
VIRGINIA HIGHWAY SAFETY PROGRAMS INVESTMENT PROGRESS UPDATE

Commonwealth Transportation Board

Mark A. Cole, PE
State Traffic Operations Engineer

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Purpose of Presentation

The purpose of this presentation is to provide an update on the Virginia Highway Safety Improvement Program (VHSIP) and an associated status update on the current VHSIP Strategy and Infrastructure Investment Plan.

The presentation provides a foundation for future updates to the VHSIP Investment Strategy that will be adopted by the CTB.

Outline

- 1. Virginia Highway Safety Improvement Program**
- 2. Project Types, Funding and Implementation Progress**
- 3. Completed Project Benefits**
- 4. Next Steps**

Virginia Highway Safety Program (VHSIP)

Purpose

- Established by § 33.2-373 for the CTB to direct strategies to reduce fatalities and severe injuries for all roadway users on state and local highways.
- Funded through federal and state safety set-aside funds (§ 33.2-358) and certain automated speed enforcement traffic-fine revenues (§ 46.2-882.1.)

Funding Allocation by Code (Average Annual Total Funding \$103.7M)

- At least 54% – Infrastructure safety projects addressing hazardous locations or features.
- At least 29% – Strategies and programs targeting behavioral causes of severe crashes.
- Remaining funds – Other eligible safety purposes consistent with the CTB's investment strategy.

VHSIP Infrastructure Investment Strategy

- The VHSIP Investment Strategy was last updated in September 2022
- The CTB directed:
 - Safety funds (federal + state) to be split **between locally maintained roads and VDOT roads based on fatality proportions.**
 - Funding should **first prioritize low-cost, systemic safety treatments** across the network because they deliver higher returns on investment.
 - **High-benefit spot and corridor projects** may be added after the initial systemic rollout.
 - **Progress and performance** must be tracked and reported, along with any recommended adjustments to the strategy.

Federal Programs' Requirements

§ 148. Highway Safety Improvement Program

- VDOT leads development of 5-year Strategic Highway Safety Plan (SHSP)
- Data driven identification of locations with potential for safety improvement
- Prioritize investments on expected benefits and evaluate effectiveness
- Eligible categories of projects include: Traffic control (signals, signs, markings); shoulder widening, rumble strips and guardrails; intersections and curve improvements; pedestrian and bicyclist accommodations; lighting
- Average annual VHSIP Federal funding \$82.5M since 2020
- Annual Reporting: HSIP process and projects obligations; project benefits; safety targets; safety performance by roadway class; Special Rule compliance
- Federal program administered as part of state program (VHSIP)

Federal Programs

§ 148. Highway Safety Improvement Program – Special Rules

- **High-Risk Rural Roads:** If rural road fatality rate rises over the past 2 years
 - Virginia triggered in FY25; set-aside: \$4.6M
- **Vulnerable Road Users:** If VRU fatalities are $\geq 15\%$ of total annual fatalities
 - Virginia triggered in FY25; obligated \$14.2M (16%) for VRU projects
- **Older Drivers & Pedestrians:** If fatalities/serious injuries per capita for those 65+ increase over 2 years
 - Virginia did not trigger in FY25 – requires SHSP to have actions to address

