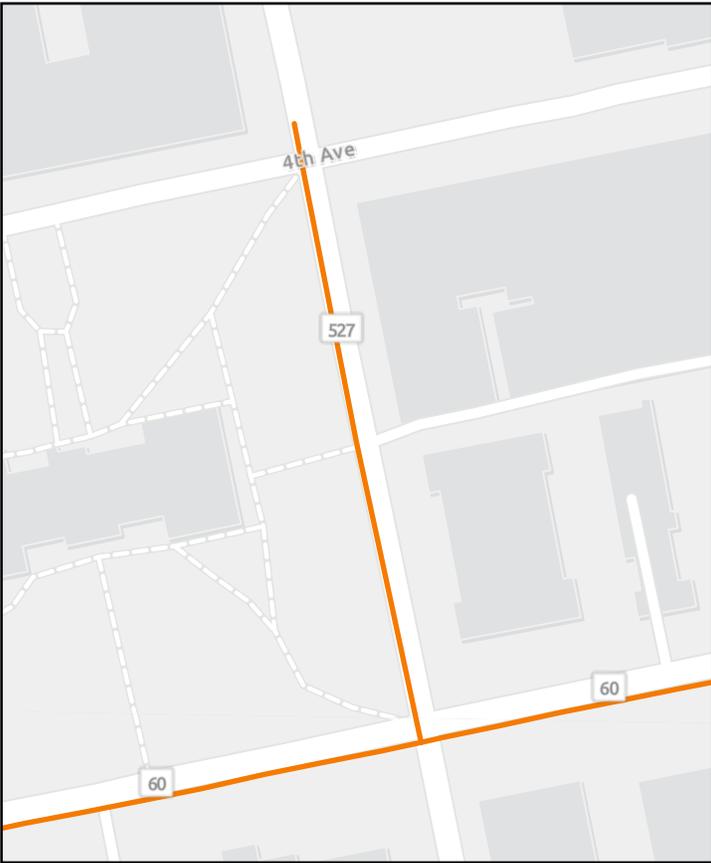


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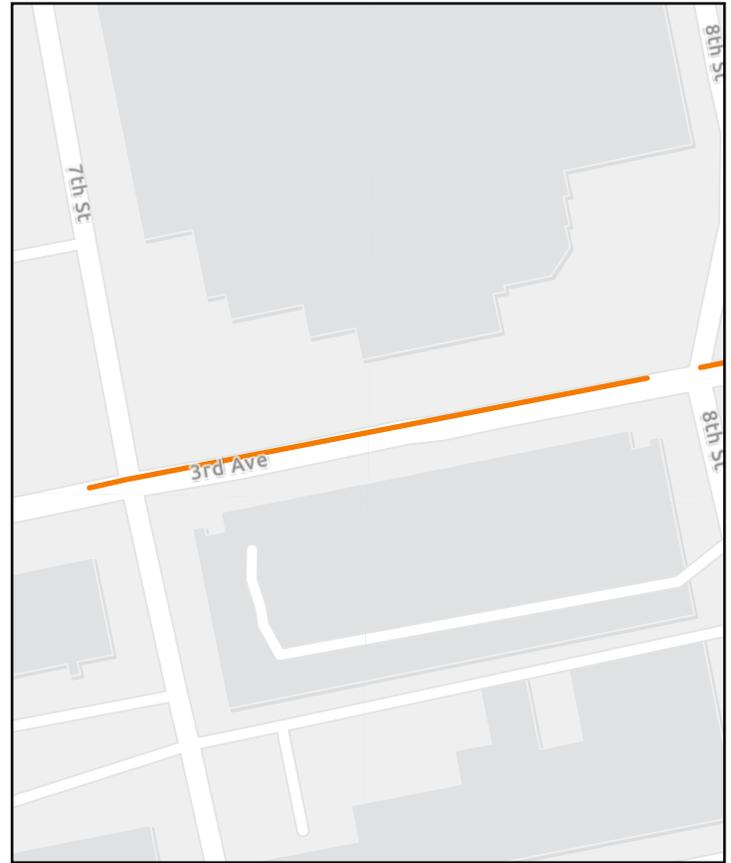
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Route ID: 0630527000000





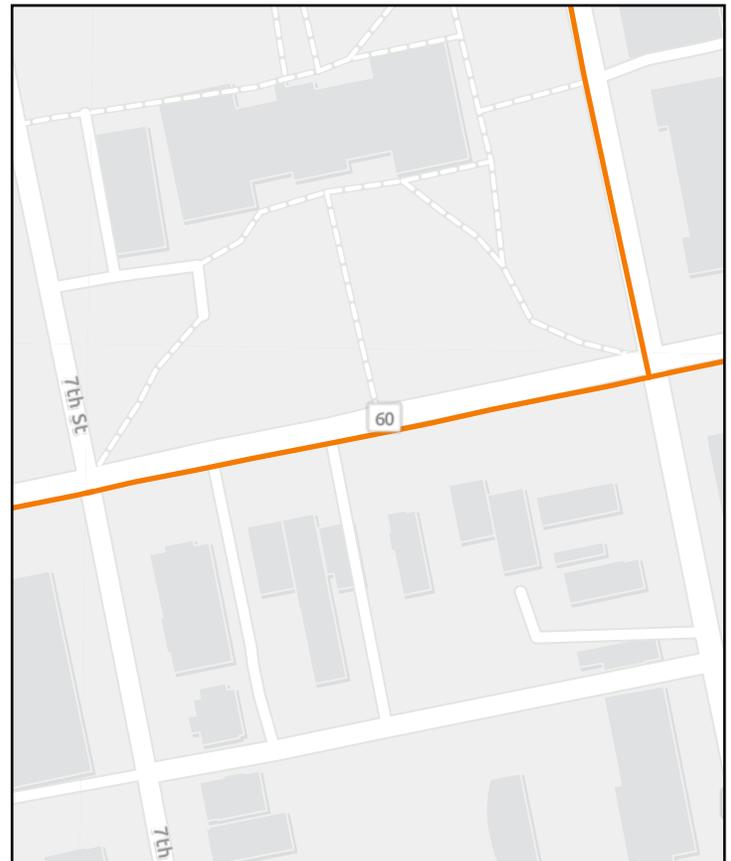
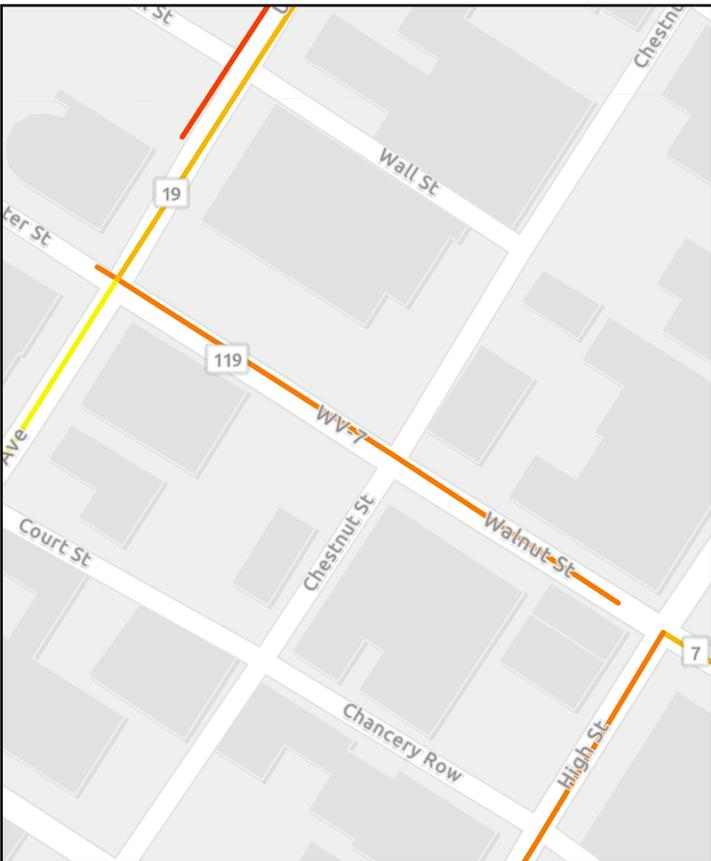
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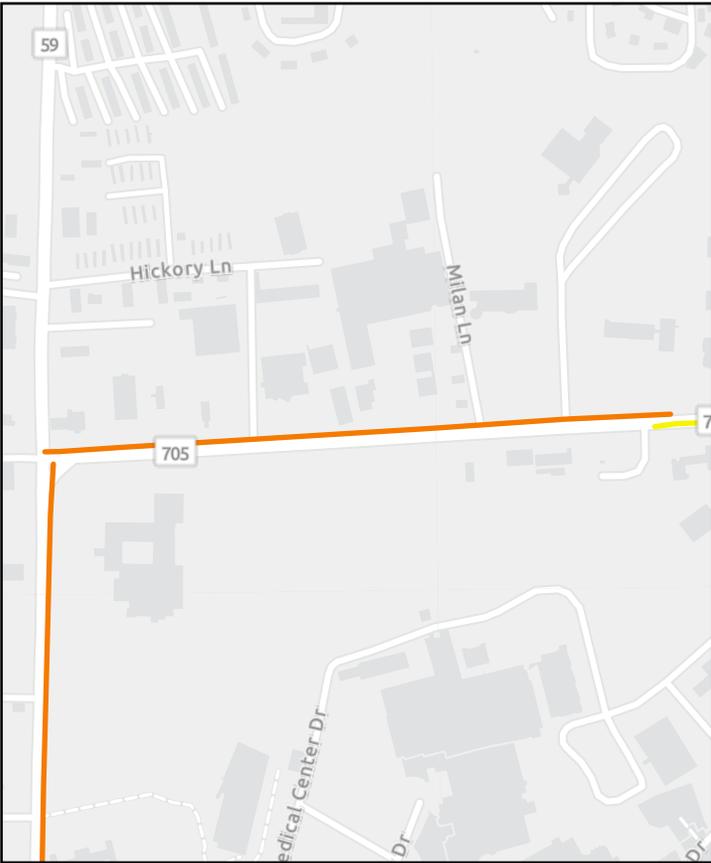


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Monongalia County - Rank: 35
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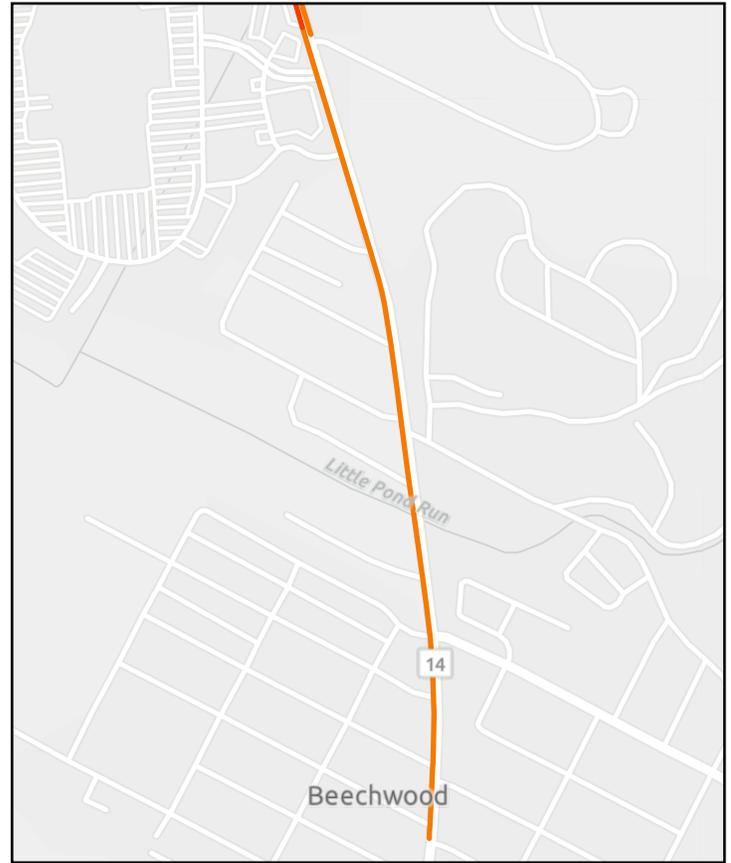
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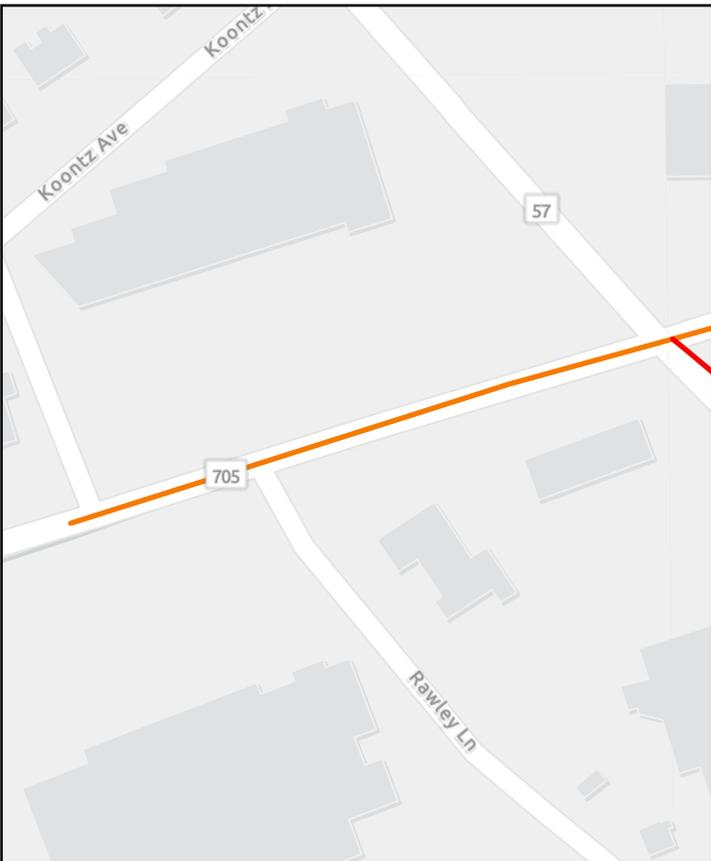
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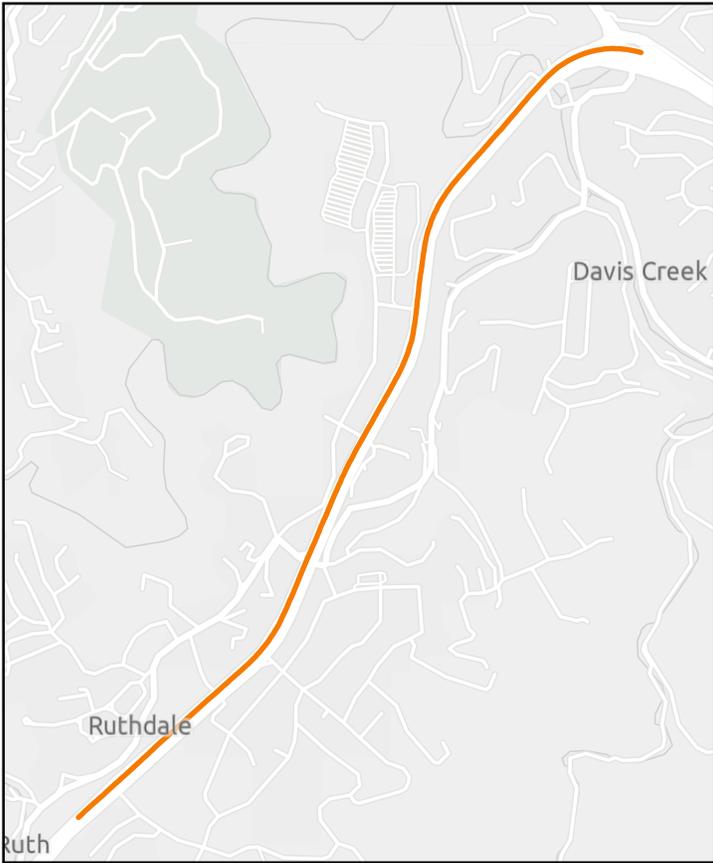
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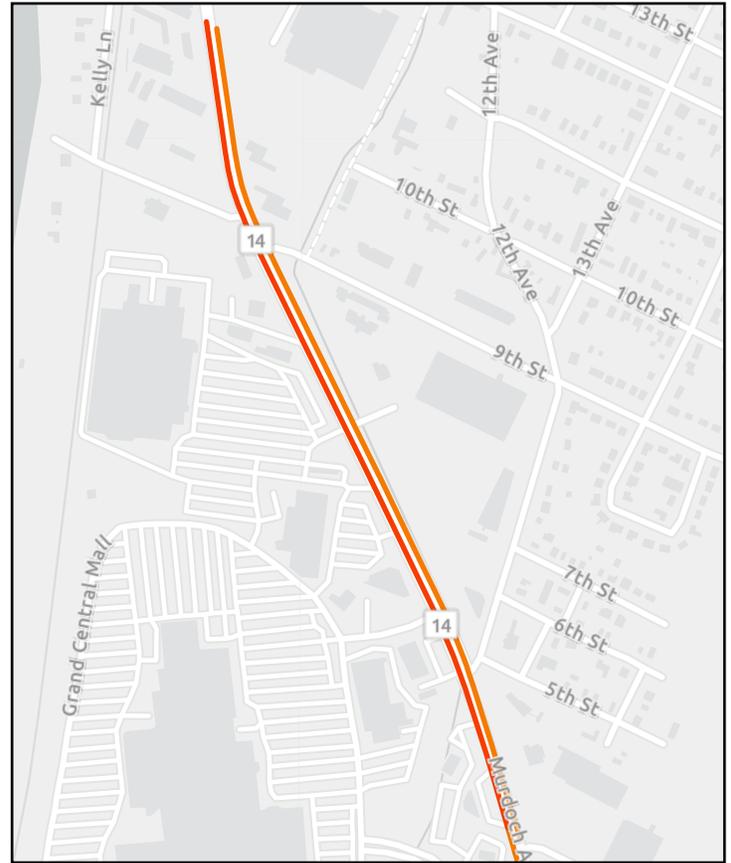
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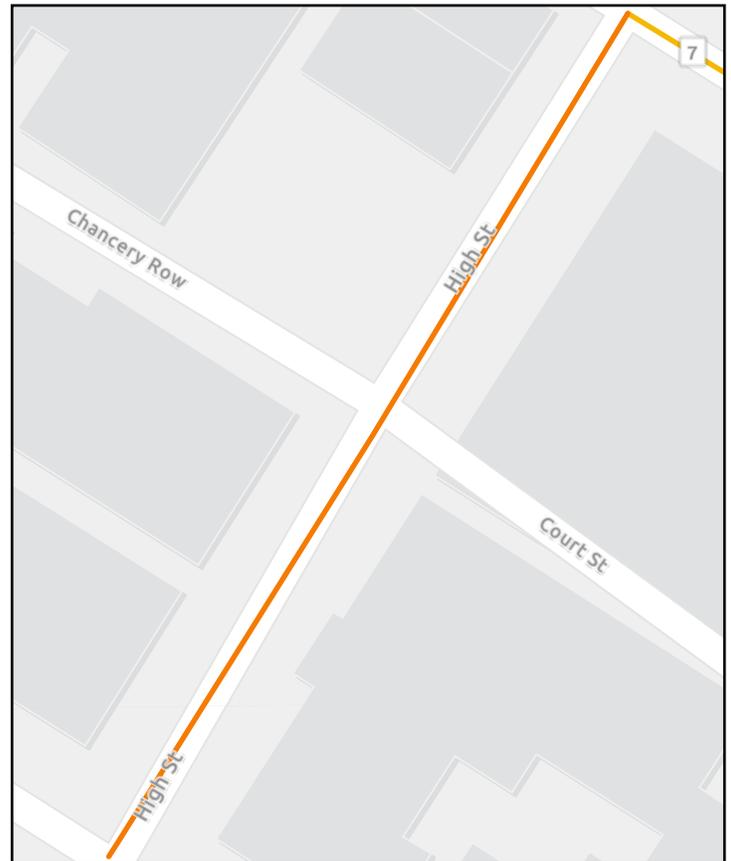
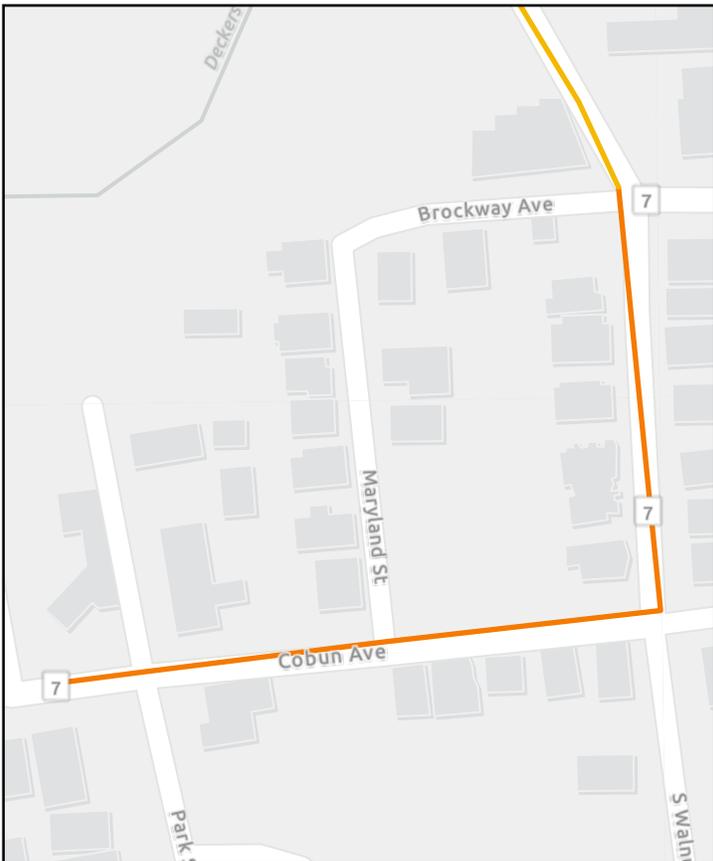
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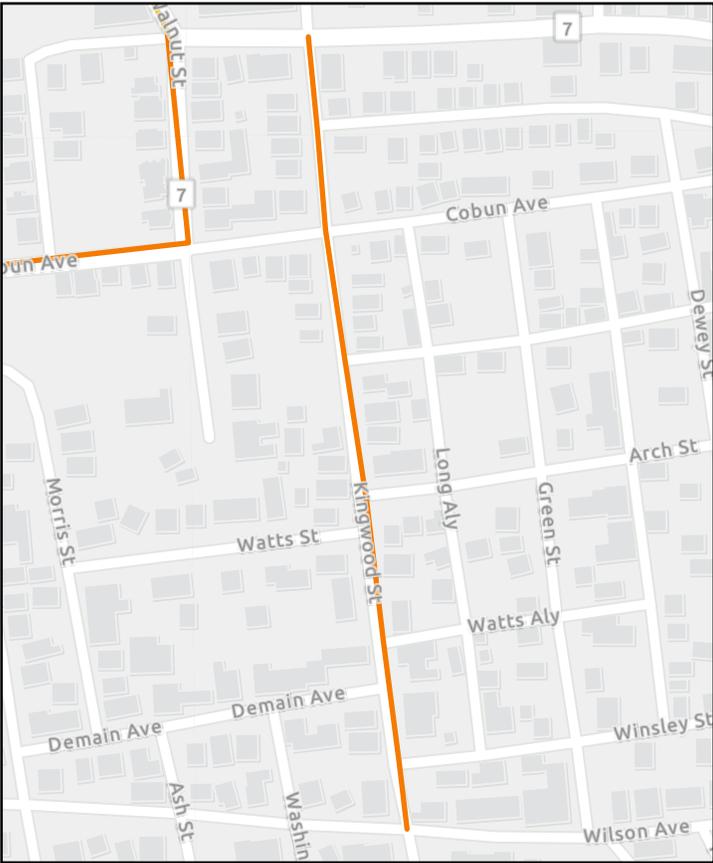


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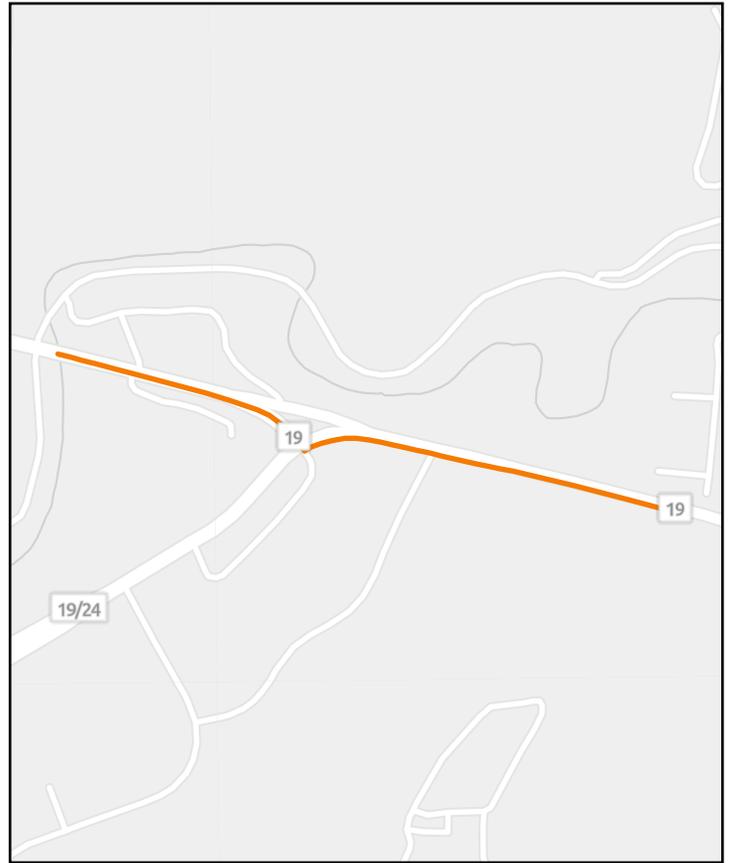
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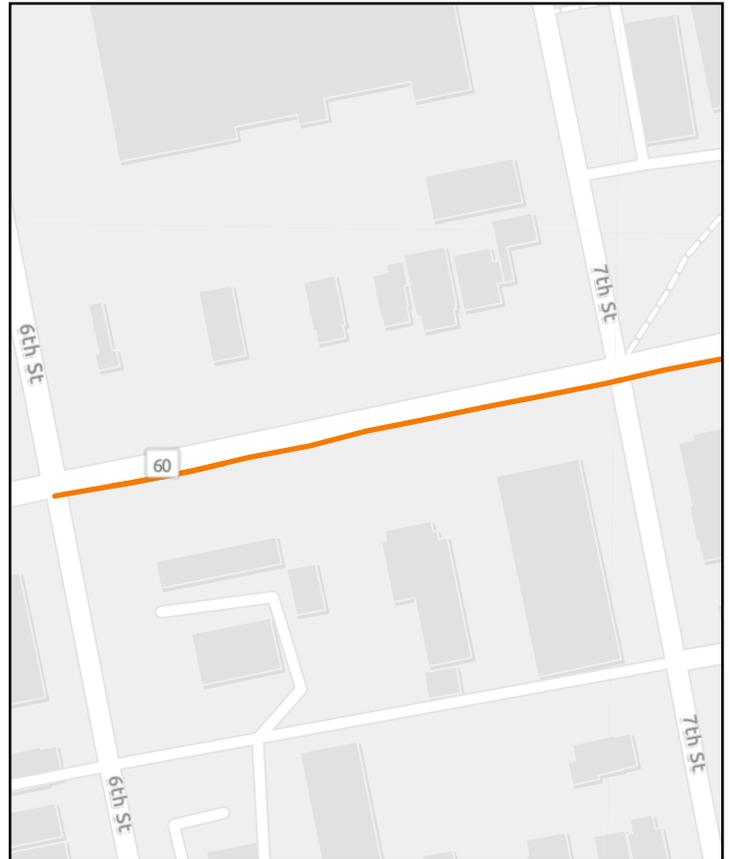
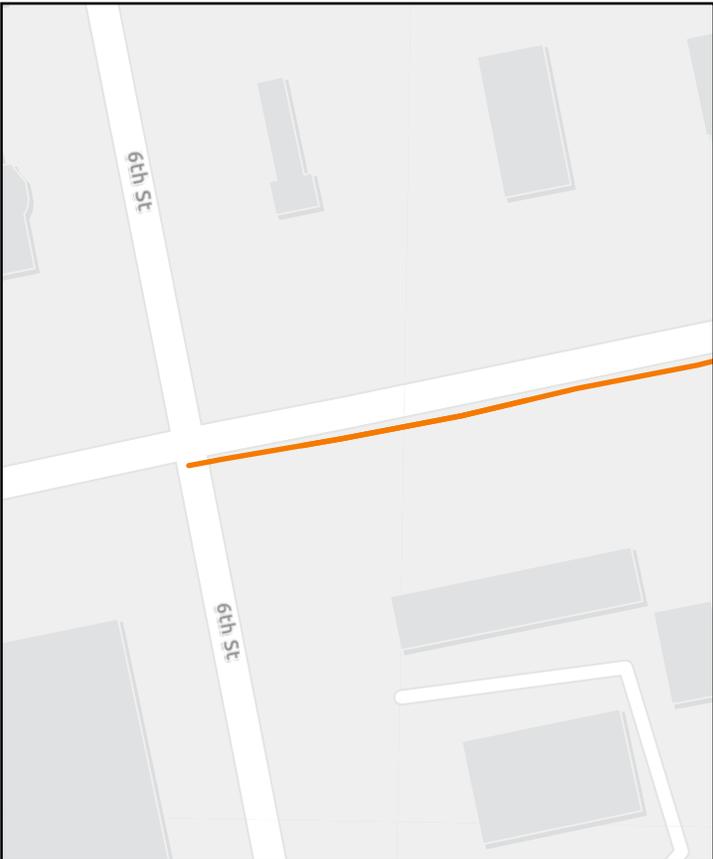
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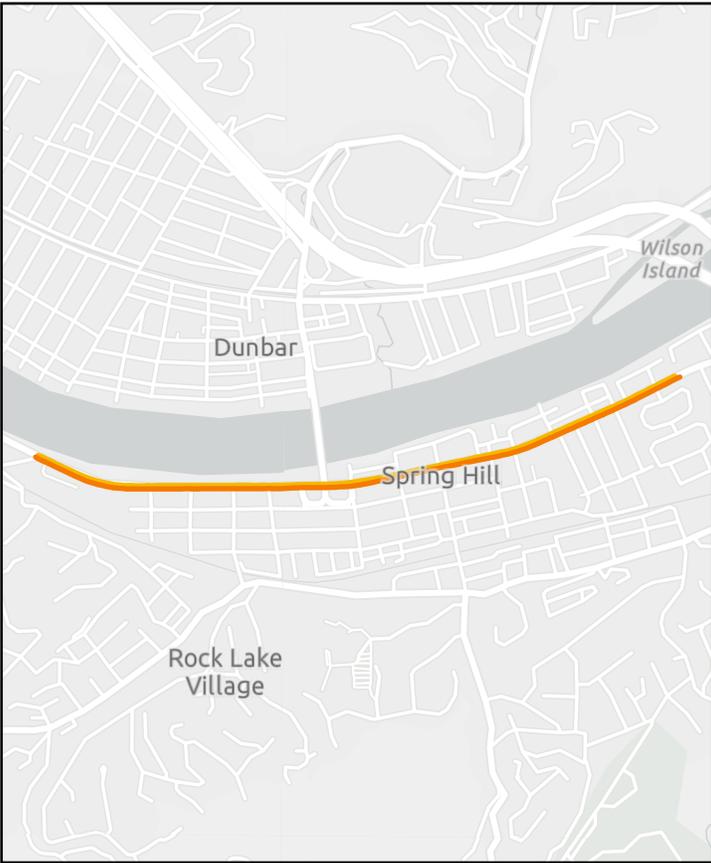


