



COMMONWEALTH of VIRGINIA

Commonwealth Transportation Board

W. Sheppard Miller, III
Chairperson

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Richmond, Virginia 23219

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AGENDA

CTB Innovation Subcommittee

Tuesday, September 19, 2023

3:00 p.m.

Virginia Department of Transportation
Central Office Old Highway Building Computer Lab,
1221 East Broad Street
Richmond, Virginia 23219

1. Welcome
Cathy McGhee, Chief Deputy Commissioner, Virginia Department of Transportation
2. Approval of March 2023 Meeting Minutes
Cathy McGhee, Chief Deputy Commissioner, Virginia Department of Transportation
3. VDOT Amplifying Innovation Updates
- Strategy document, Catalog, Innovation Labs, AHQ outreach
Hari Sripathi, Virginia Department of Transportation
4. VDOT Innovation Recognition Options
Hari Sripathi, Virginia Department of Transportation
5. Topics for Future Discussions
Committee members
6. Public Comments

Meeting Notes: CTB Innovation Subcommittee

Date: Tuesday, March 28, 2023

The meeting was called to order at 9:00 am by Kevin Gregg, Chief of Maintenance and Operations (CMO)

Members of the Subcommittee in attendance: Kevin Gregg, Scott Kasprowicz, Mary Hynes, Wayne Coleman, Greg Yates, Thomas Fowlkes, Thomas Lawson.

Approval of December 2022 minutes – The minutes from the December meeting were approved without comment.

Kevin Gregg, VDOT CMO, welcomed the Subcommittee and discussed the importance of safety data as well as the systemic HSIP projects and their progress along with the recent merger of the former Traffic Engineering and Operations Divisions. Mr. Kasprowicz asked if VDOT looked at both crashes and crash rates. Depending on the approach, this could change the focus area of improvements. He expressed his desire to see the funding go to where it would do the most good. Mr. Coleman indicated the need to look at both measures to assure the issues are properly addressed. Mr. Kasprowicz discussed the PSI (Potential for Safety Improvement) data. He also asked that the safety data be regularly presented to the Subcommittee and the CTB members regarding their Districts. Mr. Gregg asked about other items the Board would like to hear about on a regular basis. Mr. Kasprowicz requested a look at the statewide and District related “hot spots”. Ms. Hynes asked about the inclusions of data for localities that maintain their own roadways. Mr. Cole indicated this is included in the data analyzed but is not updated as frequently as those on the VDOT roadway system.

Mark Cole, Traffic Operations Division (TOD) Administrator, and Shan Di, TOD Crash Data Analysis Team Lead, provided a presentation on Safety Data Analysis for VDOT Highway Safety Improvement. (Presentation Attached)

Several questions came up during the presentation. Ms. Hynes referenced a forum on safety in NOVA where it was indicated that video of issue locations had helped to identify pedestrian issues not identified in crash reports. Mr. Cole indicated that these methods are sometimes used and that pedestrian safety is very different from vehicular safety. VDOT’s approach to pedestrian safety attempts to match improvements to desired crossing locations and enhance motorist expectations. Mr. Kasprowicz discussed pedestrian fatalities and trends. Mr. Cole indicated that pedestrian fatalities are increasing faster than other fatal crash types. However, roadway departure is still the highest followed by intersections (which included some pedestrians). Pedestrian crashes accounted for 17% of all Virginia fatalities in 2022. VDOT is reviewing what can be implemented to improve visibility at these locations and to change behaviors.

Concerns were also raised about pedestrian actions that put them at risk. Mr. Cole discussed most pedestrian fatalities were not at intersections and approximately 3 out of 4 occur in dark conditions. He also indicated that DMV was investing funds in outreach to communities to promote better decisions among pedestrians. There was also interest among the subcommittee to discuss the relationship to

speed among pedestrian fatalities. Mr. Cole indicated that the 2022 crash data was just recently published and that he would be happy to return to the subcommittee once other relationships to pedestrian crashes were analyzed. Mr. Kasproicz stated this would help the Board focus their efforts on trends.

Mr. Kasproicz inquired if the Pedestrian Safety Action Plan (PSAP) was a federally mandated program. Mr. Cole indicated that the PSAP was first developed in 2018 by VDOT but is not federally mandated. VDOT also won a National Safety Award in 2019 for the development of this plan. The Highway Safety Improvement Program, and associated Strategic Highway Safety Plan, is a federally mandated program. Under this program, VDOT has developed a systemic plan that identifies several low cost countermeasures with proven safety benefits to ensure we upgrade design of road system. The recent federal infrastructure bill did add a requirement for states to develop a Vulnerable Road User (VRU) plan and include it in the state's Strategic Highway Safety Plan. VDOT is working to develop the VRU plan in advance of FHWA's November 2023 deadline.

When the Potential for Safety Improvement (PSI) metric came up in the presentation, Mr. Kasproicz asked if DMV created the PSI format. Ms. Di responded that VDOT created the metric and uses it to perform the screening of the roadway network. Mr. Coleman asked if weather factors were included in the analyses. Ms. Di indicated that this was not specifically included in the PSI analysis as it is primarily focused on locations of crashes. A review of the causal factors is conducted once the locations are selected. Questions were also raised about how this information is shared with other agencies and localities/planning organizations to assist in their development of projects. Mr. Cole stated that this information is shared with VDOT Districts, localities, and other safety partners on a routine basis.

After an example project location that was identified on the PSI list was presented, there was a discussion of simple fixes at other locations to address crash issues instead of waiting to develop SmartScale projects. Mr Kasproicz asked how VDOT can ensure immediate improvement is made in advance of projects that take years to complete? This prompted a discussion of the roadway safety audits (RSA) where a multidisciplinary team will review a location for low cost/short term improvements. Ms. Hynes thought these would be great opportunities to involve local leaders and educate them about other tools and programs. Mr. Cole indicated that the HSIP funding is intended to provide safety improvements as quickly as possible.

Ms. Hynes also asked how VDOT is assessing the benefits of these improvements if some of the systemic treatments are being implements on 15+ year cycles. Mr. Cole responded by describing how the treatments will be evaluated annually along the way. Mr. Coleman inquired if these assessments include distracted/impaired drivers? Mr. Cole indicated that they do and District staff typically works with local law enforcement when they are identified. Mr. Kasproicz recommended that the PSI locations would be a valuable tool in the hands of local law enforcement officers.

Mr. Yates asked if a follow up to this presentation could be made to the Board in a few months to present on lower-cost improvements. Mr. Kasproicz recommended the need for more focused group discussion and getting local officials involved to solicit input.

Mr. Cole closed by providing sample handouts that included the PSI locations and underlying data for each District. Ms. Hynes also requested a copy of the pedestrian crash mapping.

The meeting was adjourned at 9:45 AM.

MEETING AGENDA: CTB Innovation

Subcommittee DATE: Tuesday, March 28, 2023

TIME: 8:30 a.m.

LOCATION: Virginia Department of Transportation
Central Office Old Highway Building Computer Lab,
1221 East Broad Street
Richmond, Virginia 23219

MEETING LEADER: Cathy McGhee, email: cathy.mcgee@vdot.virginia.gov, phone: 804-916-9508

AGENDA:

- Welcome
Cathy McGhee, Chief Deputy Commissioner, VDOT
- Approval of December 2022 meeting minutes
Cathy McGhee
- Safety Data Analysis for VDOT Highway Safety Improvement
Mark Cole, Traffic Operations Division
- Public Comments



Safety Data Analysis For VDOT Highway Safety Improvement

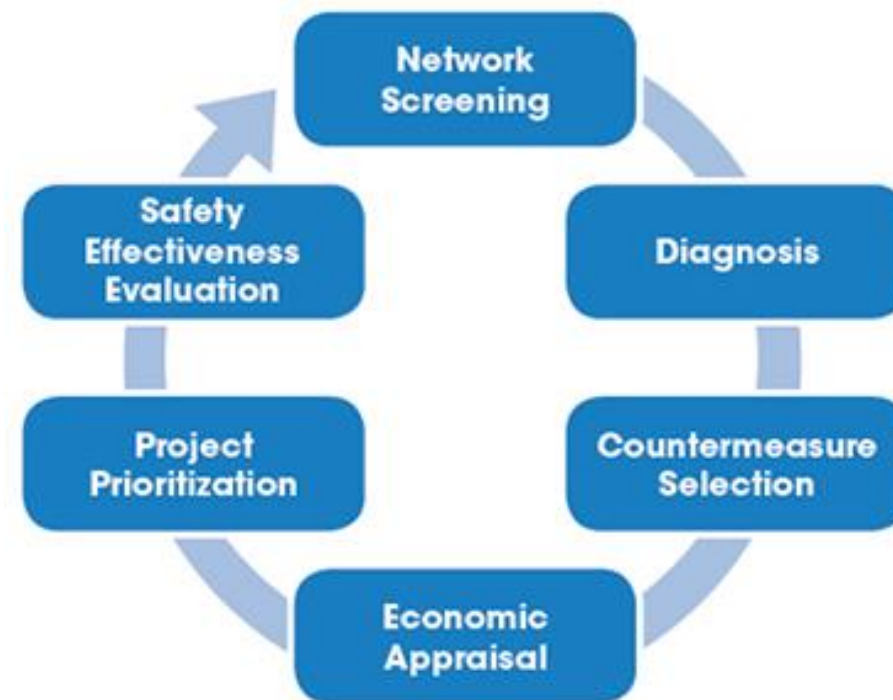
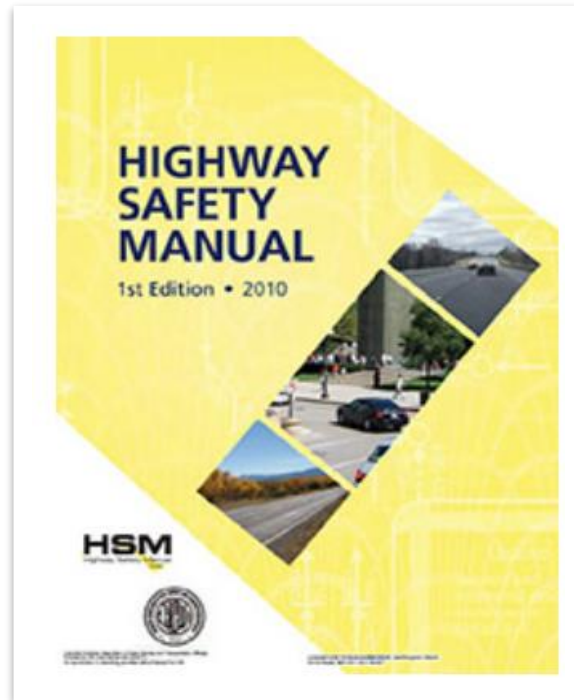
Mark Cole and Shan Di

Highway Safety Improvement Program(HSIP), Traffic Operations Division

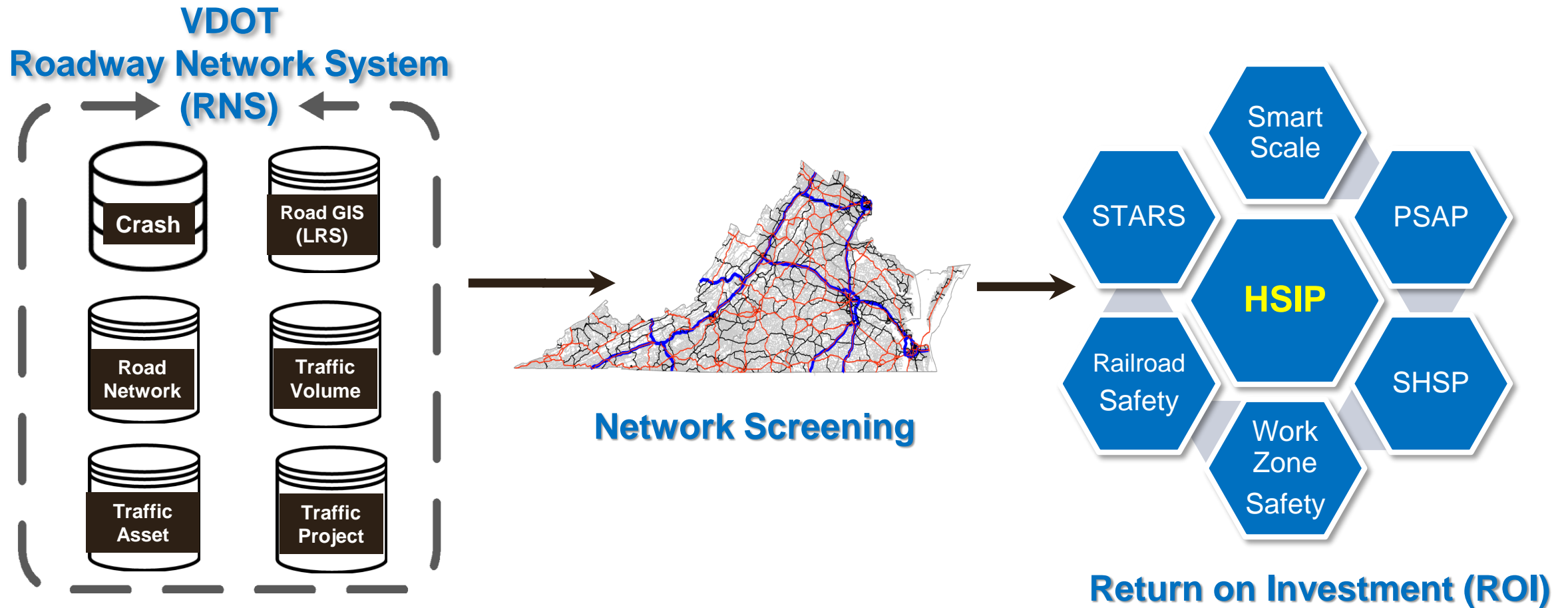
March 2023

Roadway Safety Management Process

- ❑ Highway Safety Manual recommended best practice
- ❑ A process to continually improve highway safety infrastructure