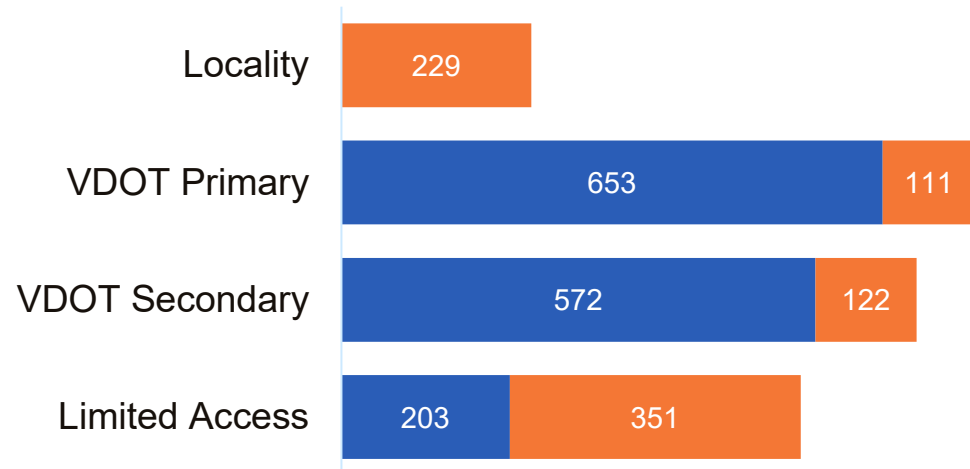
* VRU are pedestrians and bicyclists

FHWA Rail Grade Crossing Program (Section 130)

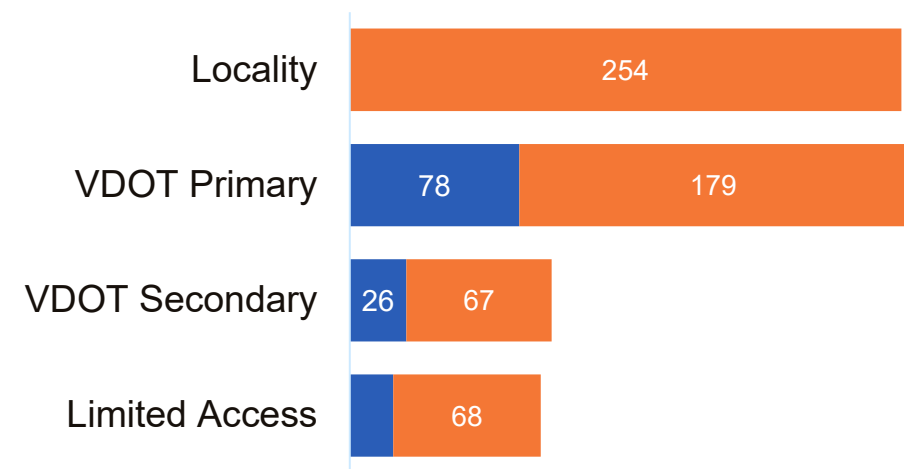
- State is required to maintain inventory of railroad crossing elements
- Identify crossings that require separation, relocation, or warning devices.
- Virginia receives \$4.8M each year
- Range of project cost: \$100K-\$330K.
- Focus on low-cost safety upgrades: lights and gates; surface improvements; close crossings; upgrade signal systems

Virginia Crash Fatalities Summary by System (2021-25)