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Cabell County - Rank: 47
Route ID: 06200600000EB





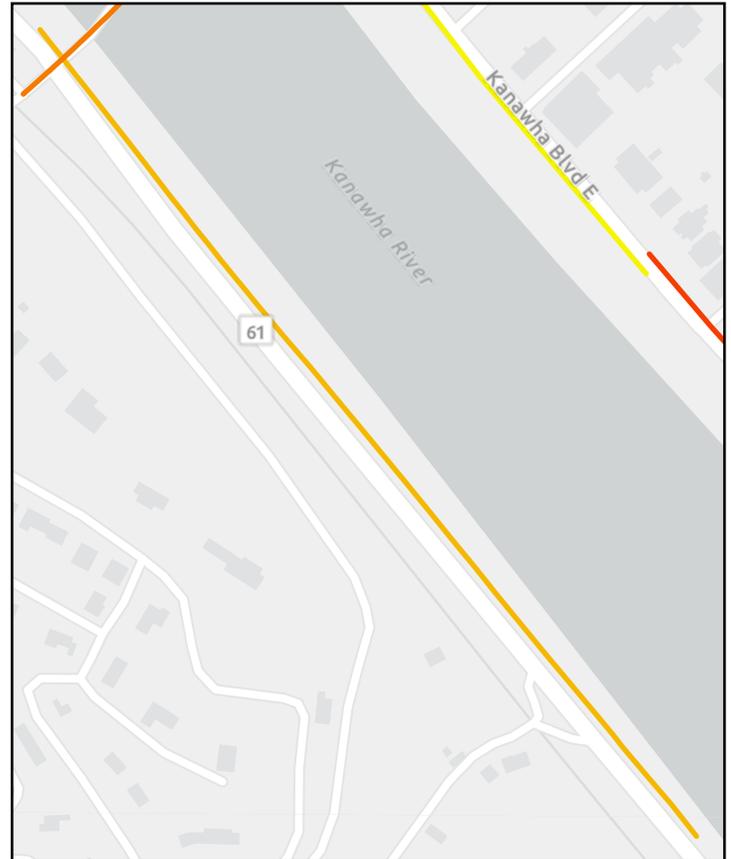
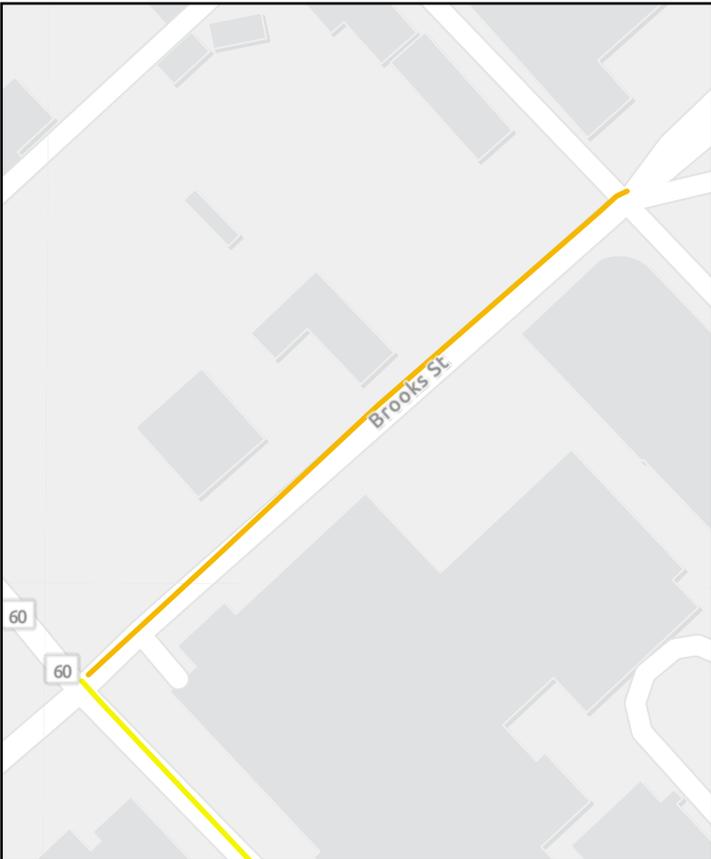
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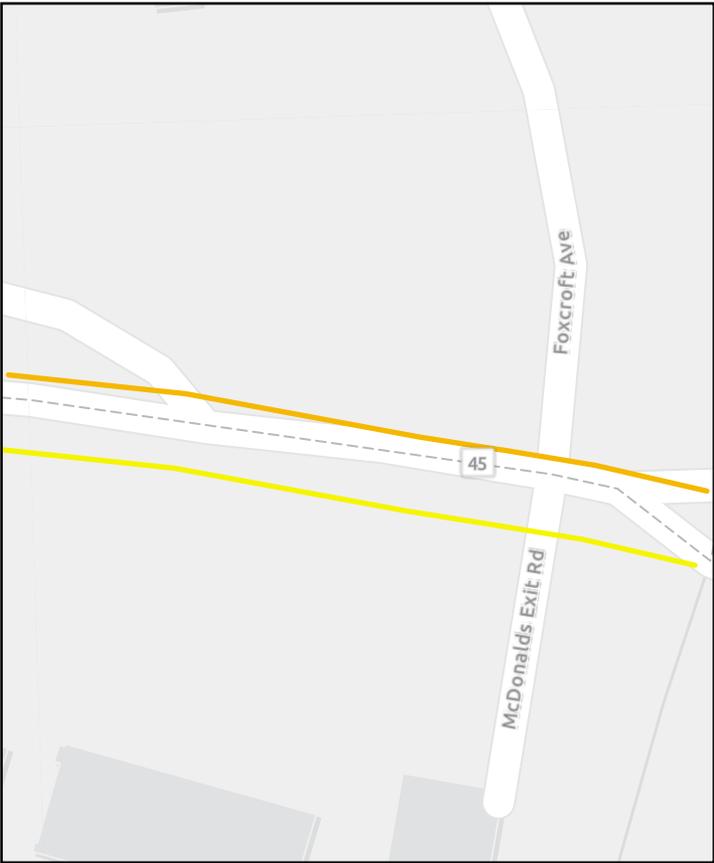
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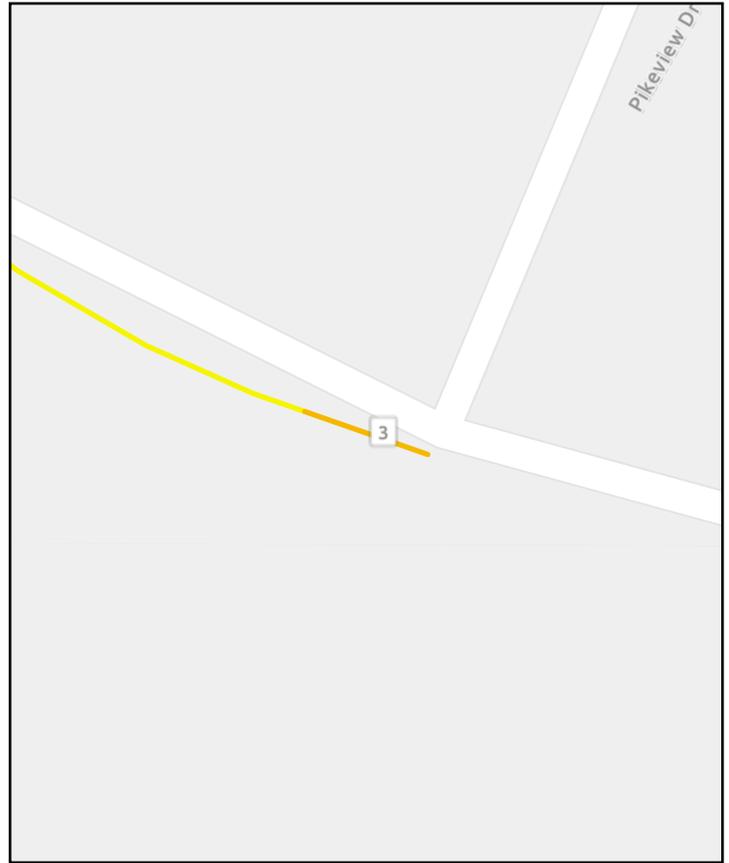
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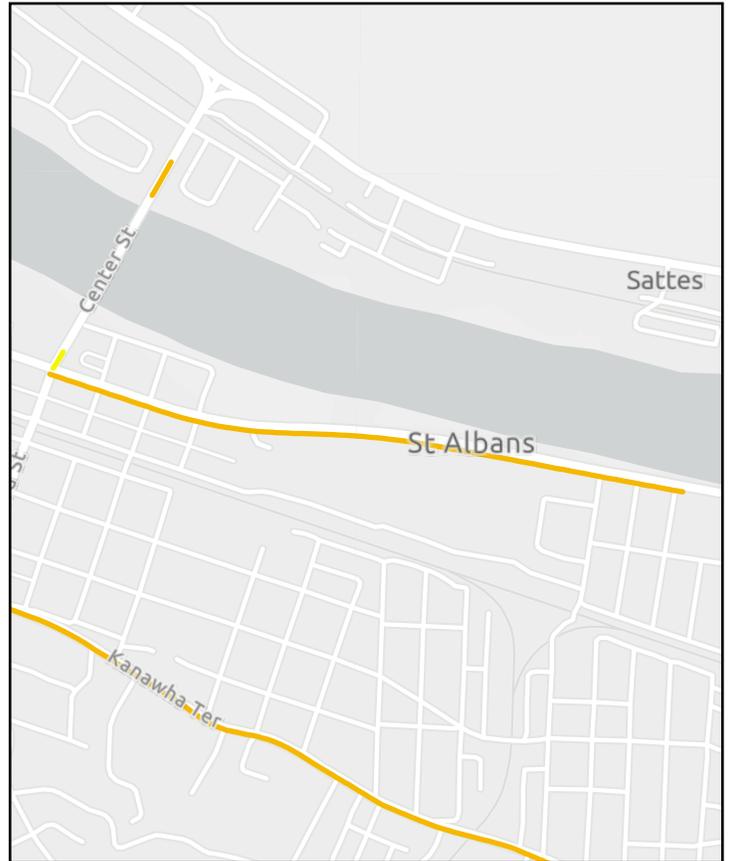
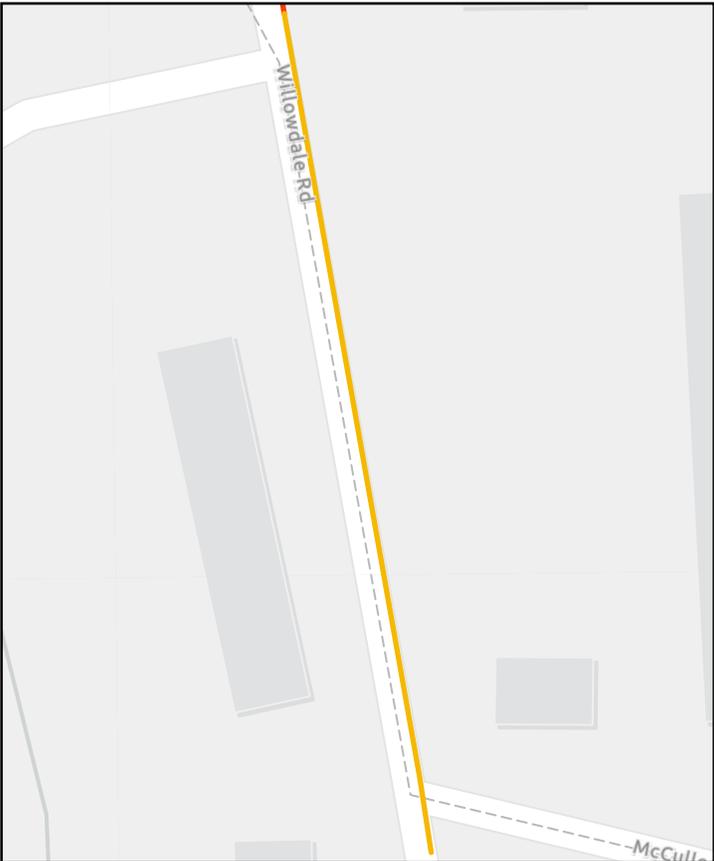
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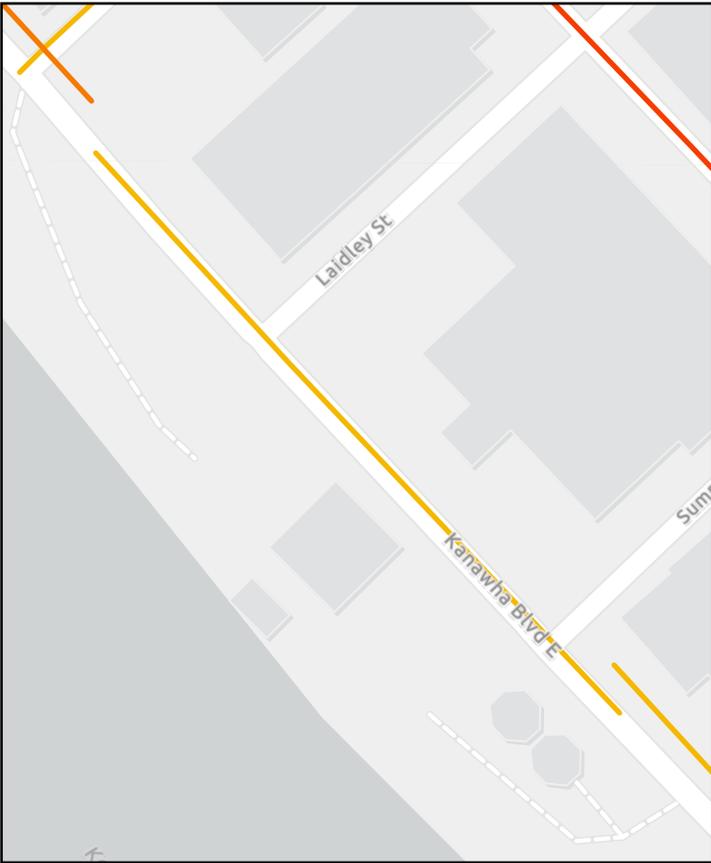


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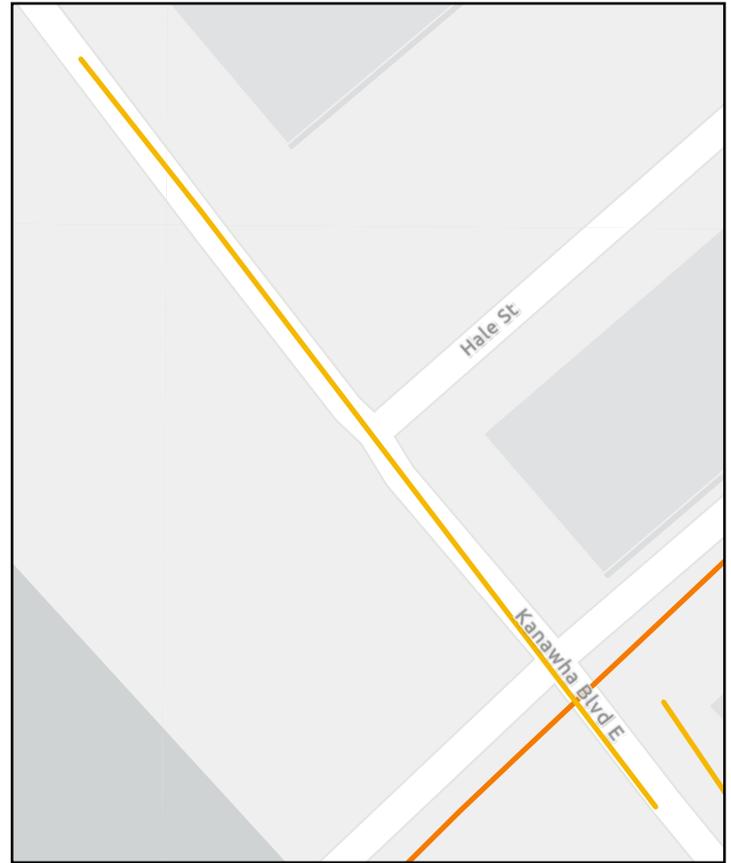
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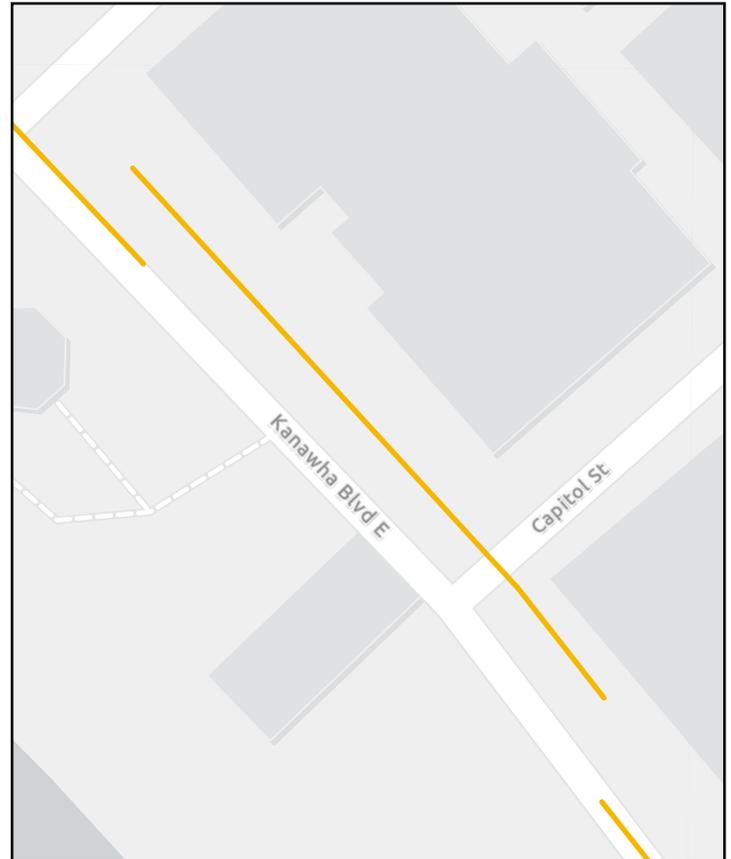
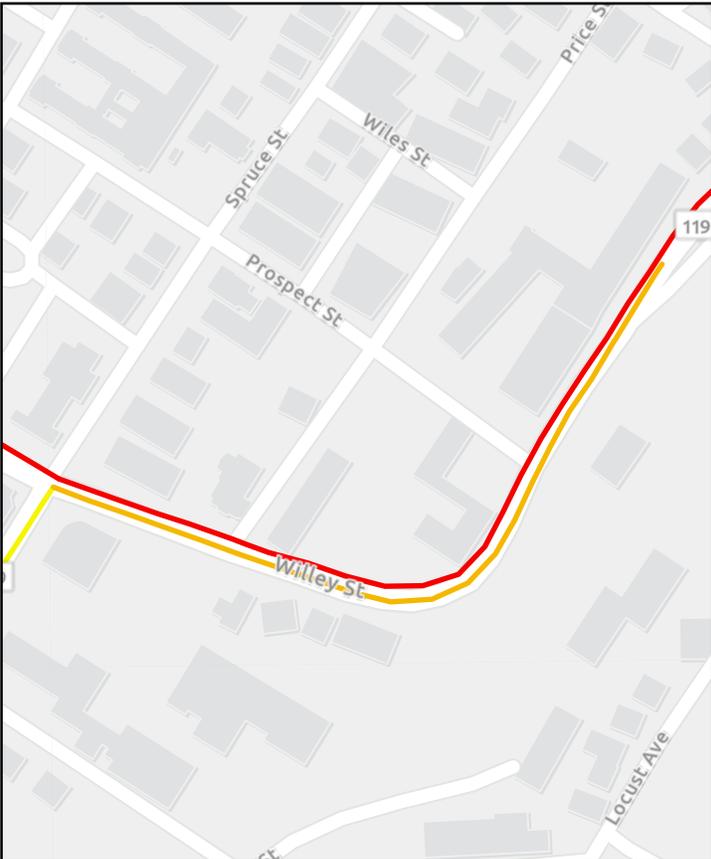
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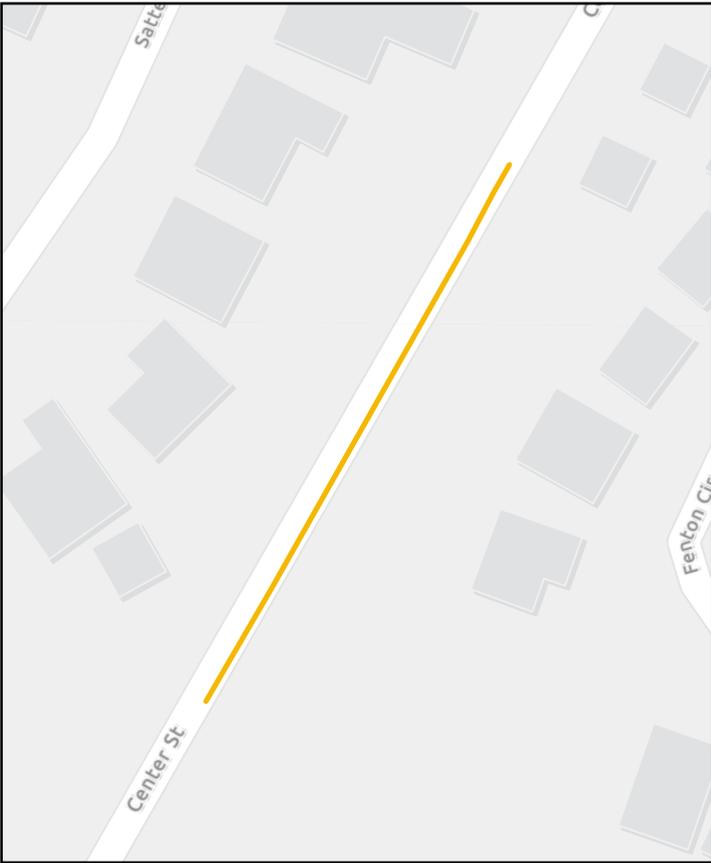


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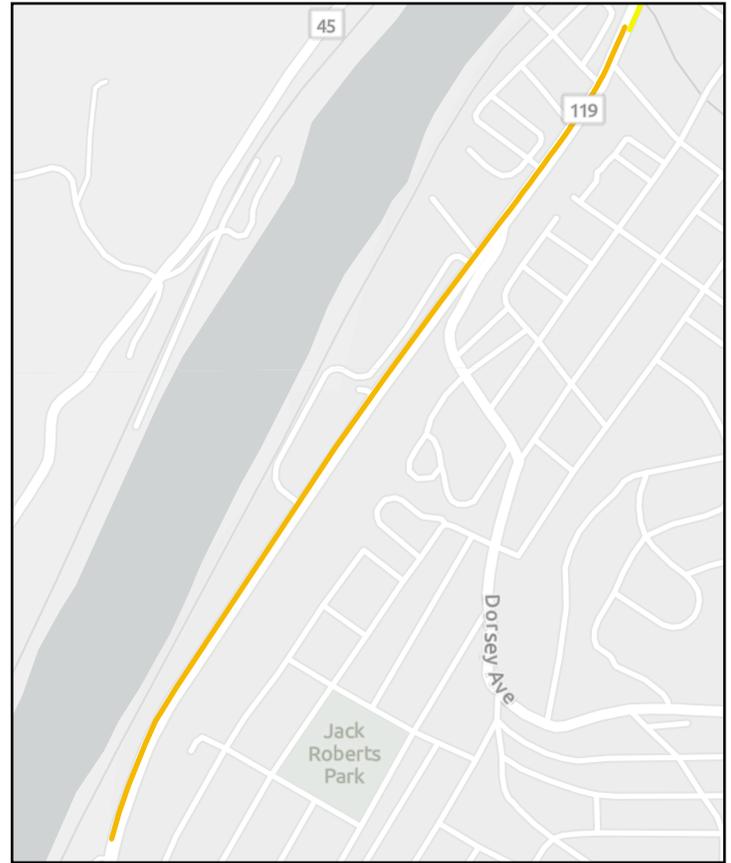
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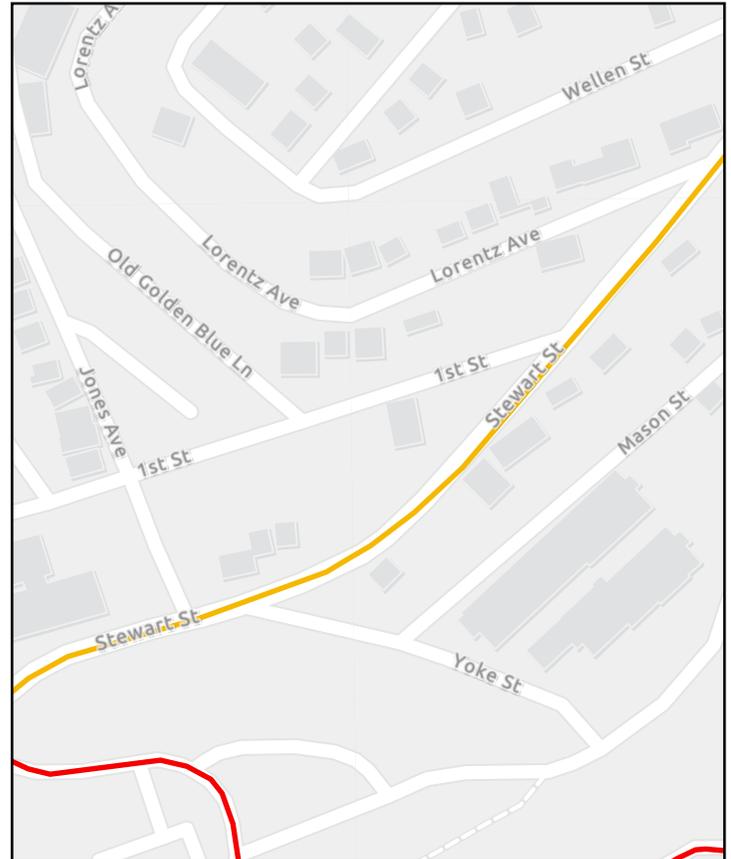
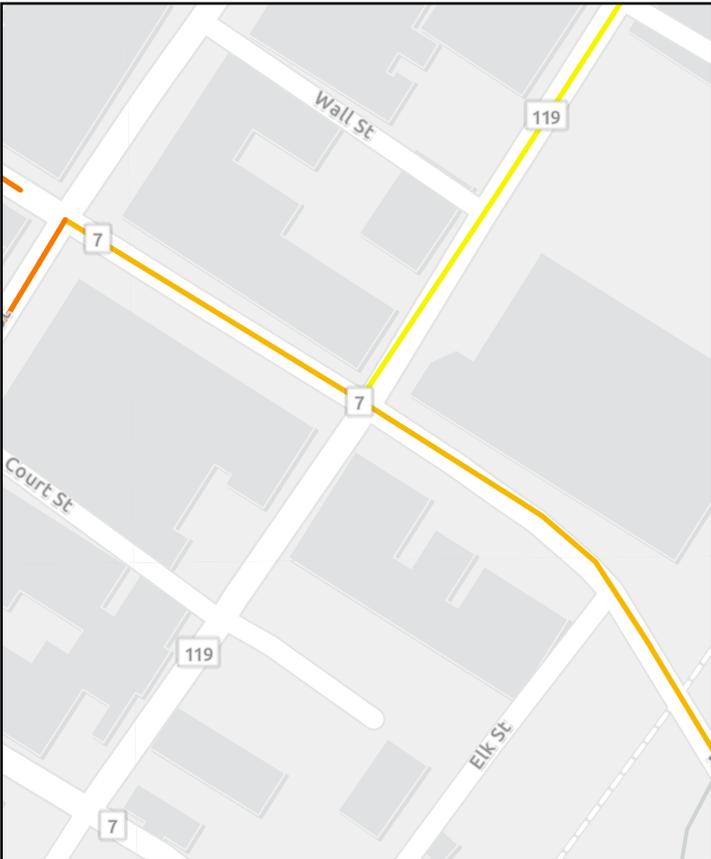