A Data-Driven Approach



Network Screening Process



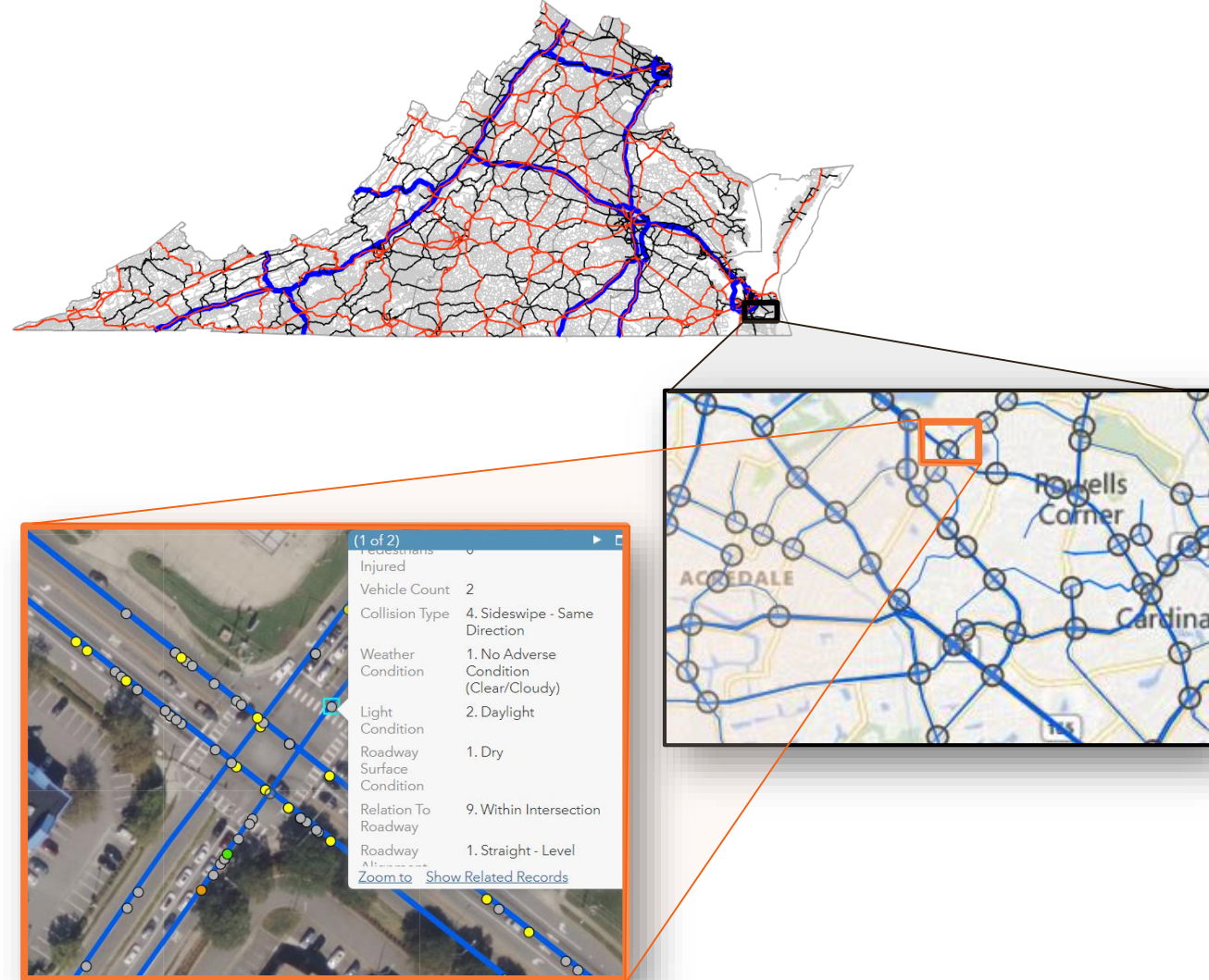
Total crashes reduction → *Safety performance functions* → **Potential for Safety Improvement (PSI) Locations**

Pedestrian safety → *Pedestrian risk score* → **Pedestrian Safety Action Plan (PSAP)**

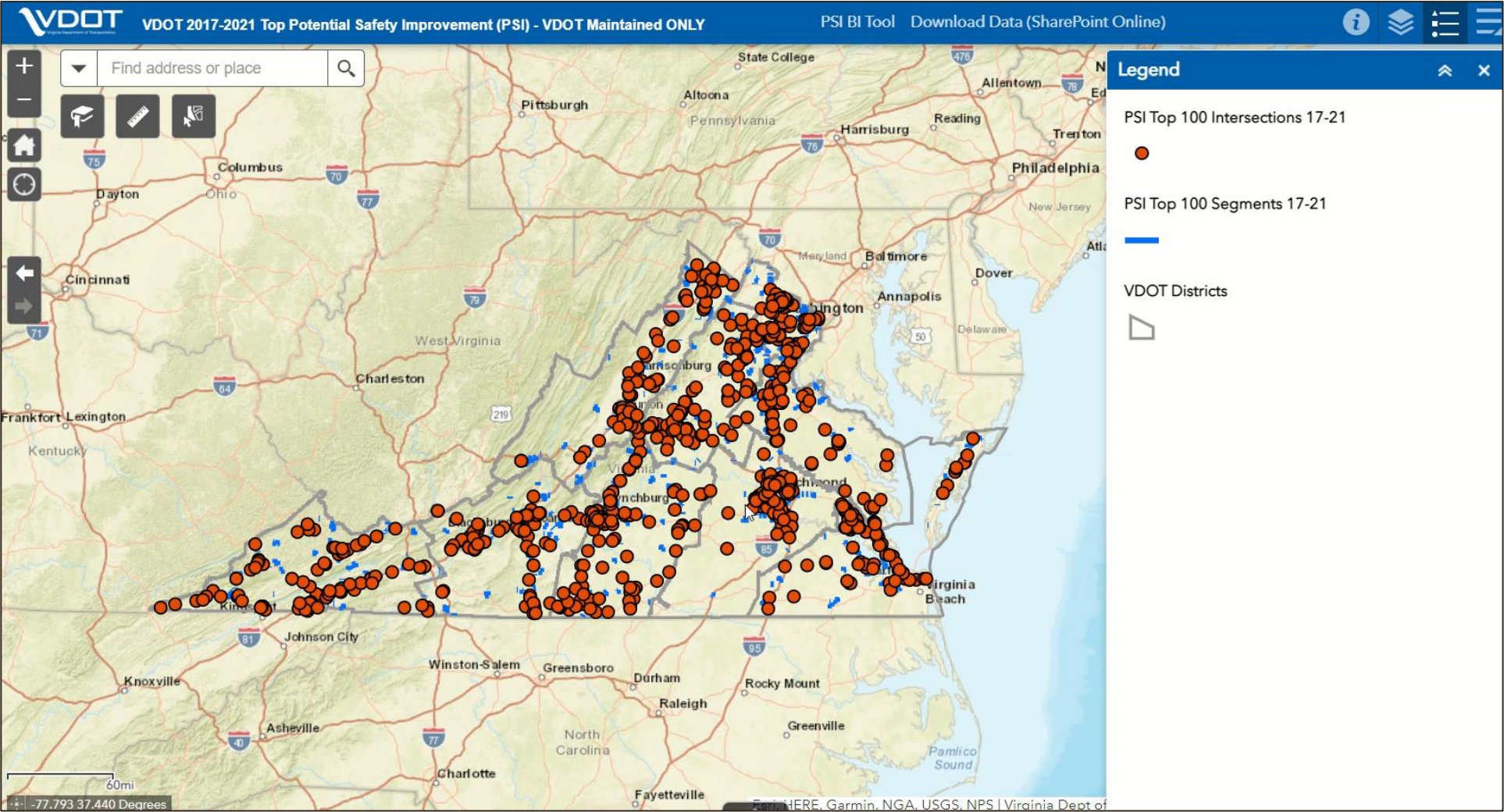
Fatal & severe crashes, specific type of crashes → *Severe crash risks* → **Systemic Infrastructure Plan**

Potential for Safety Improvement (PSI)

- Focus on long-term crash reduction
- Identifies roadway segments and intersections with worse performance compared to similar sites
- Safety analysis model based on
 - crash data
 - traffic data
 - roadway types

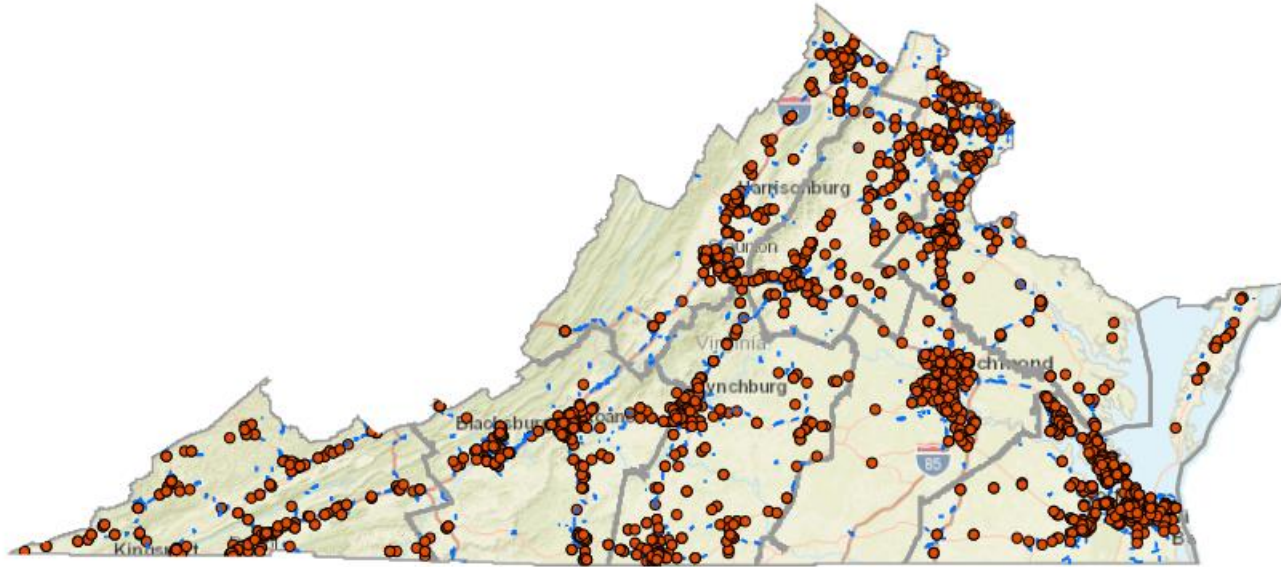


Top Potential Safety Improvement (PSI) Locations Map

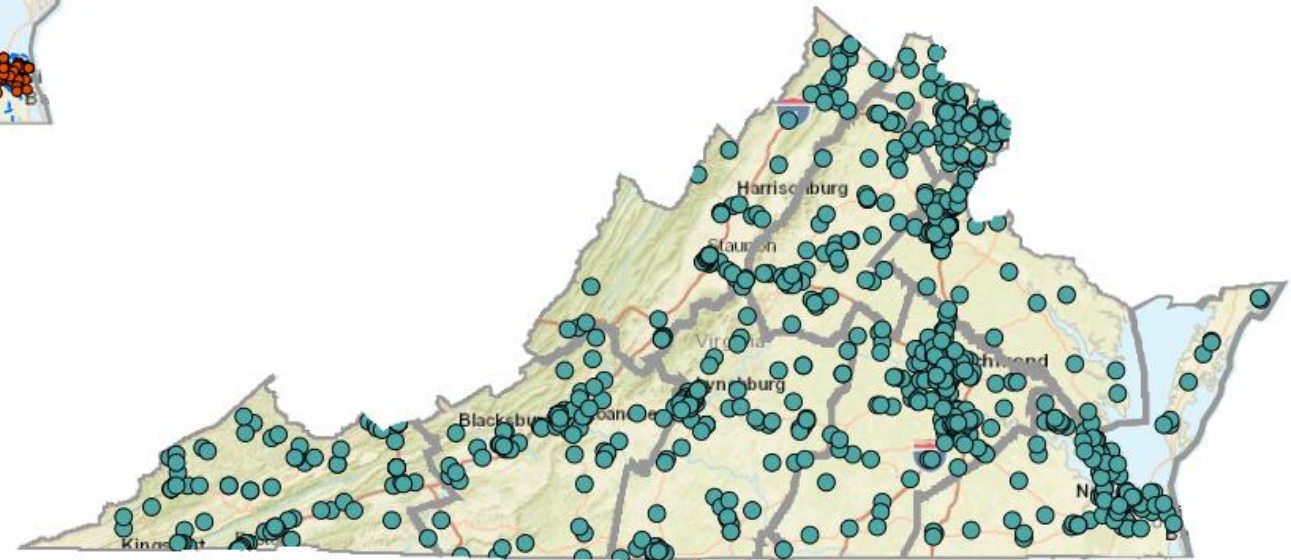
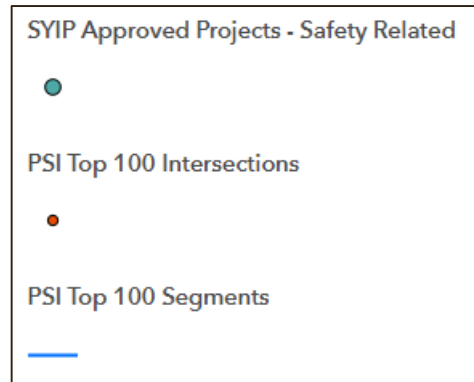