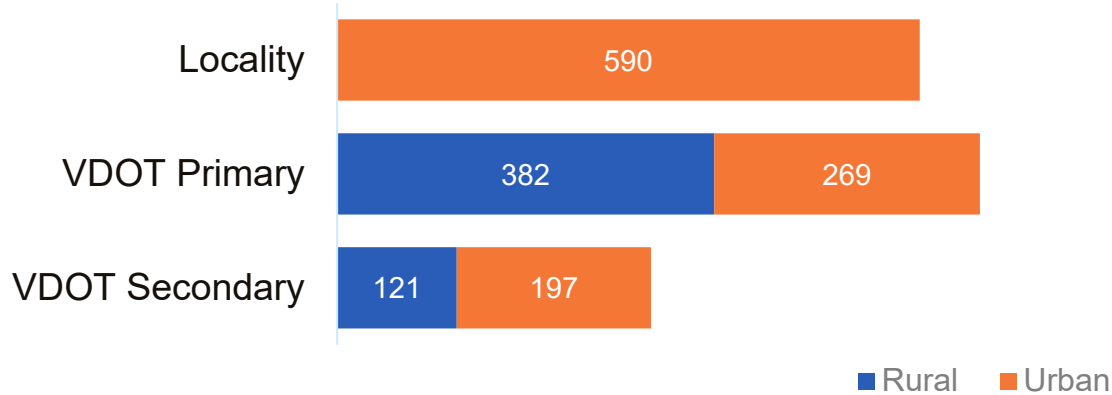
Roadway Departure



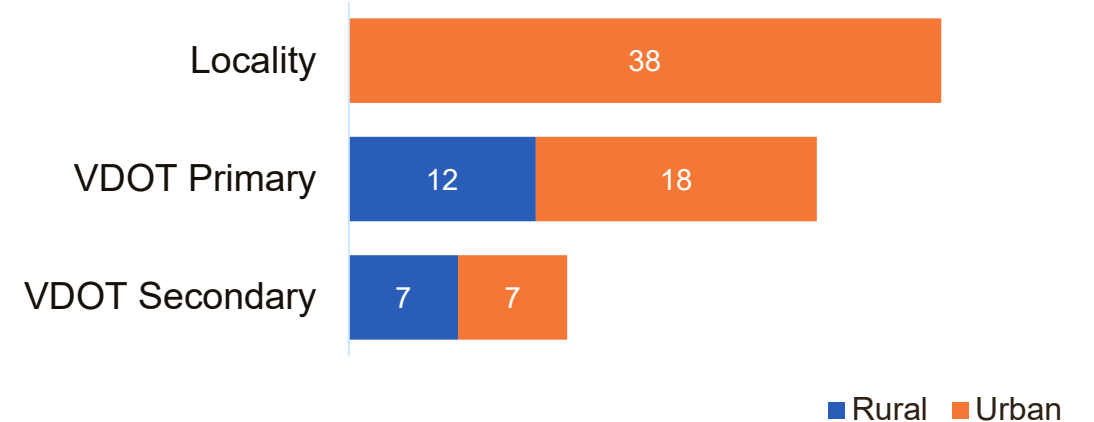
Pedestrian



Intersection




Bicyclist





Infrastructure and Operations in SHSP Emphasis Areas

SAFE ROAD USERS

-  Pedestrians
-  Bicyclists
-  Motorcyclists
-  Impaired Driving
-  Occupant Protection
-  Aging Road Users
-  Young Drivers

SAFE ROADS

-  Intersections
-  Roadway Departures

SAFE VEHICLES

-  CAV
-  Heavy Vehicles

SAFE SPEEDS

-  Speeding




POST-CRASH CARE

-  Emergency Response and Medical Services

SUPPORTING

-  Data & Analytics

Primary Responsibility

-  Engineering (VDOT)
-  Education (DMV, DOE, VDH & Others)
-  Enforcement & EMS* (VSP, VDH & Others)

Highway Safety Infrastructure Project Types

- Lower-cost / high-benefit safety countermeasures deployed at multiple higher-risk locations to address a particular crash type.
- Typical costs range from \$10,000 to \$150,000 per treated location.

Systemic



- Combination of mid-cost roadway and systemic items installed on corridors
- For example, Shoulder Widening with Rumble Strips cost \$0.5 to \$1.0 Million per mile range.

Hybrid



- Deploys safety countermeasure(s) at a single location or spot on a highway.
- Costs can vary widely but are generally in the \$0.5 to \$10 Million range.

Spot



Effectiveness of Safety Infrastructure Project Types

Based on an analysis of project types, the approximate cost to reduce a fatal or serious injury crash is:

- **Systemic Project - \$13M**
- **Hybrid Project - \$24M**
- **Spot Project - \$827M**

Systemic projects are up to 64 times more cost effective than spot projects!

VDOT VHSIP Infrastructure Funding Strategy (Phase I & II)

Existing Budget + Projected Funding (Phase I & II)

Legend:


PE	PE & CN	CN
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Countermeasures	HSIP Funding Through FY 32 (\$M)	Planned Locations (# or Miles)	Delivery Complete (%)	Prv	FY 27	FY 28	FY 29	FY 30	FY 31	FY 32
Phase I Original Systemic Plan (2020)										
High-Visibility Backplates (VDOT)	14.4	3,032 Intersections	100%							
Flashing Yellow Arrows (VDOT)	10.8	1,144 Intersections	100%							
Curve Delineation (VDOT)	14.9	1,486 Curves	100%							
Unsignalized Intersection (VDOT)	16.3	1,512 Intersections	100%							
Pedestrian Crossings (VDOT)	26.5	441 Crossings	95%							
Shoulder Wedge (VDOT)	Maintenance funds	27,070 Miles	9%							
Centerline Rumbles - Primaries (VDOT)	7.8	1,890 Miles	65%							
Edge Rumbles - Primaries (VDOT)	25.2	2,617 Miles	55%							
Total	115.9									
Phase II Systemic Plan (2022)										
Local Systemic Projects (Urban)	121.5	85 UPC's Various	25% in CN							
Expanded Flashing Yellow Arrows (VDOT)	10.0	144 Intersections	88%							
Expanded Pedestrian Crossings (VDOT)	21.1	179 Crossings	59%							
Two-Lane Rural Roads (VDOT)- TLRR	91.4	2810 Miles	25%							
TLRR (VDOT) - Shoulder Widen + Rumbles	58.5	104 Miles	50% in CN							
Spot Projects (VDOT)	152.7	59 UPC's Various	73% in CN							
Total	455.2									
Grand Total	571.1									