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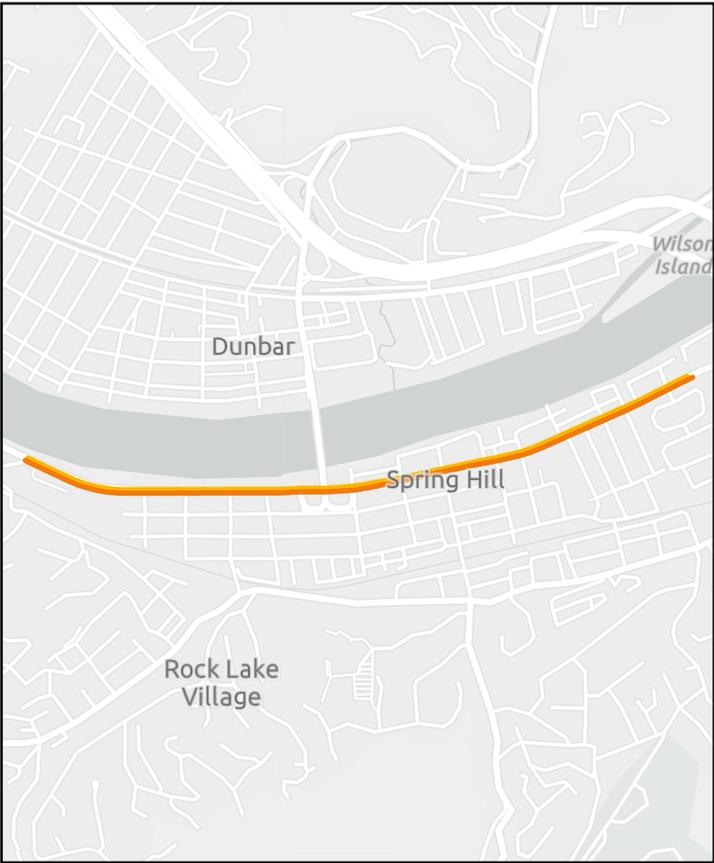


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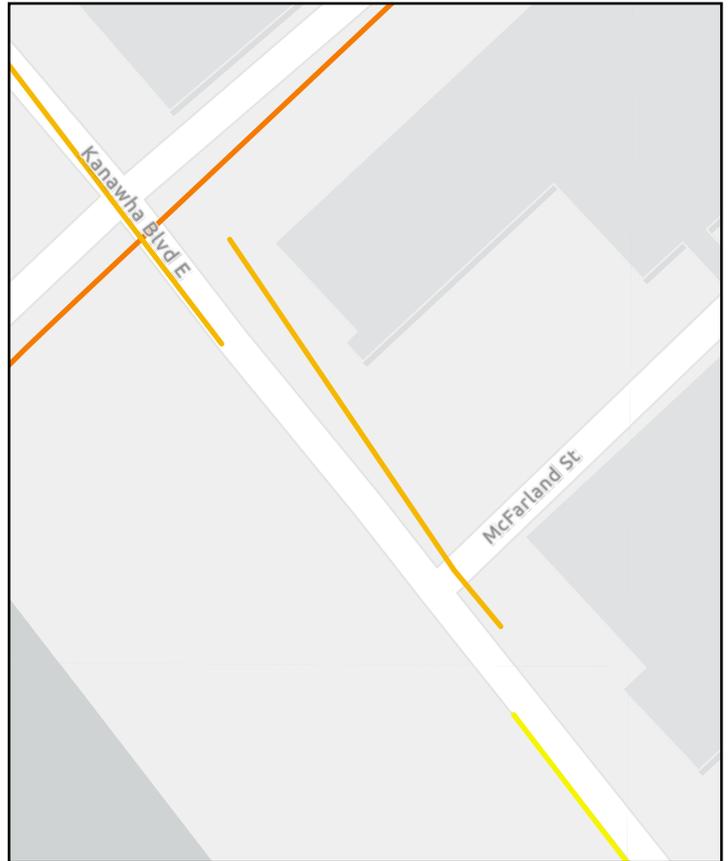
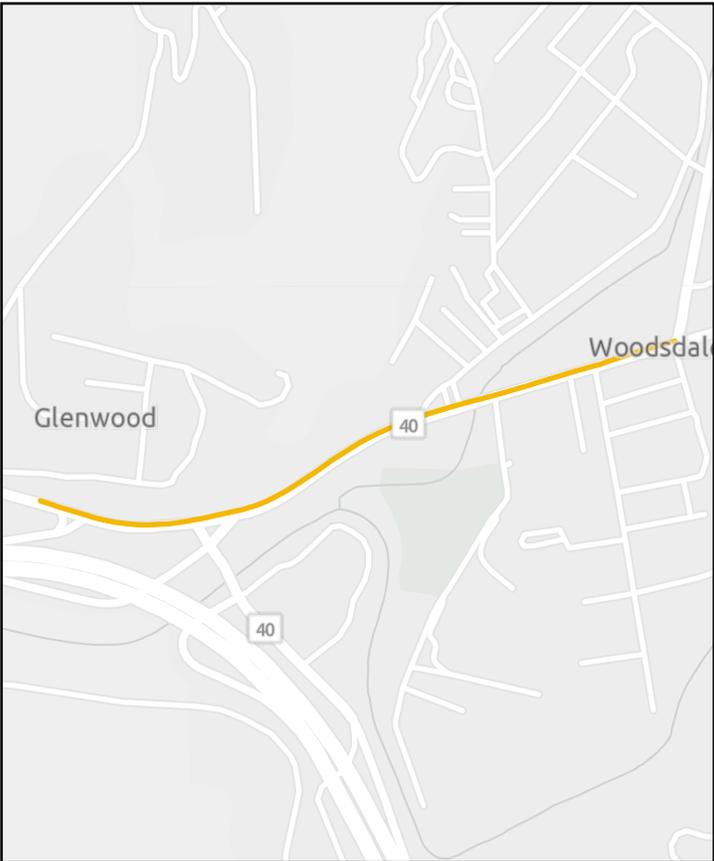
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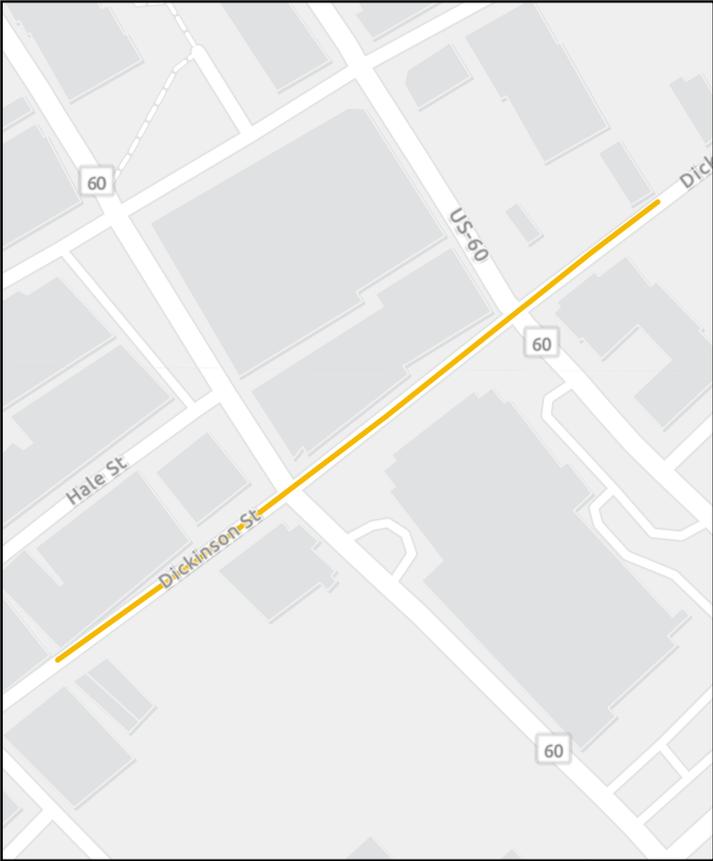


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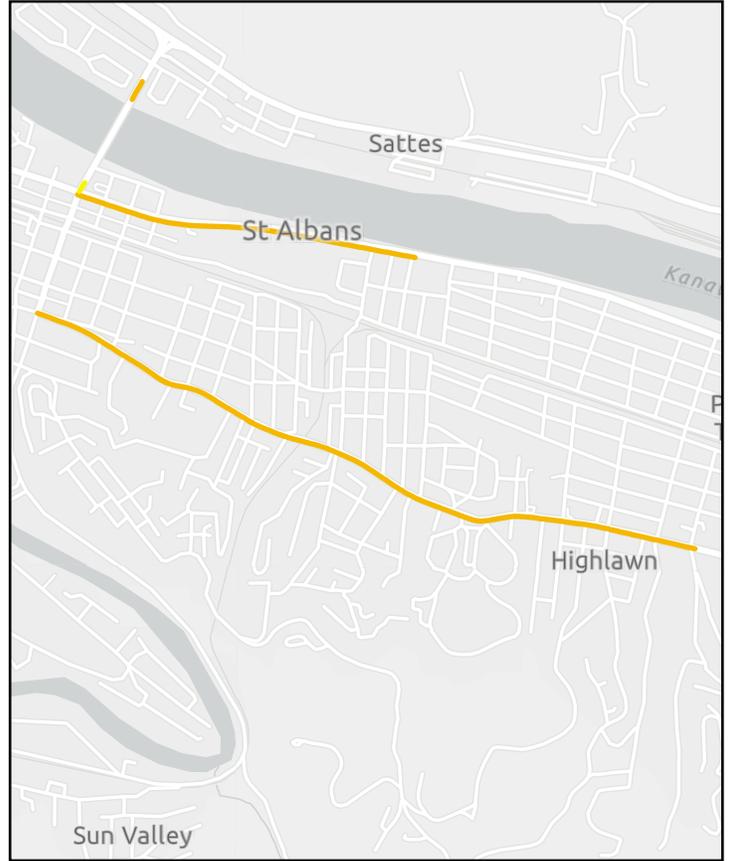
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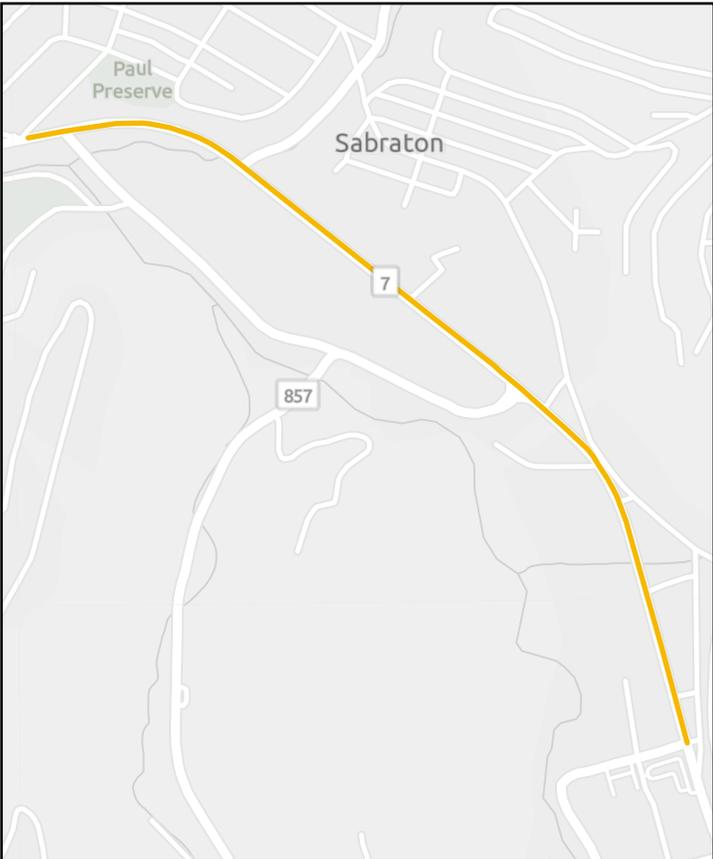


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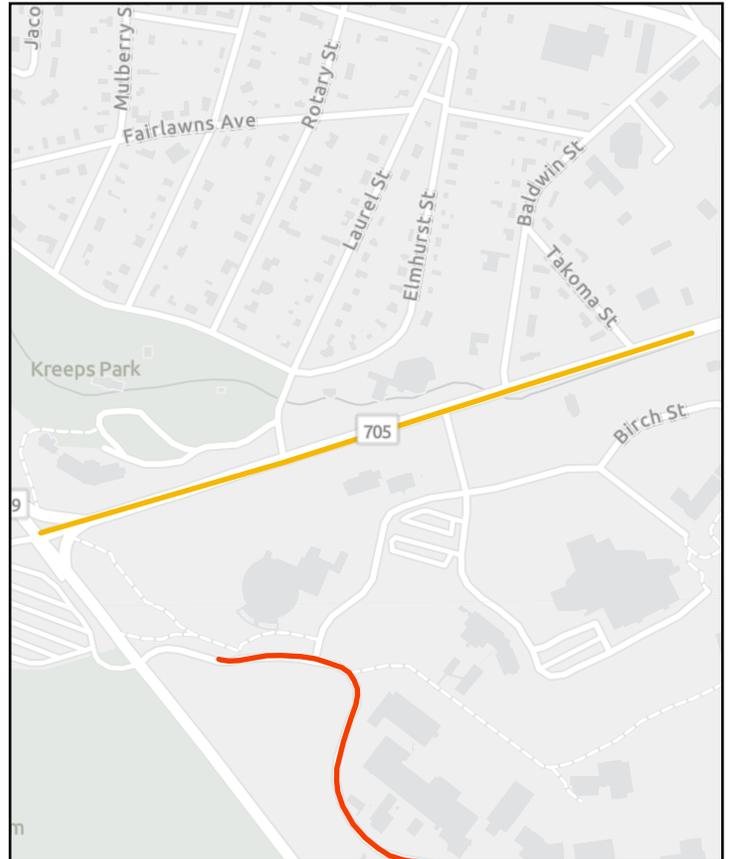


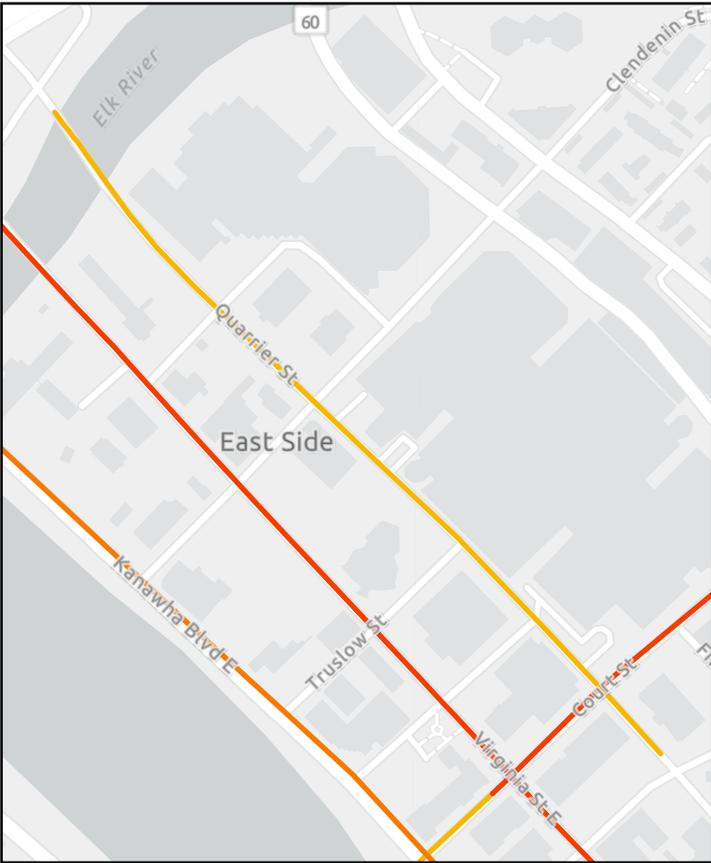
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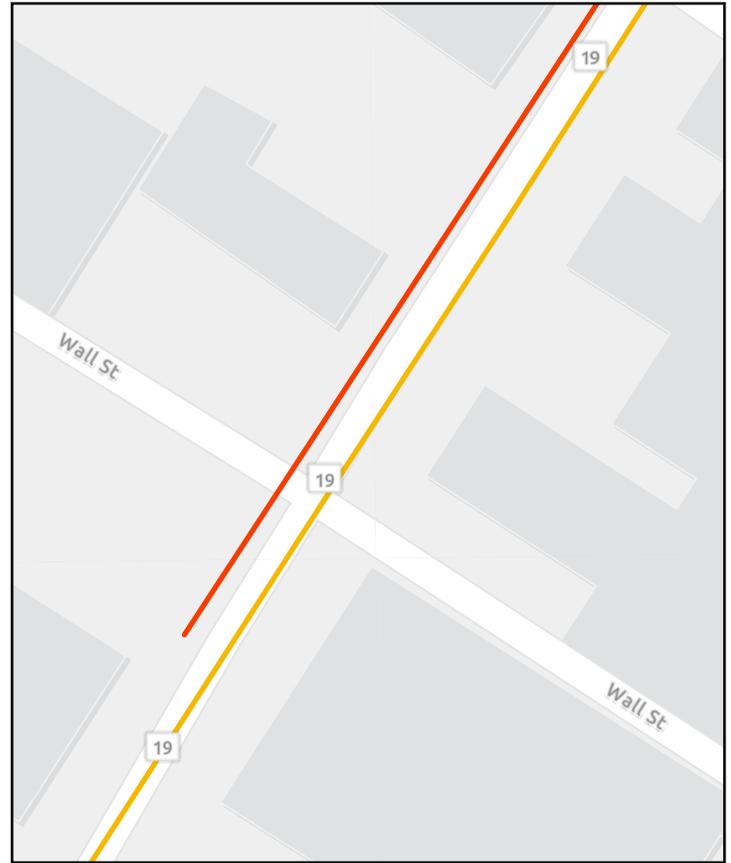
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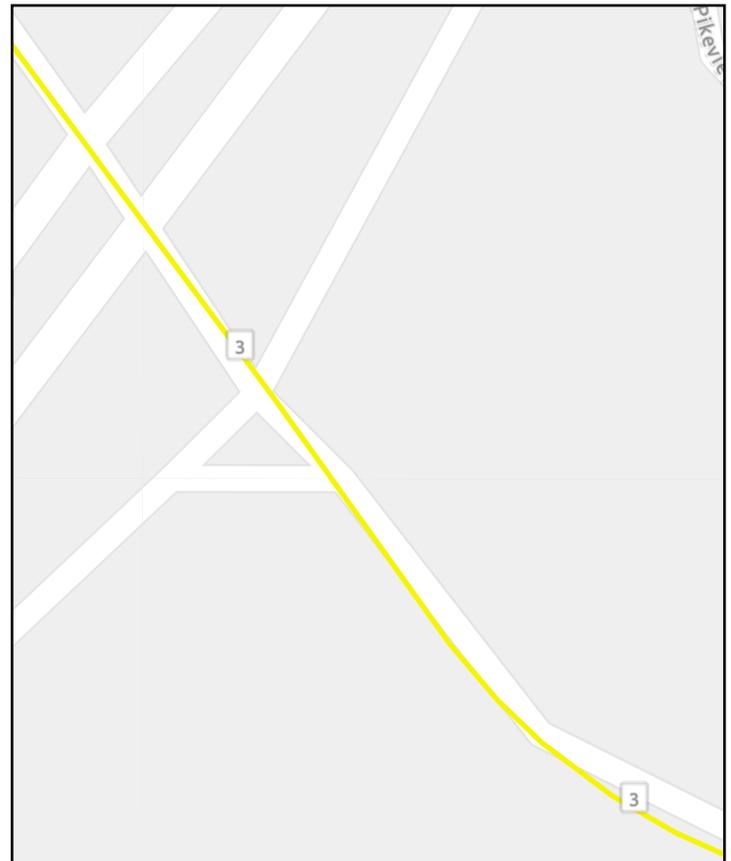
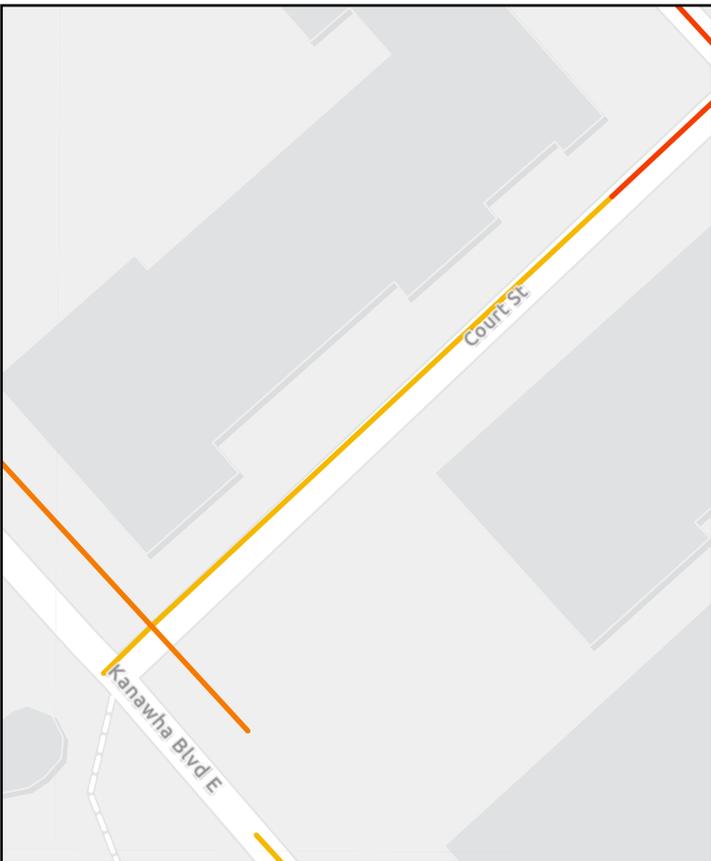
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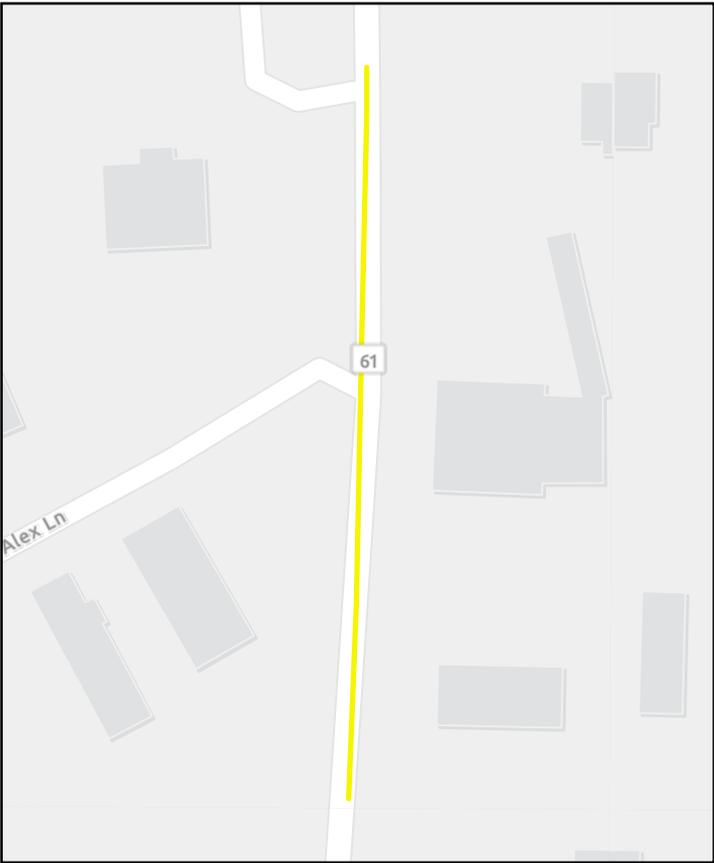
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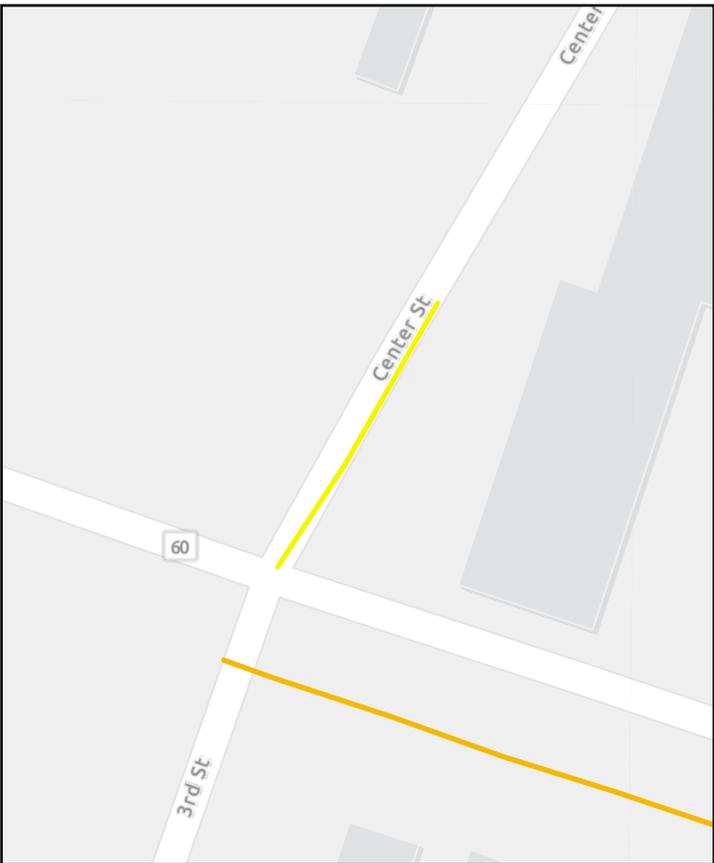
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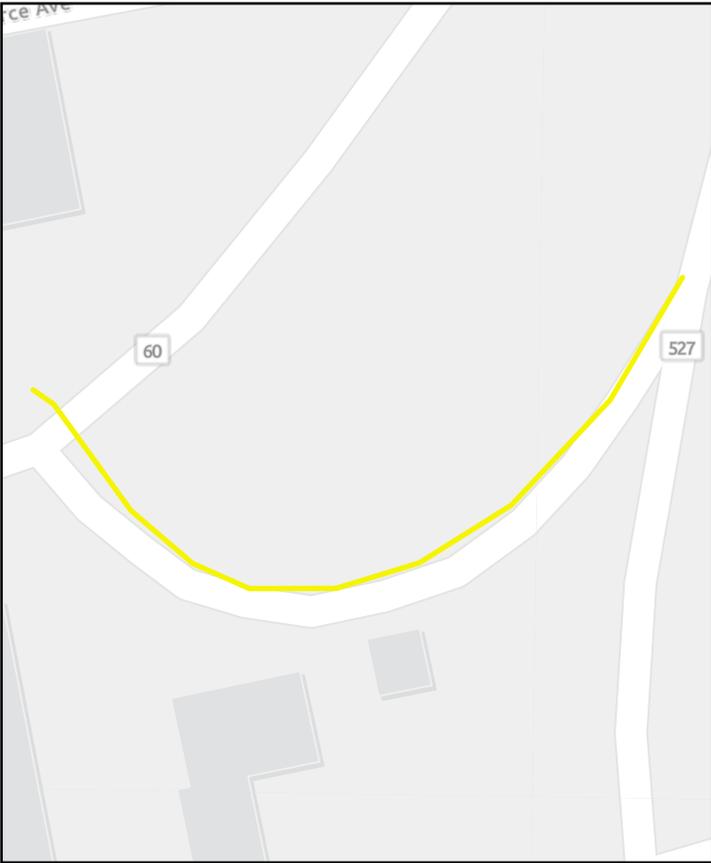
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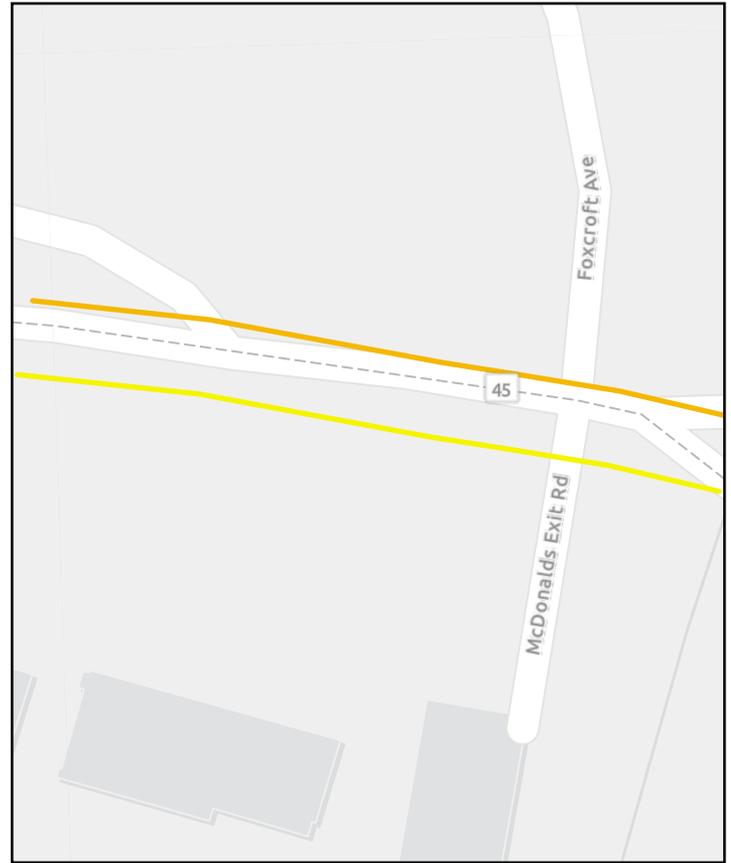
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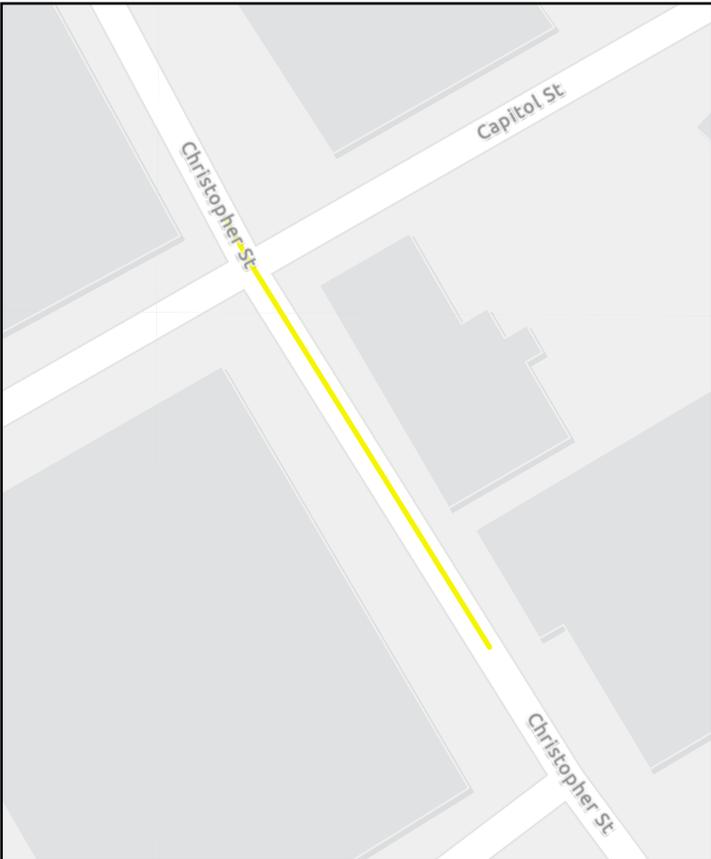