bit.ly/VDOTPSIMap

PSI Top 100 Locations



Six Year Improvement Projects (SYIP) Approved Projects - Safety Related

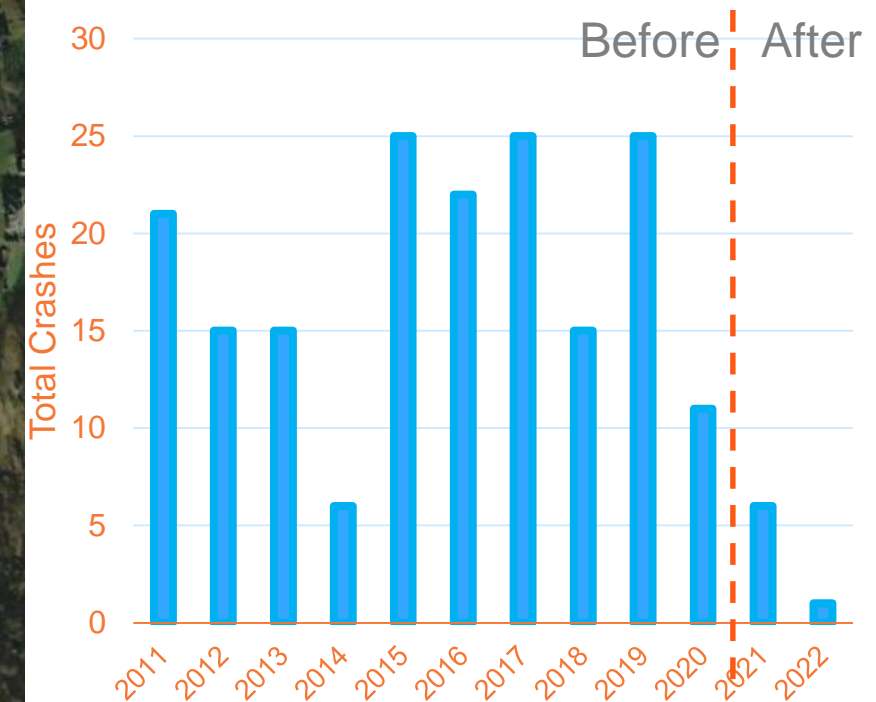


Example: Infrastructure Improvement at PSI Location

Culpeper District, Intersection US-29 @ US-17 Reconstruction



Annual Crash History

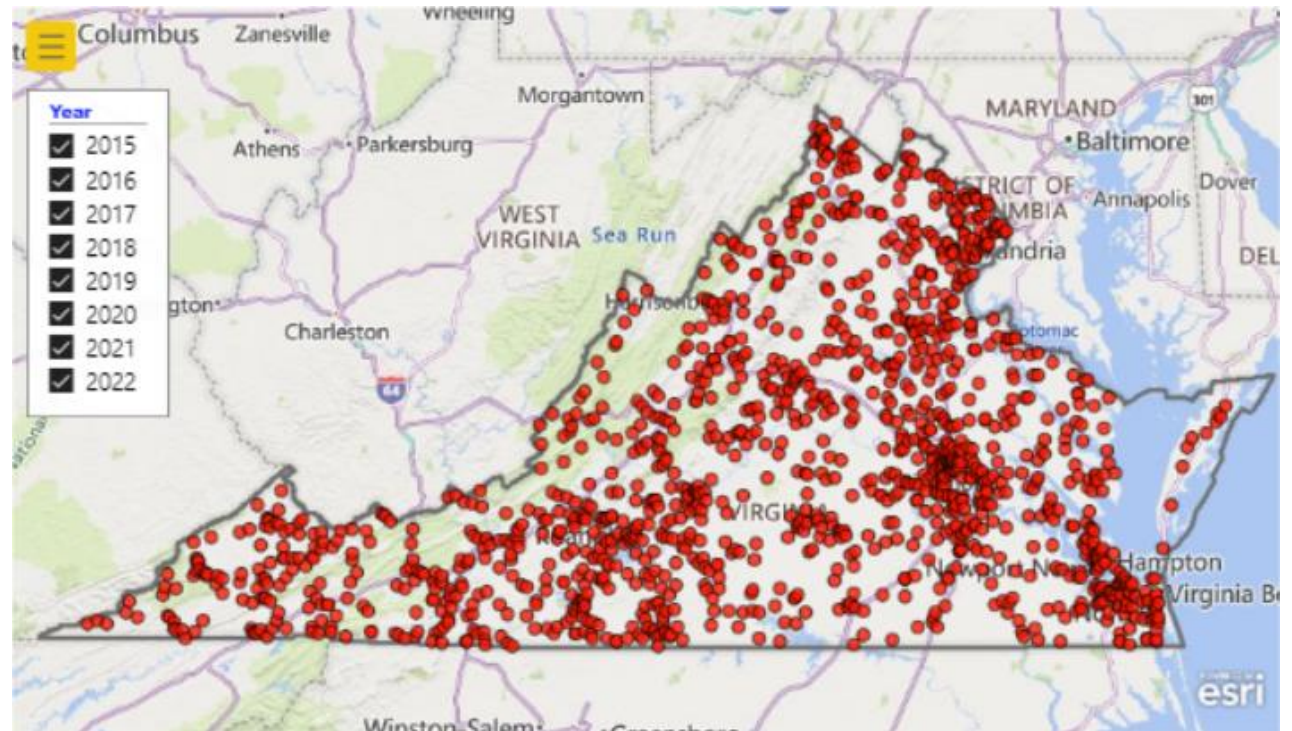


Smart Scale UPC 77384, with the purpose of this project as to implement a design which significantly reduces the number of rear end collisions, increases overall safety, reduces congestion and provides an appropriate linkage between multiple classifications of roadways.

Systemic Investment Plan

- **Focuses on severe crashes widely dispersed over road network**
- **Apply low-cost countermeasures to treat specific crash types**
- **Wider benefit/greater return on investment with more targeted safety improvements**

Distribution of Fatal Roadway Departure Crashes on Curves over Years



Systemic Plan Project Tracking Tool

VDOT Safety Investment Plan

Overview - Systemic Safety Initiative
Flashing Yellow Arrow - FYA
High Visibility Backplates -HVS
Pedestrian Crossings
Centerline and Edgeline Rumble Strip
Curve Delineation
Unsignalized Intersection
Safety Wedge

Eight Systemic Safety Countermeasures

Last Update: 8/30/2022

Highway Safety Programs

This document allows you to select, views and download the set of updated-live data and shape files for each of the eight systemic safety countermeasures that are part of VDOT's Systemic Safety Implementation Plan approved by the CTB in September of 2019. Click on the different tabs to learn more about a specific initiative:

1. Flashing Yellow Arrow (FYA)
2. High-Visibility Signal Backplates (HVS)
3. Pedestrian Crossings
4. Centerline and Edgeline Rumble Strip
5. Curve Delineation
6. Unsignalized Intersection
7. Safety Wedge

VDOT Systemic Plan – 8 Systemic Safety Countermeasures

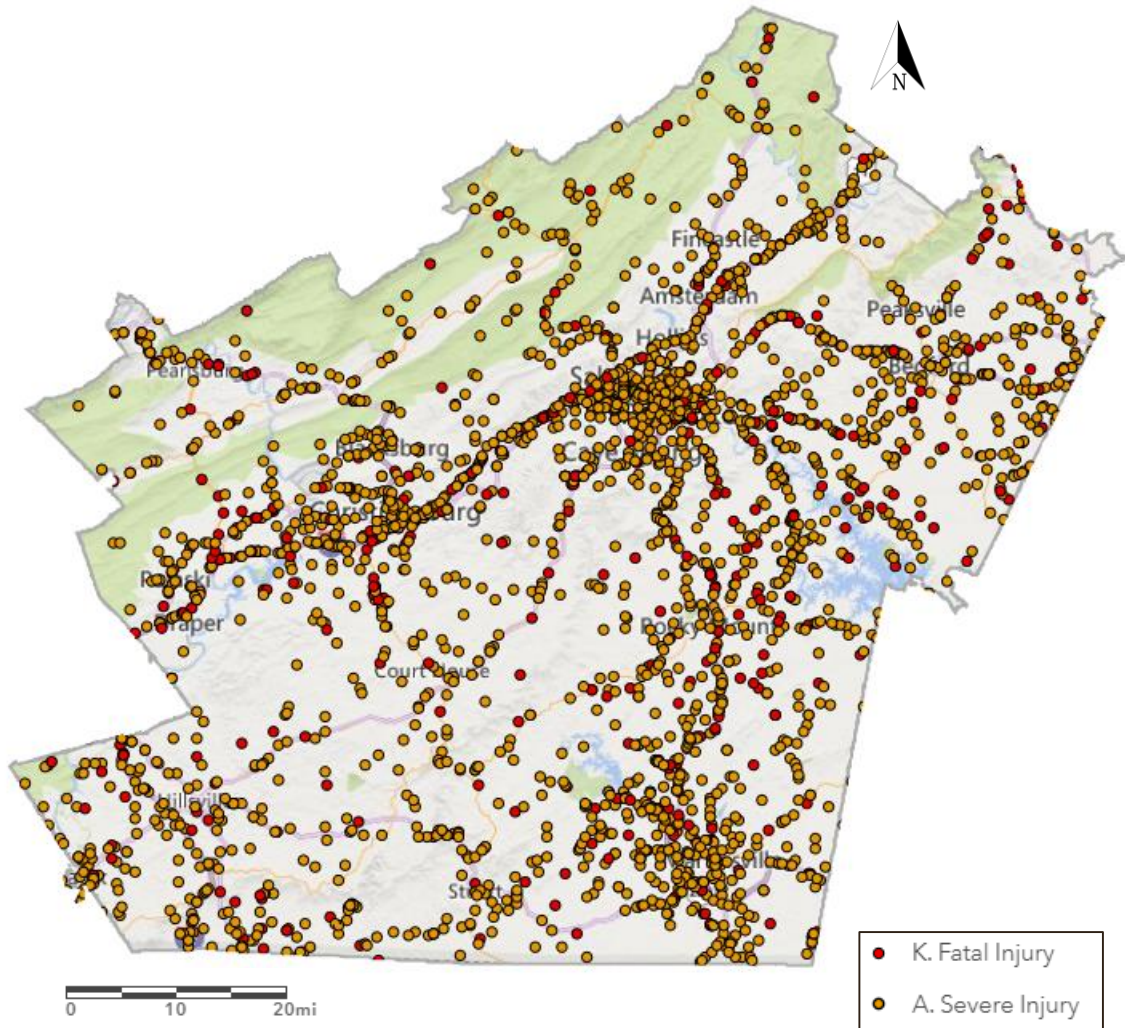
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bit.ly/VDOTHSIPInvestmentPlanMap

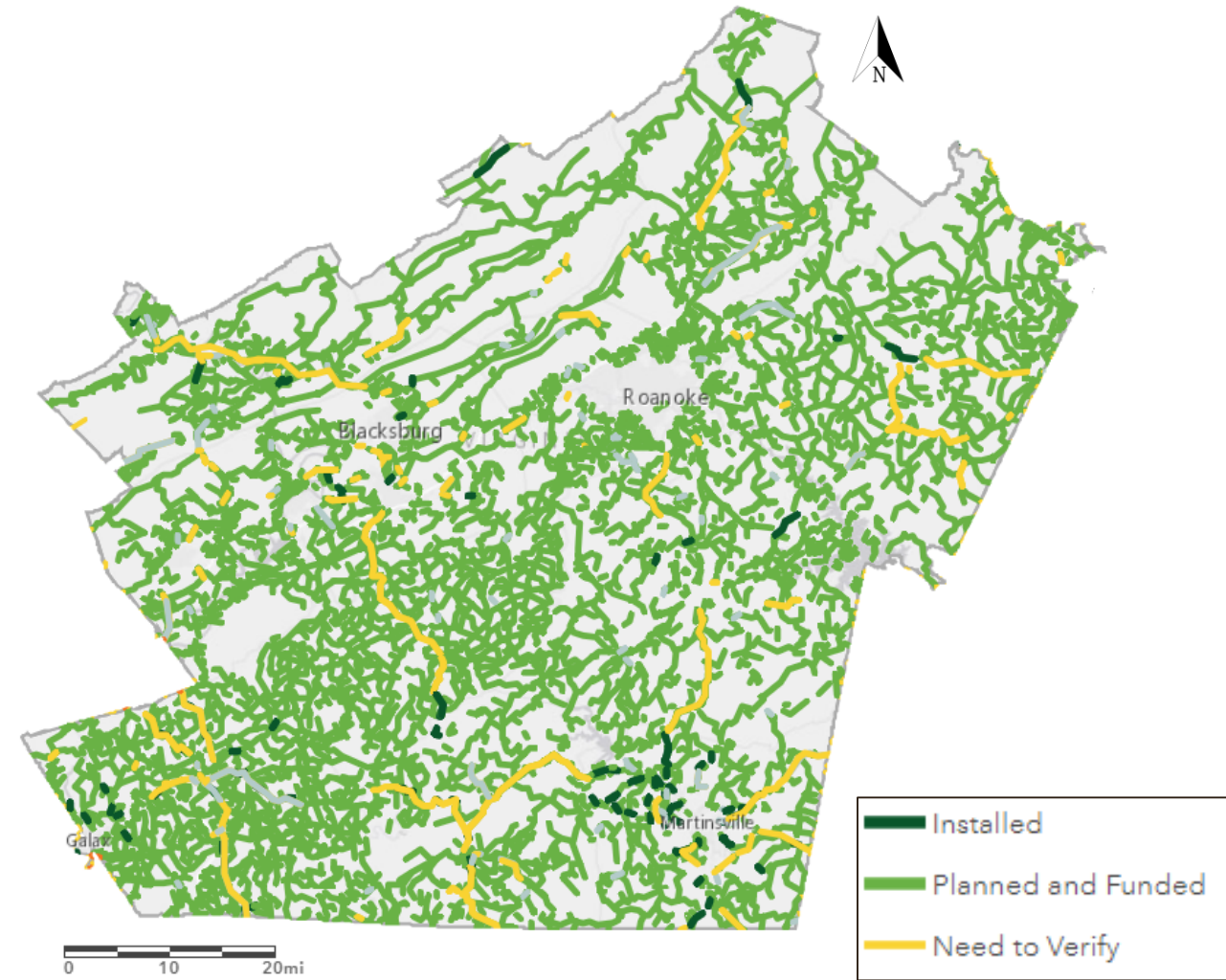
HSIP Safety Data Analysis

10

Fatal & Severe Road Departure Crashes Salem District



Curve, Shoulder Wedge and Rumble Strip Projects Salem District



New Virginia Highway Safety Program Infrastructure Investment Plan - FY 2022 - 2027

Local Systemic Projects

Flashing Yellow
High-Visibility Backplates
Pedestrian Crossings
Curve Signage
Unsignalized Intersections
Road Diets

\$60M Investment

Expanded Flashing Yellow Arrow



\$13.5M - Up to 195 locations

New VDOT Pedestrian Crossings



\$20M - Up to 200 locations

2-lane Rural Roads



\$150M - Up to 200 miles
Up to 50% crash reduction

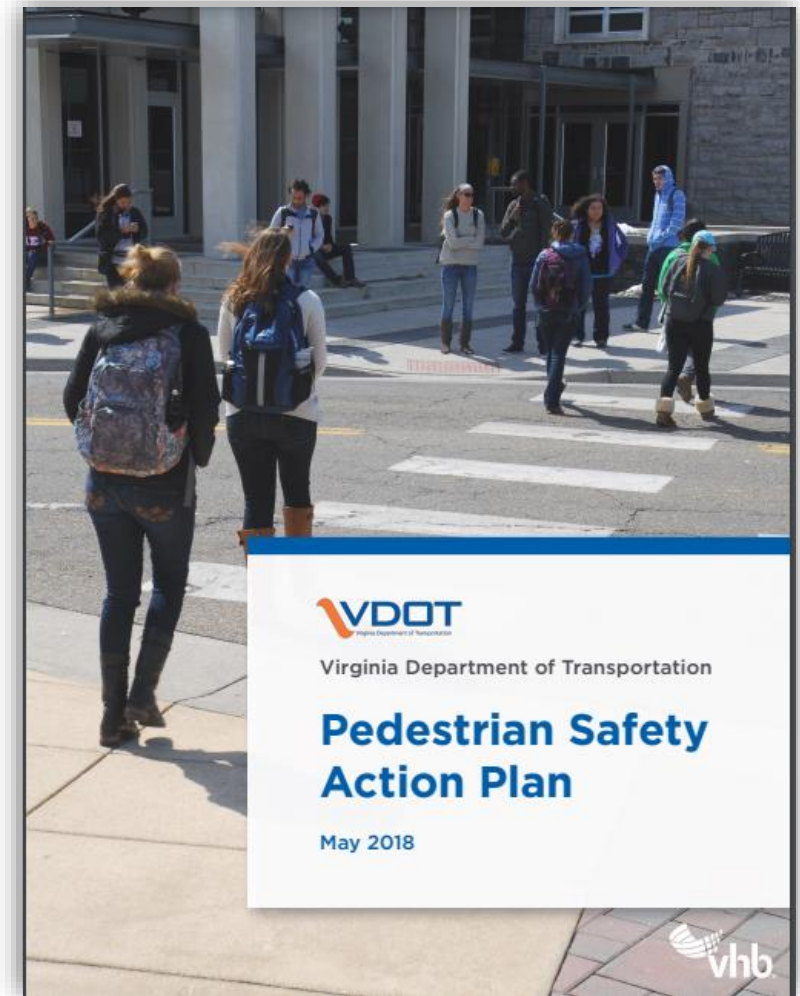
Spot Projects



\$144M Investment

Pedestrian Safety Action Plan (PSAP)