VHSIP Phase I Status

Completed 2021

High-visibility Backplates



100% Completed
(3,032 intersections)

Up to 15% crash reduction

Completed 2021

Flashing Yellow Arrow



100% Completed
(1,144 intersections)

Up to 20% crash reduction

Completed 2024

Curve Signs




100% Completed
(1,486 curves)

Up to 40% crash reduction

Completed 2024

Unsignalized Intersections



100% Completed
(1,512 intersections)

Up to 10% crash reduction

Complete By 2026

Pedestrian Crossings




95% Completed
(419 crossings)

Up to 56% crash reduction

Resurfacing Cycle -15Yr

Shoulder Wedge



8.7% Complete
(2,346 miles)

Up to 20% crash reduction

Complete By 2030

Centerline Rumble Strips



65% Completed
(1,232 miles)

Up to 60% crash reduction

Complete By 2030

Edgeline Rumble Strips



55% Completed
(1,438 miles)

Up to 50% crash reduction

VHSIP Phase II Status

Expanded FYA
Complete By 2026



Existing

89% Complete
(141 intersections)



Up to 10 to 20% Crash Reduction

Expanded Ped Xing
Completed By 2028



58% Complete
(105 Crossings)



Up to 56% Crash Reduction

Two Lane Rural Road
Completed By 2028



25% Complete
(514 miles)

Multiple Improvement

Rumble Strips – Initial Crash Reductions

\$14.3 Million spent to date

Centerline

Crash Type/
% Change

All
-4.2%

RwD
-0.1%

RwDF+Inj
-4.0%

HO-SSO
-23.9%

Edgeline

Crash Type/
% Change

All
-24.1%

RwD
-29.6%

RwDF+Inj
-40.1%

Note: RwD= Roadway Departure Crashes; HO-SSO= Head-On and Sideswipe Opposite Direction Crashes
F= Fatality; Inj= Serious to Possible Injury

Three-year Post-Installation Crash Analysis

Centerline (CLRS) = 894 miles
Edgeline (ELRS) = 824 miles

Approximate **Annual** Number of crash savings:

- Fatal and Injury Crash Reduction: **42**
- CLRS Head On Crash Reduction: **12**
- ELRS Road Departure Total Crashes: **49**
- ELRS Road Departure Fatal and Injury: **25**