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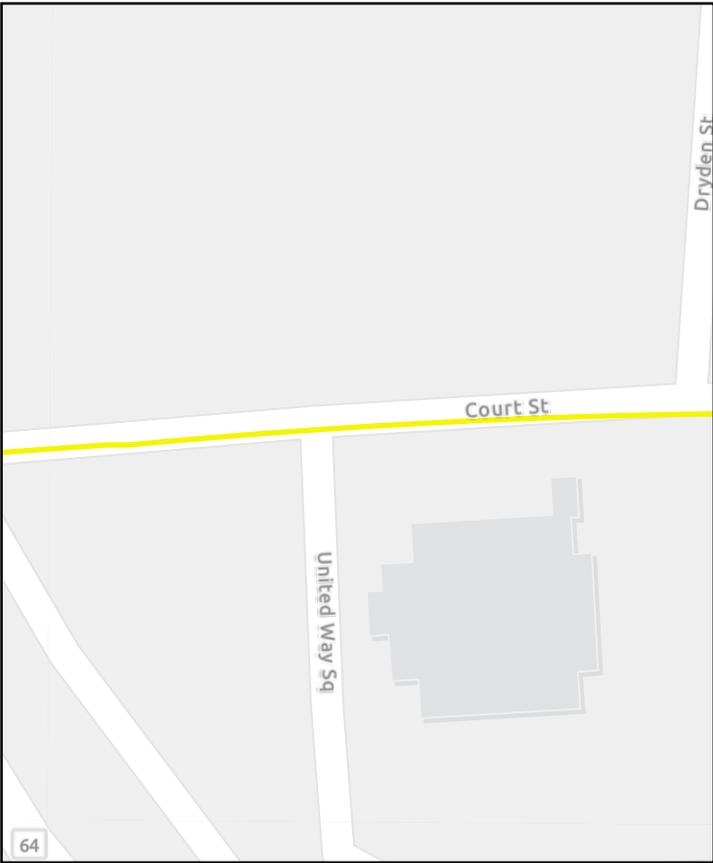


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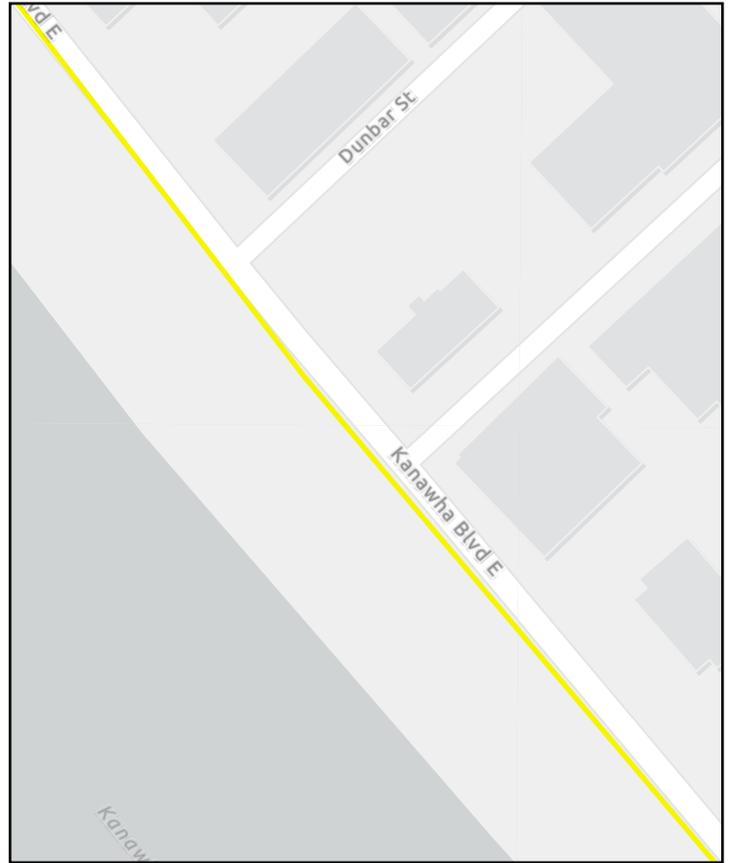
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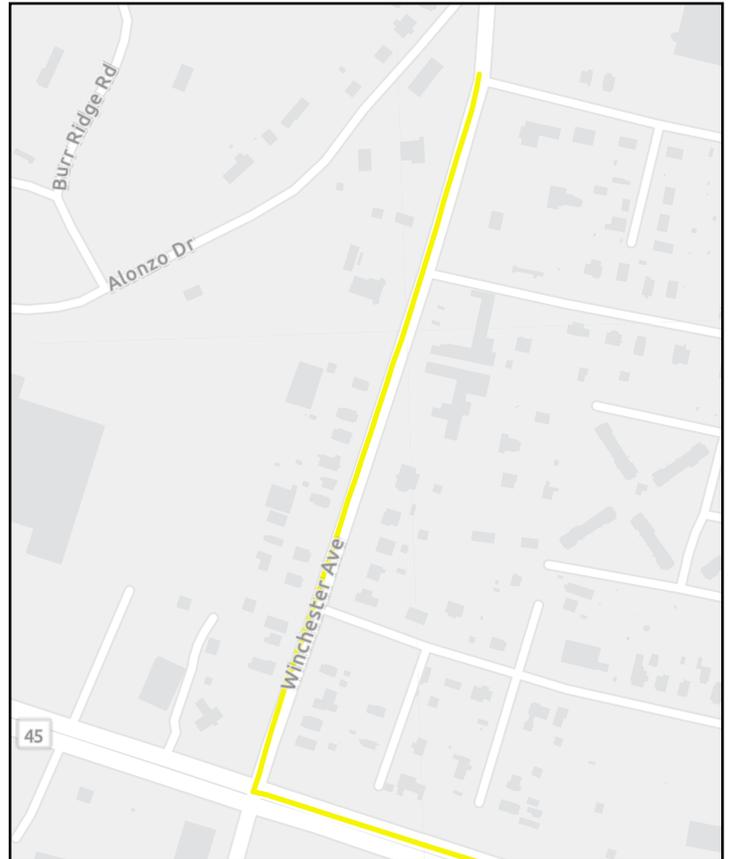
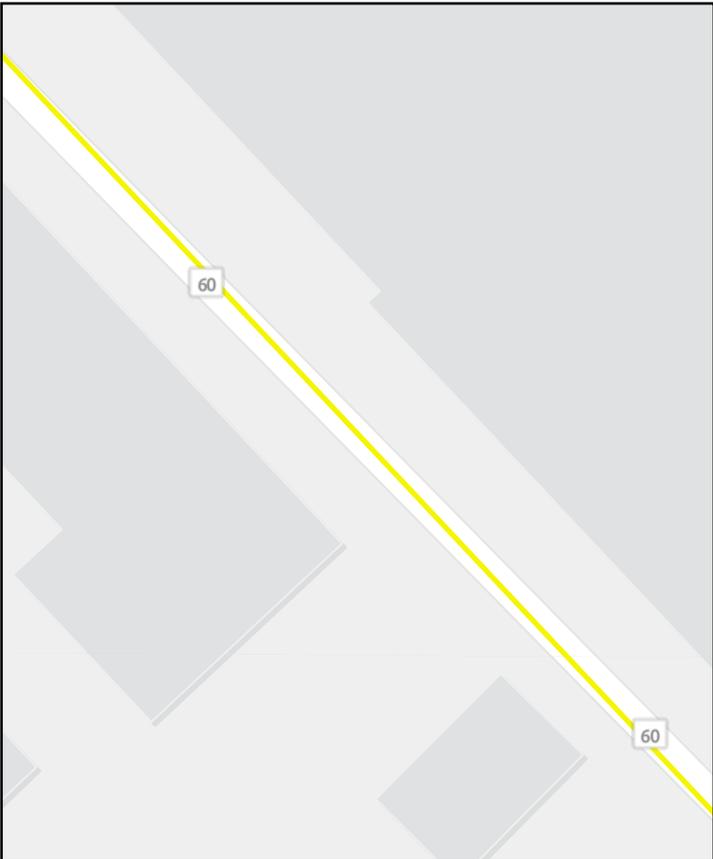
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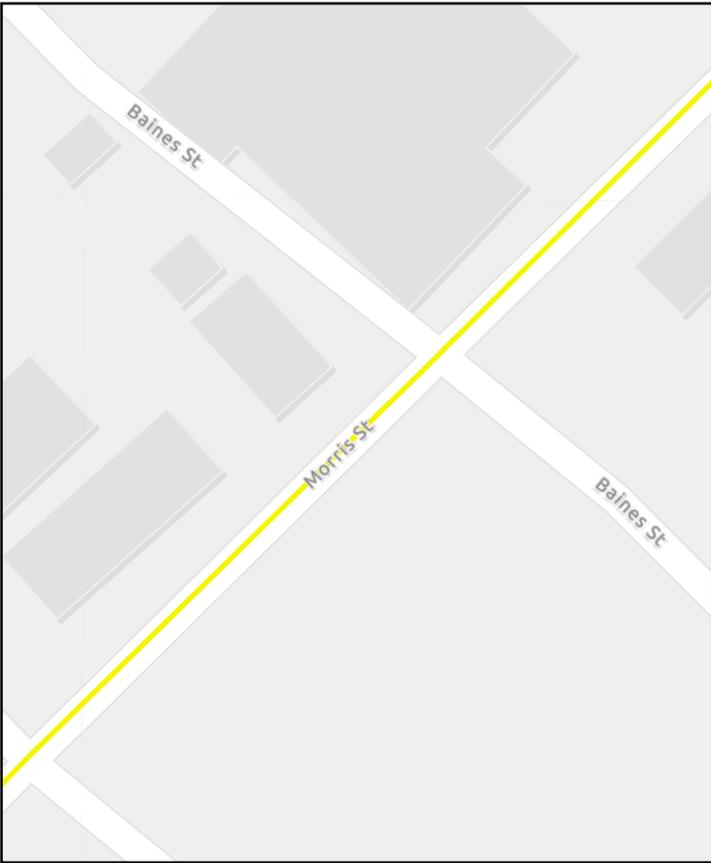


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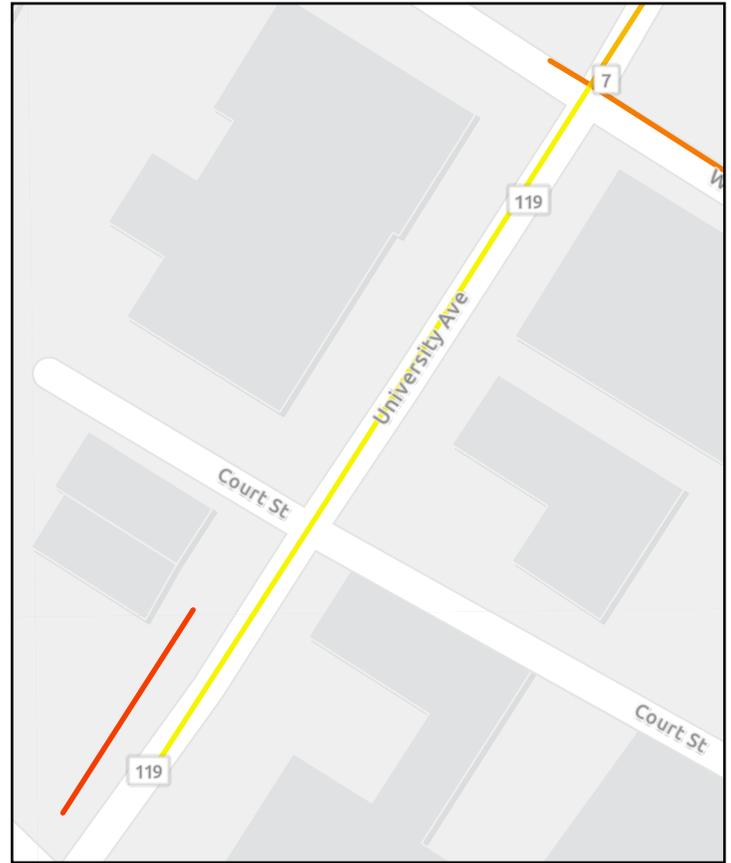
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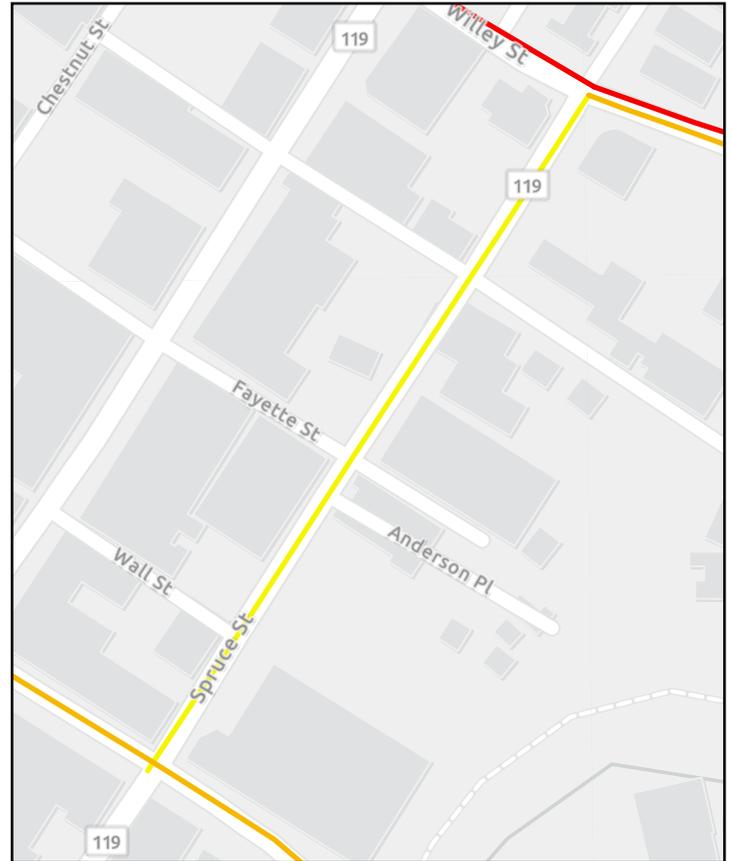
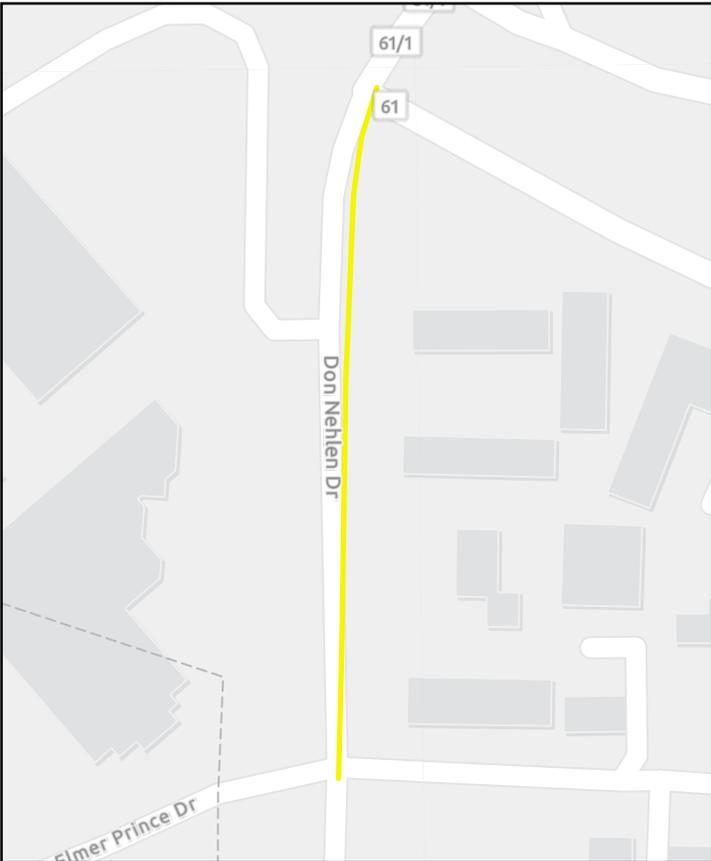
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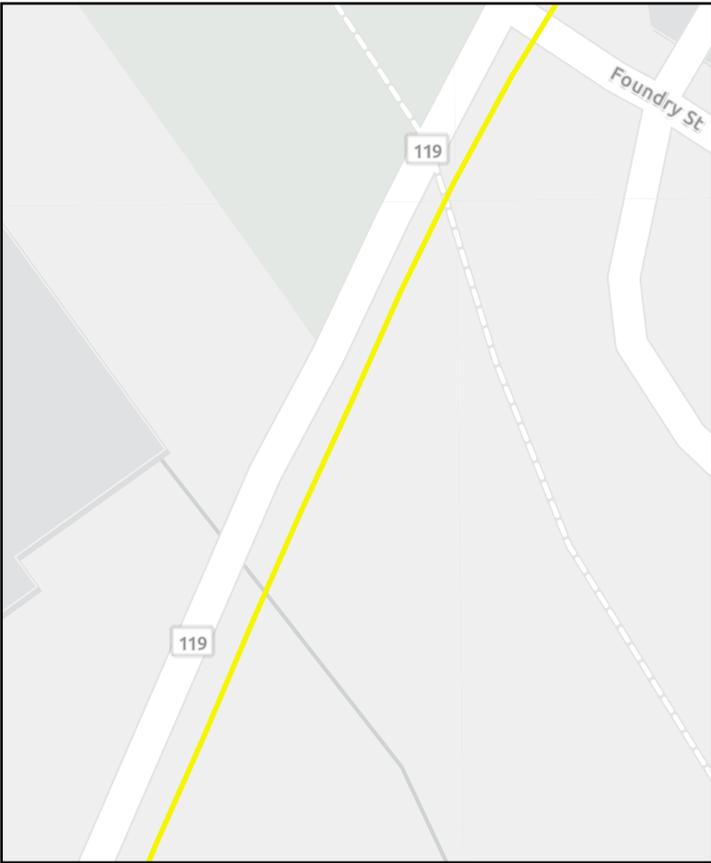


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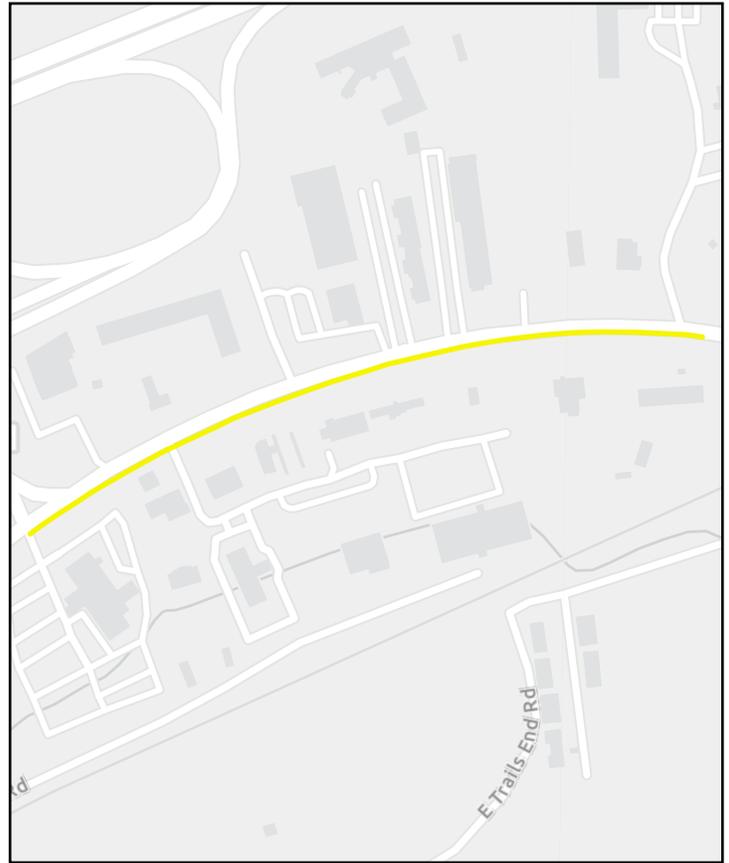
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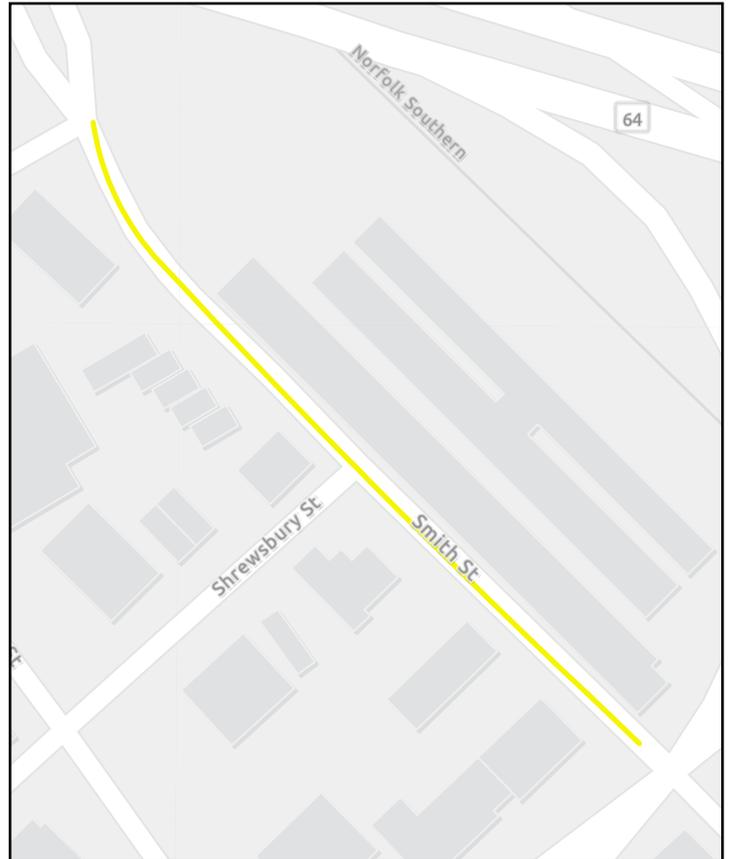
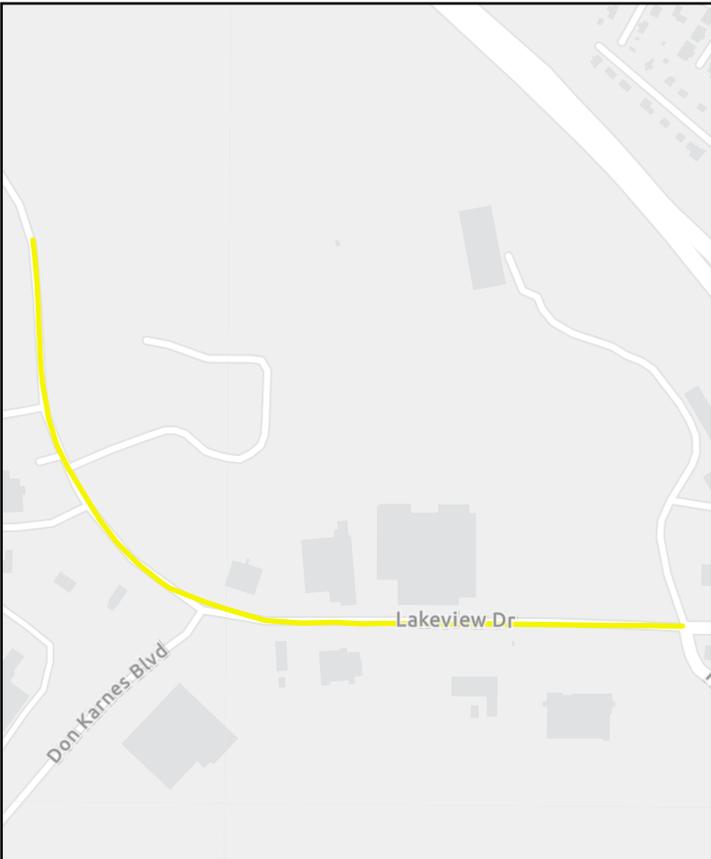
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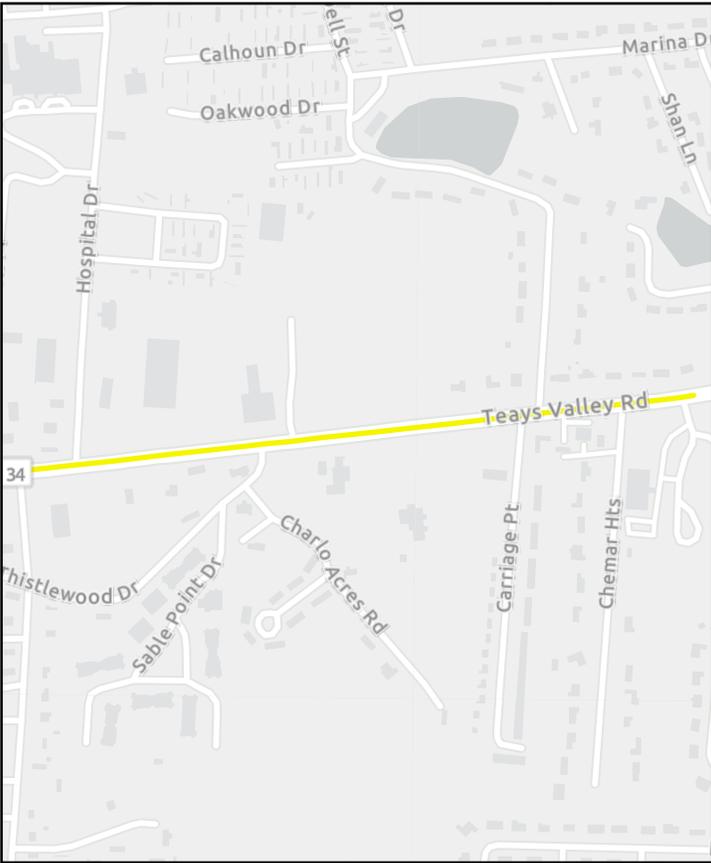