- Focus on pedestrian safety with VDOT Policy Recommendations
- Predictive safety analysis to determine which specific road locations pose the greatest risk for pedestrians
- Pedestrian safety countermeasure toolbox
- PSAP map that shows locations with highest risk for vulnerable users



2019 National Roadway Safety Awards

PSAP - Priority Corridor Criteria

- Annual average daily traffic (AADT)
- Zero-vehicle households
- Health Opportunity Index (HOI)
- Transit access
- Population density
- Employment density
- Pedestrian crash history
- Posted speed limit
- Proximity to a school
- Proximity to a park
- Roadway geometry
- Urban/rural context

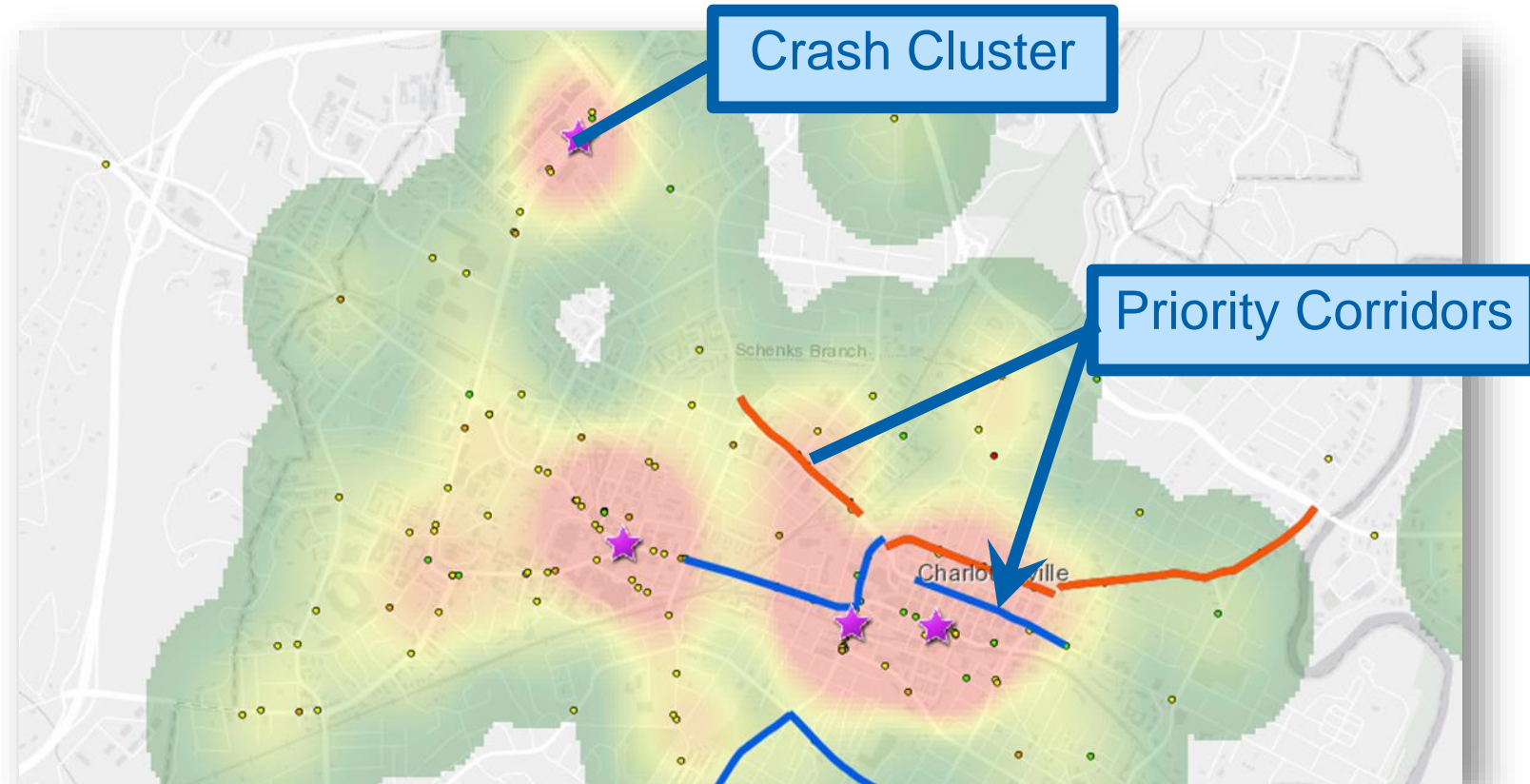
PSAP Crash Clusters and Priority Corridors

Crash Clusters

- Density map of actual crash locations
- Look back

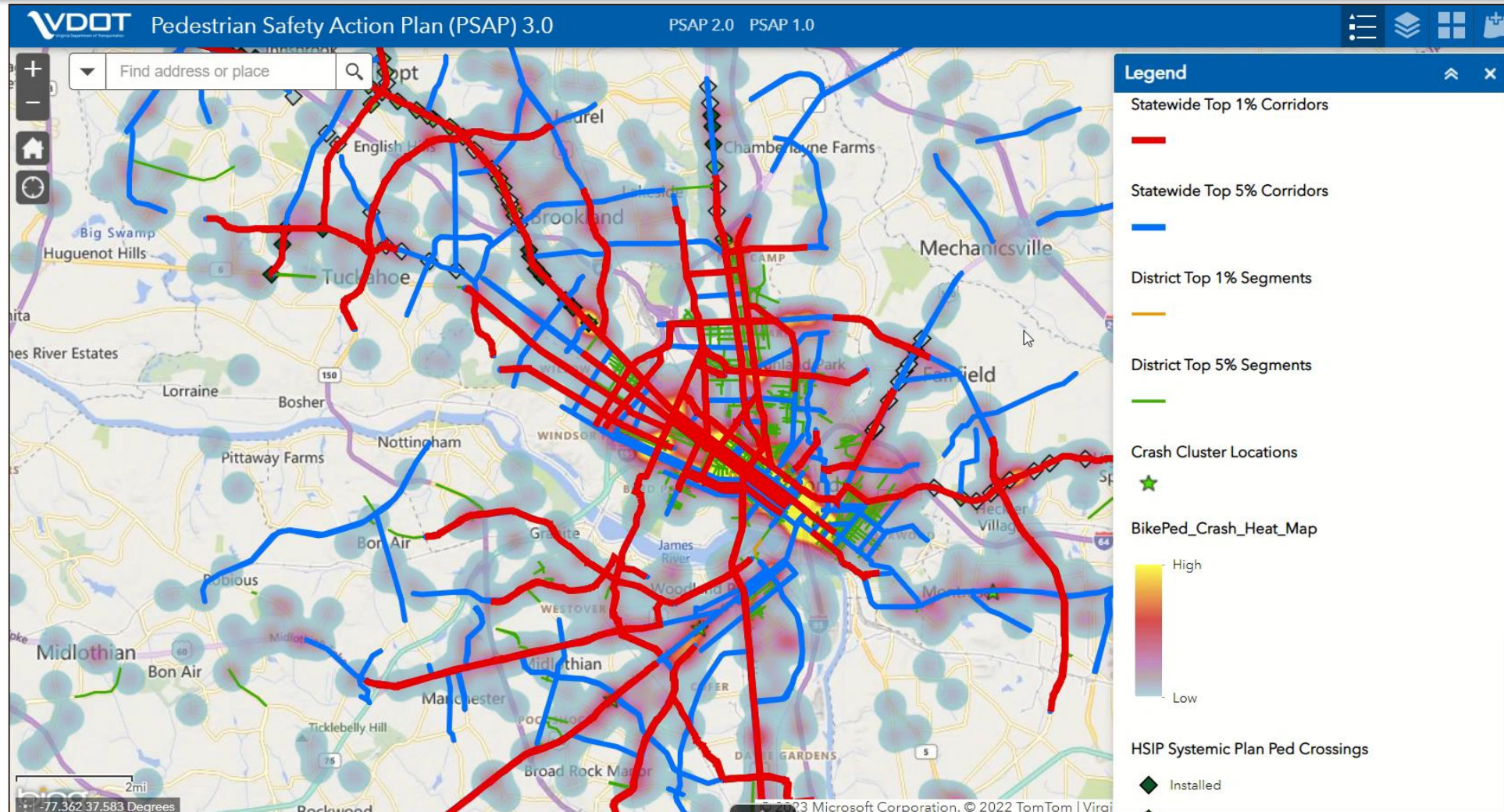
Priority Corridors

- Top ranked corridors based on scoring criteria indicating pedestrian presence or risk
- Predictive



bit.ly/VDOTPSAP

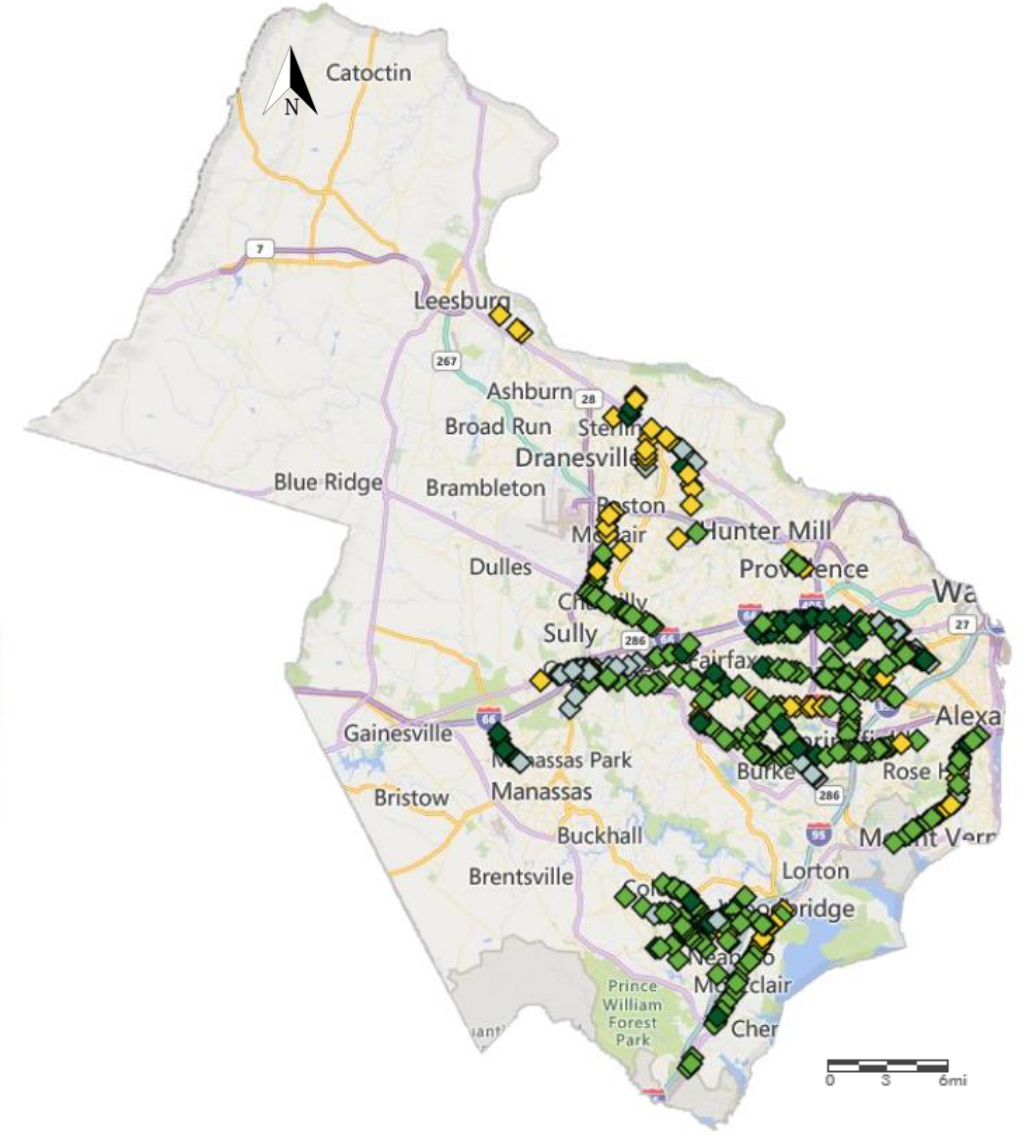
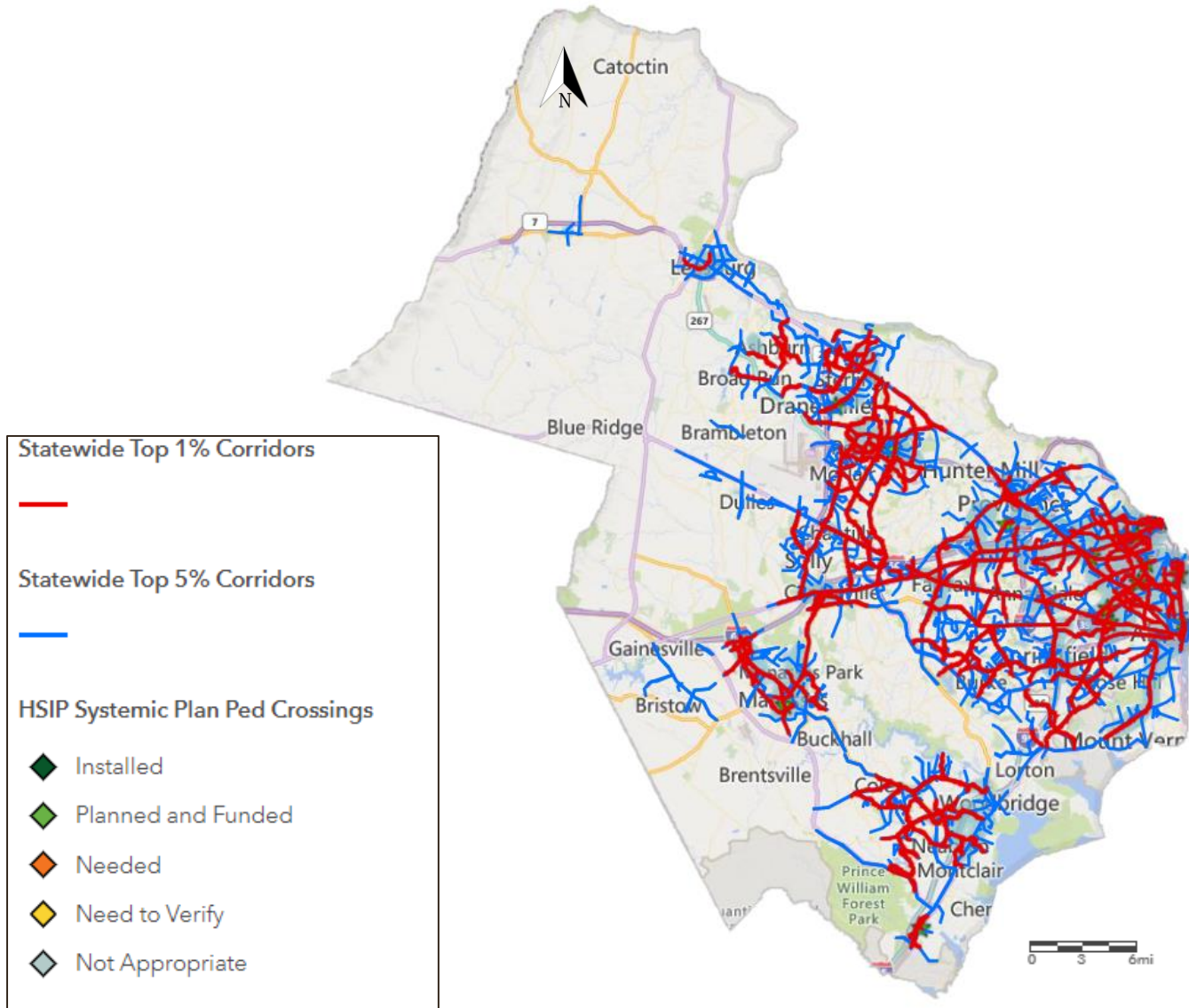
PSAP 3 Statewide Top Priority Corridors Map