**Originally Predicted
Benefit-Cost Ratio: 30 - 40**

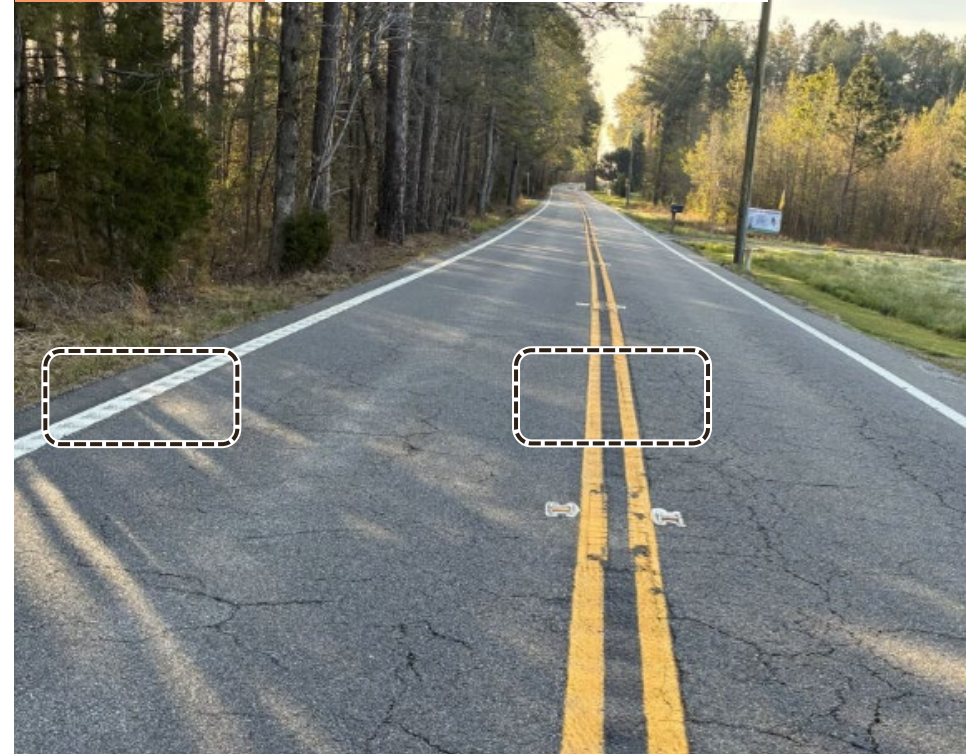
Actual B/C Ratio to date: 52

Rumble Strips Example

Before 9 Crashes/Year



After 0 Crashes/Year



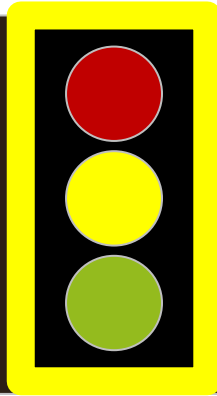
Installed CLRS and ELRS
US Rte 33, Richmond

Flashing Yellow Arrow and High-Visibility Backplates - Initial Crash Reductions

\$24.0 Million spent to date

HVSB

Crash Type/
% Change



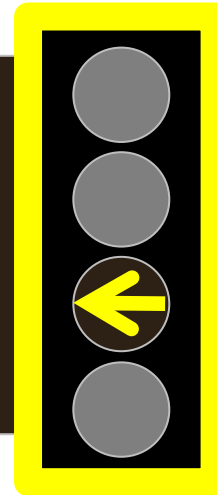
All
-3.8%

F + Inj
-16%

Rear End
-16.1%

FYA+HVSB

Crash Type/
% Change



All
-4.9%

F + Inj
-6.3%

Rear End
-9.1%

Angle
-4.8%

Three-year Post-Installation Crash Analysis

High-Visibility Backplates (HVSB) = 1,320
Flashing Yellow Arrow (FYA) = 689

Approximate **Annual** Number of crash savings:

