PEDESTRIAN & BICYCLIST
FOCUSED APPROACH TO SAFETY

Evaluating Pedestrian and Bicyclist Safety Improvements

Thursday, September 8, 2022

U.S. Department of Transportation
Federal Highway Administration

ZERO IS OUR GOAL
A SAFE SYSTEM IS HOW WE GET THERE

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Webinar Logistics

- Please post questions at any time
- We will be saving time at the end of the session for questions and discussion
- Webinar slides and recording will be posted at https://www.pedbikeinfo.org/webinars/webinar_details.cfm?id=120

Continuing Education Credits

- Webinar approved for 1.5 CM credits through AICP
- Link to evaluation and certificate of attendance
- Certificates of Attendance can be requested following this webinar

Agenda

- Introduction and Welcome (Elliott Moore, FHWA)
- Agency Case Studies:
  - Virginia Department of Transportation (Stephen Read)
  - San Francisco Municipal Transportation Agency (Brian Liang)
- Discussion

Webinar Objectives

- Understand the importance and value in safety evaluation.
- Identify key sources of data that can be used to evaluate projects.
- Learn from transportation agencies about their efforts to measure project impact.

Panelist Introductions

- Elliott Moore, Federal Highway Administration
- Stephen Read, Virginia Department of Transportation
- Brian Liang, San Francisco Municipal Transportation Agency

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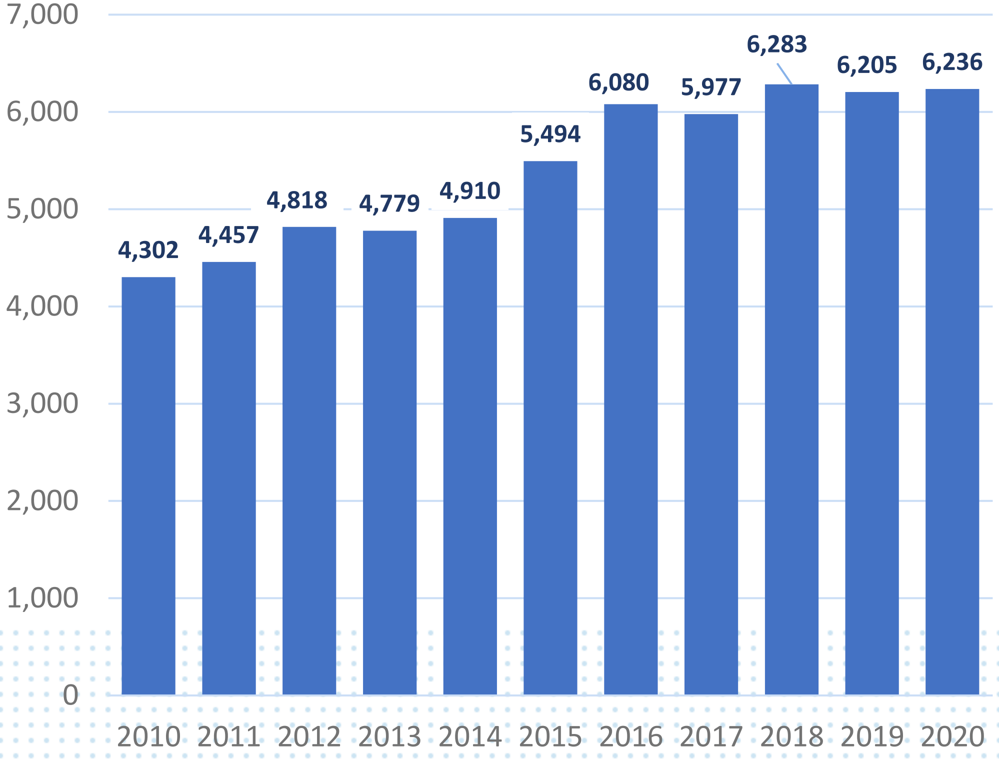
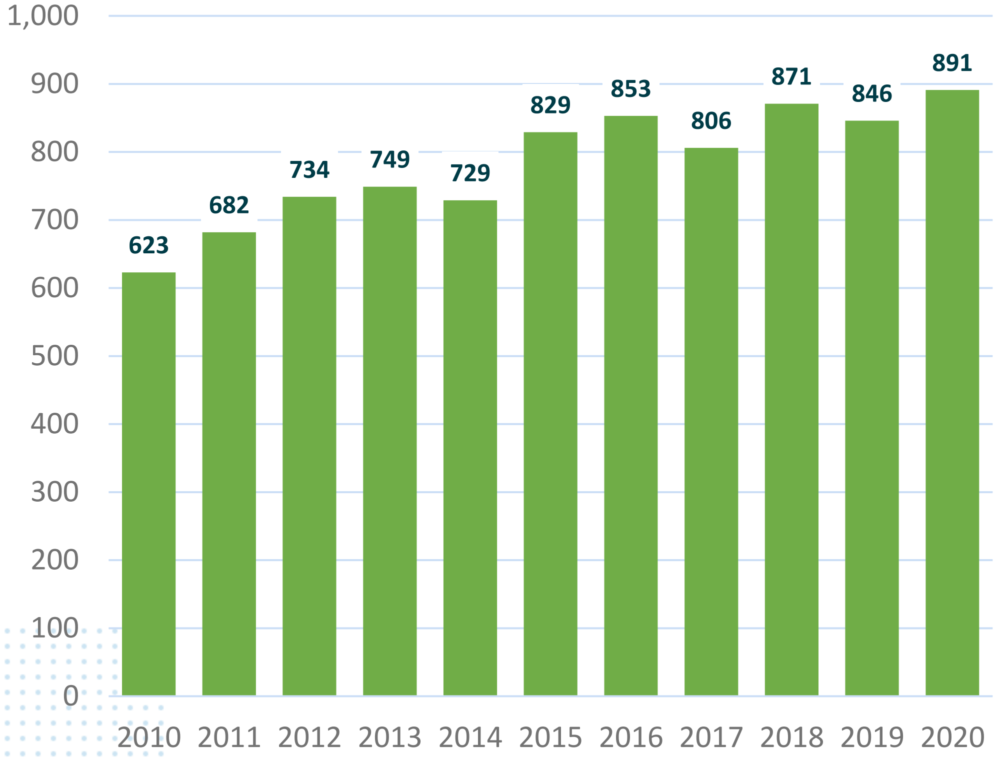
Evaluation of Ped/Bike Improvements

Why this matters…

Total US Pedestrian Fatalities
2010-2020

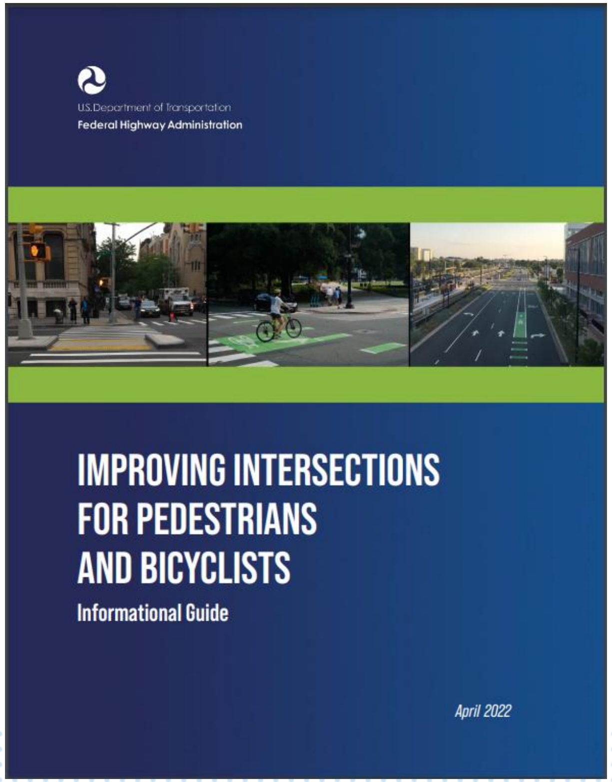


Total US Bicyclist Fatalities
2010-2020



Source: NHTSA

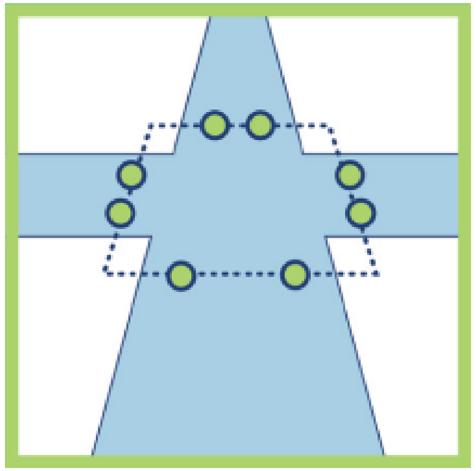
New Resource!