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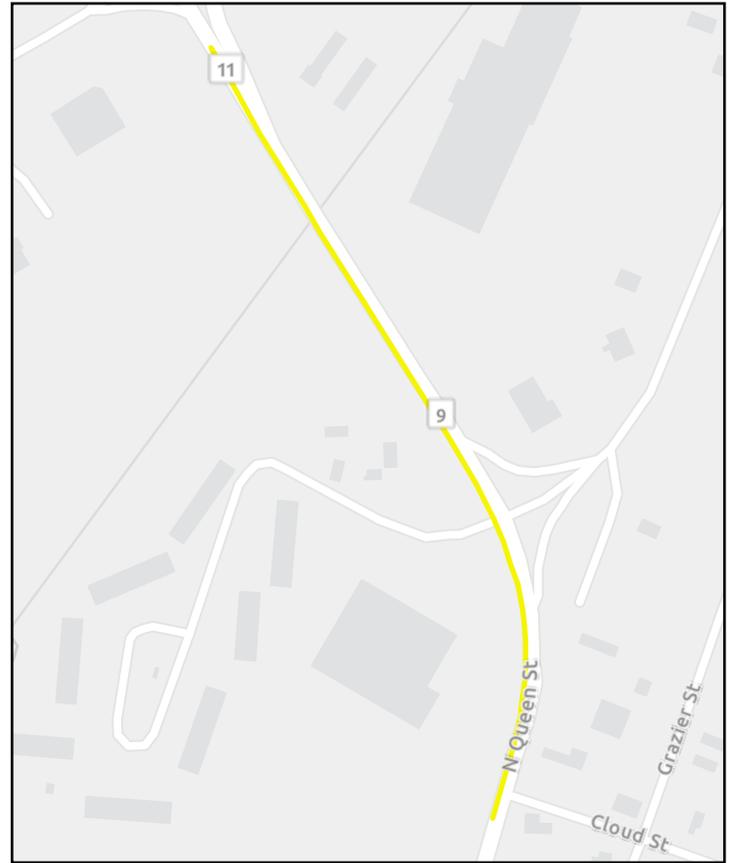
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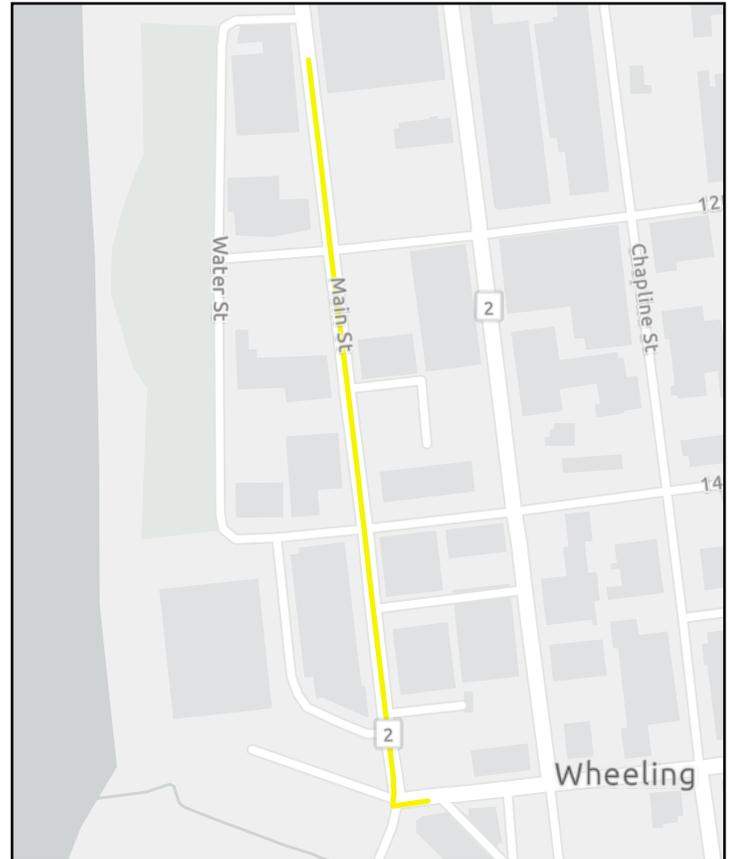
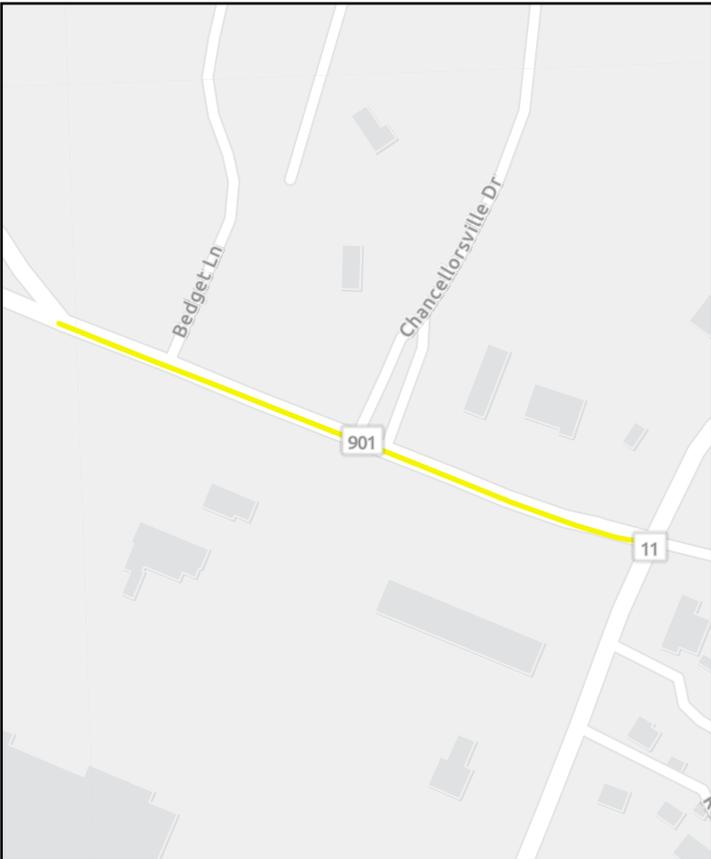
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APPENDIX B

**Additional Stakeholder
and Public Engagement
Materials**



Stakeholder Engagement

Stakeholder Advisory Committee Meeting #1 Meeting Summary

August 3, 2023

10:30 AM to 12:00 PM

Location: Zoom

Attendees:

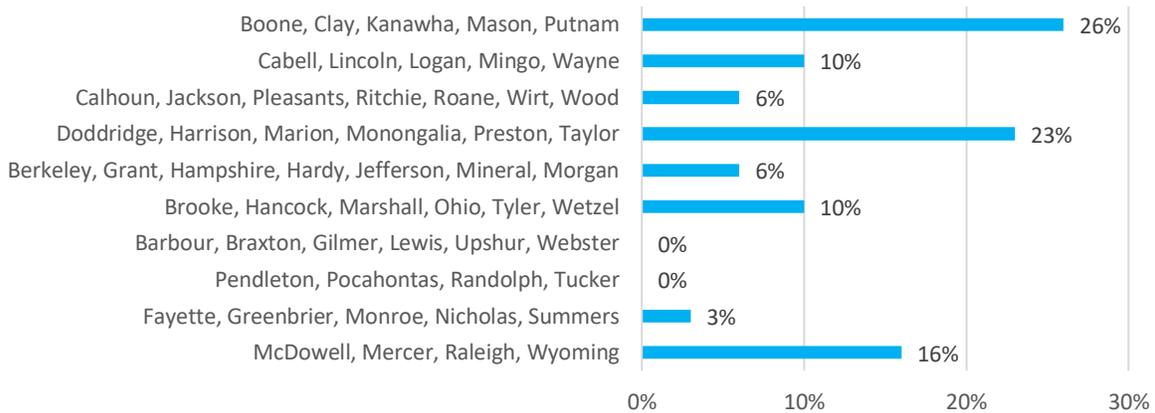
- **Christiaan Abildso** – WVU School of Public Health
- **Bill Austin** – Morgantown Monongalia Metropolitan Planning Organization (MMMPO)
- **Amy Boggs** – WV Governor’s Highway Safety Program
- **Joseph Curry** – Little Kanawha Transit Authority
- **Ron Eck** – WV Local Technical Assistance Program (LTAP)
- **Frank Enko** – National Highway Transportation Safety Administration (NHTSA)
- **Kara Greathouse** – Federal Highway Administration (FHWA)
- **Patricia Hajash** – New River Transit Authority
- **Donna Hardy** – West Virginia Division of Highways (WVDOH)
- **Sean Hill** – Kanawha Valley Regional Transportation Authority
- **Emilee Hitt** – WVDOH
- **Derrick Johnson** – FHWA
- **Dave Leisure** – Mid-Ohio Valley Transit Authority
- **George Levitsky** – Fairmont Marion County Transit Authority
- **Heather Lilly** – New River Transit Authority
- **Ash Litton** – WV Department of Health and Human Resources
- **Marsha Mays** – WVDOH
- **Michaela McDonough** – Hagerstown Eastern Panhandle Metropolitan Planning Organization (HEPMPO)
- **Brandon Mehlinger** – Active Southern West Virginia
- **Andrew Morgan** – WV LTAP
- **Kelly Pack** – Rails-to-Trails Conservancy
- **Vanessa Perkins** – Centra Bus
- **Sam Richardson** – Regional Intergovernmental Council (RIC)
- **Saleem Salameh** – KYOVA Interstate Planning Commission
- **Lt. Robert Sell** – Jefferson County Sheriff’s Office
- **Rakesh Sharma** – Belomar Regional Council
- **Breanna Shell** – City of Huntington
- **Jake Smith** – RIC
- **Shae Strait** – City of Fairmont
- **Dennis Strawn** – Complete Streets Advisory Board
- **Tyler Thaxton** - WV Governor’s Highway Safety Program
- **Benjamin Tolliver** – Beckley Fire Department
- **John Tuggle** – Fayette Raleigh Metropolitan Planning Organization (FRMPO)
- **Eric Wade** – Wood-Washington-Wirt Interstate Planning Commission

- **Erica Weaver** – New River Transit Authority
- **Brady Wood** – Belomar Regional Council
- **Matt Martin** – Mountain Transit Authority
- **Butch Fox**– Mountain Transit Authority
- **Maria Cantrell** – Burgess & Niple (B&N)
- **Ella Donley** – B&N
- **Rodney Holbert** – B&N
- **Kendra Schenk** – B&N

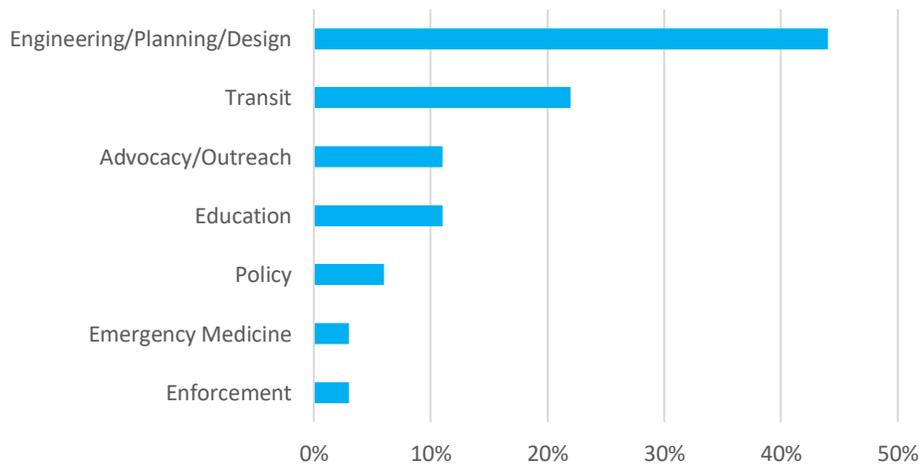
Introductions

The meeting began with introductions from the consulting team and the WV Division of Highways. Meeting participants were invited to sign in and participate in polls indicating what county they were from and what best describes their agency.

What county do you represent (are you calling from)?



What best describes your agency?



Vulnerable Road User (VRU) Assessment Explanation

Kendra Schenk from B&N explained what a VRU is, what a VRU Assessment is, and why it's important to conduct this study (refer to handout of the PowerPoint presentation). This warranted a discussion about

Covid-19's impact on higher VRU crashes, including more pedestrian and cyclist activity and higher vehicle speeds. The Safe System Approach principles were explained to inform participants of the general guidance this Assessment will follow and why it is important.

Project Schedule

Schenk then went over the project schedule including when the next stakeholder meetings will likely take place, what to expect at these meetings, and how stakeholders' insight is needed throughout the planning process. The public outreach schedule was shared as well as the plans for the survey that will be used to gather public feedback. A question was asked about what the strategy for getting the survey out was, and Schenk responded that the survey will be sent out to the stakeholders and MPOs to disseminate to their communities. The link may be sent in to print in local papers, and it can be distributed in local libraries. The project team will also rely on the public workshops to engage with the public in person.

Preliminary Crash Data

Next, the preliminary crash data was presented for fatal and serious injury (FSI) crashes involving VRUs. Between 2012 and 2021, there were 663 VRUs fatally or seriously injured in West Virginia. In general, with the exception of 2020, VRU FSI crashes are trending upward. A representative from HEPMPO noted that this data makes sense to her because they had seven VRU fatalities in 2021 and seven fatalities in the combined four years before that.

Two maps of VRU crashes in WV were shown, one showing population density versus the percentage of statewide FSI crashes, and another showing the percentage of FSI crashes involving a VRU. The county of Greenbrier stood out because it has a low population density with a high number of crashes. A stakeholder offered an explanation that the crashes could be correlated with an increase in emphasis on adding bike and pedestrian infrastructure in Greenbrier and nearby Fayette Counties.

Next, data about when these crashes occur was presented. Most crashes occurred in the hours between 9:00PM and 11:00 PM. Some participants offered that this may be because restaurants close around that time. Thursdays and Fridays had the highest number of crashes, and a participant suggested one reason for this could be local sporting events that people are attending, which could also contribute to some of the spikes of crashes being the highest between August through October.

Data about the age and gender of the VRU victims and the drivers was presented, which showed the highest spikes in the drivers aged 20-29 and the VRUs aged 30-39. Male drivers and VRUs were the vast majority of those affected. Younger drivers, specially between the ages of 20 and 29 may need more education because of less practice time on the road, while older drivers may have slower reaction times. Meeting participants discussed how distracted driving could be a role in this, and whether that data can be looked at as well as how distracted driving can be better reported. Kendra explained that the distracted driving data is limited because it is self-reported by the driver, but people in the 20-29 age range are typically more likely to be distracted.

Schenk then went over where these crashes are occurring, highlighting that most crashes are on non-interstates and are occurring at the midblock segments. A participant asked whether these midblock crashes were on rural roads or urban, and Kendra responded that midblock does not differentiate between urban or rural, but the crash data in GIS can indicate where these crashes are occurring. B&N will do more evaluations to determine the area type in which these midblock crashes are occurring.

Of the 24% of the FSI VRU crashes that involved an impaired party, 65% of the impaired road user were pedestrians. This could lead to an education campaign about how to get home safely when drunk. Participants asked questions about whether this was a field sobriety test, and it was answered that it was what was indicated in the crash report. If a blood test was performed, the police officer would need to have entered it into the crash report. It is likely a mix of field sobriety tests and blood tests, especially in the instances of a deceased pedestrian.

A participant asked whether the makeup of the vehicles will be studied. Many people in the group have concerns about the growing size of trucks people are driving as personal vehicles and would like to know information about vehicle age and the breakdown between SUVs, semi-trucks, and cars. B&N will explore this information.

A question was asked about if the study could include an analysis of whether the VRU was a licensed driver. It was noted that that this type of data is not usually collected in crash reports in WV, but B&N will look into this information.

Preliminary Crash Data

Stakeholders were tasked with completing an online survey prior to coming to the meeting. The results of the poll were then presented and discussed. The first survey question asked what current challenges to VRU safety were in their community. Meeting participants commented (in addition to the presented answers):

- The state road system through the local areas is difficult to coordinate with and they typically have more safety problems. Ideally there would be more collaboration with WVDOH to make improvements on these roadways.
- State roadways are designed for much higher speeds than the speed limits and which is concerning for VRUs, particularly for bicyclists riding in the roadway.
- An increase in vehicle size and weight will cause difficulties battling the trend line of higher crashes.

The next question asked what the agencies are currently doing to improve safety for VRUs. Meeting participants commented (in addition to the presented answers):

- KYOVA IPC was awarded a Safe Streets and Roads for All (SS4A) grant that will focus on improving safety for all modes of transportation.
- HEPMPO just updated their Bicycle and Pedestrian Plan and is in the process of completing their safety plan. They are currently encouraging localities to apply for SS4A funding.
- The Complete Streets Advisory Board is a tool for the entire state to help with coordination.
- Multiple participants stated that the local match requirement is a huge barrier for project design and construction.
- WVDOH commented that there is some funding within the HSIP for bike and pedestrian improvements based on need. The current focuses for safety at the state level are speeding, aggressive driving, and road departure.

The last question asked what ideas stakeholders had for improving safety for VRUs. Meeting participants commented (in addition to the presented answers):

West Virginia Vulnerable Road User Assessment

- There needs to be more coordination at the state level for bike and pedestrian safety and infrastructure.

Next Steps: The meeting concluded with an overview of the next steps in the planning process and when the next Stakeholder meeting will be held (tentatively the week of August 28).

Stakeholder Advisory Committee Meeting #1

West Virginia Vulnerable Road User Assessment

August 3, 2023



1

Agenda

- Introductions
- What is Vulnerable Road User (VRU)?
- What is a VRU Assessment and Why is it Important?
- Project Schedule
- Preliminary Crash Data
- Existing Successes and Challenges
- Next Steps

2

Sign-In Sheet

West Virginia Vulnerable Road User Assessment Stakeholder Meeting #1

Sign-In Sheet

1. Name

Enter your answer

2. Agency

Enter your answer



3

Introductions



BURGESS & NIPLE



4

slido



What county do you represent (are you calling from)?

① Start presenting to display the poll results on this slide.

5

slido



What best describes your agency?

① Start presenting to display the poll results on this slide.

6

What is a Vulnerable Road User?

7



What is a Vulnerable Road User?

- A VRU is a **non-motorist** including a: pedestrian, bicyclist, other cyclist, or a person using a mobility assistance device (ex: wheelchair).
- This includes people walking, biking, or rolling, and also includes highway workers on foot.
- A motorcyclist is **not** considered a VRU.

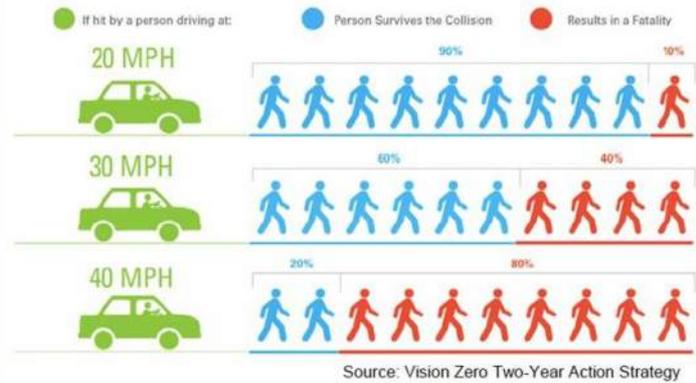
Photos from pedbikeimages.org

8

“Vulnerable”

The term **vulnerable** road user is used mainly to describe those **unprotected by an outside shield**, as they sustain a **greater risk of injury** in any collision with a vehicle and are therefore highly in need of protection against such collisions.

Source: National Safety Council



What is a VRU Assessment?

What is a VRU Assessment?

- An assessment of the safety performance of a State with respect to VRUs and the plan of the State to improve the safety of VRUs.
- New requirement from the Federal Highway Administration (FHWA)

11

What is a VRU Assessment?

Quantitative Analysis of VRU Fatalities and Serious Injuries

- Crash data trends
- Demographics of locations of fatalities and serious injuries
- Identifies "high-risk" areas for VRUs

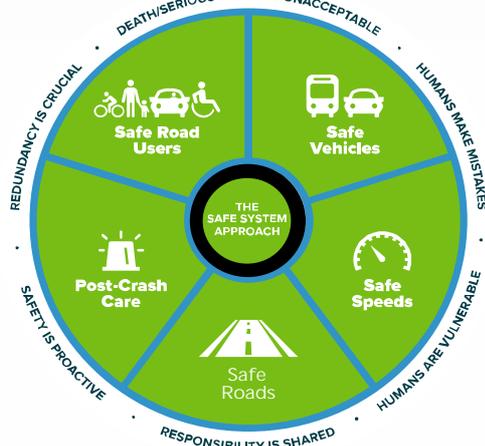


Program of projects or strategies to reduce safety risks to VRUs



12

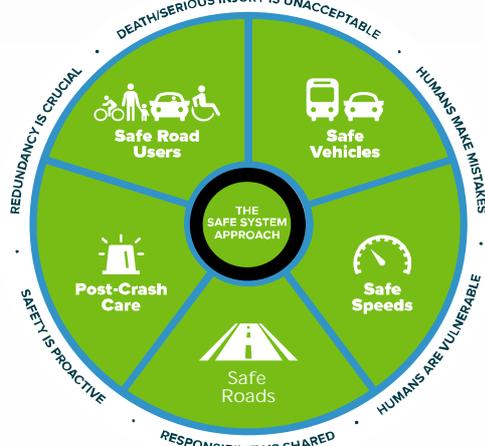
Safe System Approach



- Death/Serious Injury is unacceptable
- Humans make mistakes
- Humans are vulnerable
- Responsibility is shared
- Safety is proactive
- Redundancy is crucial

13

Safe System Approach



- **Safe Roads:** Determine ways to make roads safe for all users
- **Safe Road Users:** Ensure everyone is using the system correctly
- **Safe Speeds:** Match speeds with road context
- **Safe Vehicles:** Understand how innovation can enhance transportation safety
- **Safe Post-Crash Care:** Get emergency response to and from crash site quickly

14

Multidisciplinary Approach



Severe crashes occur for a multitude of reasons. By collaborating with transportation and safety practitioners with diverse backgrounds and perspectives, we can think more holistically about solutions.

15

Why is it Important?

GHS A projects a total of **7,485 pedestrians** were killed in traffic crashes in 2021, an increase of **11.5%** from the year before.

This would be the **largest number of pedestrian fatalities in four decades.**

GHS A

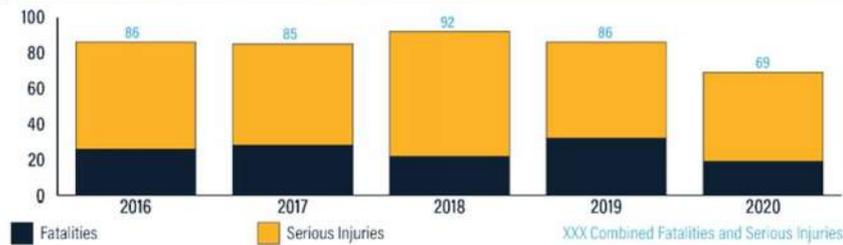
16

Why is it Important?

West Virginia Data

Pedestrians	2017-2021 SHSP '06-'15 Crashes	2022-2026 SHSP '16-'20 Crashes	Trend
% of total Fatalities	6%	9%	▲
% of total Serious Injuries	3%	6%	▲

PEDESTRIANS: FATALITIES & SERIOUS INJURIES (2016-2020)



REDUCE Pedestrian Fatalities & Serious Injuries by 4% annually over the next 5 years, from 84 to 65*

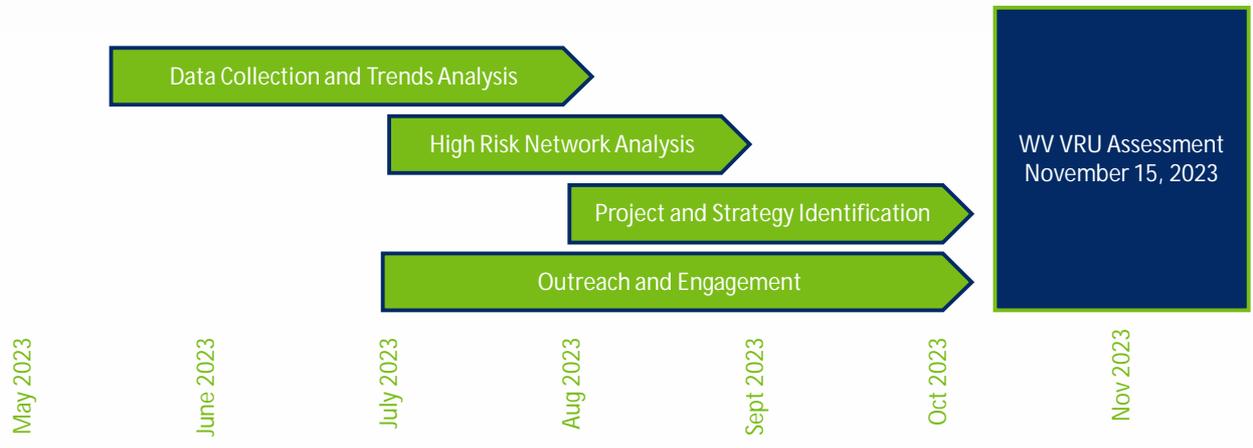
**based on 5-year rolling average*

17

Project Schedule

18

Project Schedule



19

Outreach and Engagement

- 
Stakeholder Meetings
- 
Public Survey
- 
Public Workshops

20

Outreach and Engagement – Stakeholder Meetings

Stakeholder Meeting #1
August 3, 2023

Kick-off and initial data review

Stakeholder Meeting #2
Week of August 28, 2023

Data review of high-risk areas

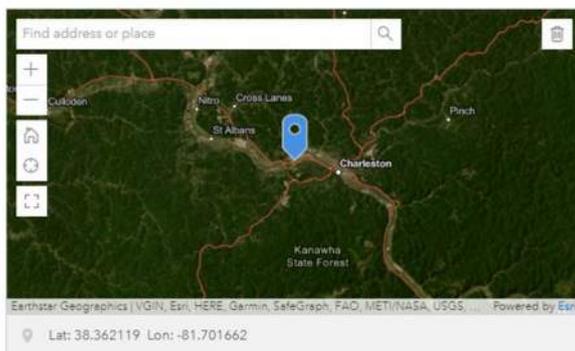
Stakeholder Meeting #3
Week of October 2, 2023

Project and Strategy
Brainstorming

21

Outreach and Engagement – Public Survey

- Online public survey
- August 21, 2023 through September 29, 2023



What is your Safety Concern?*

Safe

Unsafe

Speed Concern

Lack of Pedestrian Accommodations

Lack of Bicycle Accommodations

Other

22

Outreach and Engagement – Public Workshop



Monongalia County (MMMPO)
Wednesday, September 6



Berkeley County (HEPMPO)
Thursday, September 7



Raleigh County (FRMPO)
Tuesday, September 19



Kanawha County (RIC)
Wednesday, September 20



Cabell County (KYOVA)
Thursday, September 21

23

Preliminary Crash Data

24

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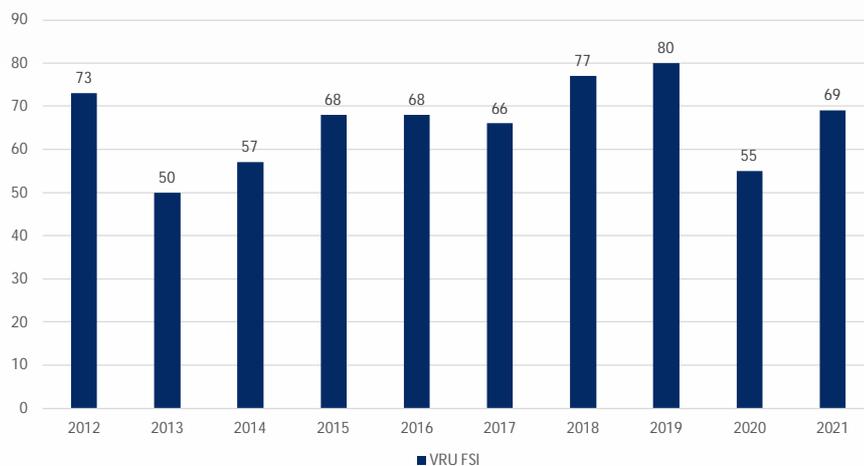


How many VRU fatalities and serious injuries (total) occurred between 2012 and 2021 in West Virginia?

⌚ Start presenting to display the poll results on this slide.

25

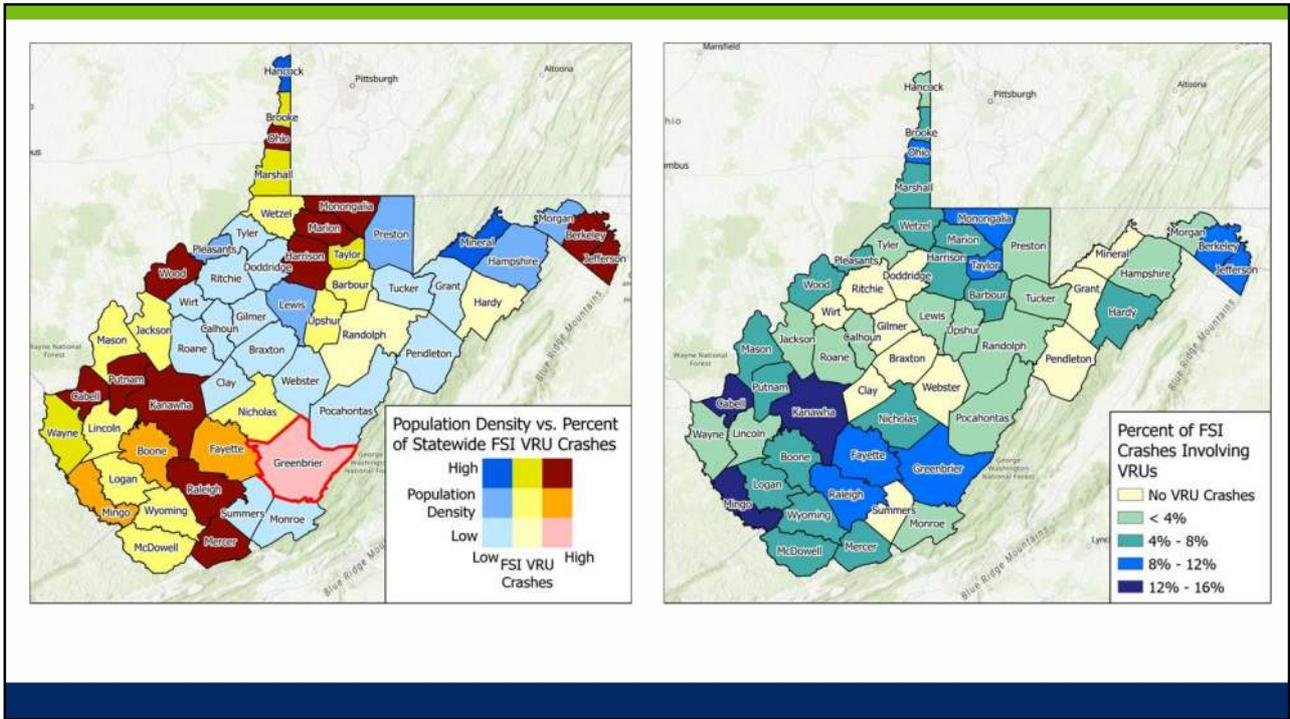
VRU Fatalities and Serious Injuries by Year



663 VRU
Fatal and
Serious
Injuries

2012 – 2021 Data

26



27

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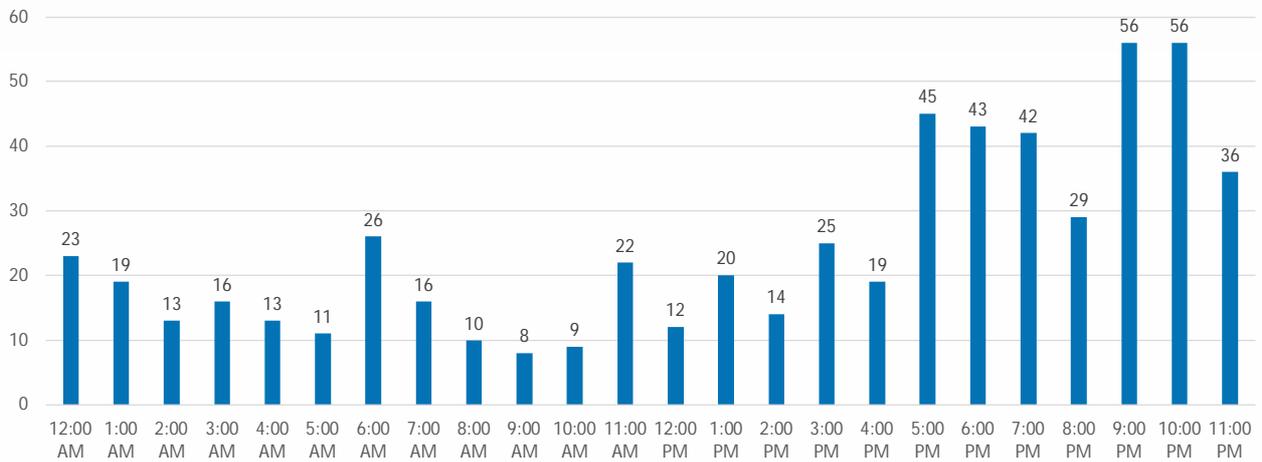


When are most fatal and serious injury VRU crashes occurring in West Virginia?