- Fatal & Injury Crash Reduction: **498**
- Rear End Crash Reduction: **715**

**Originally Predicted
Benefit-Cost Ratio: 9 - 13**

Actual B/C Ratio to date: 179

Flashing Yellow and High Visibility Backplates Example

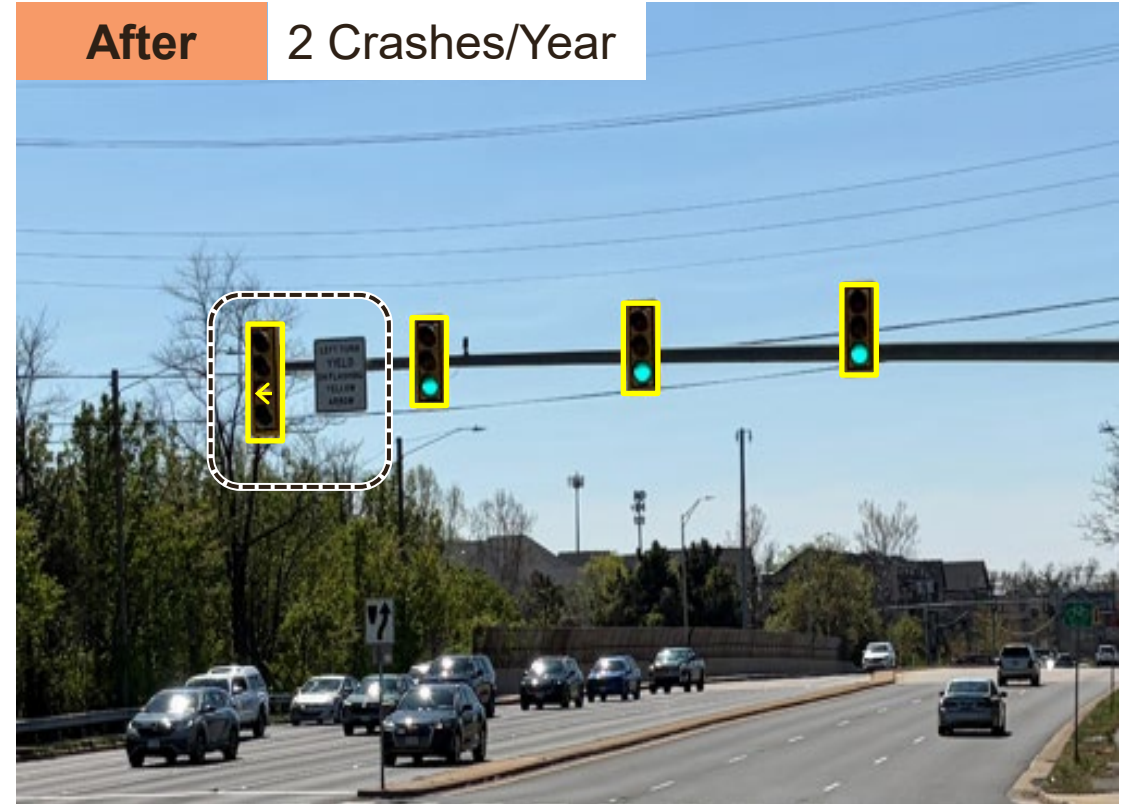
Before

9 Crashes/Year



After

2 Crashes/Year



Installed FYA and HVSB

West Ox Rd & Fair Lakes Pkwy, Northern Virginia

Unsignalized Intersections – Initial Crash Reductions



FSI
-32.7%

\$12.3 Million spent to date

Two-year Post-Installation Crash Analysis

Intersections = 1,135

All
-23.4%

Rear End
-30.0%

Angle
-23.0%

Head-On
-19.5%

Approximate **Annual** Number of crash savings:

- Total Crash Reduction: **50**
- Fatal and Serious Injury Crash Reduction: **12**

Originally Predicted
Benefit-Cost Ratio: **1.3**

Actual B/C Ratio to date:
3.4

F + Inj
-13.0%



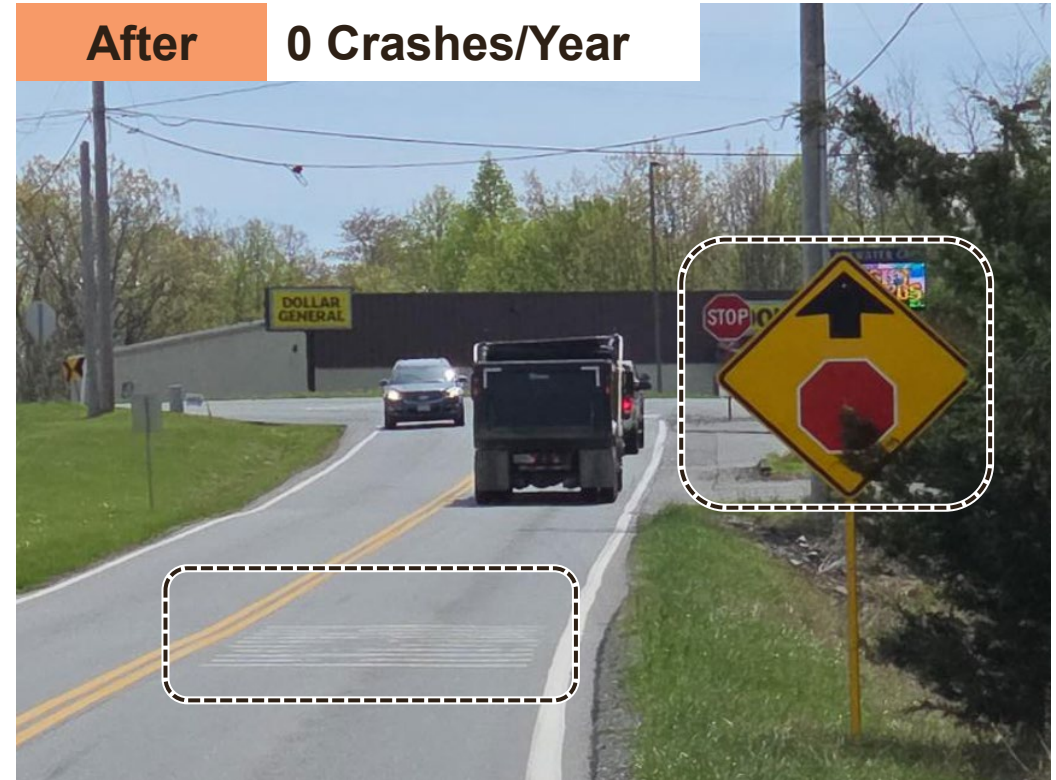
Note: F= Fatality; SI= Serious Injury,
Inj = Serious to Possible Injury