“The purpose of this guide is to inform the state of the practice concerning intersection planning and design to implement solutions that help achieve the goal for zero fatalities and serious injuries while also making roads better places for walking and bicycling.”

Improving Intersections for Peds & Bikes

Expect Pedestrians and Bicyclists at All Intersections



Use a Safe System Approach

Provide Access for All Ages and Abilities

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Improving Intersections for Peds & Bikes

Assessment Techniques:

- TRB Highway Capacity Manual (HCM)
- AASHTO Highway Safety Manual (HSM)
- FHWA Safe System for Intersections (SSI) method
- NCHRP Report 948 Design Flag Assessment technique

Improving Intersections for Peds & Bikes

Condition	Description	Assessment Technique
Uncontrolled crossings; Multilane crossings	For pedestrians and bicyclists, risk of crash harm is higher and convenience and comfort are lower, at uncontrolled or multilane crossings, especially along higher speed or rural roads.	» The Design Flag Assessment includes a flag for "yield- or uncontrolled vehicle paths" and a flag for "multilane crossings" emphasizing consideration at multi-threat or high-speed crossings.
Crossing distance	Stop-controlled intersections with multiple through or turn lanes can lead to longer pedestrian and bicyclist crossing distances and greater exposure to traffic. Certain road users may need extended time to cross longer distances, further increasing exposure and stress for the user.	» The SSI method considers the number of through lanes crossed as a concern for pedestrian and bicyclist exposure. » Travel time data collection can be used to identify locations with long crossing distances.
Visibility of pathway and bikeway crossings	The mutual visibility among pedestrians, bicyclists and motor vehicle drivers is essential for effective yielding and stopping behaviors. Further, the need to identify and act upon gaps in traffic for uncontrolled crossings or alternating stop-and-go for controlled crossings makes sight distance and view angles critical.	» The Design Flag Assessment includes a flag for "Sight Distance for Gap Acceptance Movements"

Fact Sheets


Roundabouts
Median U-Turn Intersections
Restricted Crossing U-Turn Intersections
Quadrant Roadway (QR) Intersections
Displaced Left Turn (DLT) Intersections
Diverging Diamond Interchange (DDI)

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VIRGINIA'S EVALUATION OF PROJECT BENEFITS

Safety and SMART SCALE Vulnerable User Projects

Mark Cole, P.E. & Stephen Read, P.E.

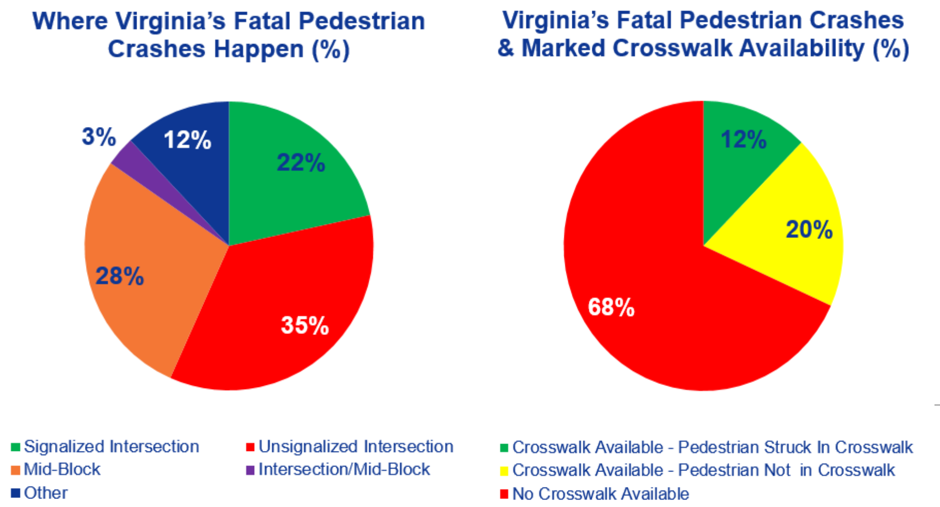
September 8th, 2022

Virginia Highway Safety Improvement Program

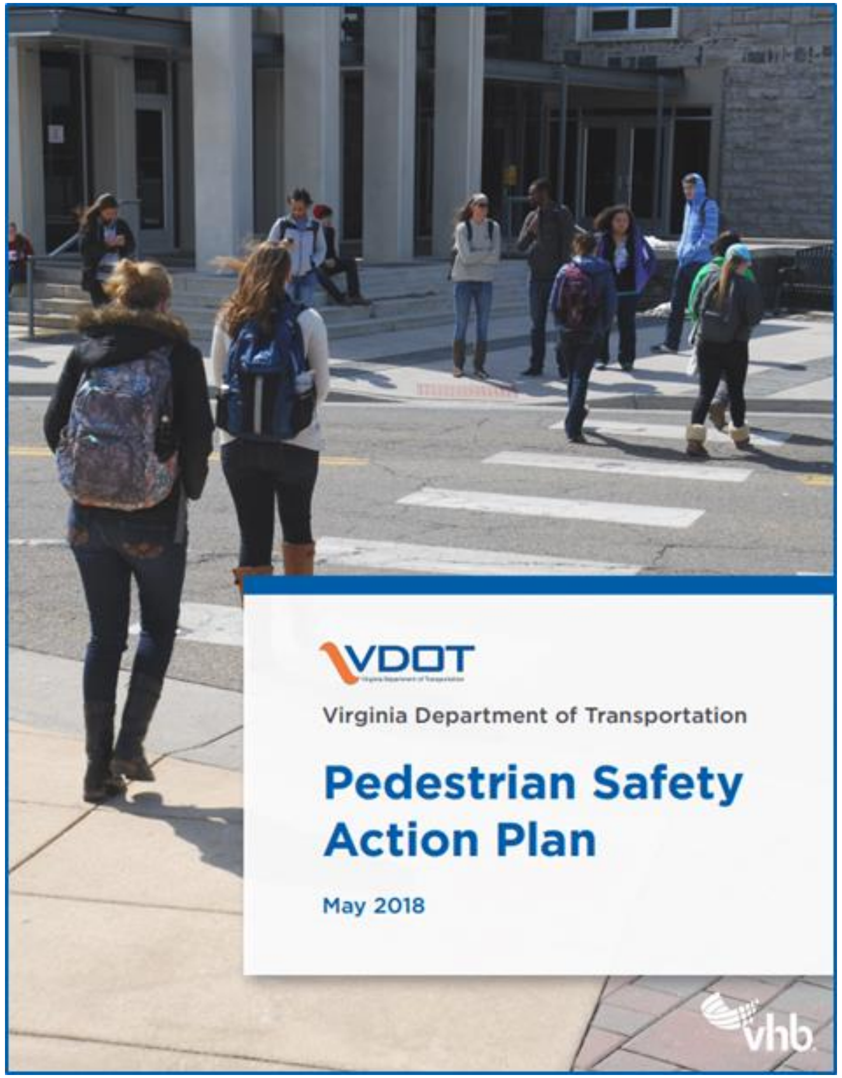
- **VDOT began bike/ped HSIP set aside in 2003 – fatalities per District (approx. 10%)**
- **Used risk and context based scoring**
- **Typically mix of roadway crossing and accommodations but mostly sidewalks and SUP**
- **Detailed review of ped crashes starting in 2016 revealed:**

Over 90% Of Ped Deaths Occur while Crossing the Road, and

Marked crosswalks not available most of the time



Virginia Pedestrian Safety Action Plan (PSAP)



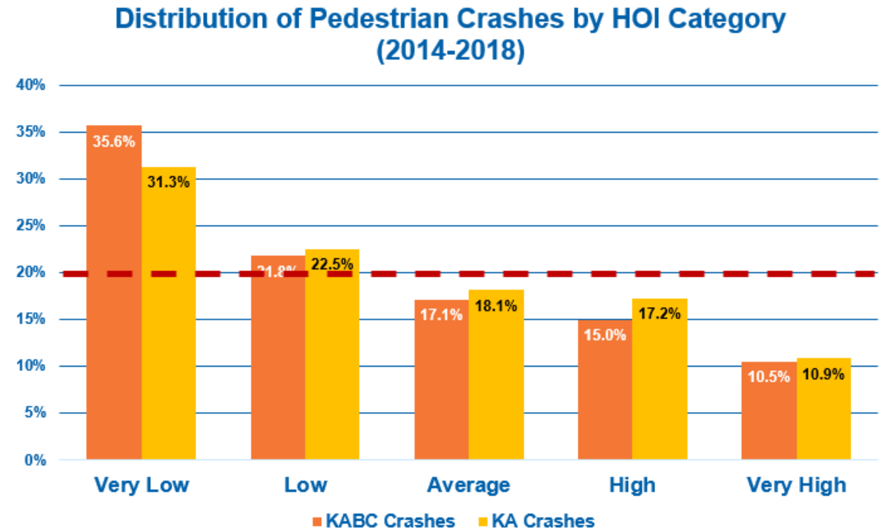
3 Major Components:

