

 Hollywood, FL

 June 13-14, 2024

# 2024 TRANSPORTATION SYMPOSIUM

## STRIDES 2 Zero Program Implementation and Challenges

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# Outline

- STRIDES 2 Zero (S2Z) program overview
  - Objectives and strategies
  - Processes we adopt: What, why, and how we do
  - Implementation and coordination with Districts
- District 4's approach to S2Z implementation and challenges
- District 6's approach to S2Z implementation and challenges

# What is STRIDES 2 Zero?

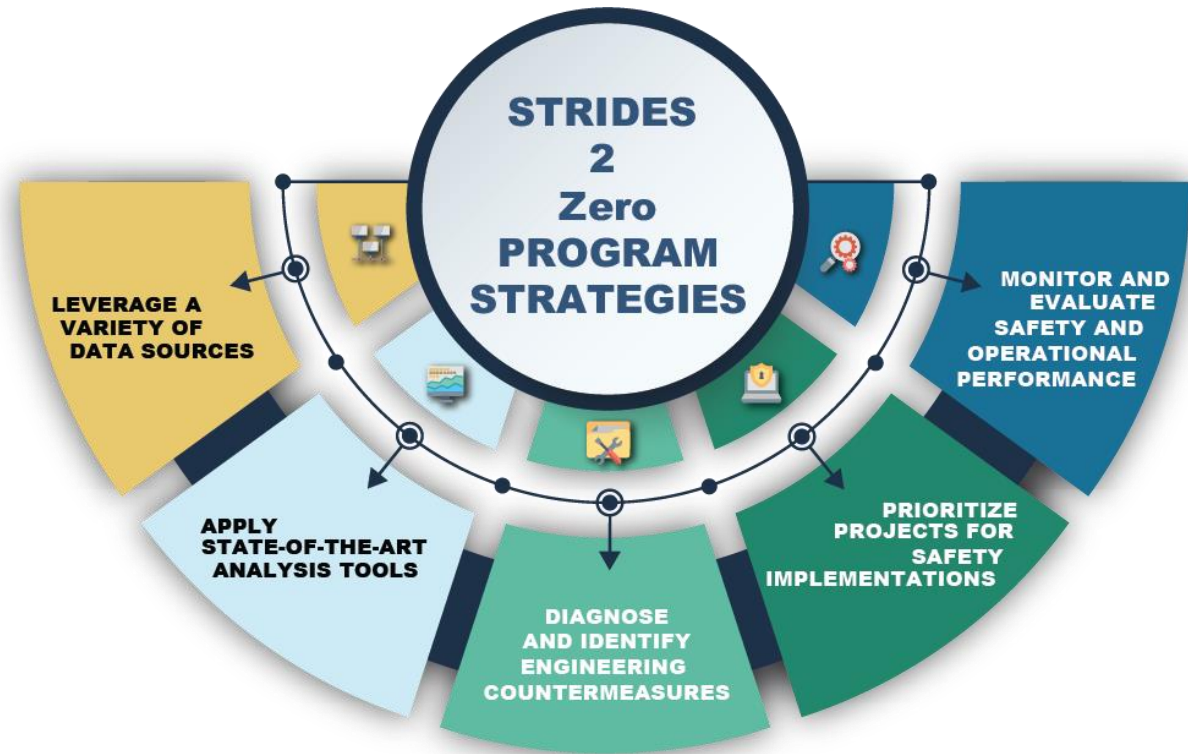
- An initiative managed by FDOT Traffic Engineering and Operations Office in collaboration with Safety Office toward the goal of zero fatalities and serious injuries on our roadways
- Enhance highway safety management practices in Florida through data-driven process
- Provide engineering-based safety solutions for different transportation facilities and modes



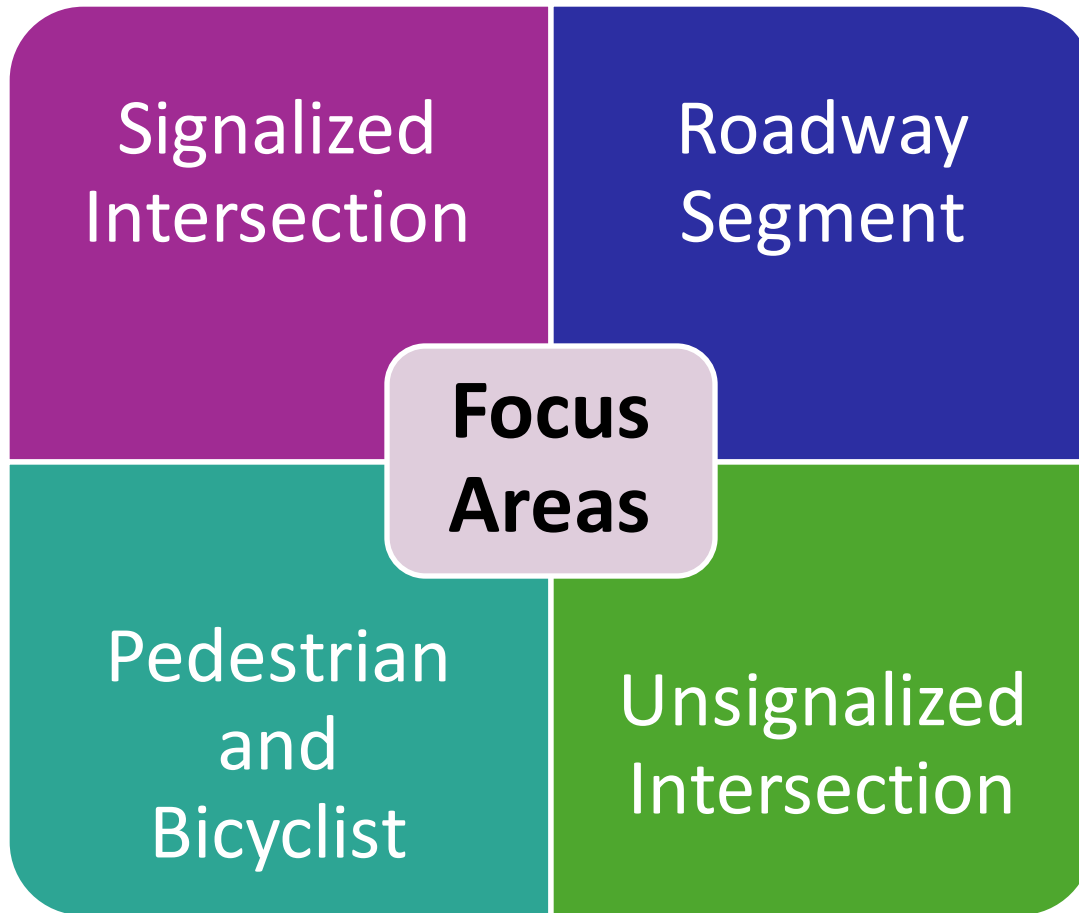
**STRIDES 2 Zero**  
State Traffic Roadway and Intersection  
Data Evaluation System Toward Zero  
Fatalities and Serious Injuries