⌚ Start presenting to display the poll results on this slide.

28

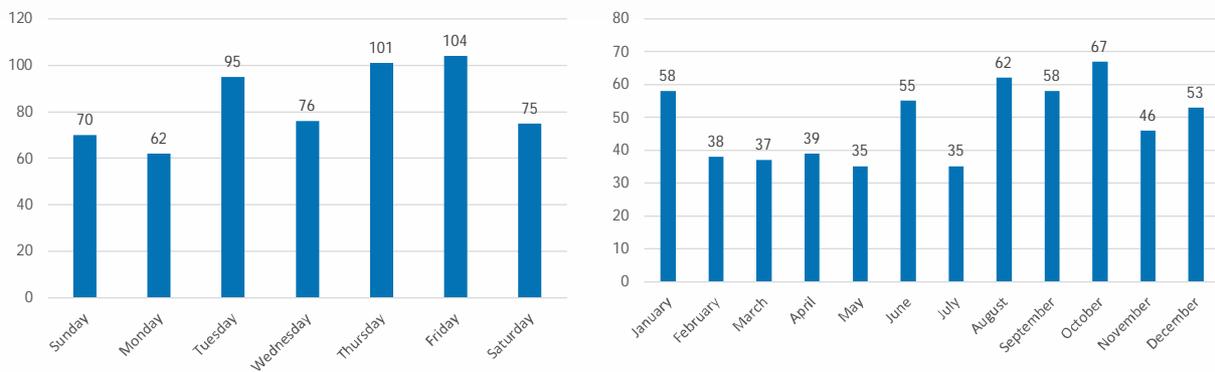
VRU Fatalities and Serious Injuries by Time of Day



2012 – 2021 Data

29

VRU Fatalities and Serious Injuries by Day of Week and Month



2012 – 2021 Data

30

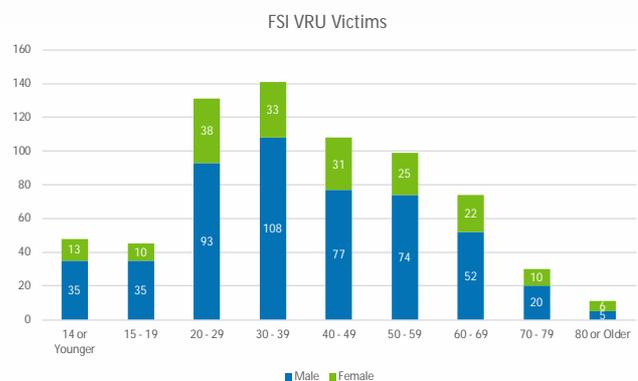
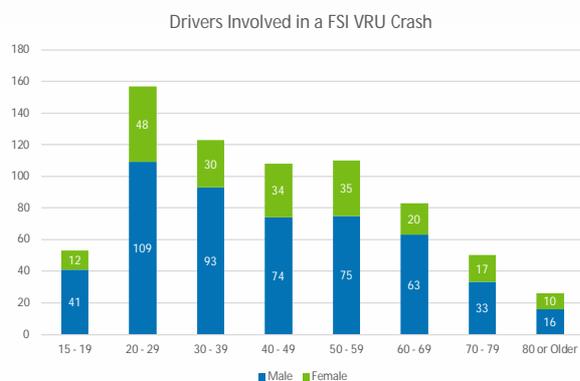
VRU Fatalities and Serious Injuries by Day of Week and Month of Year

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday		
January	9	7	6	11	9	12	4	January	58
February	4	3	10	8	6	7	0	February	38
March	4	5	6	5	8	2	7	March	37
April	4	2	8	9	5	5	6	April	39
May	3	4	7	3	3	9	6	May	35
June	11	7	7	5	9	10	6	June	55
July	3	4	3	5	8	7	5	July	35
August	6	5	8	5	12	18	8	August	62
September	6	5	8	11	10	9	9	September	58
October	9	5	12	7	17	10	7	October	67
November	3	7	10	5	10	6	5	November	46
December	8	8	10	2	4	9	12	December	53
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday		
	70	62	95	76	101	104	75		

2012 – 2021 Data

31

VRU and Driver Fatalities and Serious Injuries by Age and Gender

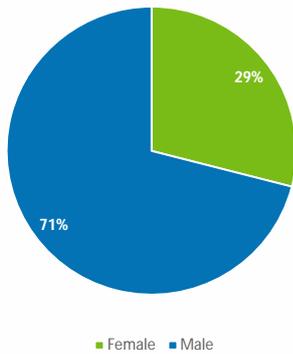


2012 – 2021 Data

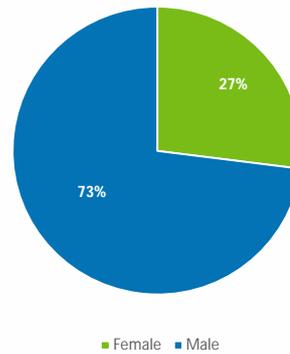
32

VRU and Driver Fatalities and Serious Injuries by Gender

Drivers Involved in a FSI VRU Crash

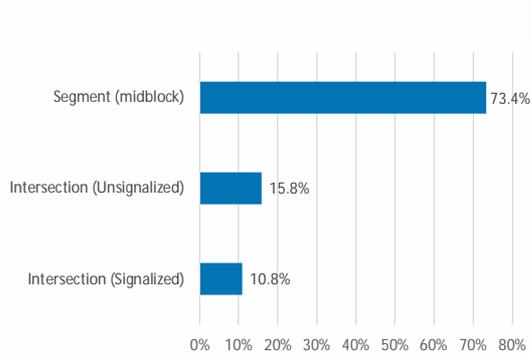


FSI VRU Victims

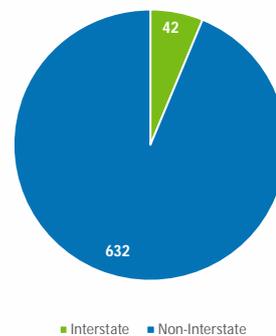


33

Where Are VRU Fatal and Serious Injury Crashes Occurring?



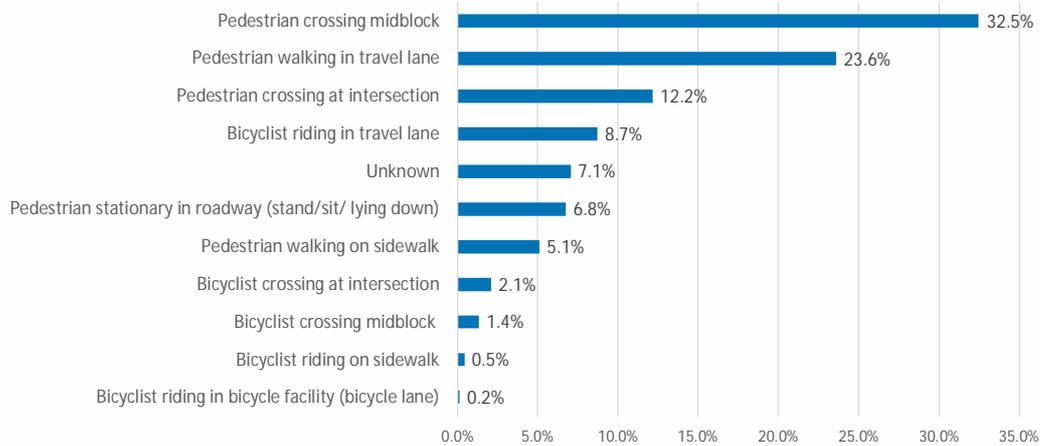
Interstate Crashes



2012 – 2021 Data

34

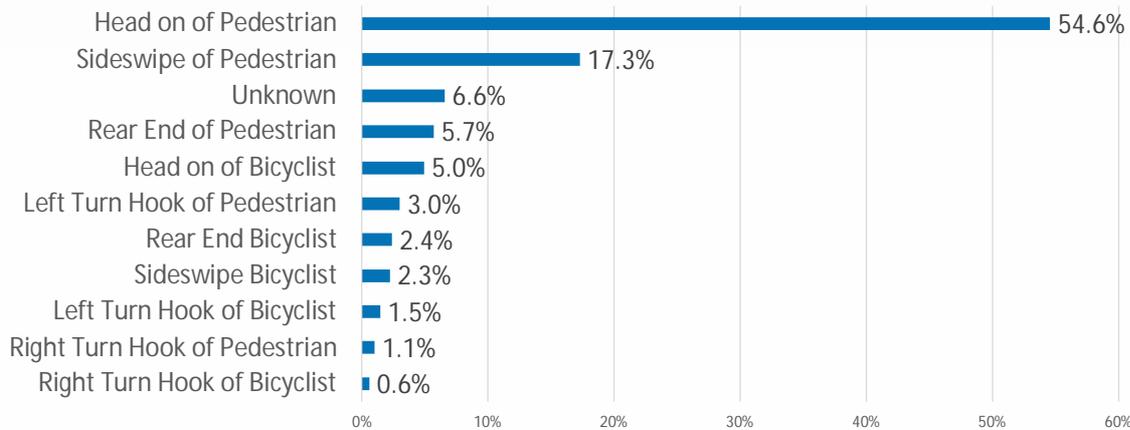
VRU Action in Fatal and Serious Injury Crashes



2012 – 2021 Data

35

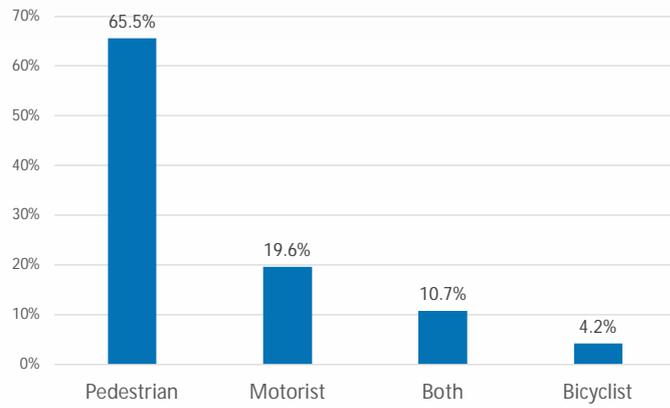
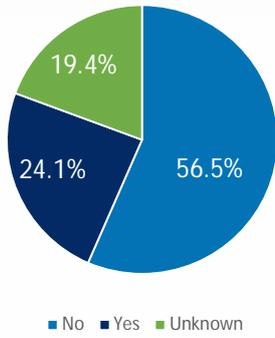
Motorist Action



2012 – 2021 Data

36

Impairment



2012 – 2021 Data

37

Existing Successes and Challenges

38

What challenges do you currently face regarding safety for bicyclists and pedestrians in your community?

- Lack of facilities/inadequate facilities
- Lack of awareness and education on sharing the road
- Unsafe behaviors:
 - Motorist (speeding and distracted driving)
 - Pedestrian (wearing dark clothes, intoxication)
 - Bicyclists (lack of helmets, biking contra flow)

39

What is your agency currently doing to improve safety for bicyclists and pedestrians?

Advocate Promote Safe Design

Complete Street Design Investing in Planning and Infrastructure

SS4A Grant Promote Walkability/Mobility Audits

Education and Public Awareness Media

40

What ideas do you have for improving safety for bicyclists and pedestrians?

Enforcement Education/Community Engagement Reflective tape/lights giveaways

Engineering Solutions

Funding Design Standards Data collection

41

Next Steps

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Next Steps

- Continued Crash Data Analysis
 - High Injury Network Screening
 - Streetlight Data Analysis
- Public Engagement
- Next Stakeholder Meeting: week of August 28, 2023

Stakeholder Advisory Committee Meeting #2 Meeting Summary

September 11th, 2023

9:00 AM - 10:30 AM

Location: Zoom

Attendees:

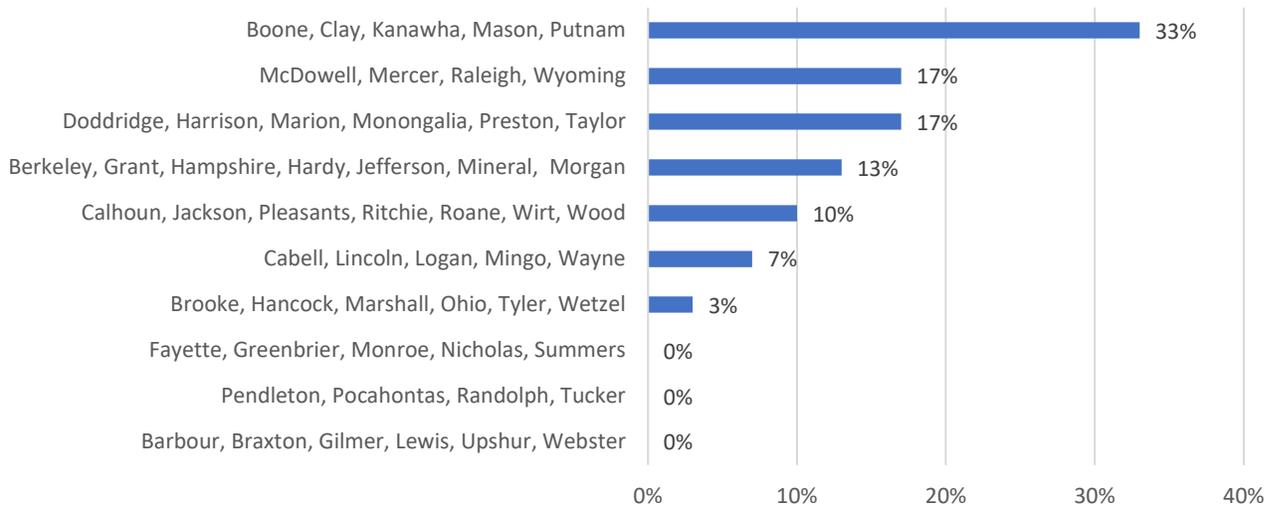
- **Christiaan Abildso** – WVU School of Public Health
- **Elaine Bartoldson** – Eastern Panhandle Transit Authority
- **Amy Boggs** – WV Governor’s Highway Safety Program
- **Joshua Coffey** – Huntington Police Department
- **Justin Darby** – Martinsburg Police Department
- **Ron Eck** – WV Local Technical Assistance Program (LTAP)
- **Butch Fox** – Mountain Transit Authority
- **Chief Erin Gibbons** – Martinsburg Police Department
- **Kara Greathouse** – Federal Highway Administration (FHWA)
- **Patricia Hajash** – New River Transit Authority
- **Tom Hammonds** – West Virginia Division of Highways (WVDOH)
- **Donna Hardy** – WVDOH
- **Kelsey Harrah** – Kanawha Valley Regional Transportation Authority
- **Emilee Hitt** – WVDOH
- **Mary Jarrell** – WV GHSP
- **Derrick Johnson** – FHWA
- **Dave Leisure** – Mid-Ohio Valley Transit Authority
- **Heather Lilly** – New River Transit Authority
- **Ash Litton** – WV Department of Health and Human Resources
- **Barbara Lobert** – WV GHSP
- **Marsha Mays** – WVDOH
- **Michaela McDonough** – Hagerstown Eastern Panhandle Metropolitan Planning Organization (HEPMPO)
- **Brandon Mehlinger** – Active Southern West Virginia
- **Andrew Morgan** – WV LTAP
- **Matt Mullenax** – HEPMPPO
- **Kelly Pack** – Rails-to-Trails Conservancy
- **Jackie Peate** – Morgantown Monongalia Metropolitan Planning Organization (MMMPO)
- **Vanessa Perkins** – Centra Bus
- **Doug Pixler** – Eastern Panhandle Transit Authority
- **John Reeves** – Bluefield Area Transit
- **Sam Richardson** – Regional Intergovernmental Council (RIC)
- **Saleem Salameh** – KYOVA Interstate Planning Commission
- **Rakesh Sharma** – Belomar Regional Council
- **Breanna Shell** – City of Huntington

West Virginia Vulnerable Road User Assessment

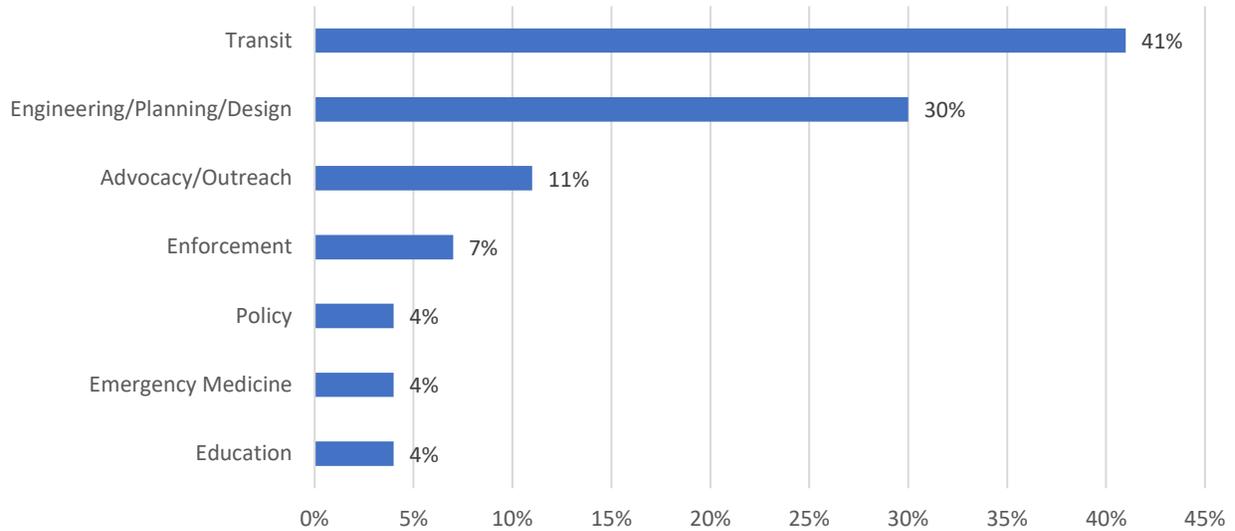
- **Jake Smith** – RIC
- **Maria Smith** – Mountain Line Transit
- **Shae Strait** – City of Fairmont
- **Dennis Strawn** – Complete Streets Advisory Board
- **Tyler Thaxton** – WV Governor’s Highway Safety Program
- **Benjamin Tolliver** – Beckley Fire Department
- **John Tuggle** – Fayette Raleigh Metropolitan Planning Organization (FRMPO)
- **Eric Wade** – Wood-Washington-Wirt Interstate Planning Commission
- **Erica Weaver** – New River Transit Authority
- **Lisa Weishar** – OVRTA
- **Brady Wood** – Belomar Regional Council
- **Maria Cantrell** – Burgess & Niple (B&N)
- **Ella Donley** – B&N
- **Rodney Holbert** – B&N
- **Bryan O’Reilly** – B&N
- **Kendra Schenk** – B&N

Introductions

The meeting began with introductions from the consulting team and the WV Division of Highways. Meeting participants were invited to sign in and participate in polls indicating what county they were from and what best describes their agency.



West Virginia Vulnerable Road User Assessment



Vulnerable Road User (VRU) Assessment Explanation

Kendra Schenk from B&N reviewed what a VRU is, what a VRU Assessment is, and why it's important to conduct this study (refer to handout of the PowerPoint presentation). Kendra explained the multidisciplinary approach, highlighting that severe crashes can be reduced through collaboration and a holistic approach.

Project Schedule

Schenk then went over the project schedule including when the next stakeholder meetings will likely take place and the next public meetings.

Project Logo

The logo for this project was revealed and Kendra asked for any comments on it. WVDOH mentioned they liked the logo and there were no other responses.



Interim Public Survey Results

Schenk then went over the survey results highlighting there were over 300 respondents, most respondents indicated they walk daily, and most generally felt unsafe walking and biking. Respondents

indicated the greatest barriers were lack of facilities, unsafe crossings, and distance to points of interest. Many people were concerned about intersections. When asking about types of improvements people prefer, many responses included more pedestrian and bicycle infrastructure as well as intersection improvements. Schenk went over the additional comments people had about the facilities and engineering related comments (things people in the survey specified they would like to be improved). Many people had comments that there needs to be driver education and there are unsafe driver behaviors that put pedestrians and cyclists at risk. Responses also included comments about increased enforcement and policy changes.

Feedback from Public Meetings

Schenk shared information about the public meetings, including how many participants, what the meetings were like, the kind of feedback that was gathered, and the top countermeasures. Stakeholders commented that the meetings so far went well. There is a recommendation to include information about other types of bike lanes that are protected.

After discussion about how to get the word out further about the survey, Ella offered to make a poster sized advertisement for the survey and some Stakeholders indicated they would like this.

Preliminary Crash Data

Next, the data that has been analyzed so far including the population density vs VRU crashes map was presented. A review of the data already presented included:

- Crashes trend higher between 5pm-11pm
- Victims are most often males under 40 years of age AND the person driving is also most often a male under 40
- 73% of crashes are mid-block (not at intersections)
- 24% involved impairment (although 20% unknown)

Using Numetric AASHTOWare Safety to further analyze all VRU crashes, not just FSI data, from 2016-2021, results showed that

- 10% of VRU crashes were speed and aggressive driving related
- 13% of all VRU crashes were Hit and Runs
- 44% of VRU crashes occurred at night.

Since the last meeting, data was pulled about vehicle years and make and model of vehicles. The study period is from 2012-2021, so most vehicles predate advanced driver warning systems. Fifty percent of VRU serious crashes involve a pickup or SUV followed by sedan or station wagon being involved with over a third of all VRU FSI crashes.

High-Injury Network

Two network analyses: the high-injury network which is reactive and the systemic analysis which is proactive.

Schenk explained the high-injury network analysis methodology. She explained the data was from 2016 through 2021, all road segments are 0.3 miles in length, and there were two methods: Equivalent Property Damage Only (EPDO) and total VRU crashes. The Numetric system was used for this analysis. The highest ranked EPDO crashes were in Poca (number 1), Charleston (numbers 2 and 3), Oakhill

(number 4), and Weston (number 5). Looking at all VRU crashes (not just fatal and serious injury) Huntington has the number one spot, then Morgantown. This shows that the analyses are very different, specifically that EPDO skews heavily towards fatal crashes. For this reason, a composite score will be calculated that accounts for both EPDO and total crash frequency. The weighting of these two factors will be explored.

Systemic Analysis

The WVDOH Linear Reference System (LRS) and other available GIS data was acquired for this analysis. The statewide network was segmented by roadway characteristics (i.e., lane widths, posted speed limits, volumes). Comparing these characteristics by crashes per lane mile, each segment will be scored to develop the systemic, proactive network analysis.

Three lane segments stood out with the highest number of crashes per lane mile in the state. There was also a high crash frequency per lane mile on seven-lane segments. However, seven-lane roads are all urban interstate and only account for 7.5 miles of roadway. Other factors included speed limit, functional class, pedestrian volumes, and AADT.

Actual vehicle speeds in lieu of posted speed limits were requested to be considered in this analysis. However, this information is more difficult to capture, especially in reference to the LRS data. The pavement widths and number of lanes will likely have higher crash frequencies regardless of the posted speed limits if vehicles are traveling at higher rates of speed.

Other factors such as lighting, road conditions, driveway presence, ADA features, and sidewalks were discussed. This data is not readily available, especially at the state level. However, an outcome of this plan may be a recommendation to include a statewide asset inventory for active transportation.

There was also additional discussion about separating risk factors for bicyclists and pedestrians. For this analysis, the results would likely not differ significantly between user types. One challenge is the lower number of bicycle crashes than pedestrian crashes which would likely not yield in meaningful analyses for bicycle risk factors. However, bike route information may be another factor that could be considered in this analysis if the data is available.

Equity Analysis

The equity analysis was summarized using bivariate maps analyzing zero car households versus fatal and serious injury VRU crashes and senior population versus fatal and serious injury VRU crashes involving seniors. This analysis could help prioritize where to invest in infrastructure in the future.

Streetlight Data

Streetlight data was collected which indicates pedestrian volumes to help determine where pedestrians are walking and correlating that information with crashes and where to prioritize infrastructure. This analysis will be done throughout the state.

Strategy Brainstorm

The next segment of the meeting was the strategy brainstorm. Kendra started the discussion by describing the Safe System Approach and how we will be using it as guidance to develop countermeasures.

There was discussion about the consideration of state funding for pedestrian and bicycle infrastructure outside of the current Transportation Alternatives Program (TAP). Money for these types of improvements is available for demonstrated need and proven safety countermeasures.

It was proposed that an action item include attending the Safety Expo to interact with law enforcement and first responders and educate them on the importance of proper crash reporting. Another countermeasure included the collection of statewide bicycle and pedestrian counts to assist in the decision-making process. The Complete Streets Advisory Board has been established and are evaluating the existing documentation regarding VRU accommodations and designs. However, no formal guidance or publications have been developed.

Kendra explained that the project team will draft strategies, outcomes (measurables) and responsible parties for stakeholder review before the next meeting in early October.

Next Steps:

- Public Engagement September 19 (Beckley), September 20 (Charleston), and September 21 (Huntington)
- Public Survey ends September 30th
- Next Stakeholder Meeting week of October 9th (tentative)

Stakeholder Advisory Committee Meeting #2

West Virginia Vulnerable Road User Assessment

September 11, 2023



1

Agenda

- Introductions
- Purpose of VRU Assessment
- Logo
- Interim Survey Results
- Feedback from Public Meeting
- Crash Analysis Results
- Strategy Brainstorm
- Next Steps

2

Sign-In Sheet

West Virginia Vulnerable Road User Assessment
Stakeholder Meeting #2

Sign-In Sheet

1. Name

2. Agency

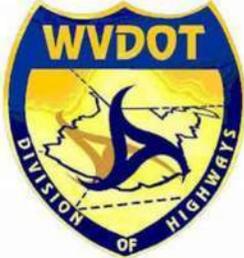


3

Introductions



BURGESS & NIPLE



4

slido



**What county do you represent
(are you calling from)?**

① Start presenting to display the poll results on this slide.

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What best describes your agency?

① Start presenting to display the poll results on this slide.

6

Purpose of VRU Assessment

7



What is a Vulnerable Road User?

- A VRU is a **non-motorist** including a: pedestrian, bicyclist, other cyclist, or a person using a mobility assistance device (ex: wheelchair).
- This includes people walking, biking, or rolling, and also includes highway workers on foot.
- A motorcyclist is **not** considered a VRU.

Photos from pedbikeimages.org

8

What is a VRU Assessment?

- An assessment of the safety performance of a State with respect to VRUs and the plan of the State to improve the safety of VRUs.
- New requirement from the Federal Highway Administration (FHWA)

9

What is a VRU Assessment?