1 – VDOT Policy Recommendations to ensure pedestrian safety

2 – Safety Analysis to determine which specific road locations pose the greatest risk for pedestrians

3 – Pedestrian safety countermeasure toolbox

Almost 60% of deaths and injuries occur in locations with VERY LOW or LOW Virginia Health Opportunity Index



VDOT Pedestrian Safety Infrastructure Projects

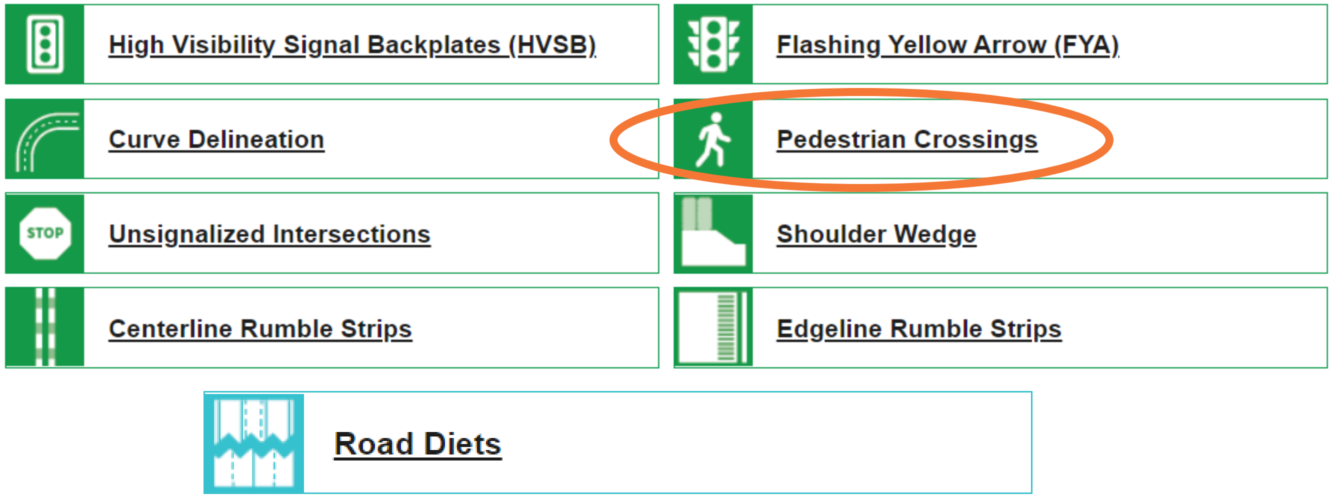
- **Fall 2019 – Systemic Plan Ped Crossings, Phase 1**
  - $34 Million approved for ped crossings at traffic signals on PSAP routes
  - Over 500 signals being evaluated for crossings
  - 2025 Completion date
  - Currently 17% complete

- **December 2021 – Systemic Ped Crossings, Phase 2**
  - $20 Million approved for up to 200 crossings
  - 2028 Completion Date

- **Fall 2022 – Locality Systemic Funding**
  - pedestrian crossings included
  - Road diets included

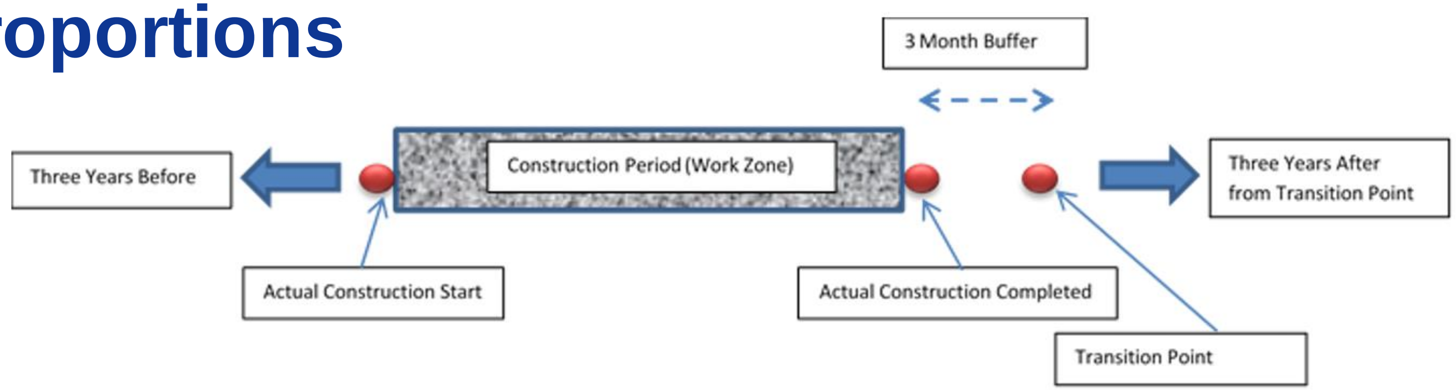
New HSIP Funding Strategy

- In 2019 our Trans. Board resolved that our VHSIP would be 80% systemic and 20% spot/corridor
- Essential 8 countermeasures include ped crossings; road diets were added for FY23
- Ped crossings on top 1% of PSAP corridors
- Additional state safety funds starting in FY22



VHSIP Evaluation of Project Benefits

- Updated simple B/A procedures in 2003 to report all project types
- Revised to include KABCO and determine total and targeted crash benefits
- In 2017, began compiling systemic treatment locations and conducting targeted crash B/A
- Treated locations/corridor and system-wide analysis with shift in target crash proportions