bit.ly/VDOTPSAP

PSAP Top Priority Corridors Northern Virginia District

HSIP Pedestrian Crossing Systemic Plan Northern Virginia District



Safety Data Analysis for VDOT Highway Safety Improvement

Questions?



Safety Data Analysis For VDOT Highway Safety Improvement

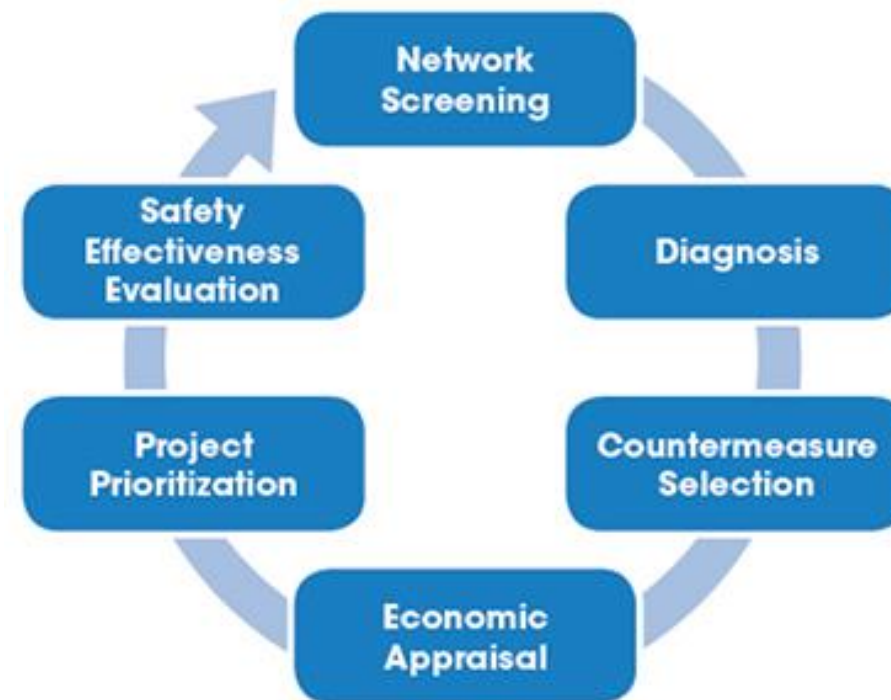
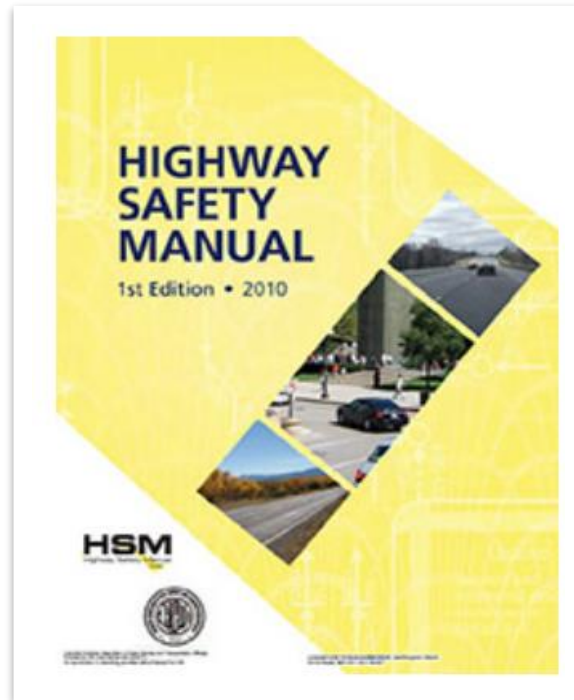
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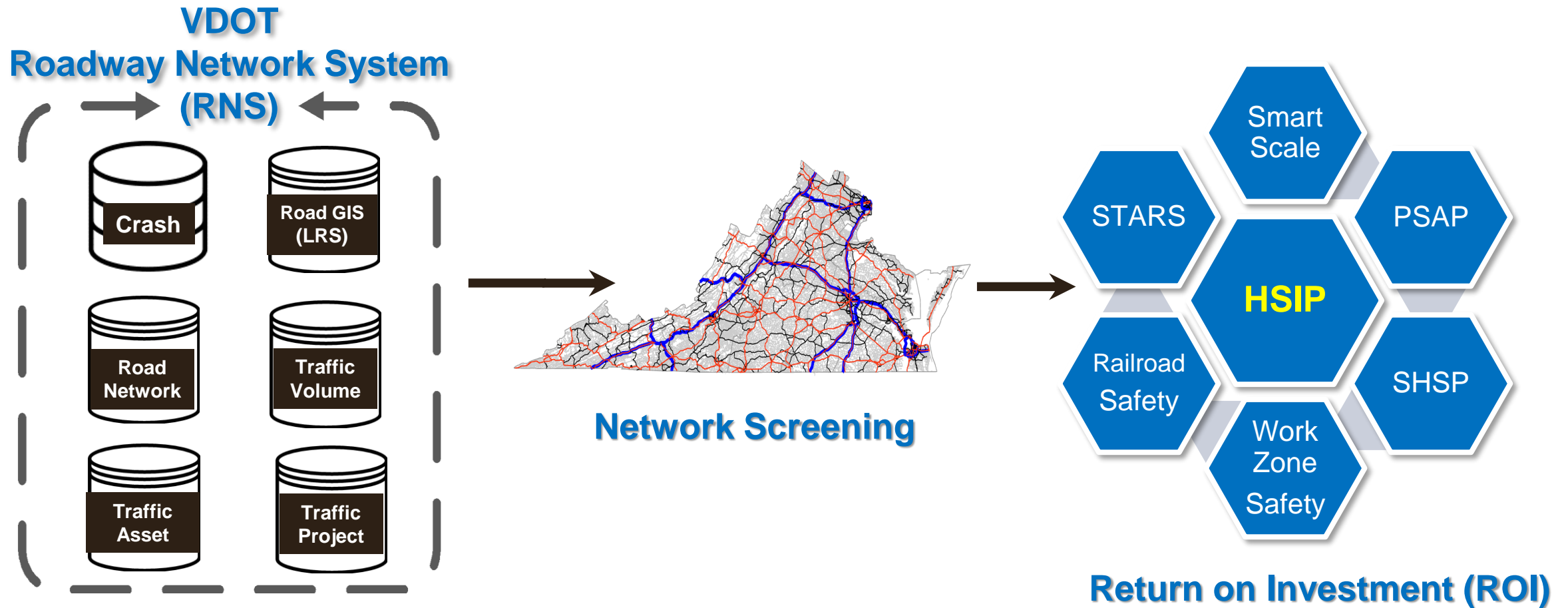
March 2023

Roadway Safety Management Process

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A Data-Driven Approach



Network Screening Process



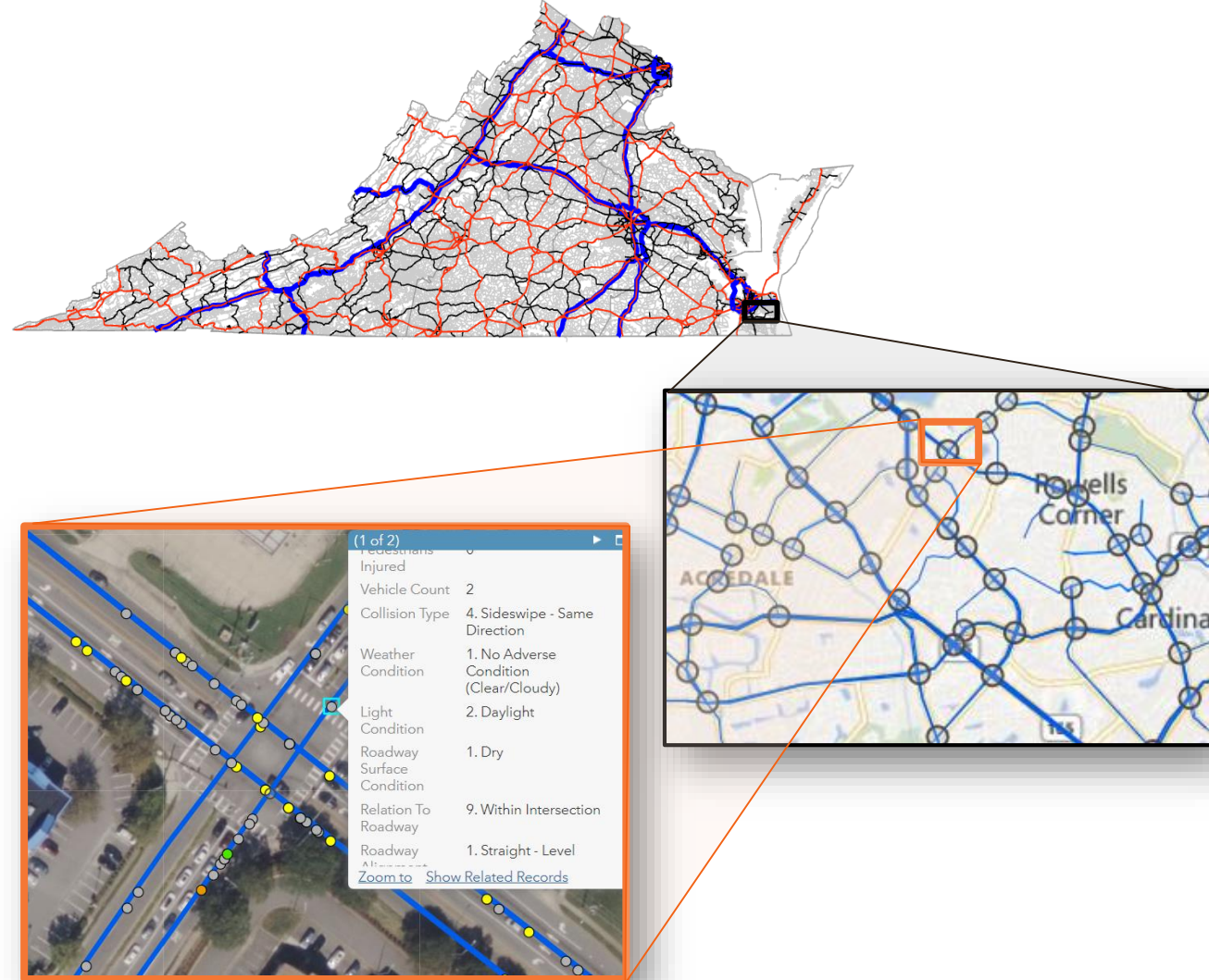
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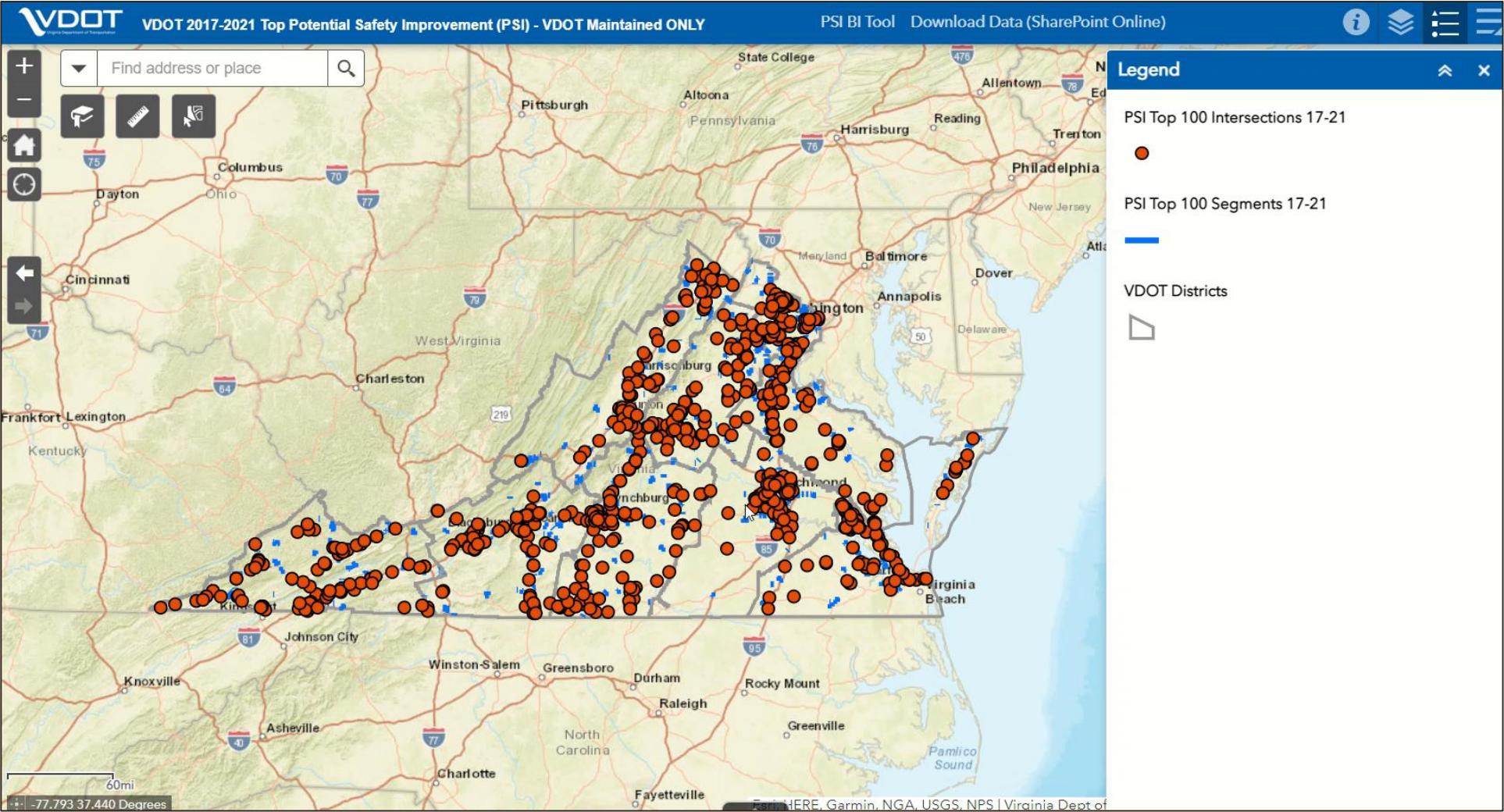
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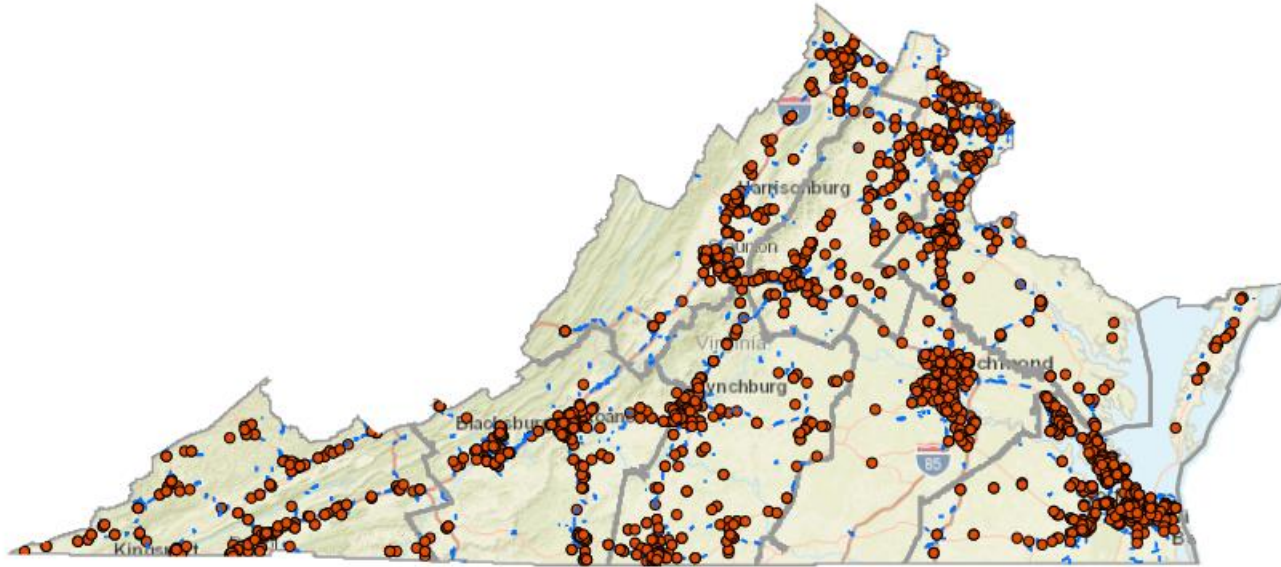