# STRIDES 2 Zero Program Strategies

- Leverage a variety of data sources
- Apply state-of-the-art analysis tools
- Diagnose and identify engineering countermeasures
- Prioritize projects for safety implementation
- Monitor and evaluate safety and operational performance of countermeasures



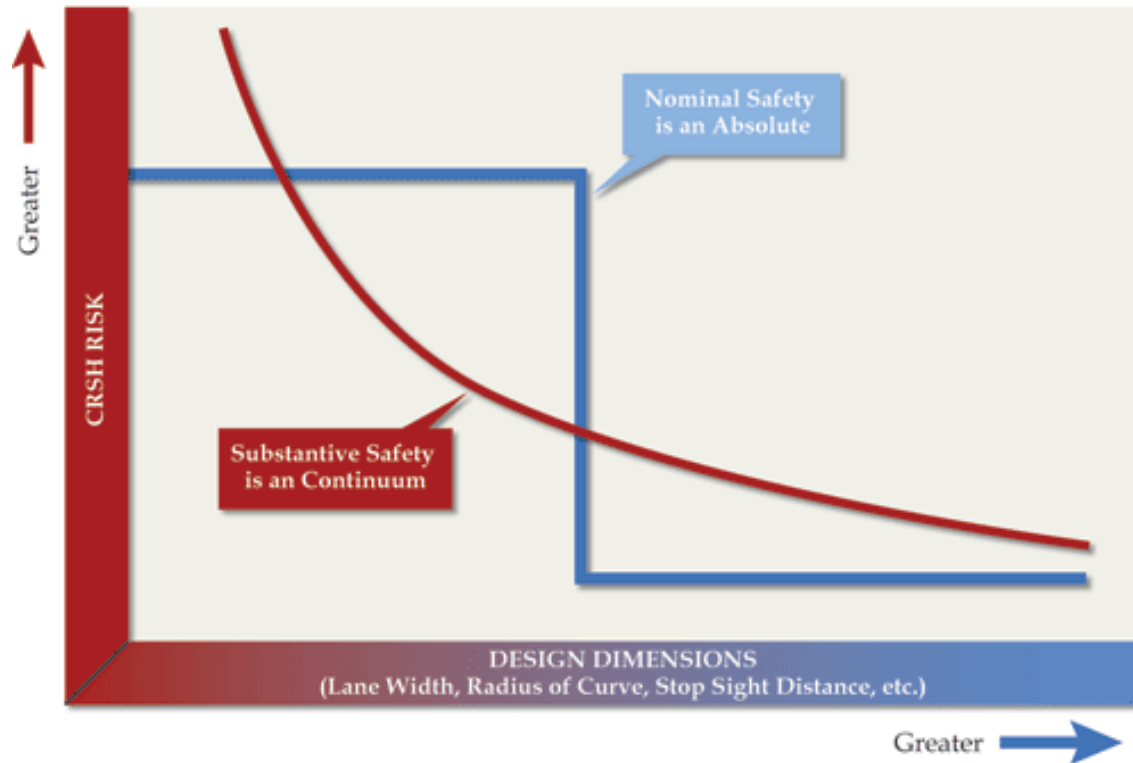
# Focus Areas



- All focus area efforts concentrated on State Highway System
- Started with Signalized Intersection focus area

# Evaluate Safety Performance

- Nominal vs. Substantive Safety



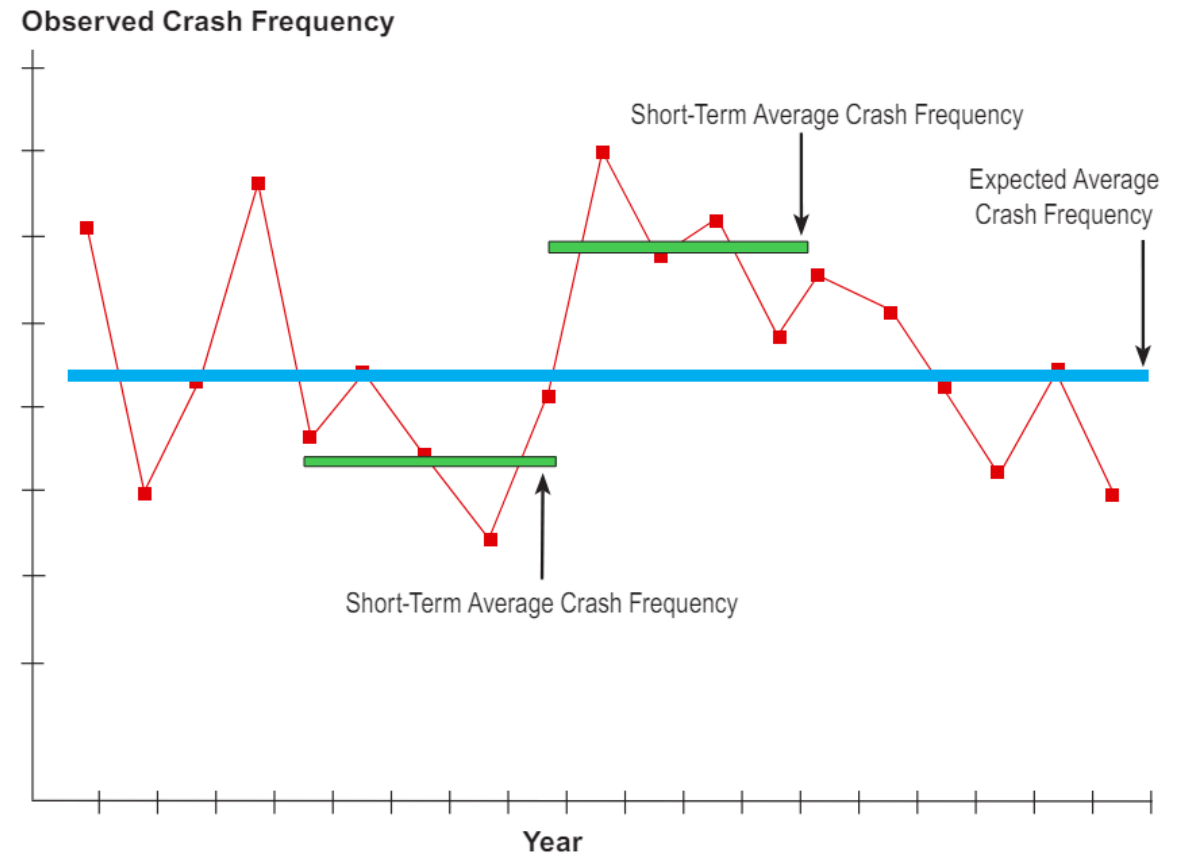
**Nominal Safety:** a design feature or roadway either meets minimum criteria or it does not.