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Multidisciplinary Approach

Severe Crashes

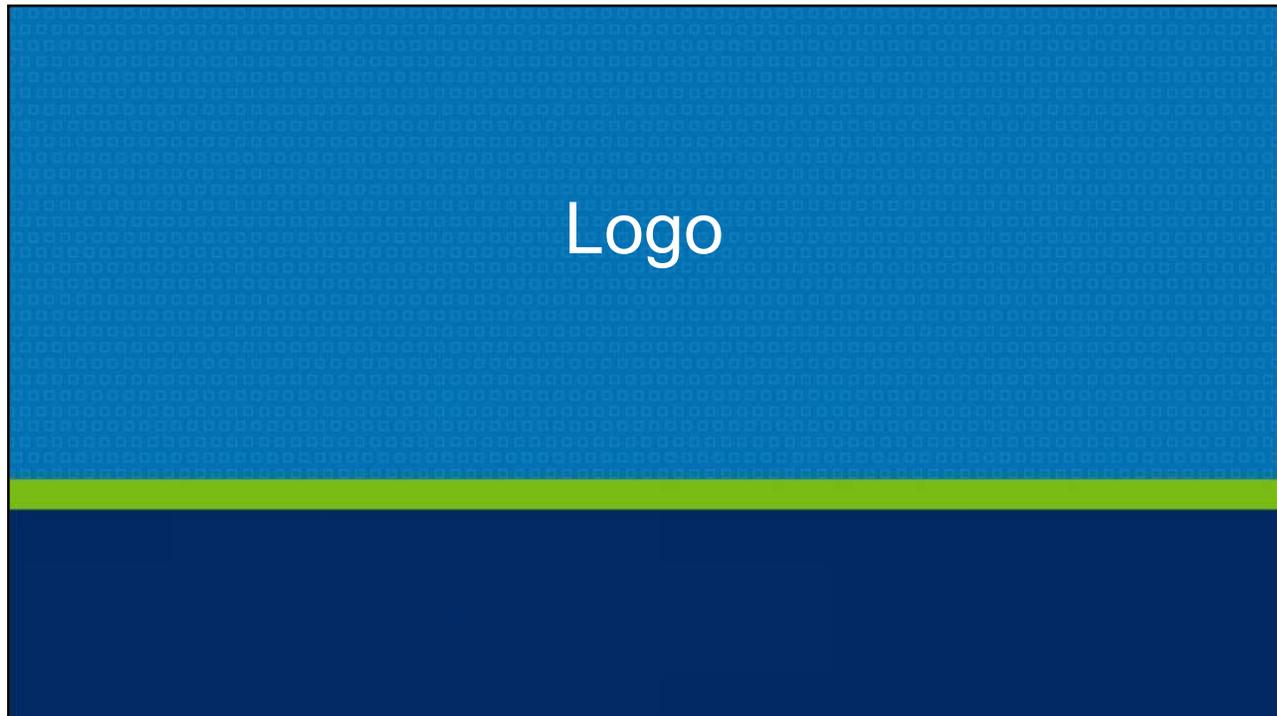
Severe crashes occur for a multitude of reasons. By collaborating with transportation and safety practitioners with diverse backgrounds and perspectives, we can think more holistically about solutions.

11

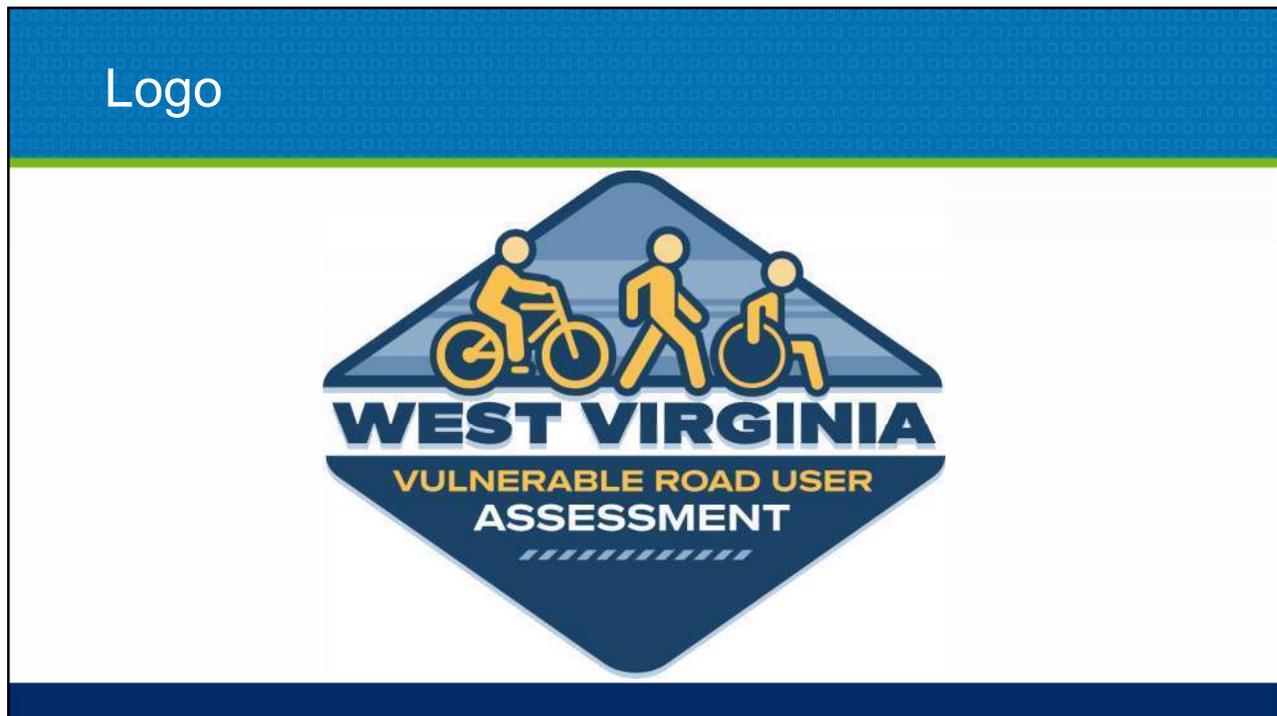
Project Schedule

Task	Start Date	End Date
Data Collection and Trends Analysis	May 2023	July 2023
High Risk Network Analysis	July 2023	September 2023
Project and Strategy Identification	August 2023	October 2023
Outreach and Engagement	July 2023	October 2023
WV VRU Assessment	November 15, 2023	November 15, 2023

12



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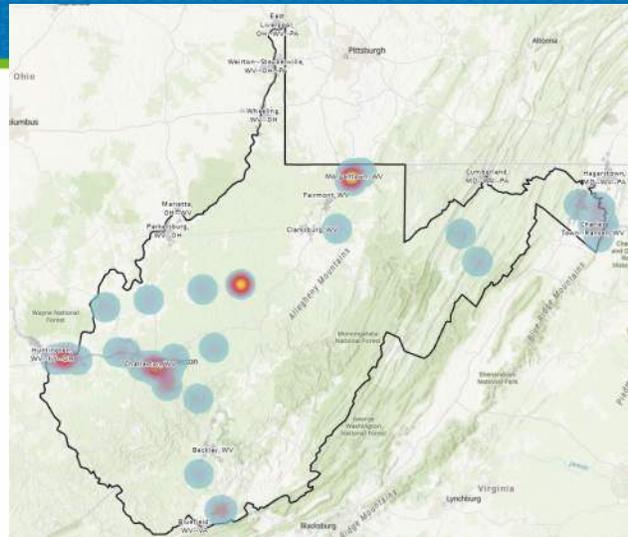
14

Interim Public Survey Results

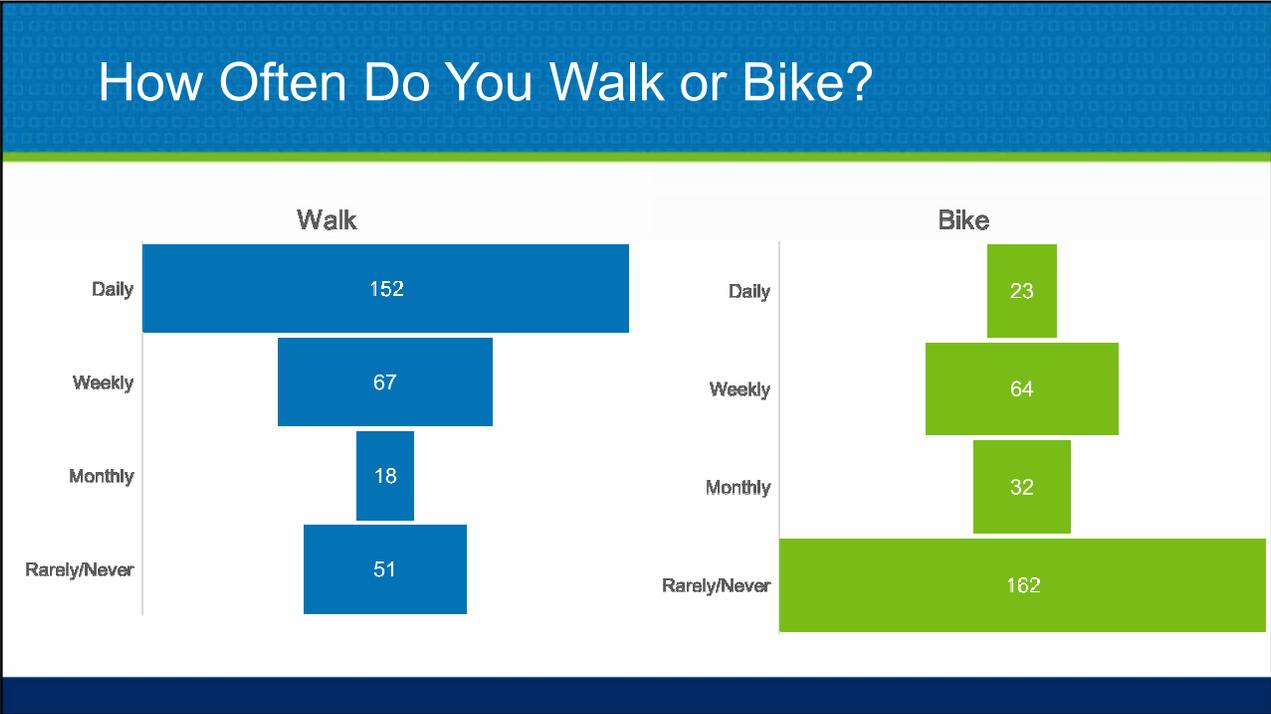
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Survey Highlights

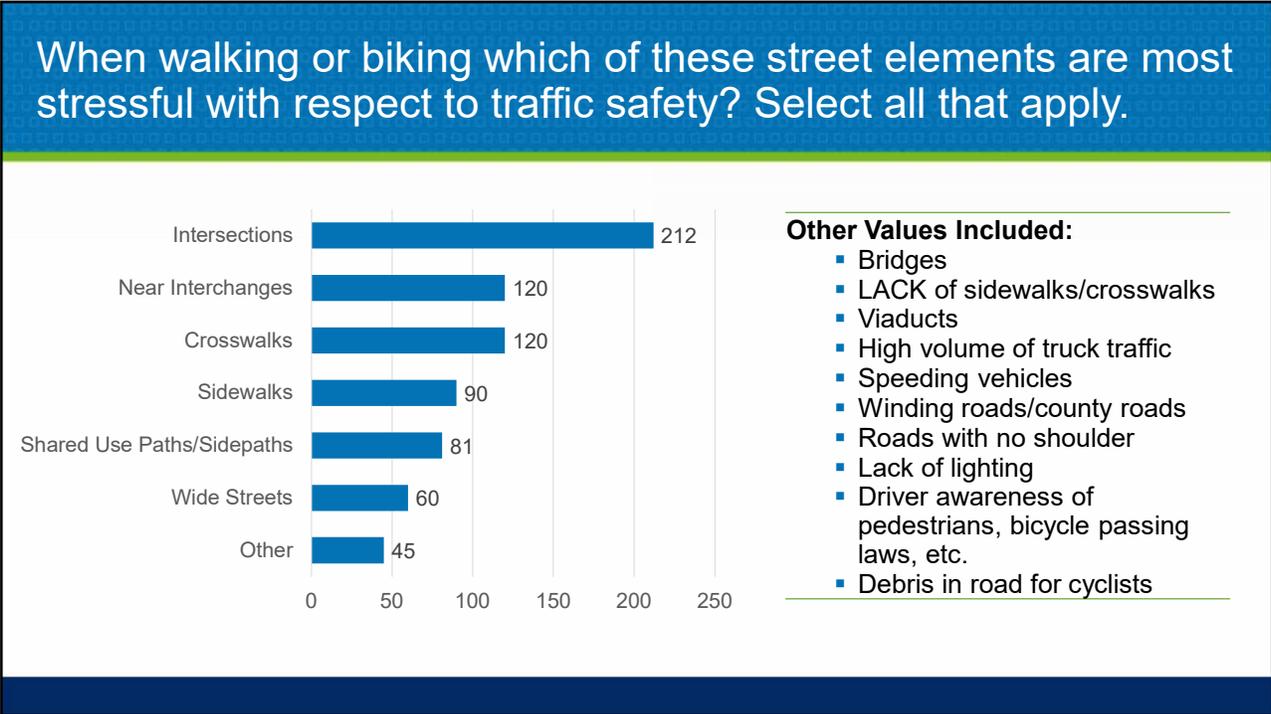
- 300+ respondents so far (mostly from Monongalia, Cabell, Kanawha counties)
- Most respondents indicate they walk daily, few bike
- Most generally feel unsafe walking or biking
- Greatest Barriers:
 - Lack of Facilities, Unsafe to Cross, Distance to Points of Interest



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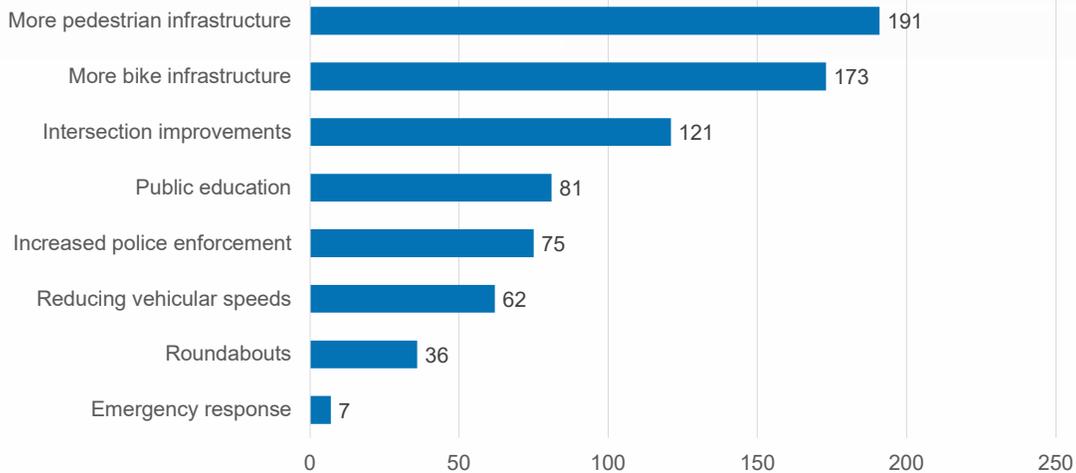


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18

Please indicate what you feel are the most promising investment opportunities to improve traffic safety.



19

Do you have any additional comments about road safety in your community or the state as a whole?

Facilities:

- Bike lanes are unsafe/not protected
- Both urban and rural areas lack pedestrian infrastructure
- Sidewalk gaps that leave pedestrians in dangerous places
- 55 mph roads have no pedestrian or cyclist facilities
- Sidewalks are not ADA accessible: by design, utility poles in the middle of sidewalks, and poor condition
- Unsafe crossings
- No lighting



20

Do you have any additional comments about road safety in your community or the state as a whole?

Engineering

- **Traffic calming measures:** lane reductions, street shrubs, chicanes, speed tables, and raised pedestrian crossings
- Curb or delineator post protected bicycle lanes
- Curb protections for bicyclists at intersection
- Painted bicycle crossings
- Bicycle signals at intersections
- Poor road conditions for cyclists
- Roundabouts
- Unpainted road markers
- No shoulders



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Do you have any additional comments about road safety in your community or the state as a whole?

- **Education of Drivers:**
 - Bicyclists permitted on roadways (share the road)
 - Hostility towards cyclists
 - Cyclist passing laws
 - Pedestrians using shoulder and roadway
 - Pedestrians crossing (at signal or midblock)
- **Driver Behavior:**
 - Distracted driving
 - Aggressive driving, threat to pedestrians crossing at intersections
 - Don't stop at crosswalks
 - Speeding



22

Do you have any additional comments about road safety in your community or the state as a whole?

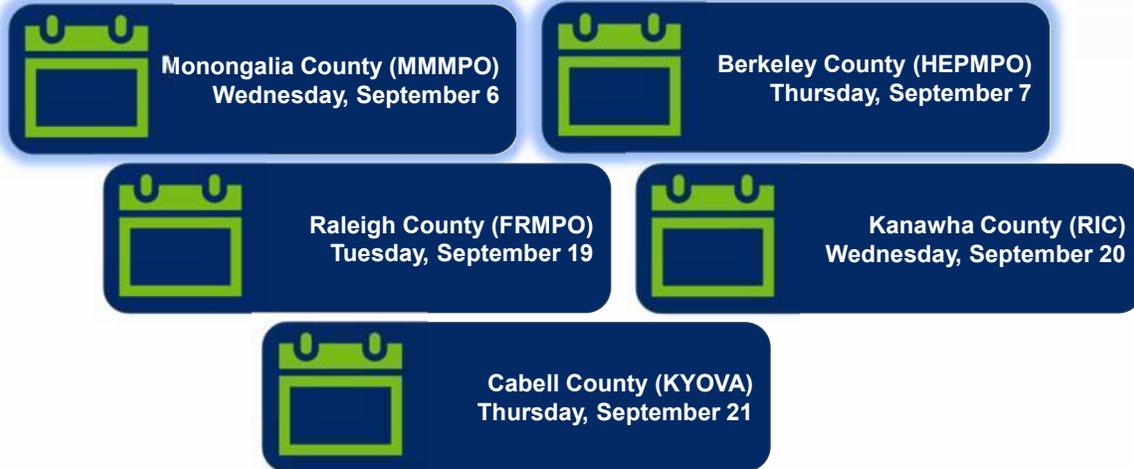
- Enforcement
 - Lack of enforcement of dangerous driving behavior: speeding, running red lights, distracted driving, failing to yield to pedestrians
 - Educate law enforcement about pedestrian and cyclist dangers and right-of-way
- Policy
 - New housing developments do not have sidewalks
 - Most funding goes to vehicle infrastructure, no taxes directly go to pedestrian or cyclist infrastructure

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Feedback from Public Meetings

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Outreach and Engagement – Public Workshop



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Initial Feedback

- Three “stations”
 - Welcome
 - Existing Crash Data
 - Countermeasures for Consideration
- About 15-20 attendees at each meeting
- Lots of conversation – specifically about lack of facilities
- Common Countermeasures:
 - Walkways, Bicycle Lanes, Road Diets



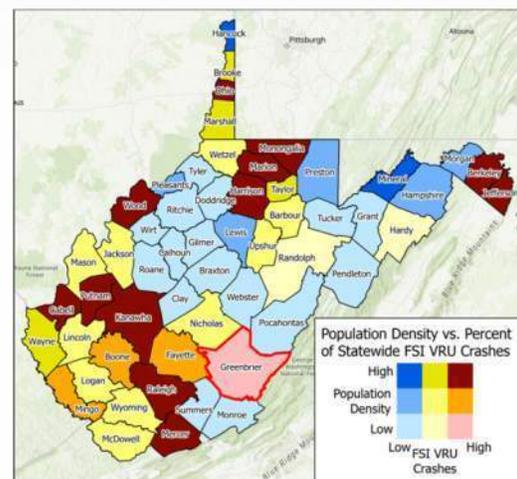
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Crash Analysis Results

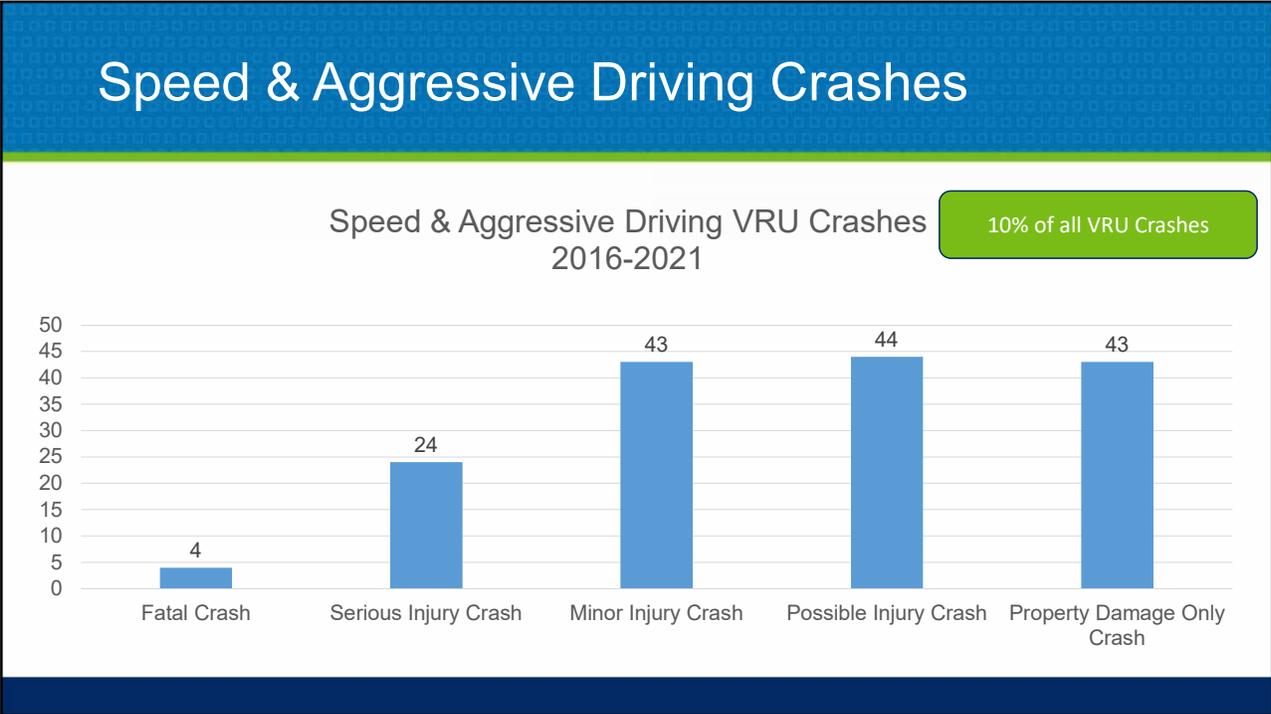
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VRU FSI Data Review

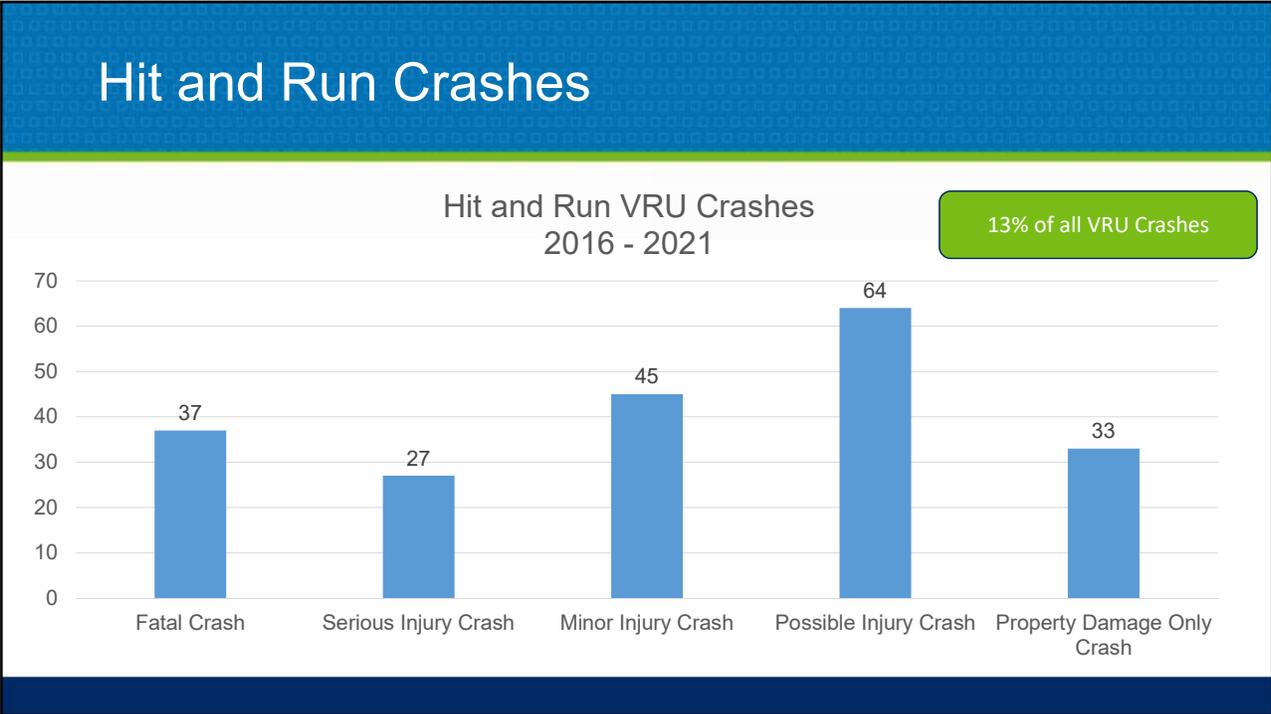
- Crashes trend higher between 5pm-11pm
- Males under 40 are most often the victim AND the driver
- 73% of crashes are mid-block (not at intersections)
- 24% involved impairment (although 20% unknown)