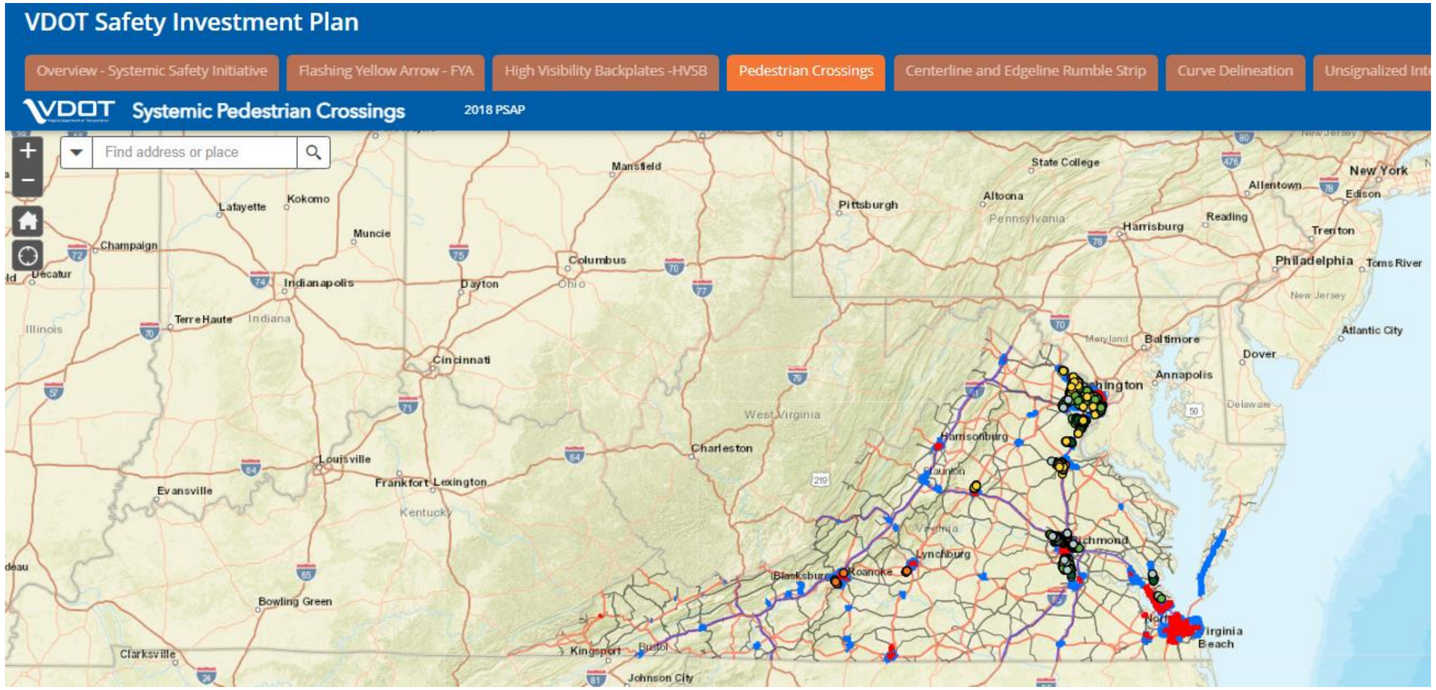
Traditional Benefit Analysis

Co-mingled bike/ped improvements can be difficult to parse out

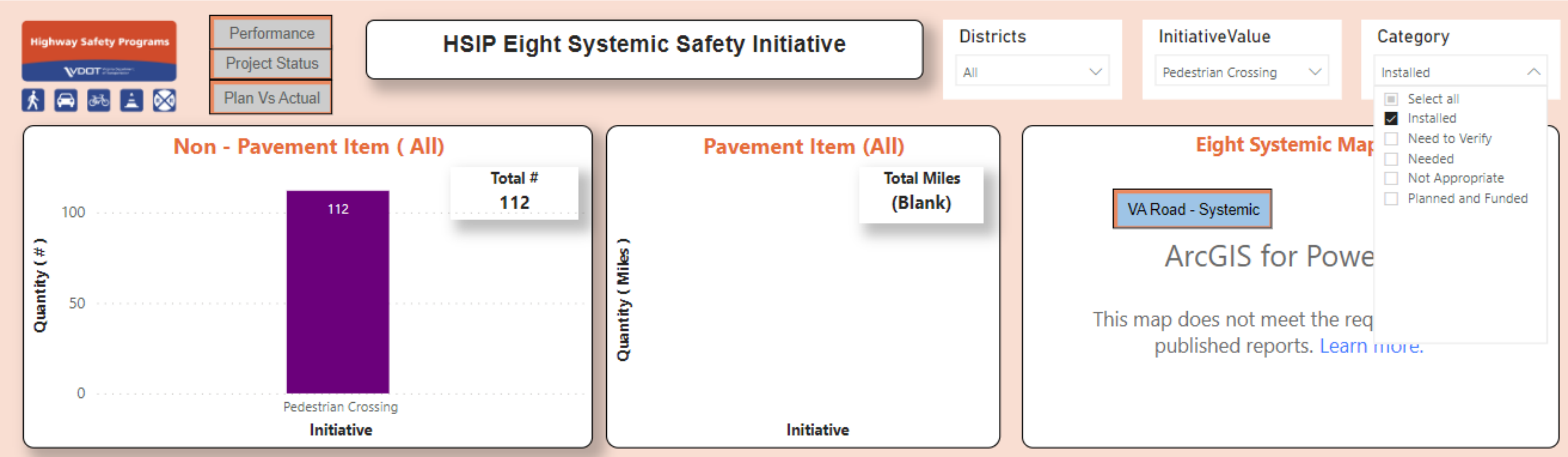
	A	B	C	D	F	G	H	I	J	K	L	M	N	O
1	Project evaluation data for completed projects (CY 2018)													
2					PROJECT INFO									
3	Location	ArcGIS In	District	Various	Analysis Months	CN END BUFFER	BEFORE		Actual CN Started	Actual CN Completed	AFTER		Functional Class	description
11	51845	109325161	Fredericksburg		36	3	5/2/2013	5/2/2016	05/02/2016	01/26/2018	4/26/2018	4/26/2021	URBAN MINOR ARTERIA	INTERSECTION IMPROVEMENTS - RTE 620 & RTE 1
12	107098		Fredericksburg	Fredericksburg - Districtwide	36	3	3/15/2015	3/15/2018	03/15/2018	08/20/2018	11/20/2018	11/20/2021	Major Collector	ROADWAY DEPARTURE COUNTERMEASURES-DISTRICTWIDE
13	104337	456,275.00	Hampton Roads		36	3	4/3/2015	4/3/2018	04/03/2018	11/09/2018	2/9/2019	2/9/2022	Other Principal Arterial	Int.Safety Improvements – Rte 143 at F-137 and I-64 Exit 238
14	108312		Hampton Roads	Adaptive Signal Controlers - District Wide	36	3	7/31/2014	7/31/2017	07/31/2017	08/20/2018	11/20/2018	11/20/2021	Other Principal Arterial	Adaptive Capable Signal Controlers
19	109701		Lynchburg	Citywide- Various	36	3	9/20/2015	9/20/2018	09/20/2018	10/25/2018	1/25/2019	1/25/2022	Other Principal Arterial	CITYWIDE - INSTALL FLASHING ARROWS AND SIGNAL HEADS
22	111316	113588817	Lynchburg		36	3	8/28/2015	8/28/2018	08/28/2018	10/23/2018	1/23/2019	1/23/2022	Other Principal Arterial	RTE 29 - INSTALL DYNAMIC FLASHING LIGHT SYSTEM AT RTE 699
25	96751		Northern Virginia		36	3	9/18/2014	9/18/2017	09/18/2017	05/30/2018	8/30/2018	8/30/2021	Other Principal Arterial	Install Curb & Gutter, Sidewalk and Upgrade Signal on US 50
26	100634	101078101	Northern Virginia		36	3	9/18/2014	9/18/2017	09/18/2017	10/11/2018	1/11/2019	1/11/2022	Other Principal Arterial	Custis Trail and W&OD Trail Safety Improvements
27	100640	100258103	Northern Virginia		36	3	9/18/2014	9/18/2017	09/18/2017	04/17/2018	7/17/2018	7/17/2021	Other Principal Arterial	Redesign intersection of Arlington Blvd and Manchester
28	96750		Northern Virginia		36	3	9/5/2014	9/5/2017	09/05/2017	04/17/2018	7/17/2018	7/17/2021	Other Principal Arterial	Install Curb & Gutter, Sidewalks and Upgrade Signal on US 50
29	100689	279508	Northern Virginia		36	3	9/25/2014	9/25/2017	09/25/2017	12/31/2018	3/31/2019	3/31/2022	URBAN LOCAL	ROOSEVELT ST ADD PED CROSSING AT SIGNALIZED INTERSECTION

Tracking Systemic with AGOL

Ped Crossing Tracking: Power BI and AGOL



- PBI driven by Sharepoint entered locations, and VDOT project management system



Project # for District Systemic Treatments

- **Tract treatment types by district, project, functional class, ownership, SHSP EA etc.**

	A	B	D	E	F	G	H
1	Required State-Defined Field (e.g. Federal or State project	Select from Dropdown	Select from Dropdown	Select from Dropdown - Improvement Category must be selected from Column D first to populate Improvement Subcategory selections	**Number of Crashes Before** - The sum of PDO Before, Fatal Before, Serious Injury Befor		
2	**Location**	**Functional Class**	**Improvement Category**	**Improvement Subcategory**	**PDO (Before)**	**Fatal (Before)**	**Serious Injury (Before)**
3	107066	Rural Principal Arterial (RPA) - Other	Roadway	Rumble strips – edge or shoulder	10	0	2
4	107072	Rural Principal Arterial (RPA) - Other	Roadway	Rumble strips – edge or shoulder	22	1	4
5	107123	Rural Principal Arterial (RPA) - Other	Roadway	Rumble strips – edge or shoulder	2	0	1
6	104110	Rural Minor Arterial	Roadway	Rumble strips – center	10	1	0
7	111424	Rural Principal Arterial (RPA) - Other	Intersection traffic control	Modify traffic signal – modernization/re	16	1	3
8	107012	Rural Principal Arterial (RPA) - Other	Roadway	Rumble strips – edge or shoulder	7	0	2
9	107014	Rural Principal Arterial (RPA) - Other	Roadway	Rumble strips – edge or shoulder	5	0	1
10	107015	Urban Principal Arterial (UPA) - Other	Roadway	Rumble strips – edge or shoulder	7	0	2
11	109593	Rural Minor Arterial	Roadway	Rumble strips – edge or shoulder	4	0	1

SMART SCALE (SS) Project Benefits

SMART SCALE
Funding the Right Transportation Projects in Virginia
www.vasmartscale.org

- SS prioritizes roadway, operational, multi-modal, and transit/rail project applications for Safety, Congestion, Accessibility, Land Use, Environmental and Economic Development measures.
- Ranking and funding is for last 2 years of 6 Year Improvement Program (SYIP)
- Safety scoring was initially based on Fatality and Serious Injury (SI) and F+SI rate reductions; now based on all injuries (weighted by KA,B,C costs)
- First based on most beneficial improvement and total crashes; now multiple improvements that may have targeted crashes – e.g., ped countdown signal and SUP improve VRU and vehicle safety.
- GIS Tool tracks: road segment and improvement CMFs, crashes, VMT before info

SMART SCALE Performance Based Planning Benefits

- Began pilot of assessing SCALE benefits for completed FY16 projects – over 150 projects per round
- VRU benefits are a component of many and primary improvement in some projects
- All crash report numbers are tracked so determining VRU benefits are possible
- Considering how to automate the benefit analysis based on the project scoring segmentation mapping and data

Thank you!