**Substantive Safety:** actual or expected long-term safety performance of a roadway.

# How to Determine Expected Safety Performance?

## Concern #1: Natural Variability in Crash Frequency

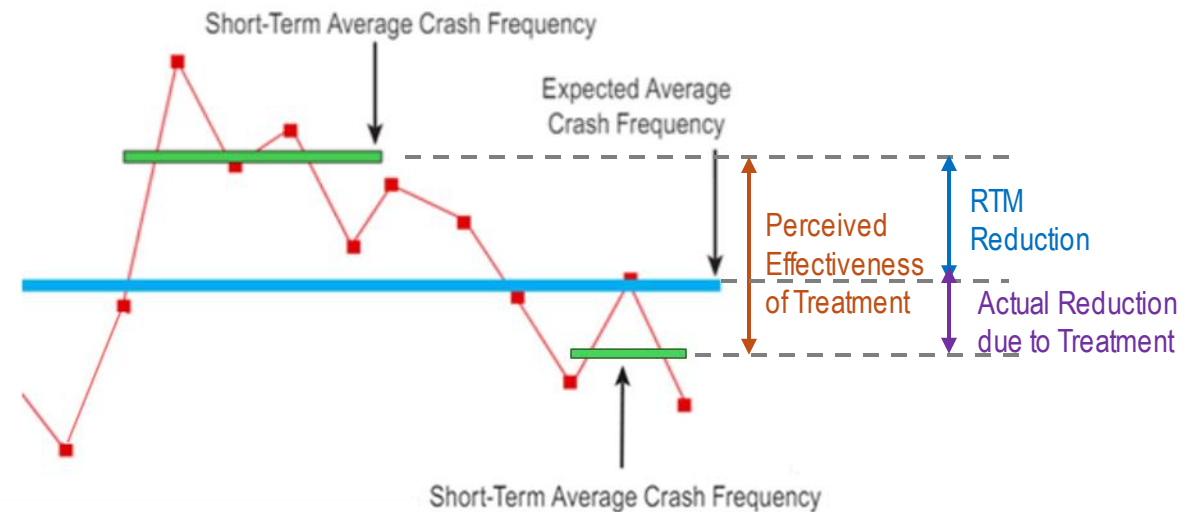
- Crashes are random events
  - *What is the probability of a crash occurring at a site on a particular day and time?*
- Observed average crash frequency over short periods
  - *Is it high, average, or low?*



# How to Determine Expected Safety Performance?

## Concern #2: Regression-to-the-mean (RTM) Bias

- A period of high crash frequency is likely to be followed by a period of low crash frequency or vice versa.
- Had the treatment not been applied for, what would have been the safety performance of the site for which treatment is selected based on short-term observed average crash frequency?





# How to Determine Expected Safety Performance?

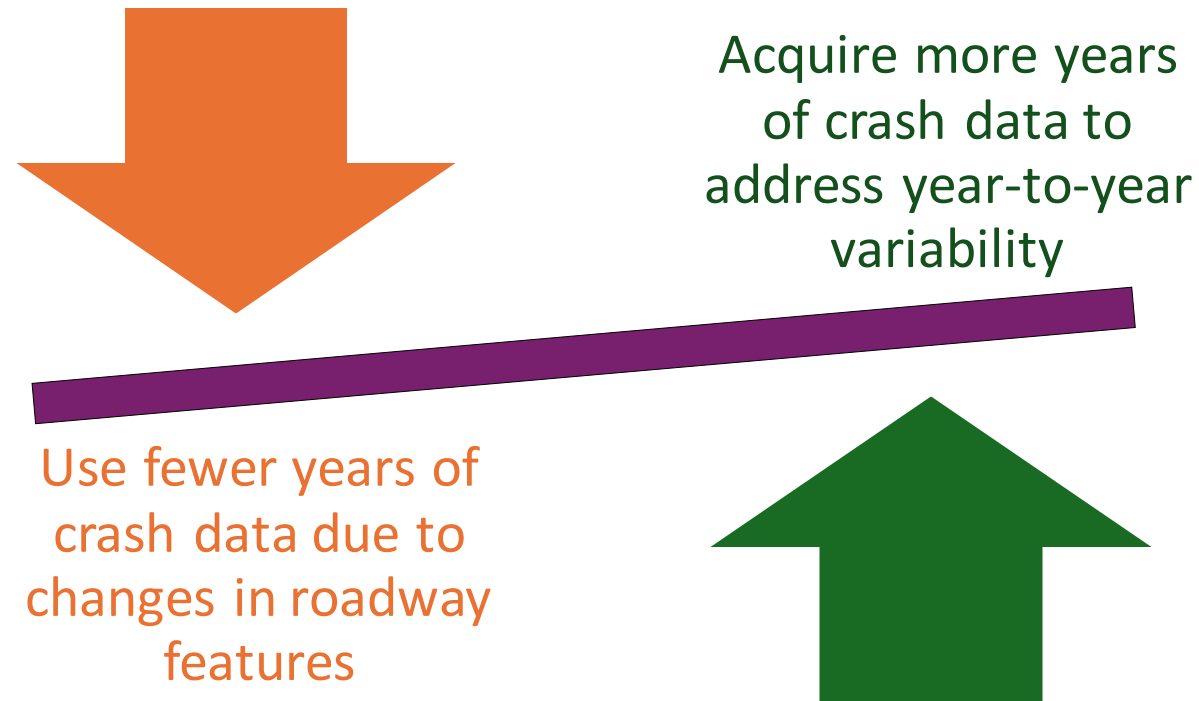
## Concern #3: Variation in Roadway Characteristics

- Some roadway characteristics are subject to change over time.
- Some characteristics change on a continual basis.
- Use of a longer period of data may not capture the changes in site conditions that could be associated with occurrence or non-occurrence of crash incidents.