Unsignalized Intersection Example

Before 2 Crashes/Year



After 0 Crashes/Year



Two-way to all-way conversion
Bluewater Dr & Scruggs Rd, Salem

Curve Delineation – Initial Crash Reductions

Two-year Post-Installation Crash Analysis

Curves = 576

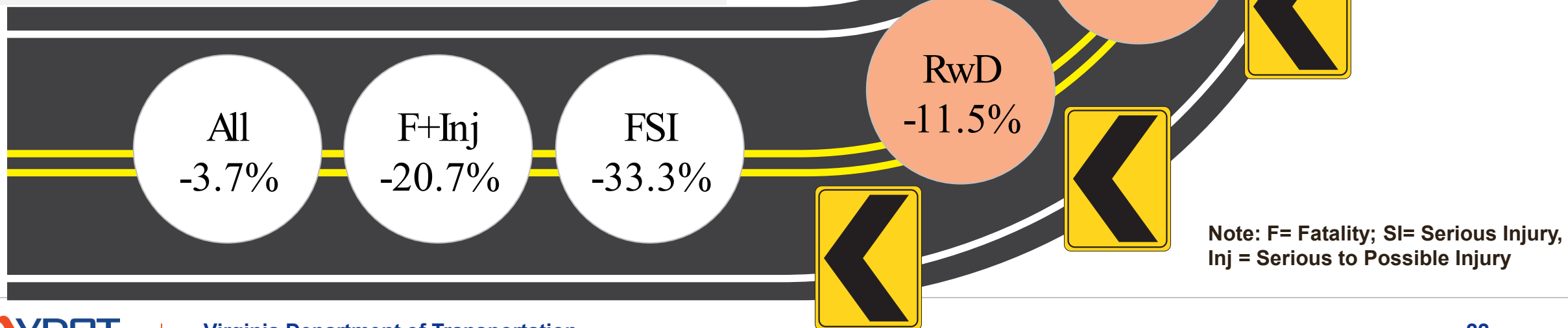
Approximate **Annual** Number of crash savings:

- Fatal and Injury Crash Reduction: **38**
- Fatal and Serious Injury Crash Reduction: **8**

Originally Predicted Benefit-Cost Ratio: 1.7

Actual B/C Ratio to date: 11.5

\$14.7 Million spent to date



Note: F= Fatality; SI= Serious Injury, Inj = Serious to Possible Injury

Curve Delineation



Installed Additional Chevrons
SR 122 NB, Salem

Virginia Highway Safety Investment Plan – Next Steps

- Identify countermeasures and update highway safety investment plan
- Program VDOT and DMV projects based on updated investment plan
- Invite Urban Localities to submit complimentary projects

- Upcoming CTB Highway Safety Topics (May and beyond):
 - May/June - 2027 Federal Safety Targets Adoption
 - Summer - Crash data root cause analysis discussions
 - Summer/Fall – Approve updated highway safety investment plan
 - Fall - Strategic Highway Safety Plan Update