Follow-up:

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Mark.Cole@vdot.Virginia.gov

SFMTA

Safe Streets Evaluation Program

FHWA Pedestrian and Bicyclist Focused Approach to Safety

September 8, 2022

Brian Liang, Safe Streets Evaluation Program Manager

History of the Program

- Safe Streets Evaluation Program is part of the Livable Streets subdivision (SFMTA's Bike, Pedestrian, and Traffic Calming programs)
- Prior to the program, project evaluations and studies were rare, but a few one-off efforts existed
- Safe Streets Evaluation Program was initiated in 2018
  - Driven by the city's **Vision Zero policy**
- To date approximately 50 efforts (projects, programs, pilots, etc.) have been evaluated or are in the process of being evaluated by the Safe Streets Evaluation Program:
  - Capital Projects
  - Quick-Build Projects
  - Neighborhood-wide Traffic Calming Efforts
  - Left-Turn Traffic Calming Pilot
  - Slow Streets Program
  - AB 43 20 mph Initiative

Why Evaluate?

Inform opportunities to refine a project's design.

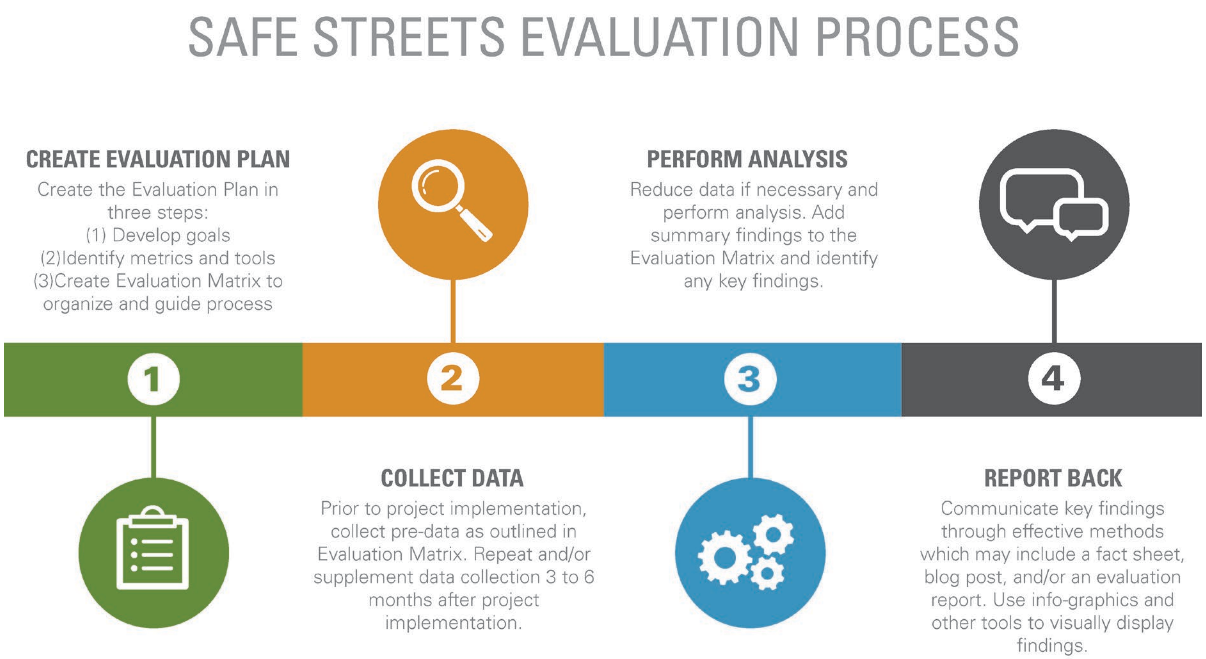
Communicate project effectiveness to the public, decision makers and other transportation professionals.

Support the use of design treatments at other locations.

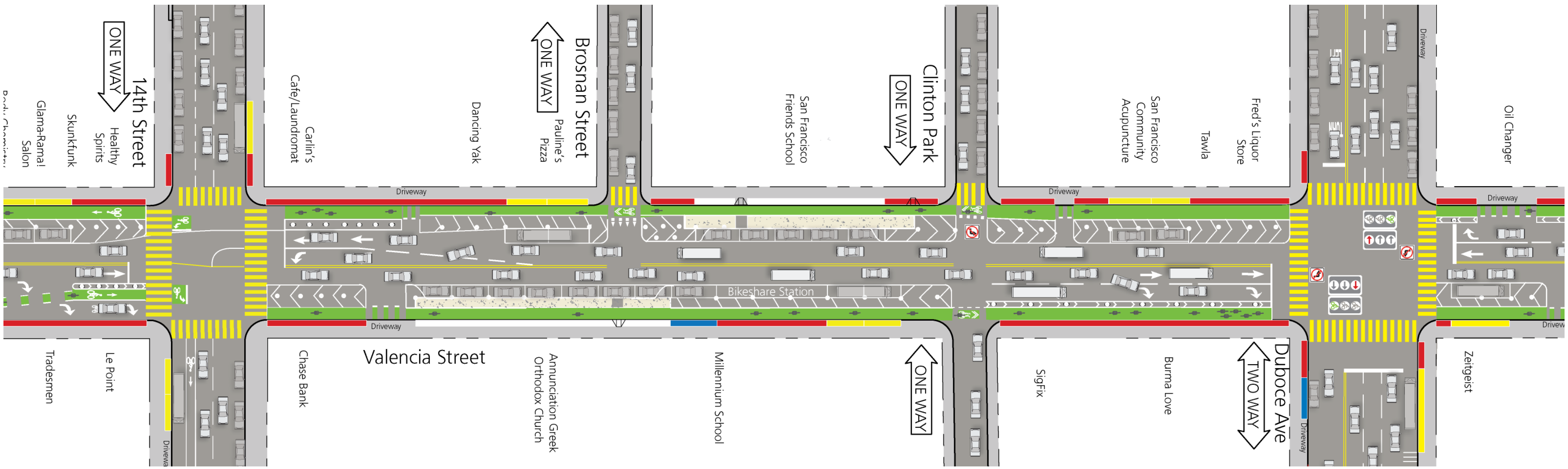
Streamline the design of future projects and track trends.

Process


July 2018
Safe Streets
Evaluation Handbook
VISION
ZERO
SF


SAFE STREETS EVALUATION PROCESS
CREATE EVALUATION PLAN
Create the Evaluation Plan in three steps:
(1) Develop goals
(2)Identify metrics and tools
(3)Create Evaluation Matrix to organize and guide process
1
COLLECT DATA
Prior to project implementation, collect pre-data as outlined in Evaluation Matrix. Repeat and/or supplement data collection 3 to 6 months after project implementation.
2
PERFORM ANALYSIS
Reduce data if necessary and perform analysis. Add summary findings to the Evaluation Matrix and identify any key findings.
3
REPORT BACK
Communicate key findings through effective methods which may include a fact sheet, blog post, and/or an evaluation report. Use info-graphics and other tools to visually display findings.
4

Example One – Northern Valencia Pilot



Safety issue	**Treatment installed**
Outdated bike facility, double parking, and dooring	Parking protected bikeways
Pedestrian visibility at intersections	Daylighting & advanced limit lines
Pedestrian/Bike conflicts	Loading islands w/ protective railing
Double parking and dooring	Increased loading zones
Intersection conflicts	Turn restrictions
Intersection safety and bicyclist visibility	Bike signal

Step 1 – Create Evaluation Plan

Safe Behavior..............................Are people behaving safely?

Effective Design .... Are the new design treatments effective?

Ease of Navigation.......................Are all street users able to travel easily?

Mobility...What are the mobility trends?

Perceived Safety & Comfort..........Do people feel safer?

Step 1 – Create Evaluation Plan

Safe Behavior	▪ Are vehicles continuing to block the bike? Type and duration? What about double parking? ▪ Will new design decrease conflicts, especially dooring and cyclist conflicts with rideshare vehicles?
Effective Design	▪ Are bikes and pedestrians conflicting at new parking protected bike lanes at high pedestrian volume sites such as schools and churches? ▪ How many people are riding in the travel lane vs. parking protected lane (is the channel created by the parking protected configuration too narrow?)
Mobility	▪ Has the number of cyclists using the application site increased?
Perceived Safety & Comfort	▪ Do people bicycling feel safer after design was implemented? ▪ How do business owners and motorists feel about the changes?