# How to Determine Expected Safety Performance?

## Concern #4: Conflict between Crash Frequency Variability and Changing Site Conditions



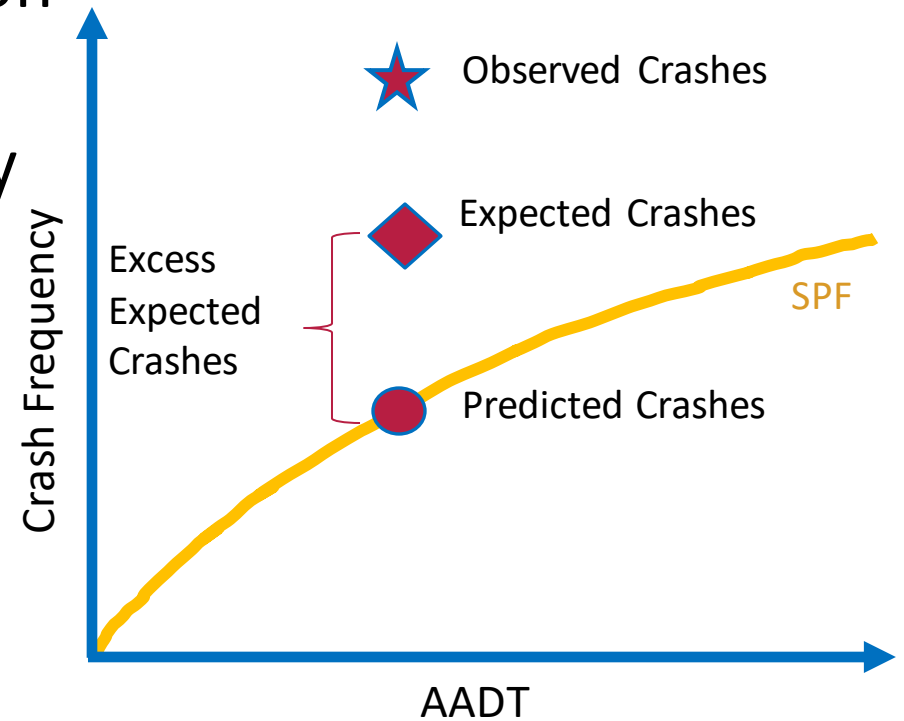
# Predictive Method to Determine Expected Crash Freq.

- Predictive method in the AASHTO Highway Safety Manual
- Safety Performance Functions (SPFs) : A regression equation to estimate predicted average crash frequency as a function of exposure and roadway features.
- Predicted Crash Frequency

$$N_p = \exp[-8.071 + 0.419 \times \log(AADT_{maj}) + 0.323 \times \log(AADT_{min})]$$

- Expected crash frequency

$$N_e = w \times N_p + (1 - w) \times N_o]$$



# Signalized Intersections

- Since 2020, annual network screening of signalized intersections
- Annual SPFs using the latest three years of fatal-and-serious-injury (KA) crash and traffic data and incorporating roadway and intersection features
- Candidate intersections based on the highest Excess Expected Crash Frequency (most reliable performance measure)
- Overrepresented crash type
- Sister intersection

**FLORIDA DEPARTMENT OF TRANSPORTATION**  
Traffic Engineering and Operations Office  
System Analysis and Forecast Evaluation (SAFE) Candidates  
Fatal and Severe Crashes at 4-Leg Signalized Intersections 2016-2018

Wednesday, April 15, 2020

-----Statewide Top 20 Sites-----  
Sorted by Estimated Benefit-cost Ratio (BCR)

District	RDWYID	Mile Post	Days Between Expected KA Crashes	Backplates	Special Emphasis Crosswalk
7	14030000	9.73	85		
5	75010000	10.15	108		
5	75060000	9.45	113		
7	14090000	0.00	122		
4	93070000	22.69	152		
5	75010000	8.64	136		
6	87030000	2.43	223		
5	75010000	2.70	157		
6	87140000	12.60	194		
6	87281000	8.20	196		

**FLORIDA DEPARTMENT OF TRANSPORTATION**  
Traffic Engineering and Operations Office  
System Analysis and Forecast Evaluation (SAFE) Candidates  
Fatal and Severe Crashes at Signalized Intersections 2017-2019

Thursday, February 18, 2021

-----Statewide Top 20 Sites-----  
Sorted by Estimated Benefit-cost Ratio (BCR)

District	RDWYID	Mile Post	Days Between Expected KA Crashes	Backplates	Crosswalk	Lighting	PVA	LT Offset	LT Lane	RT Lane	LPI	DSWF	Days Between Expected KA Crashes After Treatment	Expected Savings of Treatment(s)	Months to Reduce One KA Crash	BCR
													120	\$2,716,515	26	5,817.43
													203	\$1,610,120	45	3,448.08
													296	\$1,255,399	65	2,688.45
													323	\$1,098,689	71	2,352.85
													238	\$4,763,799	16	1,089.94
													381	\$1,536,818	51	1,053.25
													144	\$3,433,420	21	1,036.92
																827.95
																629.01
																608.05
																587.29
																527.33
																400.32
																371.55
																290.84
																283.11
																275.64
																273.46
																259.93
																248.38

**FLORIDA DEPARTMENT OF TRANSPORTATION**  
Traffic Engineering and Operations Office  
2022 System Analysis and Forecast Evaluation (SAFE)  
List of Candidate Signalized Intersections