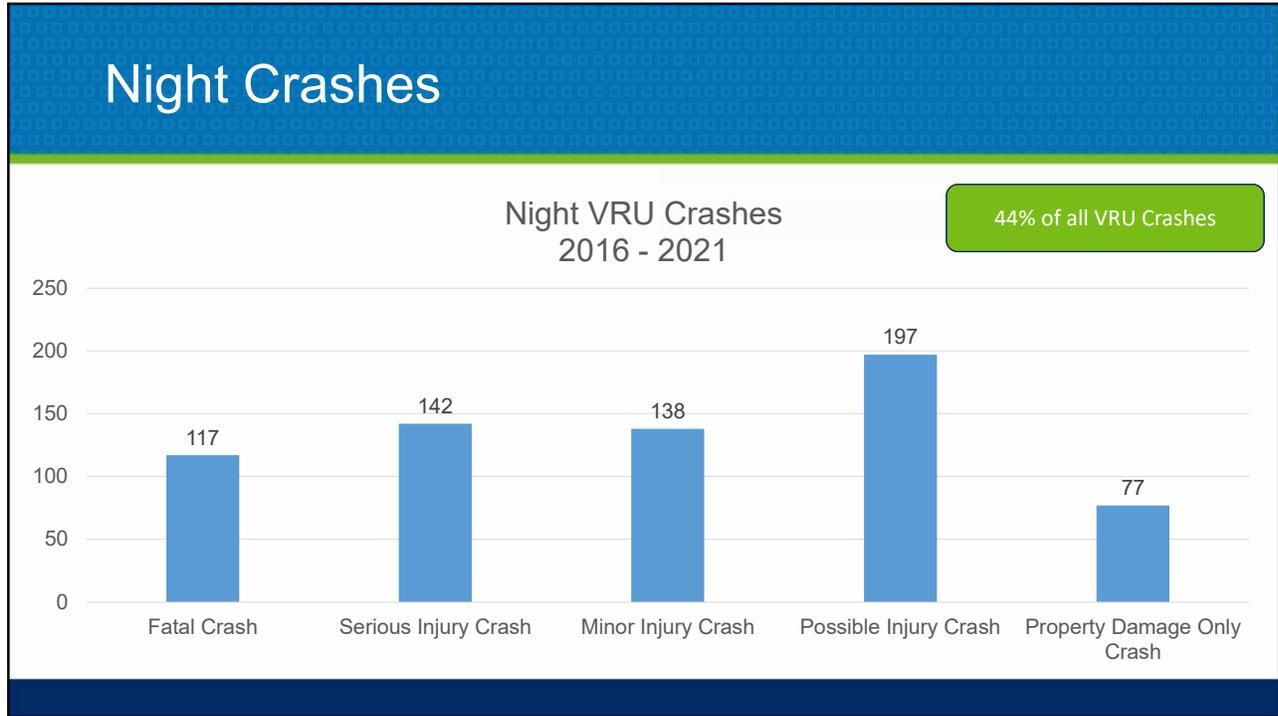
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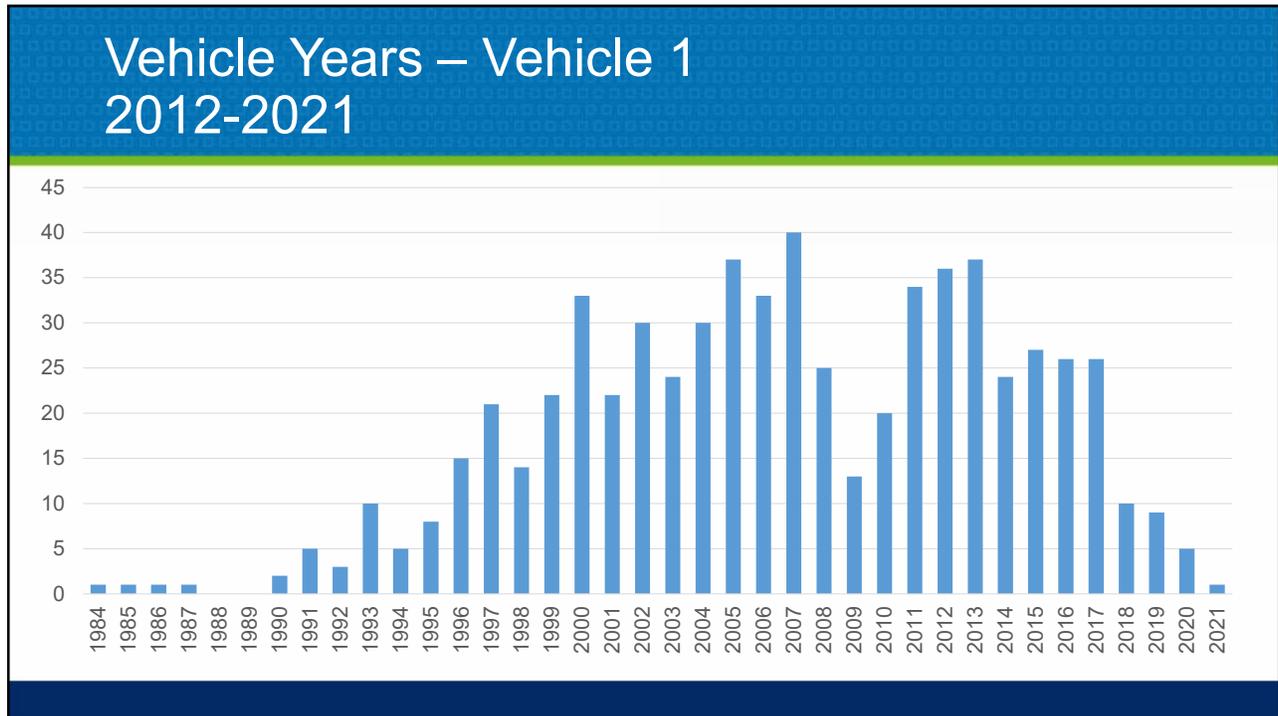
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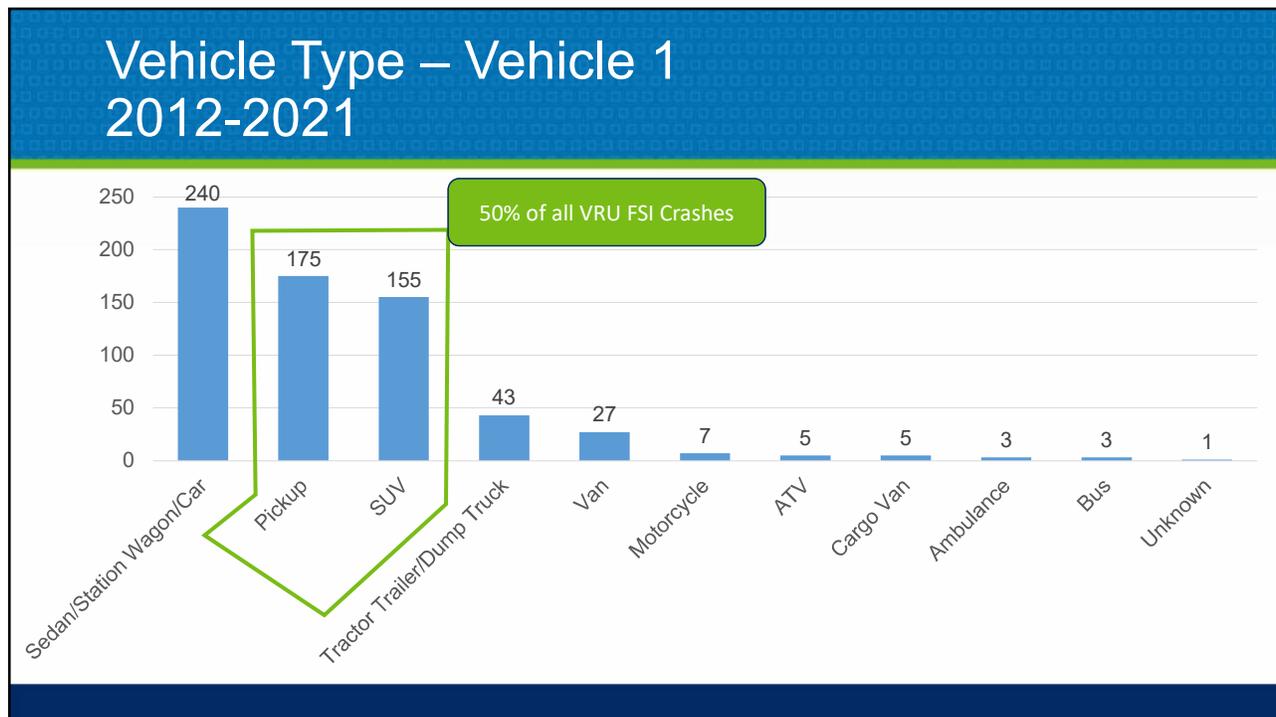
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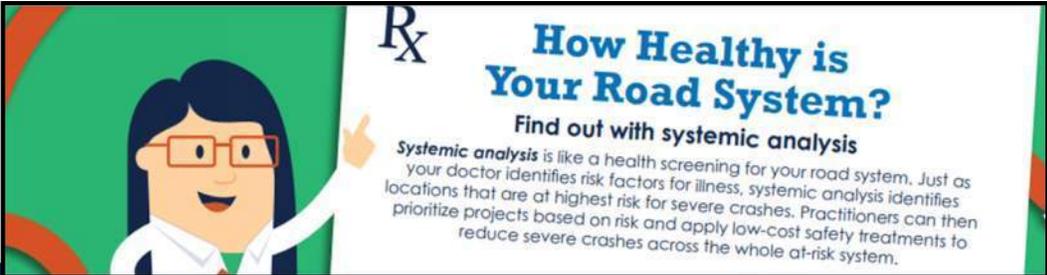
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Network-Level Analyses

- **High-Injury Network (REACTIVE)**
 - Segments where crashes have occurred regardless of contributing factors
- **Systemic Analysis (PROACTIVE)**
 - Segments where factors contributing to crashes are present regardless of crash history



Rx

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.

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High Injury Network

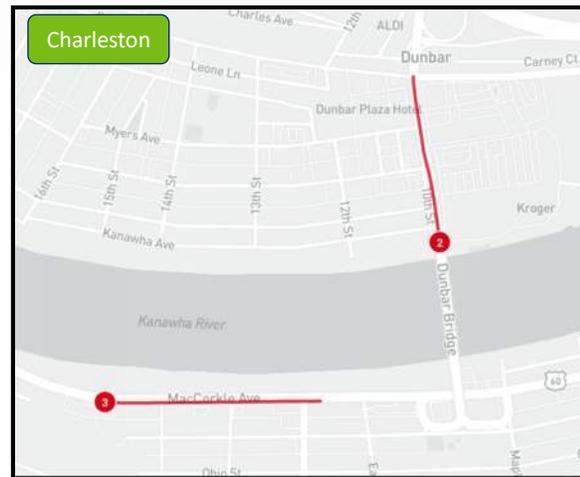
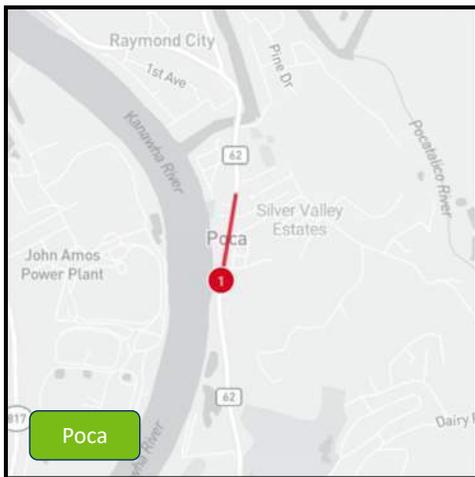
- All segments are 0.3 miles in length
- January 1, 2016 through December 31, 2021 Data
- Two methods:
 - EPDO = Equivalent Property Damage Only
 - Total VRU Crashes

Equivalent to Property Damage Only:

(O) Property Damage-Only	1.0
(C) Possible Injury	10.1
(B) Suspected Minor Injury	17.1
(A) Suspected Serious Injury	53.2
(K) Fatal Injury	930.1

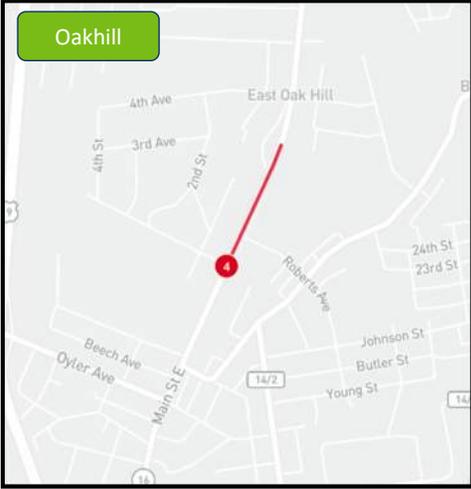
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High Injury Network - EPDO



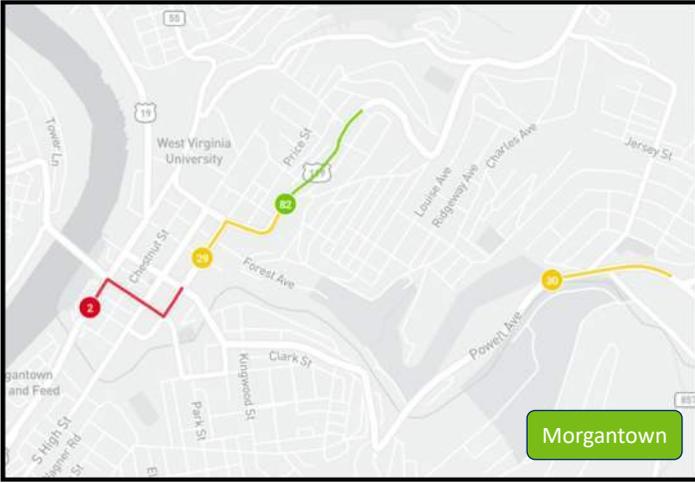
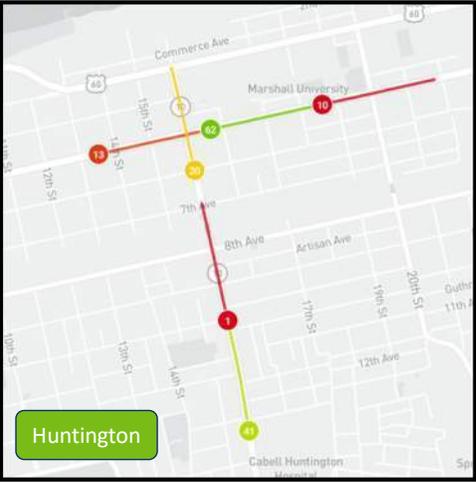
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High Injury Network - EPDO



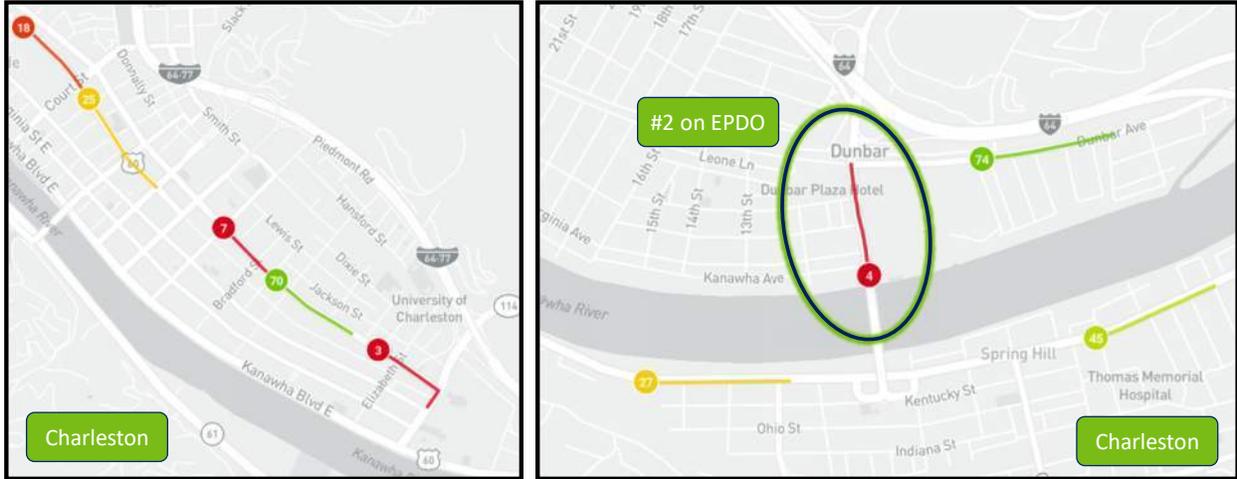
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High Injury Network – VRU Crashes



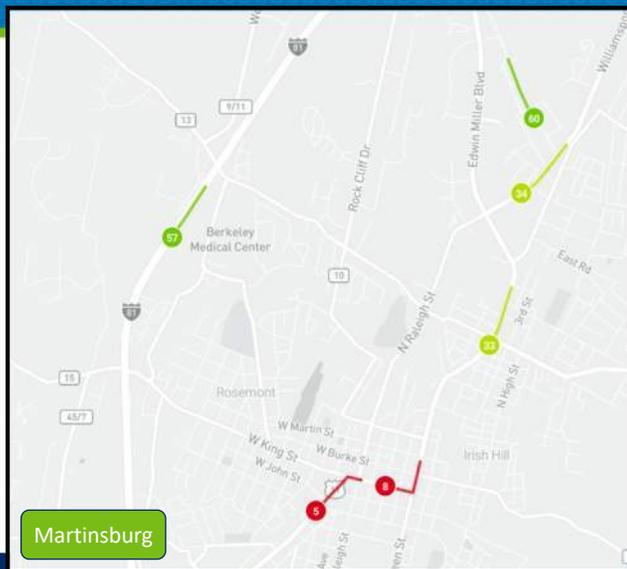
38

High Injury Network – VRU Crashes



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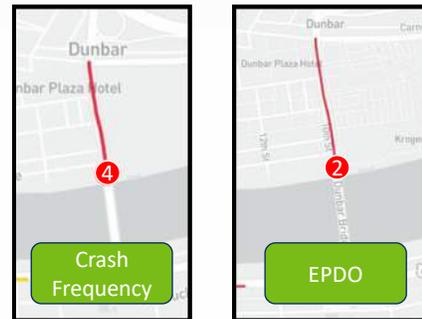
High Injury Network – VRU Crashes



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High Injury Network - Results

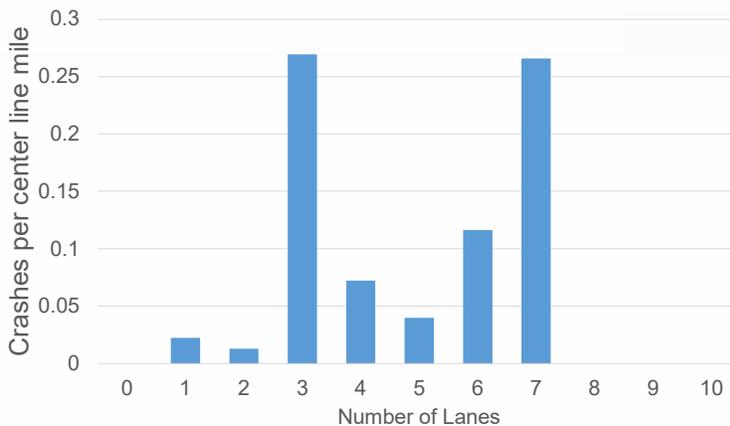
- EPDO skews toward fatal crashes
 - One fatal crash may elevate a segment over another segment with multiple, less severe crashes
- Crash Frequency alone does not account for severity
- Suggest combining the rankings to get a composite score



Composite Score = 4+2 = 6

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Systemic Analysis Results

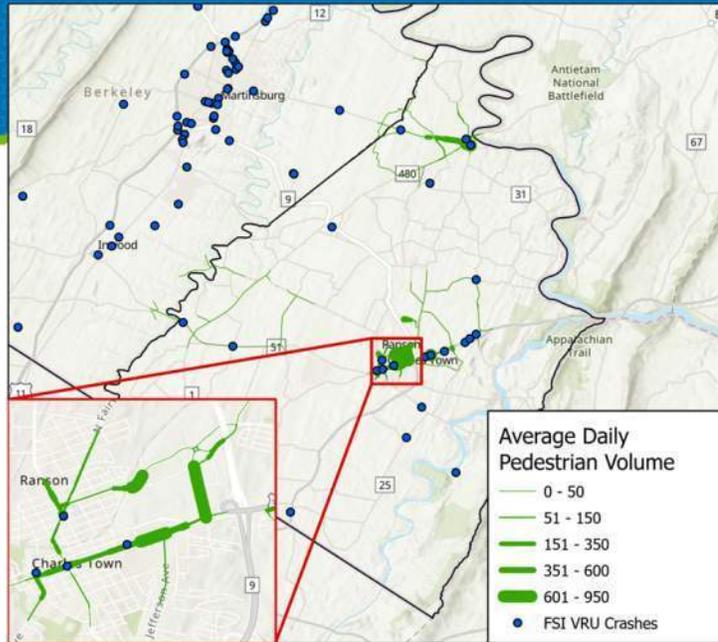


- Three-lane roads stand out
- Seven-lane roads are all urban interstate and only account for 7.5 miles of roadway

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Streetlight

- Data shows some areas where pedestrian volumes correlate to more pedestrian crashes

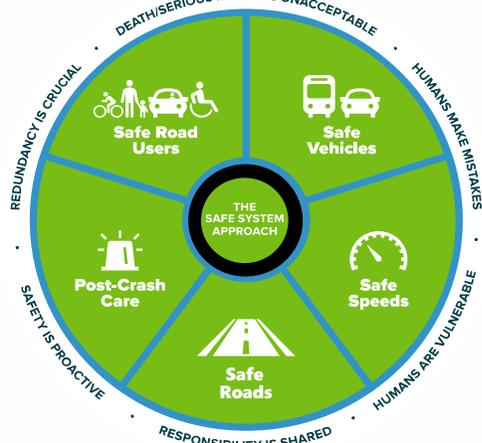


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Strategy Brainstorm

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Safe System Approach



- **Safe Roads:** Determine ways to make roads safe for all users
- **Safe Road Users:** Ensure everyone is using the system correctly
- **Safe Speeds:** Match speeds with road context
- **Safe Vehicles:** Understand how innovation can enhance transportation safety
- **Safe Post-Crash Care:** Get emergency response to and from crash site quickly and appropriate post-crash reporting

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Next Steps

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Next Steps

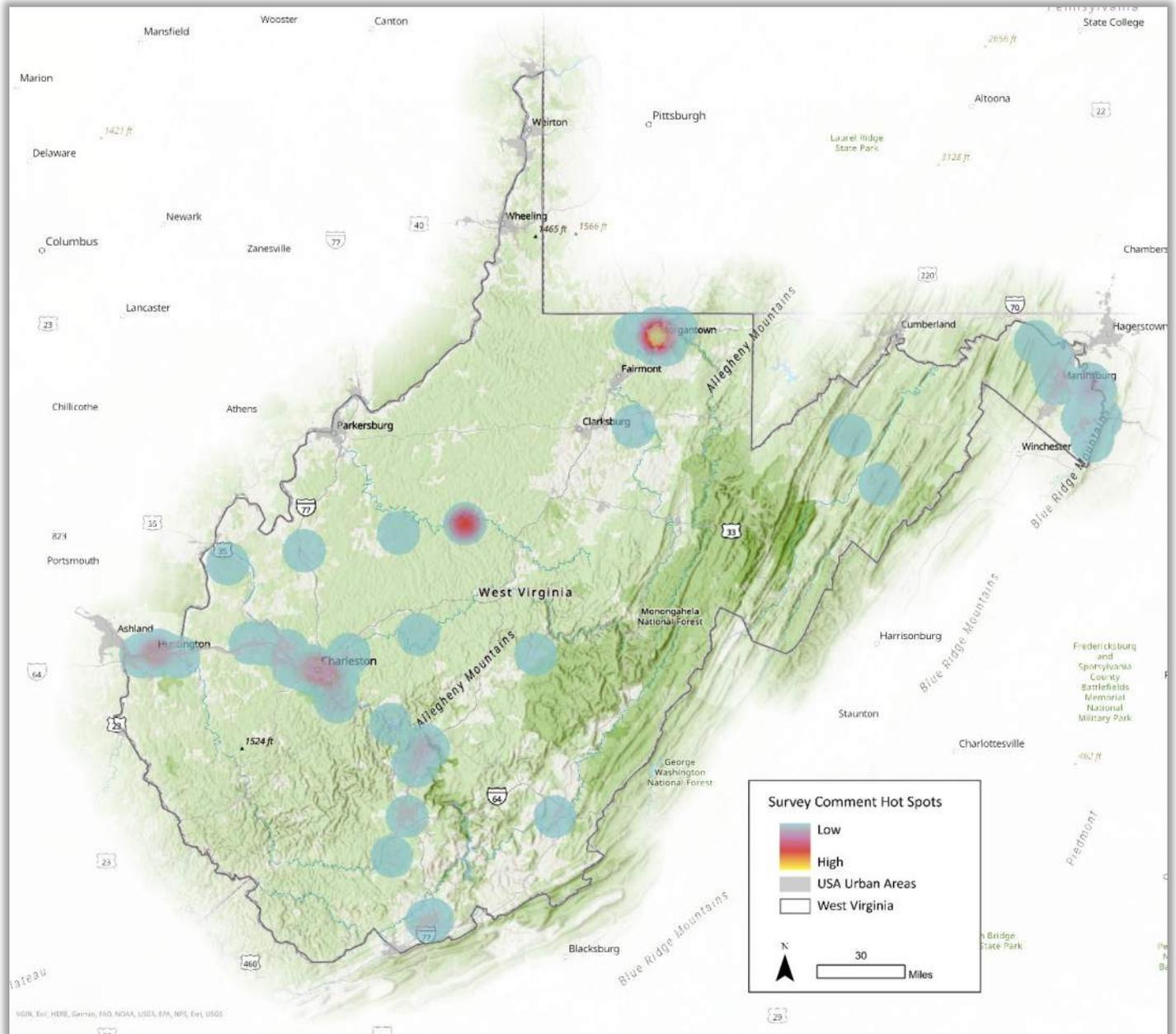
- Continued Public Survey
- Public Engagement
- Next Stakeholder Meeting: Week of October 9
 - Strategy Discussions



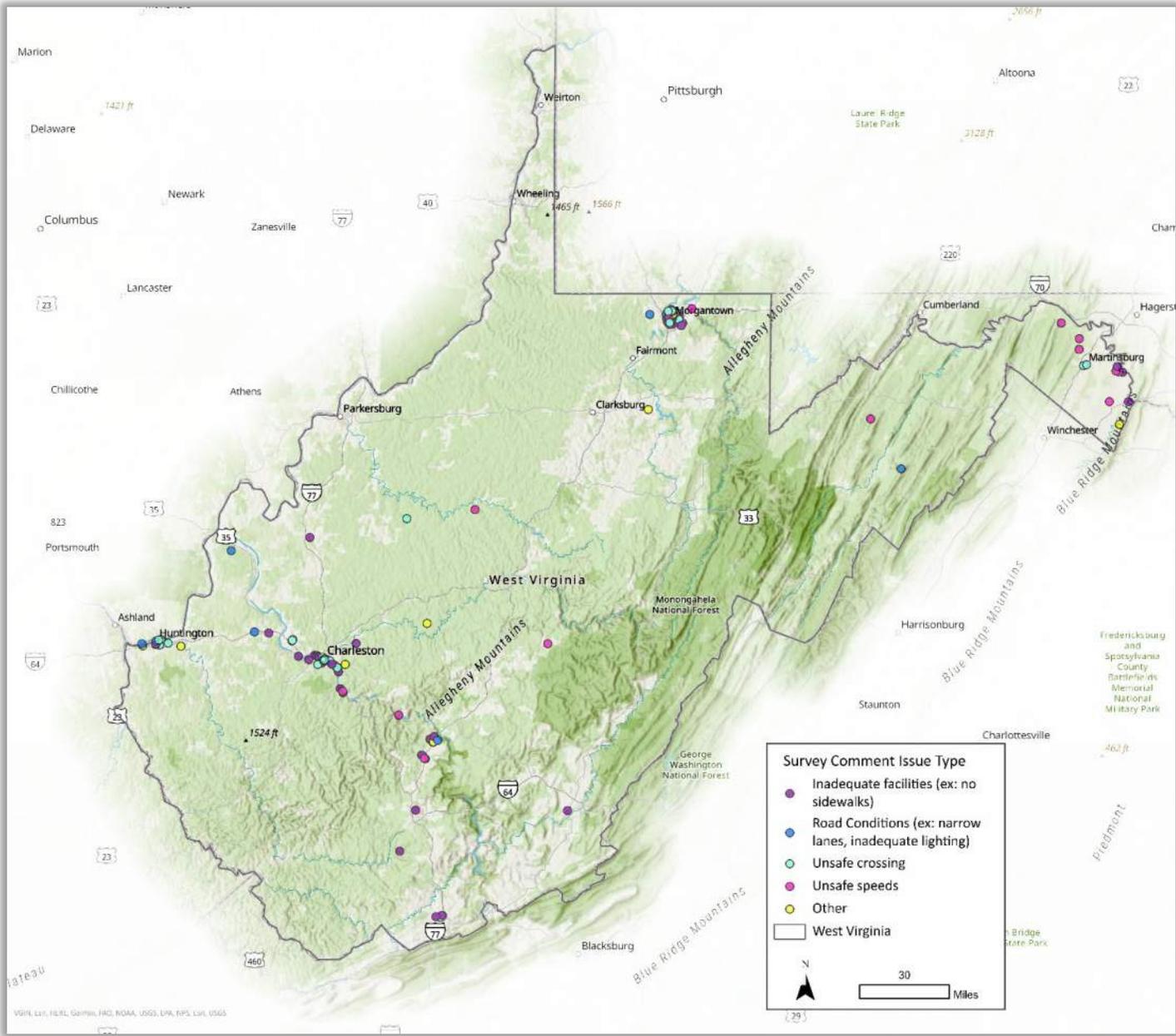
Public Survey Location Based Comments

Location-Based Survey Comments

Location Based Map Comments- Hot Spots



Location Comments by Type of Issue



Morgantown Location Comments by Type of Issue

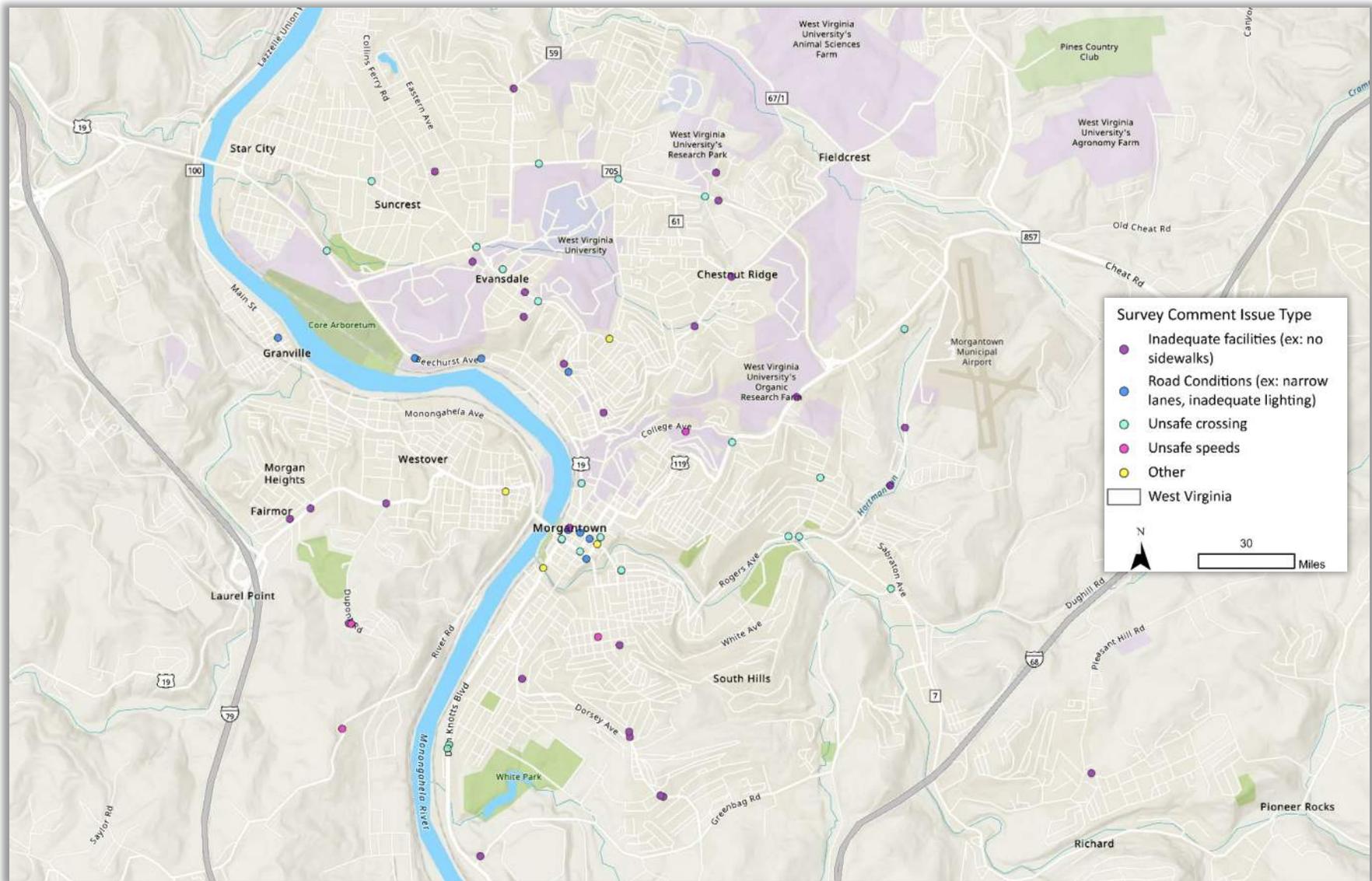


Figure 1: Huntington Location Comments by Type of Issue