Step 1 – Create Evaluation Plan

Goal	Metric/Measure	SOP #	Selected
Safe Behavior	Driver Yielding Behavior: Crosswalk	SOP 4	
	Driver Yielding Behavior: Mixing Zone	SOP 4	✓
	Qualitative Observation of Close Calls	SPOP 4-5	✓
	Collision	Standard	✓
	Mid-block Vehicle/Bike Interactions	SOP 11	✓
Effective Design	Bicyclist Compliance at Traffic Devices	SOP 7-8	✓
	Vehicle Compliance at Traffic Devices	SOP 7-8	
	Vehicle Loading Behavior	SOP 10	✓
Ease of Navigation	Bicyclist Positioning	SOP 1	✓
	Vehicle Blockage of Bike Lanes	SOP 2	
	Vehicle Diversion: Travel Time Runs	SOP 3	
Mobility	Bicyclist Volumes	Standard	✓
	Pedestrian Volumes	Standard	
	Vehicle Average Daily Traffic	SOP 12	
	Vehicle Speeds and Classification	SOP 12	✓
Perceived Safety & Comfort	Public Opinion Surveys	Standard	✓

Step 1 – Create Evaluation Plan

Valencia Evaluation Plan Matrix

Project Name:	Valencia Safety Project
Project Manager:	Leung, Kimberly

Project Scope:	Upgrade Valencia bike facilities from Class II bike lanes to protected/separated bike lanes. Curb management changes to address rideshare, loading and parking challenges.
Project Limits:	Valencia Street, Market to 15th streets
Project Timeline:	Implement in December 2018 to early 2019 (Market to 15th Striping + Color Curb)

Intended Outcome		Metrics	Evaluation Tools		Evaluation Location	Data Collection Time Periods		Movements	Data Collection Timeframe		
Goal	Objective/Question					Time Period 1	Notes		Pre-Construction	Spring 2019	Fall 2020
Drop Down Menu	*Manual Entry*	*Manual Entry - Potential Options Below*	*Drop Down Menu*		*Manual Entry**	*Drop Down Menu*	*Manual Entry*	*Manual Entry*	*Manual Entry*	*Manual Entry*	
Safe Behavior	Are vehicles continuing to block the bike? Type and duration? Double Parking?	**Loading/Curb Behavior**	Video with Manual Reduction	14_15_E	Valencia between 14th and 15th (Block Face- East Side)	One Weekday (T,W,Th) 2-Hour Peaks: 9am-11am, 1pm-3pm, 7pm-9pm	Use High Quality Camera as detailed information is needed, and some video will take place at night when it is dark. Cameras need to be placed so as to accurately capture the entire east and west block faces of Valencia between 14th and 15th	All movements	Oct-18	Week of May 13, 2019	early Nov 2019
				14_15_W	Valencia between 14th and 15th (Block Face- West Side)				Oct-18	Week of May 13, 2019	early Nov 2019
	Are vehicles complying with Left Turn bans at NB/SB Valencia	**Stop/Left Turn Compliance**			Northbound and southbound left turns at Valencia and Duboce	One Weekday 2-Hour Peaks: AM/PM		NB/SB Valencia at Duboce- Left Turns	N/A	N/A	early Nov 2019
	Bike signal compliance and conflicts vs. mixing zone (interim vs. post)	**Driver Yielding Behavior: Mixing Zone/ Bike Signal Compliance**	Video with Manual Reduction		Northbound Valencia at Duboce, Southeast corner of Valencia and Duboce	One Weekday 2-Hour Peaks: AM/PM		NB Valencia at Duboce	N/A	Week of May 13, 2019	early Nov 2019
	Will new design decrease conflicts, especially dooring and cyclist conflicts with rideshare vehicles?	Qualitative Observation of Yielding at Block Face/Mid Block Locations + Dooring	Video with Manual Reduction	14_15_E	Valencia between 14th and 15th (Block Face- East Side)	One Weekday (T,W,Th) 2-Hour Peaks: 9am-11am, 1pm-3pm, 7pm-9pm	Use High Quality Camera as detailed information is needed, and some video will take place at night when it is dark. Cameras need to be placed so as to accurately capture the entire east and	All movements	Oct-18	Week of May 13, 2019	early Nov 2019
				14_15_W	Valencia between 14th and 15th (Block Face- West Side)				Oct-18	Week of May 13, 2019	early Nov 2019
Effective Design	Looking at vehicle/bikes in pre condition, looking at vehicle/bikes/peds in post condition. Are bikes and peds conflicting at new parking protected bike lanes at high ped volume sites such as schools and churches?	Close Calls between Peds and Bikes	Video with Manual Reduction	14_CP_E	Valencia between 14th and Clinton Park (East Side)	One Weekday (T,W,Th) 2-Hour Peaks:7am-9am, 2pm-4pm		All movements		Week of May 13, 2019	early Nov 2019
				14_CP_W	Valencia between 14th and Clinton Park (West Side)					Week of May 13, 2019	early Nov 2019
	How many people are riding in the travel lane vs. parking protected lane (is the channel created by parking protected configuration too narrow?)	**Bike Positioning**	Video with Manual Reduction	14_CP_E	Valencia between 14th and Clinton Park (Block Face- East Side)	One Weekday 2-Hour Peaks: AM/PM	Use biking AM/PM peak	All movements	N/A	Week of May 13, 2019	early Nov 2019
				14_CP_W	Valencia between 14th and Clinton Park (Block Face- west Side)						early Nov 2019
				14_15_E	Valencia between 14th and 15th (Block Face- East Side)						early Nov 2019
				14_15_W	Valencia between 14th and 15th (Block Face- West Side)						early Nov 2019
Mobility	Has the number of cyclists using the application site increased?	**Bicyclists Volumes**	Intersection Movements		Valencia between 15th and Market	One Weekday 2-Hour Peaks: AM/PM		All movements	Oct-18	Week of May 13, 2019- only Intersections between 15th and Market on Valencia	early Nov 2019

Responsibility/Lead:	Evaluation Project Manager/Valencia Project Team
Before Pictures:	ASK JEREMY (thalia)
After Pictures:	
Link to Data:	T:\T_E_FILES\LivableStreets_Bicycle Program\Projects\Valencia\Data

Step 2 – Collect Data

Project Name/Number: Valencia Safety Project / 149738
Data Collector (Name): Jaylyn Sanford, Michael Garcia

Bicyclist Positioning Data Collection Sheet

Site Characteristics	
Location (incl. direction)	Valencia btwn 14th & Clinton (East Side)
Date (incl. day of week)	5/14/19, Tuesday
Time Period(s)	08:00 AM - 10:00 AM
Weather Conditions*	Sunny
Type of Bike Facility*	Protected
Type of Parking*	On-Street Parallel Parking between Bike La
Sidewalk Presence*	Yes

* Drop Down Menu

Notes

Screenline Diagram

Bike Positioning Data							
Time Period		In Vehicle Lane	Within Bike Lane			In Parking Lane	On Sidewalk
Start Time	End Time		Buffer	Bike Lane	Door Zone		
Weekday AM Period (8-10am) - Northbound/Westbound							
8:00 AM	8:05 AM	0	0	13	0	0	0
8:05 AM	8:10 AM	0	0	21	0	0	0
8:10 AM	8:15 AM	0	0	26	0	0	0
8:15 AM	8:20 AM	0	0	29	0	0	0
8:20 AM	8:25 AM	0	0	17	0	0	0
8:25 AM	8:30 AM	0	0	37	0	0	2
8:30 AM	8:35 AM	0	0	29	0	0	0
8:35 AM	8:40 AM	0	0	32	0	0	0
8:40 AM	8:45 AM	0	0	30	0	0	0
8:45 AM	8:50 AM	0	0	31	0	0	0
8:50 AM	8:55 AM	0	0	16	0	0	0
8:55 AM	9:00 AM	0	0	19	0	0	0
9:00 AM	9:05 AM	0	0	20	0	0	0

Bicyclist Positioning – SOP Summary

Related Project Objective
Safer bicycling environment

SOP last updated July 25, 2017.

Bicyclist positioning refers to the location of a bicyclist within the cross section of the street (i.e., within a bike facility, in a vehicle lane, on the sidewalk, etc.).

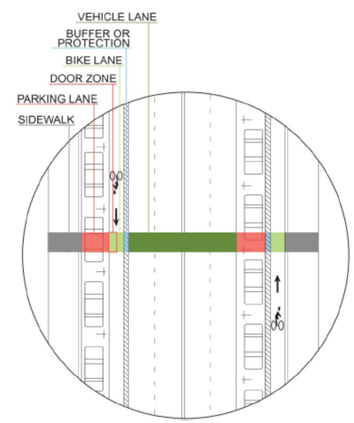
The SOP for bicyclist positioning standardizes where along a block the positioning data are collected, accounting for the type of bicycle facility and the presence of transitions between facility types.