March 2022  
Revised August 2022

-----District 1-----  
Sorted by Context Class and Excess Expected Fatal and

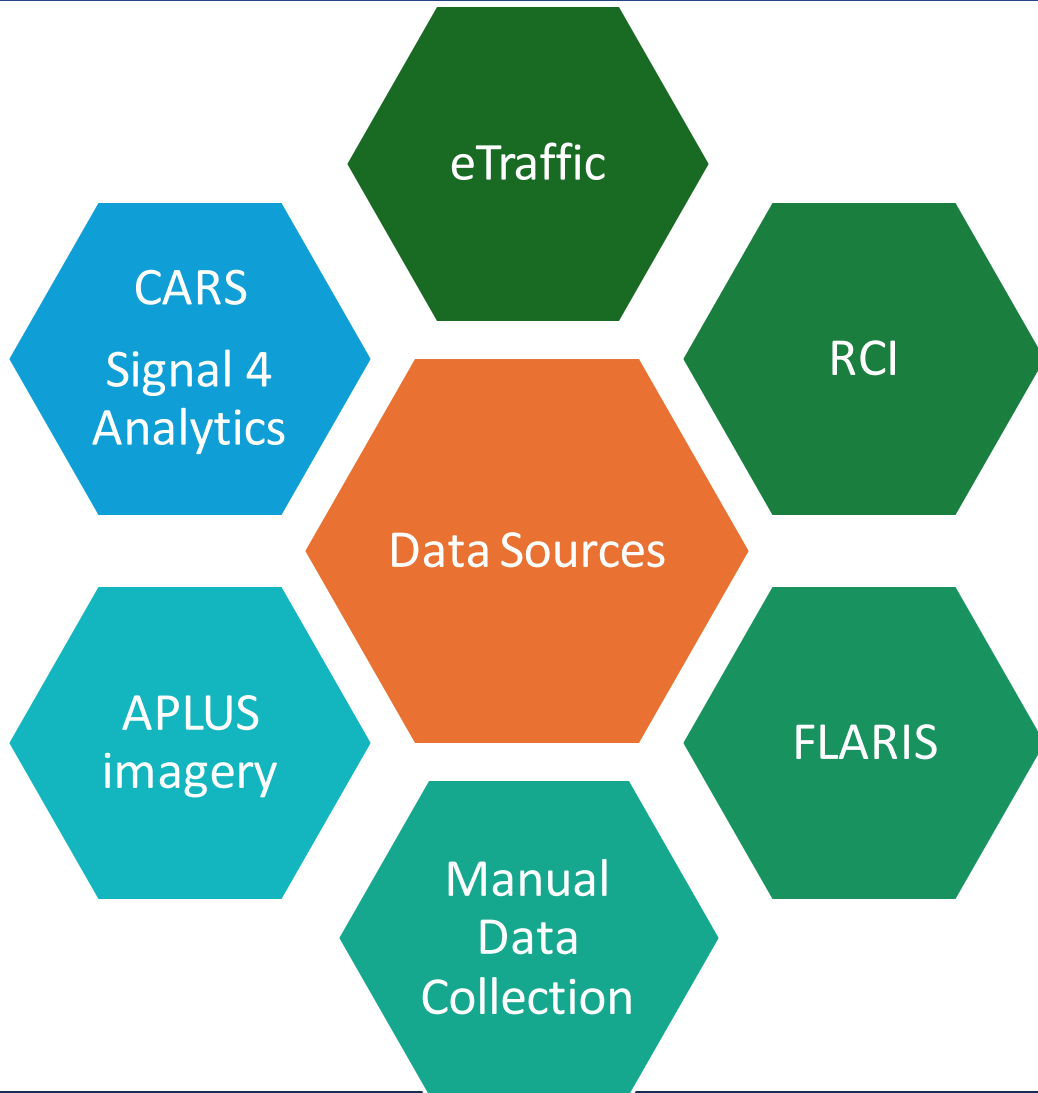
Main Roadway ID (MP)	Intersecting Roadway ID (MP)	Number of Legs	Expected KA Crashes	Excess Expected KA Crashes	Head-on	Rear-end
<b>C1-Natural, C2-Rural, C2T-Rural Town</b>						
16300000 (7.27)	16180000 (5.94)	4	3.83	2.64		
09110000 (0.01)	09030000 (0.00)	4	3.14	2.06		
<b>C3C-Suburban Commercial</b>						
13160000 (2.54)	13000159 (2.94)	4	7.69	5.98		
13010000 (1.73)	13000085 (0.00)	4	4.37	3.11		
17008000 (4.85)	17000047 (0.00)	4	3.93	2.43		
<b>C3R-Suburban Residential</b>						
13010000 (4.25)	13162000 (0.00)	4	11.03	9.24		
13162000 (1.76)	13160000 (0.00)	4	9.38	7.76		
13010000 (2.55)	13000079 (0.00)	3	4.86	3.57		
13010000 (3.77)	12000076 (1.24)	4	4.03	2.71		
13162000 (1.26)	13000068 (0.51)	4	3.81	2.64		
13010000 (3.14)	13000091 (0.74)	4	3.67	2.13		
12020000 (18.24)	12055000 (26.23)	3	2.88	2.10		

**Section 2. 2023 Candidate and Sister Signalized Intersections**

Rank	Candidate Intersections Major Roadway Name(s) & Roadway ID (MP) Minor Roadway Name(s) & Roadway ID (MP)	County	Context Class	# of Legs	Fatal and Serious Injury (KA) Crashes <sup>1</sup>				Overrepresented Crash Type	Sister Intersections District - Roadway ID (MP)
					Observed	Predicted	Expected	Excess Expected		
1	SR 55 / Tamiami Trl 13120000 (6.42) 201 Blvd 13000119 (0.00)	Manatee	C3C	4	8	1.02	3.65	2.63	ANGLE SINGLE-VEHICLE	D4 - 93130000 (3.02) cf D4 - 94050000 (7.46) cf D3 - 38050000 (3.26) cf D2 - 38020000 (0.01) cf D2 - 72010000 (13.36) cf
2	SR 600 / US 92 / Auburndale Hwy 16020000 (8.86) Neptune Rd / Berkeley Rd 16590000 (20.75)	Polk	C3C	4	6	1.57	3.70	2.13	SIDESWIPE PED / BIKE	D5 - 75000091 (0.37) cf D1 - 16210000 (6.63) cf D3 - 48010000 (12.83) cf D3 - 57040000 (0.80) cf D3 - 55060000 (5.59) cf D3 - 55050000 (4.36) cf
3	SR 64 13050000 (6.47) Ramps left from I 75	Manatee	C2	4	6	1.81	3.56	1.75	ANGLE SIDESWIPE PED / BIKE	D7 - 10340000 (10.78) cf D4 - 94120000 (0.58) cf D4 - 93016000 (8.43) cf D2 - 72220000 (7.69) cf D1 - 16070000 (3.68) cf
4	SR 60 / E Van Fleet Dr 16110000 (15.39) Flamingo Dr 16261101 (0.89)	Polk	C2	3	6	2.18	3.91	1.73	REAR-END SINGLE-VEHICLE	D5 - 79190000 (0.01) cf D3 - 55050000 (9.83) cf D4 - 8800423 (0.39) cf D6 - 87150000 (17.43) cf D4 - 93210000 (0.49) cf D3 - 55050000 (0.34) cf
5	SR 776 / CR 771 / El Jobean Rd 01050000 (16.45) Tolado Blade Blvd 01000078 (0.00)	Charlotte	C3C	4	5	1.65	3.31	1.65	REAR-END ANGLE	D3 - 55050000 (1.75) cf D3 - 46060000 (3.09) cf D1 - 01010000 (23.08) cf

<sup>1</sup> Minor roadway ID and MP are not provided in cases where minor road is a ramp. <sup>2</sup> A 350-ft buffer is used to count crashes for ramp terminal intersections, and a 250-ft buffer is used for other intersections.

# Data Sources and Data Processes



Microsoft SQL Server

Spatial Analysis Tools (ArcGIS/QGIS)

Statistical Analysis Tool (R)

Azure DevOps, SharePoint

Power BI

# Sister Intersection – Unique Concept by FDOT

- What is a sister intersection?

An intersection with similar characteristics and traffic volumes compared to a candidate intersection but experienced only a few KA crashes (0 or 1) during the study period
- How is recognizing sister intersections useful?

Identify existing safety features at better performing sister intersections, which may not be present at the candidate intersection
- A set of five (5) sister intersections for each candidate intersection





# Diagnosis of Overrepresented Crash Type

- Overrepresentation of a crash type is determined by the **probability** of long-term predicted proportion of the crash type exceeding a threshold proportion  $> 0.50$
- Assess the contributing factors associated with the particular crash type and select specific countermeasures that may help reduce the occurrence of such crashes



**Angle:** A crash where the impact type is coded in the crash report as "Angle."



**Head-on:** A crash where the impact type is coded in the crash report as "Front to Front."



**Rear-end:** A crash where the impact type is coded in the crash report as "Front to Rear."



**Sideswipe:** A crash where the impact type is coded in the crash report as either "Sideswipe, Same Direction" or "Sideswipe, Opposite Direction."



**Other Multi-vehicle:** A multi-vehicle involved crash where the crash type does not fall into any of the aforementioned categories, including Angle, Head-on, Rear-end, and Sideswipe.