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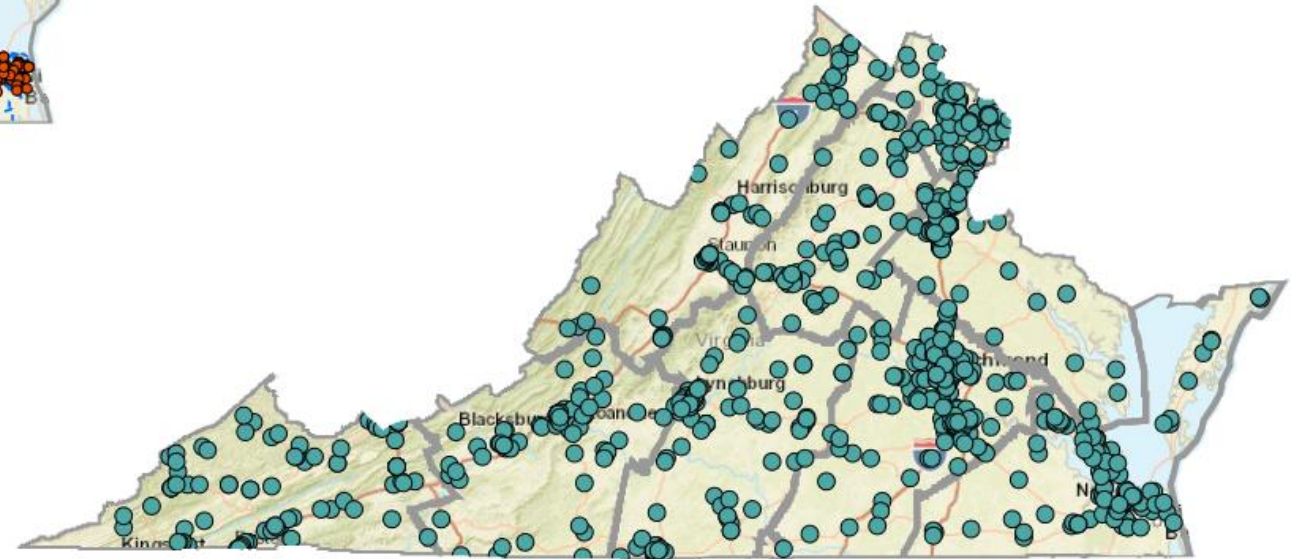
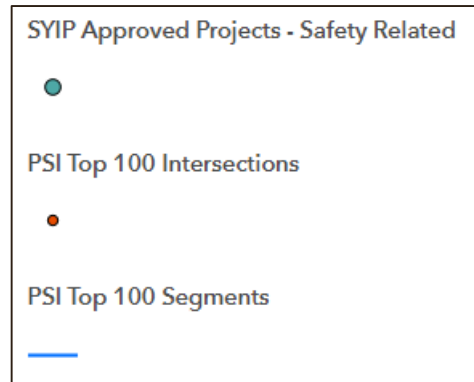


bit.ly/VDOTPSIMap

PSI Top 100 Locations



Six Year Improvement Projects (SYIP) Approved Projects - Safety Related

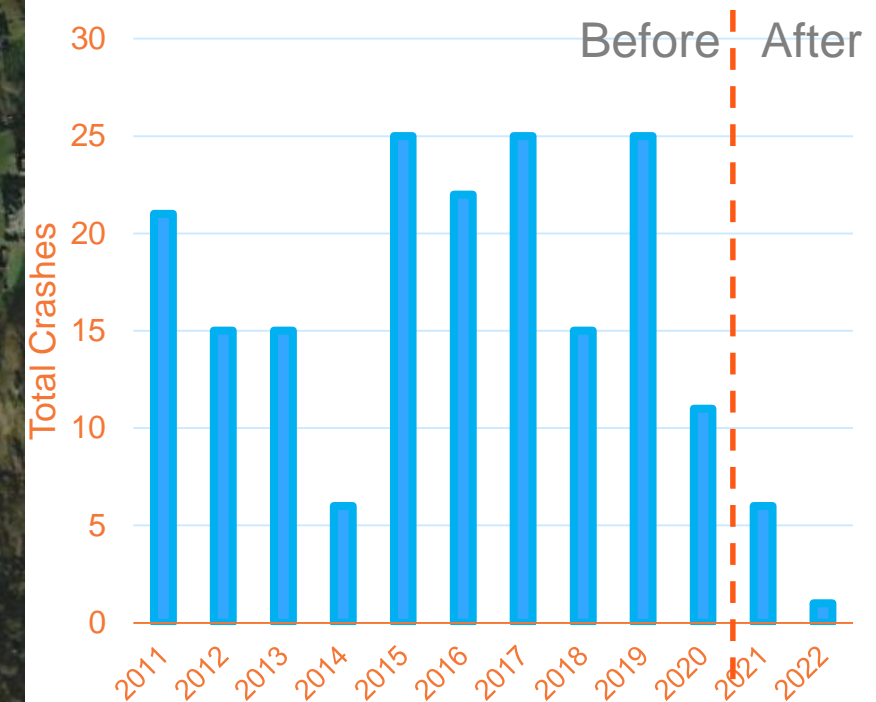


Example: Infrastructure Improvement at PSI Location

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Annual Crash History

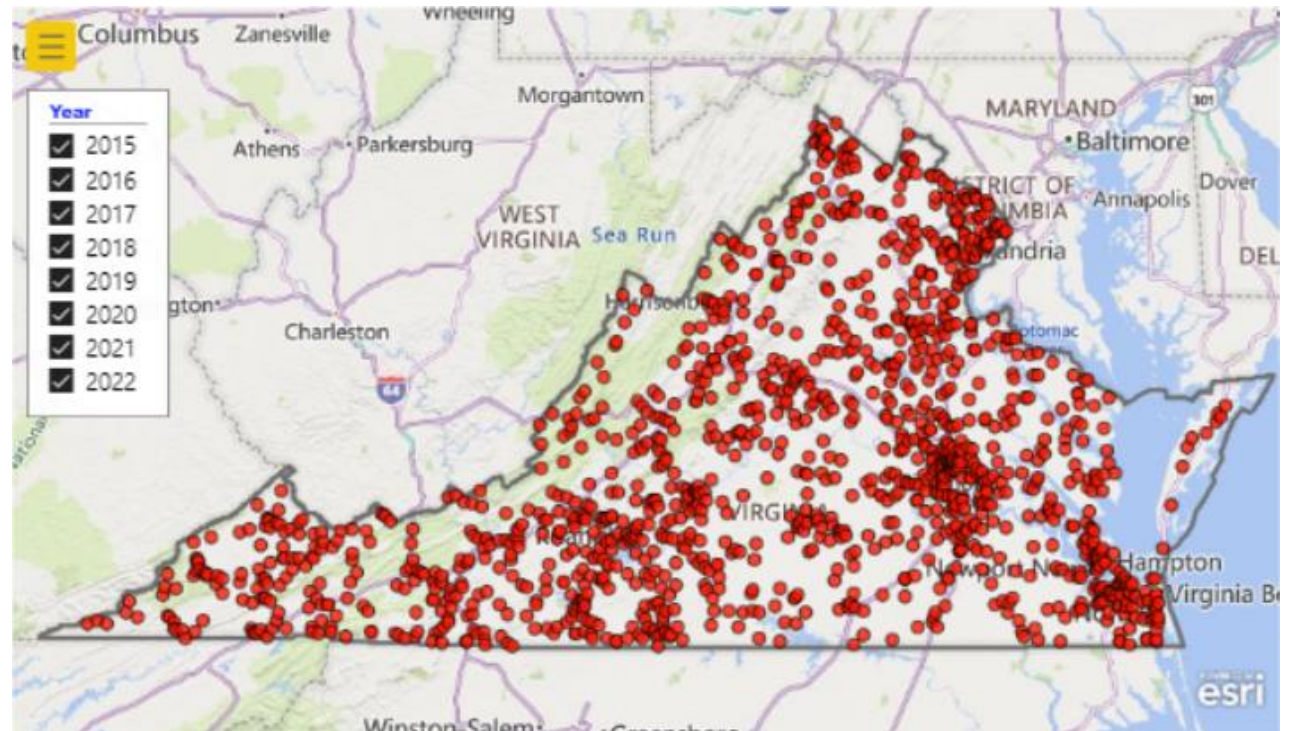


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VDOT Systemic Plan – 8 Systemic Safety Countermeasures