Data Collection Procedures

Location

- Bicyclist positioning data are collected across a screen line located midblock, as shown in Figure 1.
- Data should be recorded by zone or area within the street:
  - On the sidewalk
  - Within the bike lane and within the door zone (The door zone is within 2'-3' of the edge of parked vehicles. The width of the door zone within the bike lane will vary based on the width of the adjacent parking stall.)
  - Within the bike lane and outside the door zone
  - Within the vehicle travel lane
- For each zone, wrong-way travel should be recorded (e.g., a bicyclist traveling northbound in the southbound lane).
- The data collection line should be drawn within the area of interest for evaluation. For example, if the evaluation is assessing the use of bike boxes, then the data collection line should be at the intersection approach.
- Separate data collection lines may be appropriate for each direction of travel.
- The data collection line should be located away from bike facility transition points (e.g., at the transition from a protected bike lane to a shared lane) unless the project evaluation specifically addresses bicyclists' behavior at these locations.

Figure 1: Example Data Collection Screen Line



Time Period

- Bicyclist positioning data should be collected for a period of at least two hours.
- The time of day and day of the week should be selected based on bicyclists' existing and anticipated future travel patterns. Consider when volumes are highest and when special user groups (e.g., commuters, tourists or students) are likely present. Typical weekday AM/PM peak periods for bicyclists are 8:00-10:00 AM and 5:00-7:00 PM.

Data Evaluation Procedures

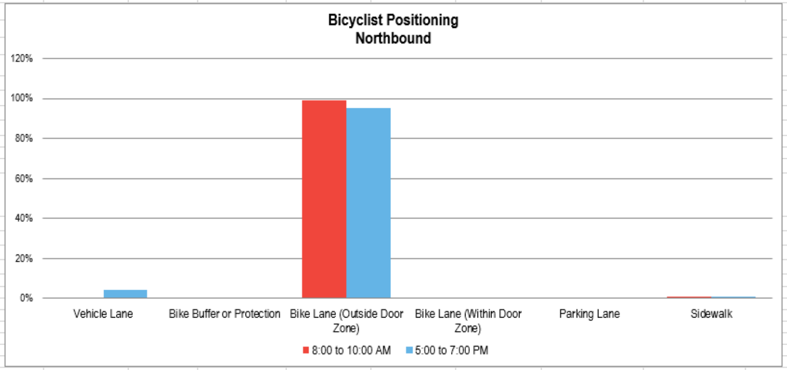
- If data are collected for multiple periods (e.g., AM and PM peak periods), the default practice is to aggregate the data for all periods before performing analysis.
- Bicyclist positioning data should be analyzed and reported as percentages by location for each data collection screen line, as shown in Figure 2.

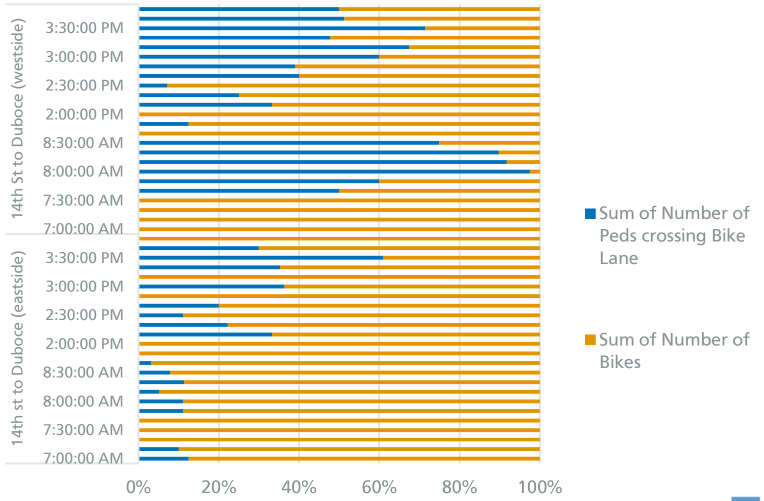
Step 3 – Perform Analysis

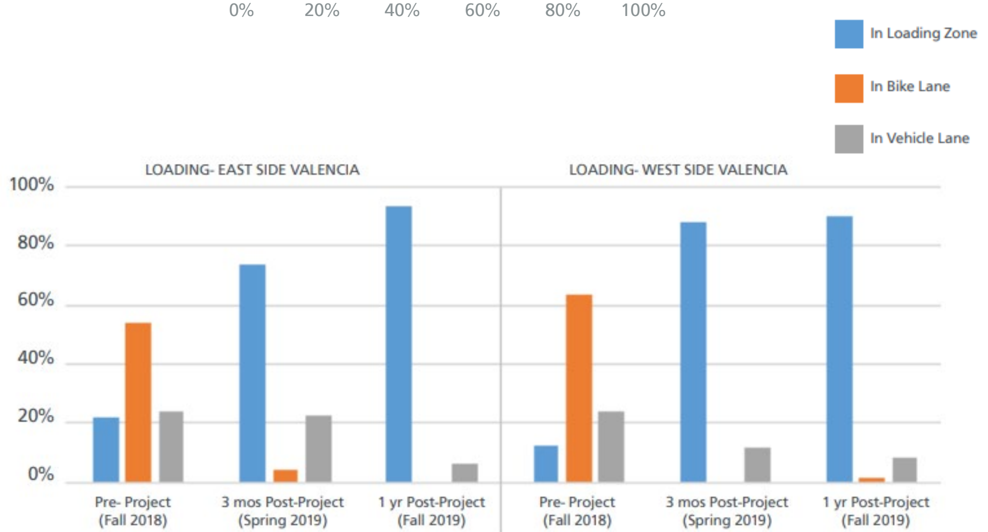
Bicyclist Positioning Analysis Sheet

Project Name/Number: Valencia Safety Project / 149738

Direction	Vehicle Lane	Bike Buffer or Protection	Bike Lane (Outside Door Zone)	Bike Lane (Within Door Zone)	Parking Lane	Sidewalk	Total
Northbound	6	0	638	0	0	5	649
	1%	0%	98%	0%	0%	1%	100%
Southbound	6	0	564	0	0	0	570
	1%	0%	99%	0%	0%	0%	100%







Step 1 – Create Evaluation Plan

Safe Behavior

- Are vehicles continuing to block the bike? Type and duration? What about double parking?
- Will new design decrease conflicts, especially dooring and cyclist conflicts with rideshare vehicles?

Effective Design

- Are bikes and pedestrians conflicting at new parking protected bike lanes at high pedestrian volume sites such as schools and churches?
- How many people are riding in the travel lane vs. parking protected lane (is the channel created by the parking protected configuration too narrow?)

Mobility

- Has the number of cyclists using the application site increased?

Perceived Safety & Comfort

- Do people bicycling feel safer after design was implemented?
- How do business owners and motorists feel about the changes?

Step 4 – Report Back

Safe Behavior

- # of vehicles loading the bike lane dropped **from 61% to >1%**
- **90%** of loading is taking place in the loading zones (*pre-project: less than 20%*), resulting in a significant reduction in double parking
- **99% decrease** in mid-block vehicle/bike interactions and a **100% decrease** in close calls or near-dooring incidents

Effective Design

- **No close calls** observed at high pedestrian/bike conflict areas.
- **98%** of bicyclist are positioned in the bikeway buffer area or in the bikeway post pilot implementation (96% in the bikeway; 2% in the buffer area)