**Pedestrian/Bicyclist (Ped/Bike):** A crash where at least one pedestrian or bicyclist is involved in the collision with a vehicle.



**Single-Vehicle:** A crash where only one vehicle is involved in the collision, but a pedestrian or a bicyclist is not involved.

# Mapping Locations with Existing Safety Priority Lists

## Safety Assessment Dashboard

Statewide View
D1 Editor
D2 Editor
D3 Editor
D4 Editor
D5 Editor
D6 Editor
D7 Editor
FTE Editor

🔗

FDOT This dashboard consists of the Traffic Operations' Statewide Safety Initiatives and the overlapping safety needs priorities identified by each district.

District  
All

Work Program Fiscal Year  
No category selected

☰

The Statewide Safety Initiatives can be filtered by using the category selectors below and choosing the initiative(s) you would like to view.

Is the project at a...

SAFE Candidate 2020 Intersection  
 No Selection  Yes

SAFE Candidate 2021 Intersection  
 No Selection  Yes

SAFE Candidate 2022 Intersection  
 No Selection  Yes

SAFE Candidate 2023 Intersection  
 No Selection  Yes

Wrong Way Driving Countermeasure  
 No Selection  Yes

Curve or Ramp  
 No Selection  Yes

### Site Specific Projects

# 182

\*Projects by point location

#### Sites

District 1  
D1 Candidates for Dilemma Zone Detection

SAFE Candidate Intersections  
2020: No  
2021: No  
2022: No  
2023: Yes

WWD Countermeasure: No  
30 Ped/Bike Safety Corridor: No  
Curve or Ramp: No

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District 1  
D1 Candidates for Dilemma Zone Detection

SAFE Candidate Intersections  
2020: No  
2021: No  
2022: No  
2023: Yes

WWD Countermeasure: No  
30 Ped/Bike Safety Corridor: No  
Curve or Ramp: No

### Corridor Specific Project:

# 490

\*Projects by segment location

#### Corridors

District 6  
D6 Lane Departure Draft 2020

SAFE Candidate Intersections  
2020: No  
2021: No  
2022: No  
2023: Yes

WWD Countermeasure: Yes  
30 Ped/Bike Safety Corridor: No  
Curve or Ramp: No

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District 6  
D6 Lane Departure Draft 2020

SAFE Candidate Intersections  
2020: No  
2021: No  
2022: No  
2023: Yes

WWD Countermeasure: Yes  
30 Ped/Bike Safety Corridor: No  
Curve or Ramp: Yes

### Work Program Filter Parameters (Expand to Read)

#### Site Specific Safety Assessment List

- D6 Int List Draft 2020
- D1 Lighting Risk at Signalized Intersections
- D1 Candidates for LPI
- D1 Candidates for Left Turn Phasing Changes
- D4 Fatal Crash Logs 2020
- D7 FDOT Intersection Lighting Enhancements
- D7 Preliminary Context Class Signalized Intersections
- D7 Signalized Ped/Bike Locations C3C
- D1 Candidates for Dilemma Zone Detection
- D4 Fatal Crash Logs 2019
- D7 Top Ped/Bike Crosswalk Crash Locations 2014-2018
- D1 Candidates for Ped Signal Upgrades at Schools
- D2 CO Safety Analyst HSLD Lighting Priority Ranking
- D7 R10 15 Locations
- D7 Signalized Ped/Bike Locations C2
- D7 Signalized Ped/Bike Locations C4
- D7 Top 200 FDOT HQ HSID Locations
- D7 Signal Studies
- D7 Top 100 Signalized On-System 2014-2018
- D7 Transit Safety Assessment Observations
- D7 Walkwise Sweeps
- D7 WWD Camera Detection
- D2 AD Ped/Bike High Crash Locations near ASE
- D2 DUI Driver or AD Ped/Bike High Crash Locations near ASE
- D2 Right Turn Slip Lane Priority Locations
- D4 Fatal Crash Logs 2018
- D7 Potential TSA Shortlist Locations
- D7 RRFB WWD Countermeasures
- D7 Signal Recommendations TOA Top Locations
- D7 Signalized Ped/Bike Locations C3R
- D7 Signalized Ped/Bike Locations C5



# Monitor and Tracking of Implementations

Year	District	CD	Name	County	Major Road	Major Sp	Minor Road	Minor Sp	Review Date	Candidate Intersection Status	Comments	COUNTERMEASURE_#1 (CM1)				COUNTERMEASURE_#2 (CM2)				COUNTERMEASURE_#3 (CM3)						
												CM1_NAME	CM1_PROGRESS	CM1_CONSTR UCTION_START _DATE	CM1_CONSTR UCTION_COM PLETION_DATE	CM1_COMMENT	CM2_NAME	CM2_PROGRESS	CM2_CONSTR UCTION_START _DATE	CM2_CONSTR UCTION_COM PLETION_DATE	CM2_COMMENT	CM3_NAME	CM3_PROGRESS	CM3_CONSTR UCTION_START _DATE	CM3_CONSTR UCTION_COM PLETION_DATE	CM3_COMMENT
2023	4	282	27	TAHOE BLVD	HOUSTON	3.26	HOUSTON	0.00	2/2/23	Candidate Intersection Selected		Lighting	Programmed - In Design	8/15/2028	1/1/2031	FM 440575.5 The project will widen the intersection	One signal Head per Lane	Programmed - In Design	8/15/2028	1/1/2031	FM 440575.5 The project will widen the intersection	High Priority	Programmed - Construction Complete	9/7/2023	10/17/2023	Work document #: PB-AUM-23-78-Y V
2023	4	289	28	TAHOE BLVD	HOUSTON	8.22	HOUSTON	12.88	2/2/23	Candidate Intersection Selected		Lighting	Programmed - In Design	12/18/2030	4/1/2031	FM 448107 This project will install mast arms at the intersection	Turning Vehicles Stop for Pedestrians' signs	Programmed - Construction Complete	9/7/2023	10/17/2023	Work document #: PB-AUM-23-78-Y V	High Priority	Programmed - Construction Complete	9/7/2023	10/17/2023	Work document #: PB-AUM-23-78-Y V
2023	4	287	25	TAHOE BLVD	HOUSTON	18.15	HOUSTON	0.00	2/2/23	Candidate Intersection Selected		Lighting	Programmed - In Design	3/18/2024	8/10/2024	FM 447001.1	Turning Vehicles Stop for Pedestrians' signs	Programmed - Construction Complete			Work document #: PB-AUM-23-78-Y V	High Priority	Programmed - Other			Work document #: PB-AUM-23-78-Y V

Excel-based Form in Central SharePoint Site

CANDIDATE_INTERSECTION_STATUS	COMMENTS
--	
Intersection not selected for further consideration at this time	
No action yet	
Scoping TWO for study	
Study ongoing	
Field Visit complete	
Study complete/report under review	
Countermeasures selected	