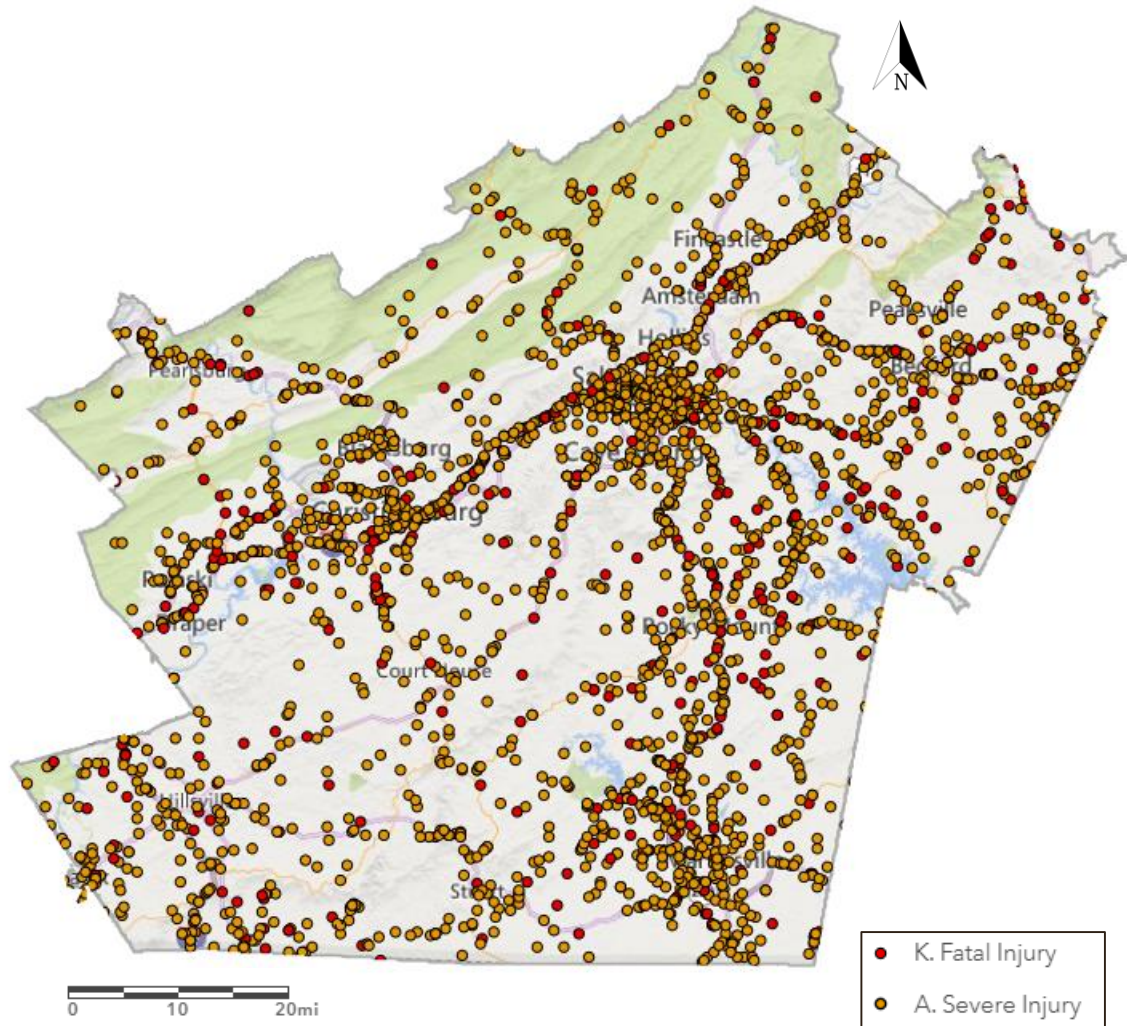
<div style="background-color: #0056b3; color: white; padding: 2px 5px; font-weight: bold;">Completed 2021</div> <div style="border: 1px solid #0056b3; padding: 5px;"> <div style="background-color: #0056b3; color: white; padding: 2px 5px; font-weight: bold;">High-visibility Backplates</div> <div style="background-color: #0056b3; color: white; padding: 2px 5px; font-weight: bold;">Up to 15% crash reduction</div> </div>	<div style="background-color: #0056b3; color: white; padding: 2px 5px; font-weight: bold;">Completed 2021</div> <div style="border: 1px solid #0056b3; padding: 5px;"> <div style="background-color: #0056b3; color: white; padding: 2px 5px; font-weight: bold;">Flashing Yellow Arrow</div> <div style="background-color: #0056b3; color: white; padding: 2px 5px; font-weight: bold;">Up to 20% crash reduction</div> </div>	<div style="background-color: #0056b3; color: white; padding: 2px 5px; font-weight: bold;">Complete By 2024</div> <div style="border: 1px solid #0056b3; padding: 5px;"> <div style="background-color: #0056b3; color: white; padding: 2px 5px; font-weight: bold;">Curve Signs</div> <div style="background-color: #0056b3; color: white; padding: 2px 5px; font-weight: bold;">Up to 40% crash reduction</div> </div>	<div style="background-color: #0056b3; color: white; padding: 2px 5px; font-weight: bold;">Complete By 2025</div> <div style="border: 1px solid #0056b3; padding: 5px;"> <div style="background-color: #0056b3; color: white; padding: 2px 5px; font-weight: bold;">Pedestrian Crossings</div> <div style="background-color: #0056b3; color: white; padding: 2px 5px; font-weight: bold;">Up to 56% crash reduction</div> </div>
<div style="background-color: #0056b3; color: white; padding: 2px 5px; font-weight: bold;">Complete By 2024</div> <div style="border: 1px solid #0056b3; padding: 5px;"> <div style="background-color: #0056b3; color: white; padding: 2px 5px; font-weight: bold;">Unsignalized Intersections</div> <div style="background-color: #0056b3; color: white; padding: 2px 5px; font-weight: bold;">Up to 10% crash reduction</div> </div>	<div style="background-color: #0056b3; color: white; padding: 2px 5px; font-weight: bold;">Resurfacing Cycle -15Yr</div> <div style="border: 1px solid #0056b3; padding: 5px;"> <div style="background-color: #0056b3; color: white; padding: 2px 5px; font-weight: bold;">Shoulder Wedge</div> <div style="background-color: #0056b3; color: white; padding: 2px 5px; font-weight: bold;">Up to 20% crash reduction</div> </div>	<div style="background-color: #0056b3; color: white; padding: 2px 5px; font-weight: bold;">Complete By 2030</div> <div style="border: 1px solid #0056b3; padding: 5px;"> <div style="background-color: #0056b3; color: white; padding: 2px 5px; font-weight: bold;">Centerline Rumble Stripes</div> <div style="background-color: #0056b3; color: white; padding: 2px 5px; font-weight: bold;">Up to 60% crash reduction</div> </div>	<div style="background-color: #0056b3; color: white; padding: 2px 5px; font-weight: bold;">Complete By 2030</div> <div style="border: 1px solid #0056b3; padding: 5px;"> <div style="background-color: #0056b3; color: white; padding: 2px 5px; font-weight: bold;">Edgeline Rumble Stripes</div> <div style="background-color: #0056b3; color: white; padding: 2px 5px; font-weight: bold;">Up to 50% crash reduction</div> </div>

bit.ly/VDOTHSIPInvestmentPlanMap

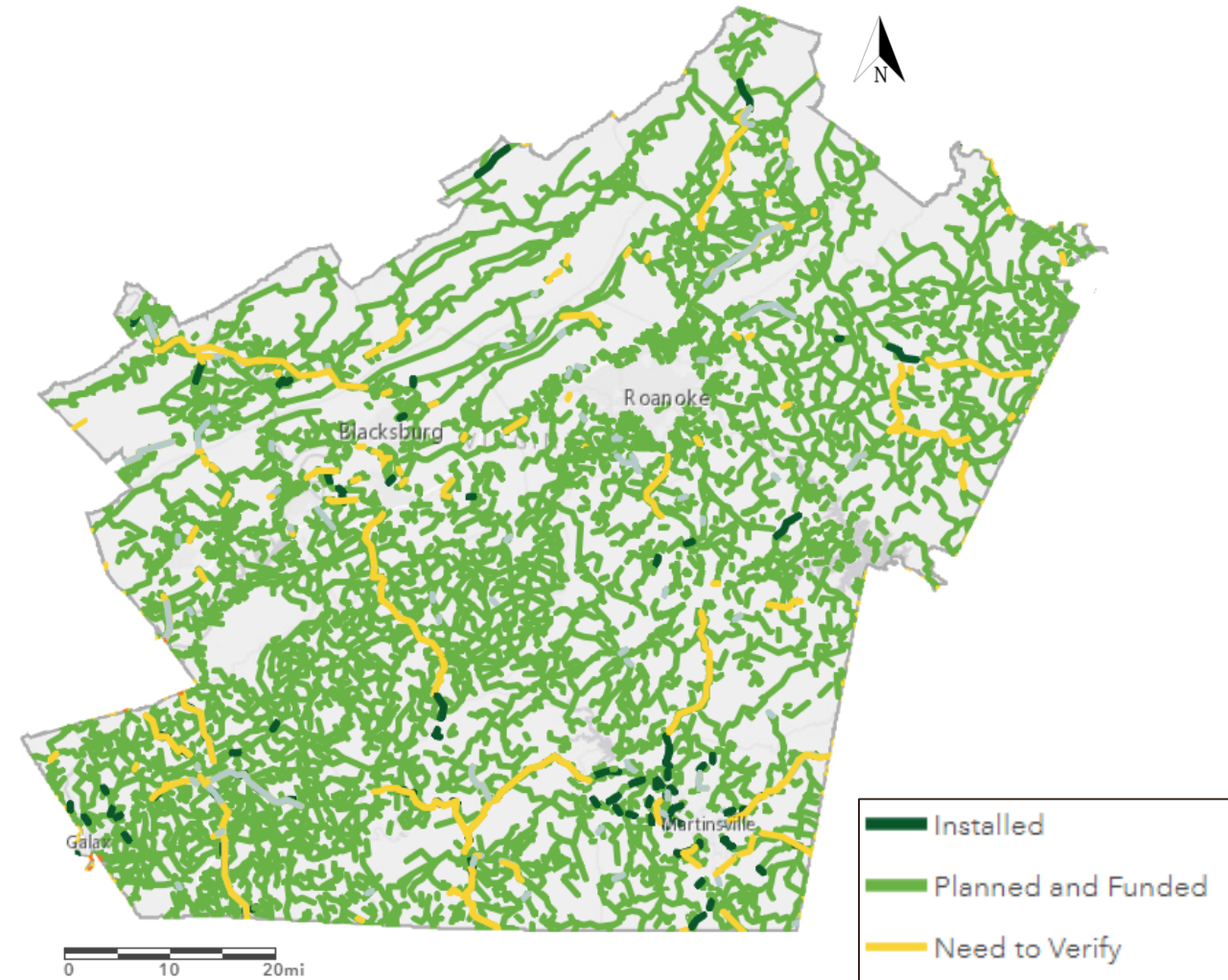
HSIP Safety Data Analysis

10

Fatal & Severe Road Departure Crashes Salem District



Curve, Shoulder Wedge and Rumble Strip Projects Salem District



New Virginia Highway Safety Program Infrastructure Investment Plan - FY 2022 - 2027

Local Systemic Projects

Flashing Yellow
High-Visibility Backplates
Pedestrian Crossings
Curve Signage
Unsignalized Intersections
Road Diets

\$60M Investment

Expanded Flashing Yellow Arrow



\$13.5M - Up to 195 locations

New VDOT Pedestrian Crossings



\$20M - Up to 200 locations

2-lane Rural Roads



\$150M - Up to 200 miles
Up to 50% crash reduction

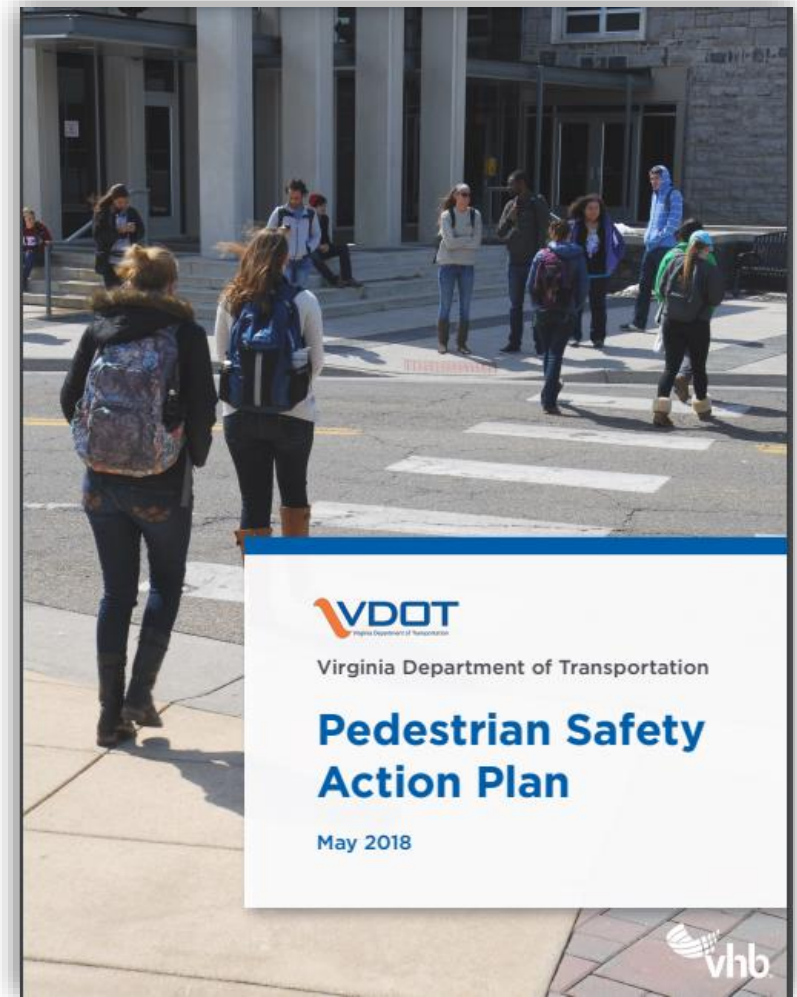
Spot Projects



\$144M Investment

Pedestrian Safety Action Plan (PSAP)

- Focus on pedestrian safety with VDOT Policy Recommendations
- Predictive safety analysis to determine which specific road locations pose the greatest risk for pedestrians
- Pedestrian safety countermeasure toolbox
- PSAP map that shows locations with highest risk for vulnerable users



2019 National Roadway Safety Awards

PSAP - Priority Corridor Criteria

- Annual average daily traffic (AADT)
- Zero-vehicle households
- Health Opportunity Index (HOI)
- Transit access
- Population density
- Employment density
- Pedestrian crash history
- Posted speed limit
- Proximity to a school
- Proximity to a park
- Roadway geometry
- Urban/rural context