Mobility

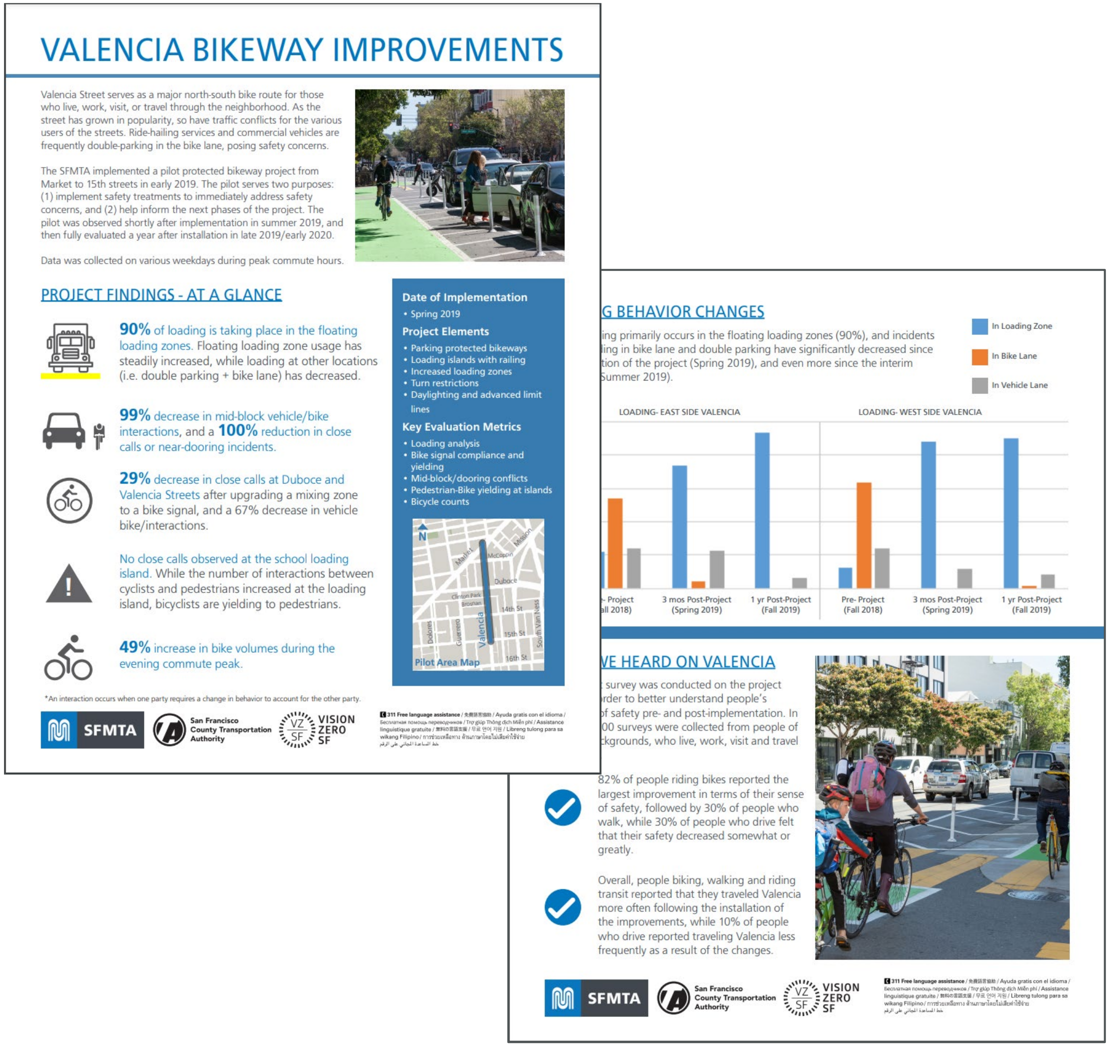
- **49% increase** in bike volumes during the evening peak period

Perceived Safety & Comfort

- **82%** of people who bike reported the largest improvement in terms of their sense of safety
- **10%** of people who drive reported traveling less frequently as a result of the changes

Step 4 – Report Back

- Fact Sheets
- Blog Posts
- Reports
- Annual Report



VALENCIA BIKEWAY IMPROVEMENTS

Valencia Street serves as a major north-south bike route for those who live, work, visit, or travel through the neighborhood. As the street has grown in popularity, so have traffic conflicts for the various users of the streets. Ride-hailing services and commercial vehicles are frequently double-parking in the bike lane, posing safety concerns.

The SFMTA implemented a pilot protected bikeway project from Market to 15th streets in early 2019. The pilot serves two purposes: (1) implement safety treatments to immediately address safety concerns, and (2) help inform the next phases of the project. The pilot was observed shortly after implementation in summer 2019, and then fully evaluated a year after installation in late 2019/early 2020.

Data was collected on various weekdays during peak commute hours.

PROJECT FINDINGS - AT A GLANCE

90% of loading is taking place in the floating loading zones. Floating loading zone usage has steadily increased, while loading at other locations (i.e. double parking + bike lane) has decreased.

99% decrease in mid-block vehicle/bike interactions, and a **100%** reduction in close calls or near-dooring incidents.

29% decrease in close calls at Duboce and Valencia Streets after upgrading a mixing zone to a bike signal, and a 67% decrease in vehicle bike/interactions.

No close calls observed at the school loading island. While the number of interactions between cyclists and pedestrians increased at the loading island, bicyclists are yielding to pedestrians.

49% increase in bike volumes during the evening commute peak.

*An interaction occurs when one party requires a change in behavior to account for the other party.

Date of Implementation
- Spring 2019

Project Elements
- Parking protected bikeways
- Loading islands with railing
- Increased loading zones
- Turn restrictions
- Daylighting and advanced limit lines

Key Evaluation Metrics
- Loading analysis
- Bike signal compliance and yielding
- Mid-block/dooring conflicts
- Pedestrian-Bike yielding at islands
- Bicycle counts

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G BEHAVIOR CHANGES

ing primarily occurs in the floating loading zones (90%), and incidents ling in bike lane and double parking have significantly decreased since tion of the project (Spring 2019), and even more since the interim Summer 2019).

VE HEARD ON VALENCIA

survey was conducted on the project rder to better understand people's of safety pre- and post-implementation. In 00 surveys were collected from people of ckgrounds, who live, work, visit and travel

82% of people riding bikes reported the largest improvement in terms of their sense of safety, followed by 30% of people who walk, while 30% of people who drive felt that their safety decreased somewhat or greatly.

Overall, people biking, walking and riding transit reported that they traveled Valencia more often following the installation of the improvements, while 10% of people who drive reported traveling Valencia less frequently as a result of the changes.

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Example 2 – Bike Signals

Step 2 – Collect Data

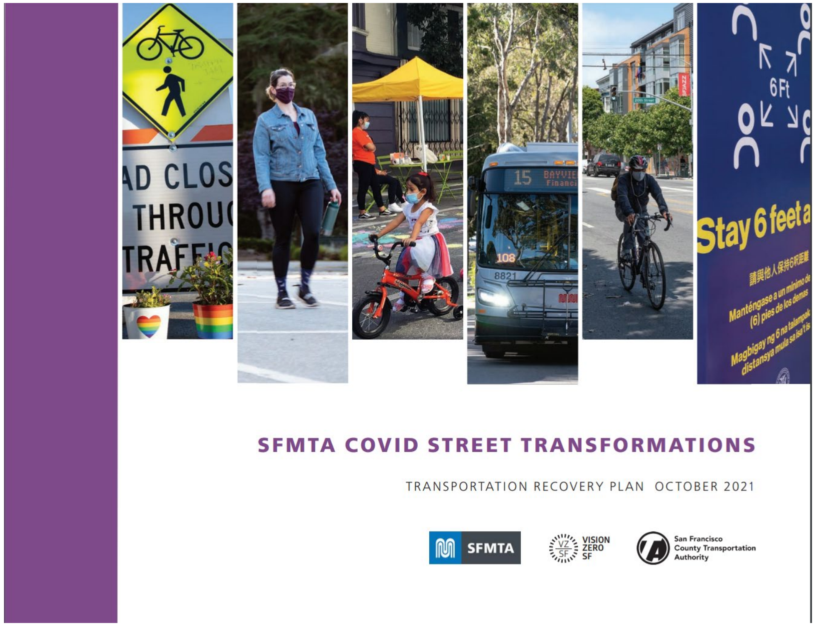
Goal	Metric/Measure	SOP #	Selected
Safe Behavior	Driver Yielding Behavior: Crosswalk	SOP 4	
	Driver Yielding Behavior: Mixing Zone	SOP 4	✓
	Qualitative Observation of Close Calls	SPOP 4-5	✓
	Collision	Standard	
	Mid-block Vehicle/Bike Interactions	SOP 11	
Effective Design	Bicyclist Compliance at Traffic Devices	SOP 7-8	✓
	Vehicle Compliance at Traffic Devices	SOP 7-8	
	Vehicle Loading Behavior	SOP 10	
Ease of Navigation	Bicyclist Positioning	SOP 1	
	Vehicle Blockage of Bike Lanes	SOP 2	
	Vehicle Diversion: Travel Time Runs	SOP 3	
Mobility	Bicyclist Volumes	Standard	
	Pedestrian Volumes	Standard	
	Vehicle Average Daily Traffic	SOP 12	
	Vehicle Speeds and Classification	SOP 12	
Perceived Safety & Comfort	Public Opinion Surveys	Standard	

Step 3 - 4 – Analysis and Report Back

Metric	Finding	2018	2019
Bike signal compliance rate	On average, people biking **complied _ _%** of the time at the observed locations with bike signals.	86%	85%
No right turn on red compliance rate	On average, people driving **complied _ _%** of the time at the observed locations with a no right on red restriction at observed locations with bike signals.	95%	90%
Change in vehicle and bicycle interactions	When comparing the before and after right turning vehicle and thru bicyclist interaction at the intersection, there was an **average decrease of _ _%** in observed incidents after the converting the intersection from a mixing to a bike signal.	81%	87%
Change in % of close calls	On average, close calls **decreased by _ _%** at observed intersections where a mixing zone was converted to a bike signal.	94%	83%

Thank You!


reporting the results
VISION ZERO
SAFE STREETS
EVALUATION
PROGRAM
2018 YEAR-END REPORT
SFMTA


SFMTA COVID STREET TRANSFORMATIONS
TRANSPORTATION RECOVERY PLAN OCTOBER 2021
SFMTA
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San Francisco County Transportation Authority
Stay 6 feet a

Questions and Discussion

Thanks for joining!

- Be on the lookout for an email with:
  - An evaluation survey
  - Meeting materials (with contact information)