Overall Status of Candidate Intersection

COUNTERMEASURE_#1 (CM1)					COUNTERMEASURE_#2 (CM2)				
CM1_NAME	CM1_PROGRESS	CM1_CONSTR UCTION_START _DATE	CM1_CONSTR UCTION_COM PLETION_DATE	CM1_COMMENT	CM2_NAME	CM2_PROGRESS	CM2_CONSTR UCTION_START _DATE	CM2_CONSTR UCTION_COM PLETION_DATE	CM2_COMMENT
Lighting	Programmed - In Design	8/15/2028	1/1/2031	FM 440575.5 The project will widen the intersection	One signal Head per Lane	Programmed - In Design	8/15/2028	1/1/2031	FM 440575.5 The project will widen the intersection
Lighting	Programmed - In Design	12/18/2030	4/1/2031	FM 448107 This project will install mast arms at the intersection	Turning Vehicles Stop for Pedestrians' signs	Programmed - Construction Complete	9/7/2023	10/17/2023	Work document #: PB-AUM-23-78-Y V
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Countermeasure Implementation Status

# District 4 STRIDES 2 Zero Program Implementation

- District 4's Approach to S2Z implementation
- Traffic Operations Office and Safety Tag Team
- Traffic Operations Office (comprised of Traffic Services/TSM&O)
- Traffic Services assists with improving safety through implementation of short-term improvements



# District 4 Team

## Traffic Services Role:

- Implement the short-term improvements → Not requiring additional analysis/feasibility studies
- Coordinate improvements through upcoming programmed projects
- Coordinate improvements through local maintaining agencies

## Traffic Services Resources:

- Push Button Contracts
  - Pavement Markings and Signing Contracts (PMS)
  - Roadway & Signalization Contracts
- Maintenance
  - Operation Centers Maintenance Units
  - Asset Maintenance Contracts

## Supplementary Data/ Resources:

- FDOT Work Program (Recently completed projects/Upcoming projects)
- Traffic Operations/Safety Studies Database

# District 4 Approach

- Obtain List of Candidate Intersections from CO
  - 34 Intersections for year 2023
- Prepare checklist of Intersection Features at Sister Intersections
- Compare Study Intersection features against Sister Intersections
- Review Work Program and Studies Database
- Identify short-term improvements that can be implemented using Traffic Services Resources
- Determine potential improvements for coordination through upcoming projects and/or Local Maintenance Agencies

Intersection Features	Yes/No	Comment
High Emphasis Crosswalks		
Backplates		
Signage		
Yellow Retroreflective Tape		
High Visibility Pavement Markings		
Skip guidelines markings		
Pedestrian Signals		
Lighting		
One Signal Head per Lane		
Exclusive Left Turn Lanes		
Exclusive Right Turn Lanes		
Bike Lanes		
Other		

# Example 1: N Jog Rd & SR 704/Okeechobee Blvd, West Palm Beach, FL

6

SR 704 / Okeechobee Blvd  
93280000 (3.02)

N Jog Rd  
93000220 (1.16)

Palm Beach

C4

4

6

2.52

4.49

1.97

HEAD-ON

ANGLE

PED / BIKE

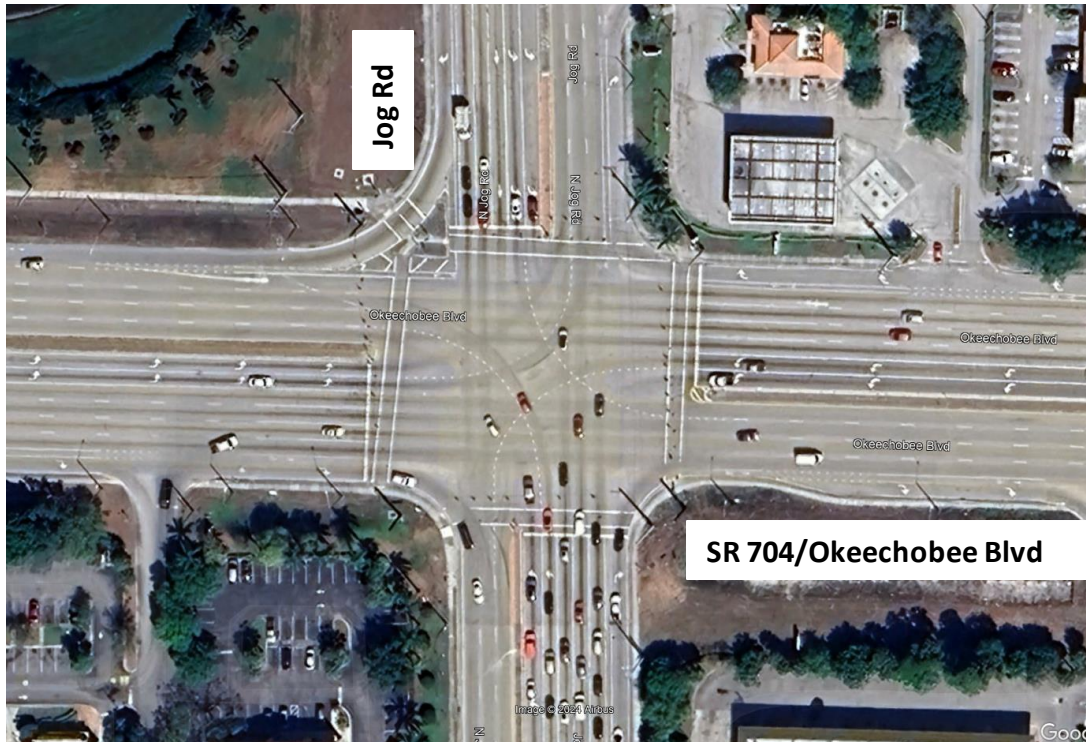
D4 - 93851000 (1.98)

D4 - 86080550 (1.53)

D4 - 86100000 (23.88)

D2 - 71130000 (2.78)

D6 - 87072000 (6.67)



Intersection Features	Yes/No	Comment
High Emphasis Crosswalks	.	
Backplates	.	
Signage	.	
Yellow Retroreflective Tape	.	
High Visibility Pavement Markings		
Skip guidelines markings	✓	
Pedestrian Signals	✓	
Lighting	✓	Determine the need
One Signal Head per Lane	✓	
Exclusive Left Turn Lanes	✓	
Exclusive Right Turn Lanes	✓	Channelized SB RT Lane
Bike Lanes	.	
Other	.	