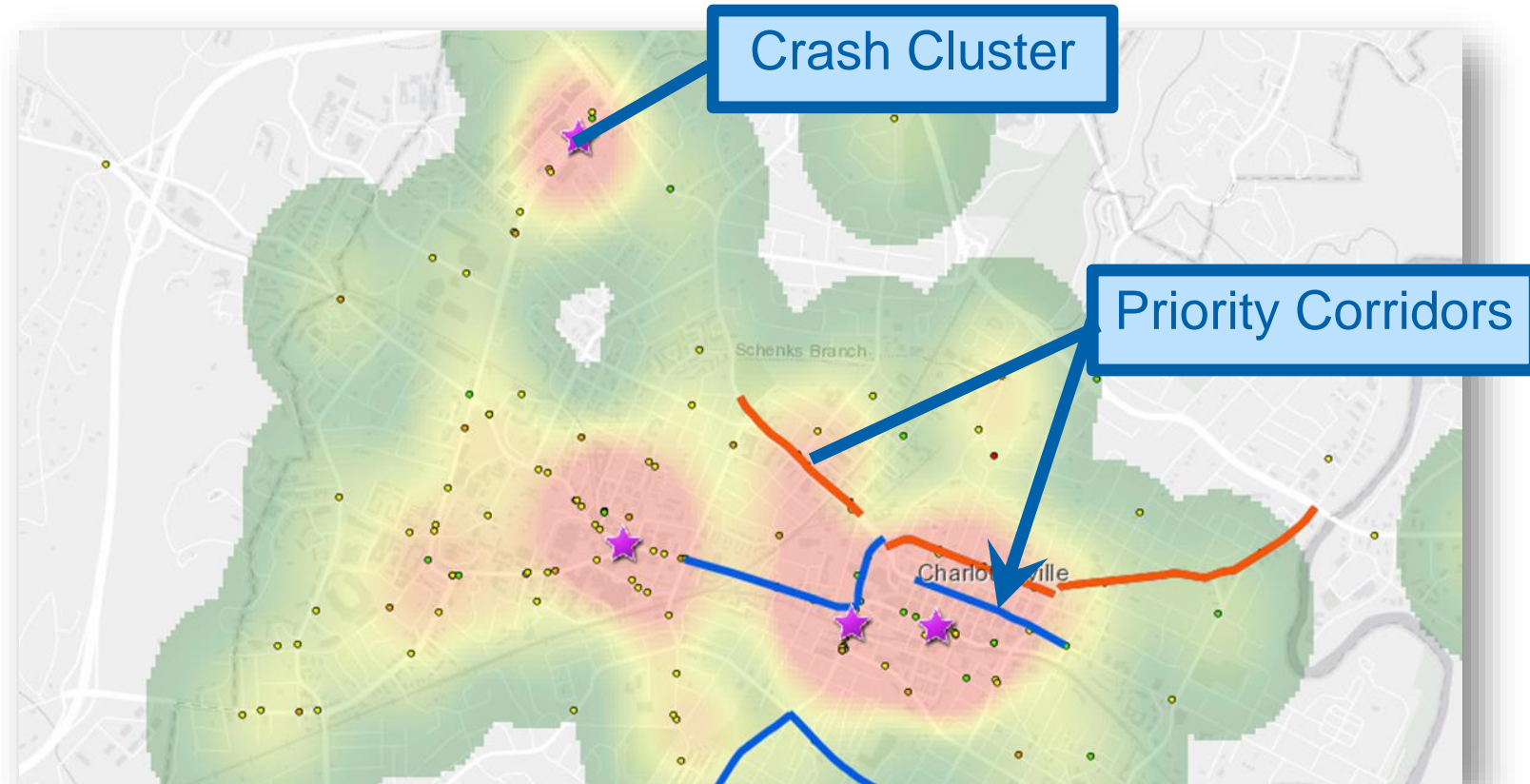
PSAP Crash Clusters and Priority Corridors

Crash Clusters

- Density map of actual crash locations
- Look back

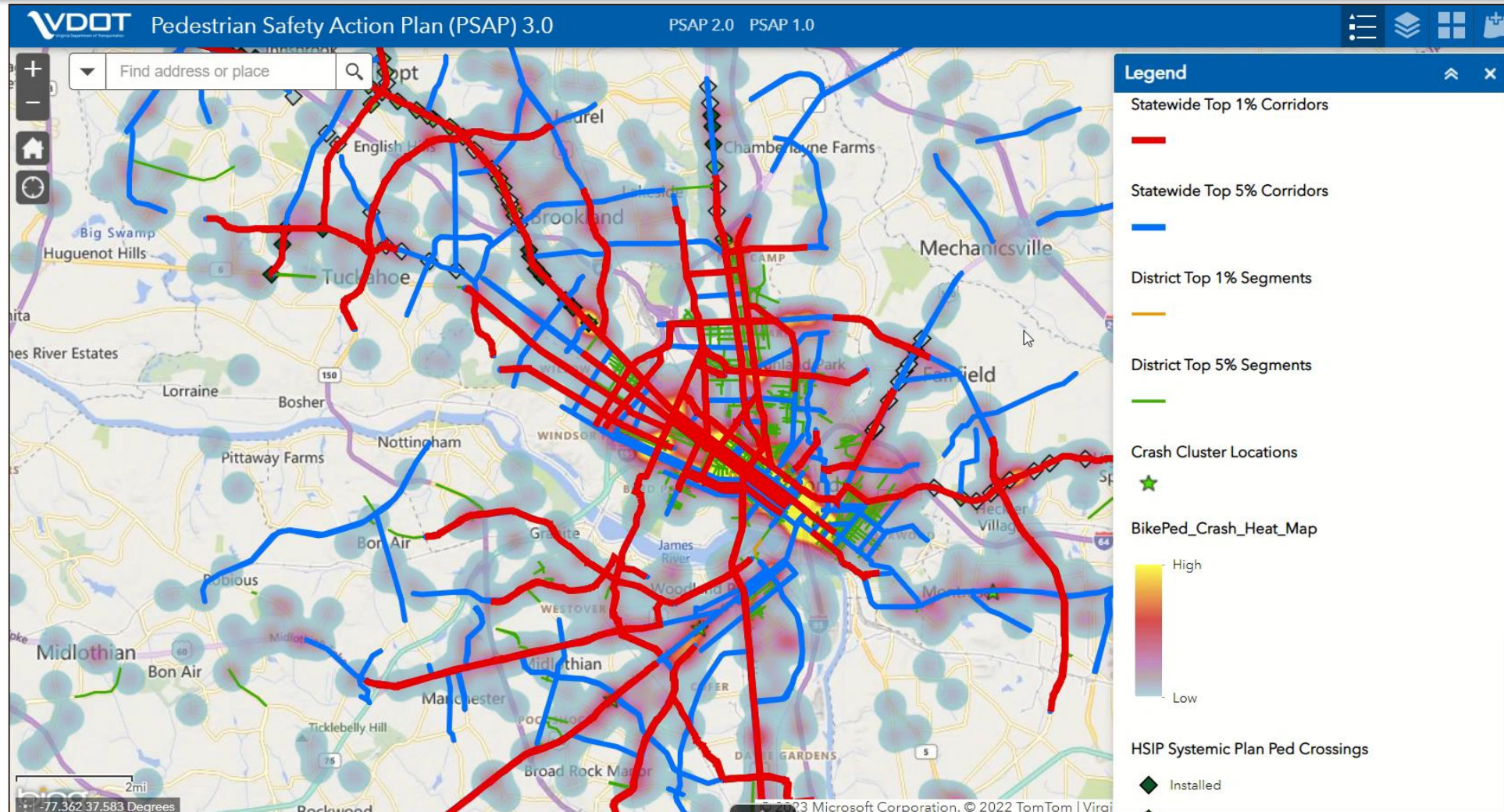
Priority Corridors

- Top ranked corridors based on scoring criteria indicating pedestrian presence or risk
- Predictive



bit.ly/VDOTPSAP

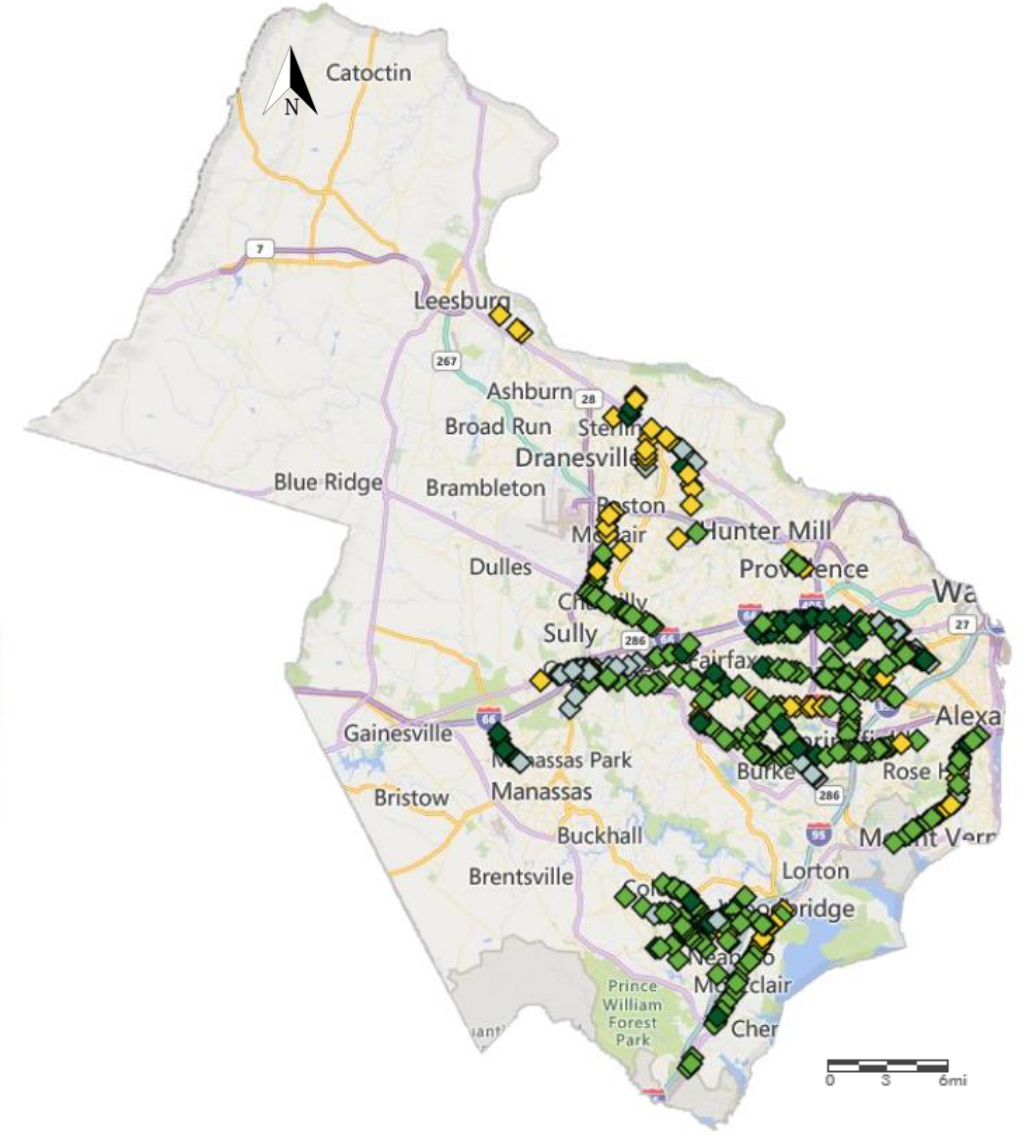
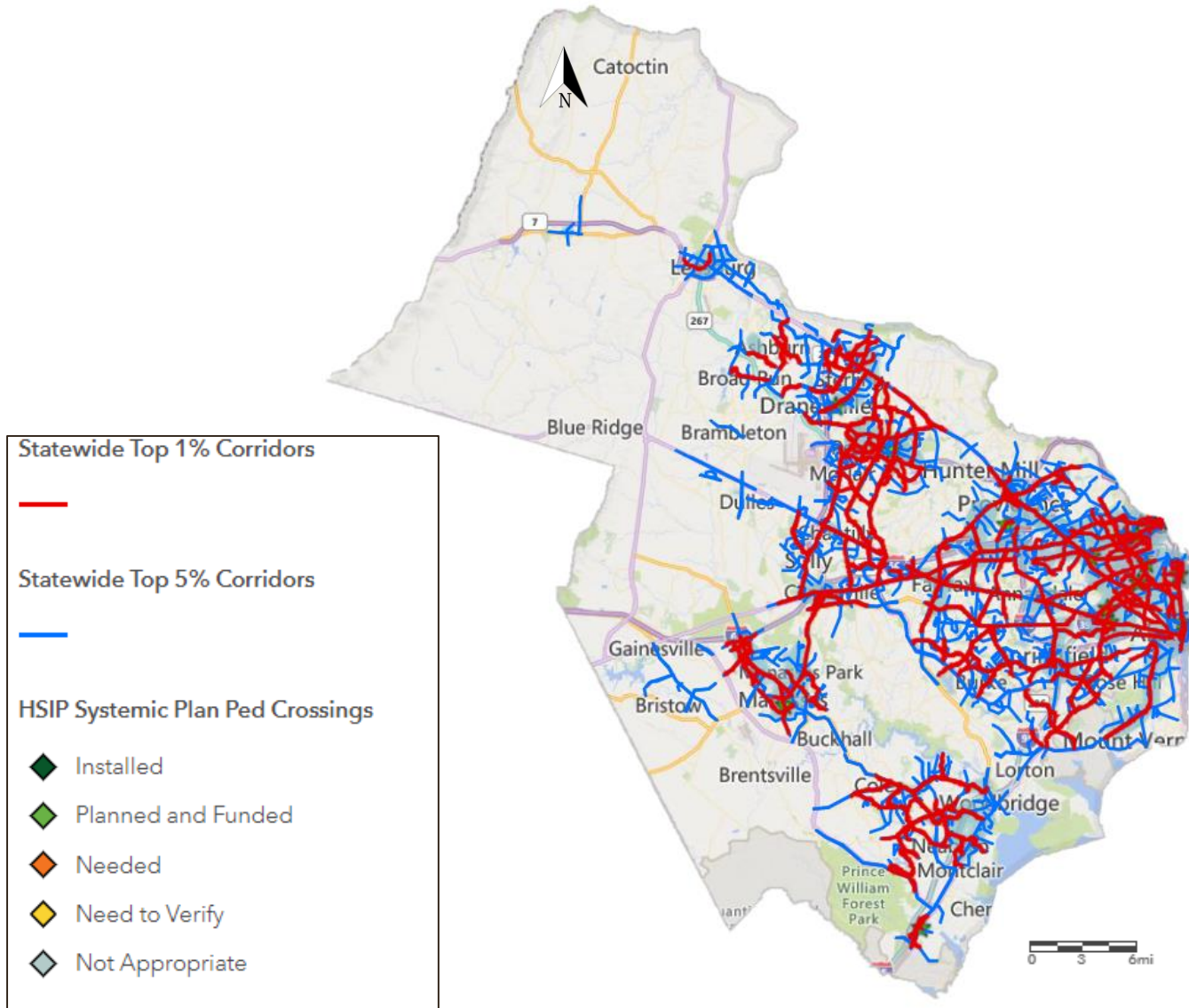
PSAP 3 Statewide Top Priority Corridors Map



bit.ly/VDOTPSAP

PSAP Top Priority Corridors Northern Virginia District

HSIP Pedestrian Crossing Systemic Plan Northern Virginia District



Safety Data Analysis for VDOT Highway Safety Improvement

Questions?