# Sister Intersections



# Sister Intersections Features

Intersection Features	Study Intersection Jog Road at Okeechobee Blvd	Sister Intersections					Comment
		1: SR 706/ Indiantown Rd & Central Blvd	2: SR 84 & University Dr	3: Hillsboro Blvd at SR 7	4: Hwy 17 & Kingsley Ave	5: SR 968/Flagler St at SW 107th Ave	
High Emphasis Crosswalks		✓	.	✓	✓	✓	
Backplates		✓	✓	✓	✓	✓	1, 2, 3, 4: EB/WB
Signage		✓	✓	.	✓	.	1, 2: Turning Vehicles Stop for Pedestrian 1: U-Turn Yield to Right Turn on mast arms 4: No U-Turn, Do Not Block Intersection
Yellow Retroreflective Tape		✓	.	✓	.	✓	1: EB/WB 3: WB
High Visibility Pavement Markings		✓	✓	✓	✓	✓	
Skip guidelines markings	✓	✓	✓	✓	✓	✓	
Pedestrian Signals	✓	✓	✓	✓	✓	✓	
Lighting	✓ <sup>1</sup>	✓	.	✓	✓	✓	
One Signal Head per Lane	✓	✓	✓	✓	✓	.	
Exclusive Left Turn Lanes	✓	✓	N/A	✓	✓	✓	4: NB, SB, EB
Exclusive Right Turn Lanes	✓ <sup>2</sup>	✓	N/A	✓	✓	.	1, 4: EB 4: SB
Bike Lanes		✓	✓	✓	.	.	
Other			One Way (WB)		Channelized Turn Lanes	.	

<sup>1</sup> Determine the need

<sup>2</sup> Channelize SB RT Lane

# N Jog Rd & Okeechobee Blvd - Planned Work Program Improvements & Potential Improvements Via Push Button

## Planned Work Program Projects:

FM 449279.1 - SHSP Emphasis Area (S) – Intersection & Vulnerable Road Crashes - **Add Lighting**  
 Production Date: 3/3/2025

## Quick Potential Improvements Implemented Via Push Button:

- Addition of High Emphasis Crosswalks – Work Document prepared
- Installation of Backplates with Yellow Retroreflective Tape: Programmed for June 2024 in the Push Button Program
- Installation of “One Way” signs and “Do Not Enter” signs at median openings – Work Document Prepared
- Incorporation of Pedestrian Signage – Work Document Prepared

Intersection Features	Yes/No	Comment
High Emphasis Crosswalks	.	
Backplates	.	
Signage	.	
Yellow Retroreflective Tape	.	
High Visibility Pavement Markings		
10' guidelines markings	✓	
Pedestrian Signals	✓	
Lighting	✓	Determine the need
One Signal Head per Lane	✓	
Exclusive Left Turn Lanes	✓	
Exclusive Right Turn Lanes	✓	Channelized SB RT Lane
Bike Lanes	.	
Other	.	

## Coordination with FDOT Maintenance Office and Palm Beach County:

- Refurbishment of Pavement Markings
- Verification of Pedestrian Clearance Times



# Improvements Implemented at N Jog Rd & Okeechobee Blvd



Pedestrian Signage

## Head-On Crashes Prevention Treatment



High Emphasis Crosswalks

# Example 2: SR 845/Powerline Rd & SR 870/Commercial Blvd

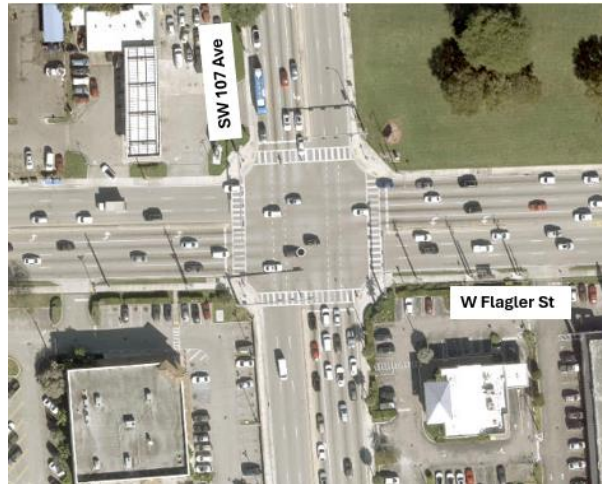
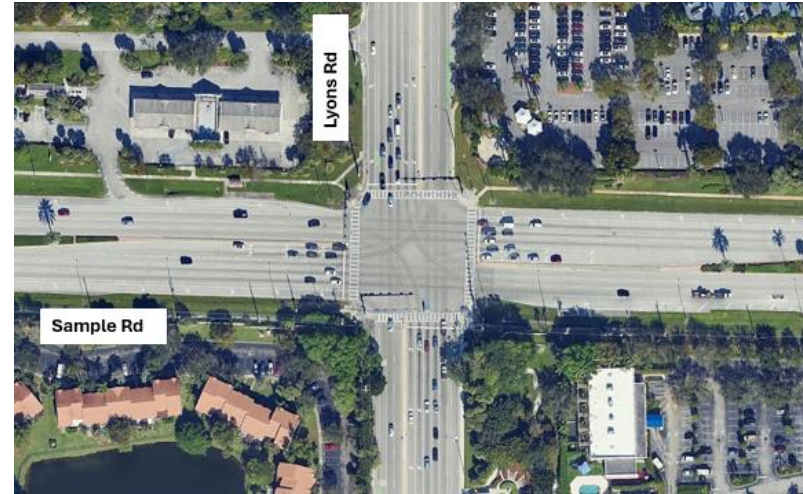
7	SR 870 / Commercial Blvd 86014000 (6.24)	Broward	C4	4	6	2.59	4.54	1.95	REAR-END HEAD-ON	D4 - 93851000 (1.98)
	SR 845 / Powerline Rd / NW 9th Ave 86065000 (3.57)									D4 - 86028000 (3.98)
										D6 - 87072000 (1.05)
										D6 - 87072000 (6.67)
										D4 - 86080550 (1.53)



Intersection Features	Yes/No	Comment
High Emphasis Crosswalks	•	Only on south leg
Backplates	✓	EB/WB
Signage	✓	Next Signal Intersection signs
Yellow Retroreflective Tape	•	
High Visibility Pavement Markings	✓	
Skip guidelines markings	✓	
Pedestrian Signals	✓	
Lighting	✓	Determine the need
One Signal Head per Lane	✓	
Exclusive Left Turn Lanes	✓	
Exclusive Right Turn Lanes	✓	
Bike Lanes	•	
Other	•	



# Sister Intersections



# Sister Intersections Features

Intersection Features	Study Intersection Powerline Rd & Comercial Blvd	Sister Intersections					Comment
		1: SR 706/ Indiantown Rd & Central Blvd	2: Lyons Rd & SR 834/ Sample Rd	3: SW 107th Ave & SW 88th Street/Kendall Dr	4: SR 968/Flagler St at SW 107th Ave	5: SR 84 & University Dr	
High Emphasis Crosswalks	1	✓	✓	✓	✓	.	
Backplates	✓ <sup>2</sup>	✓	✓	✓	✓	✓	1: EB/WB
Signage	✓ <sup>3</sup>	✓	✓	✓	.	✓	1, 3: Turning Vehicles Stop for Pedestrian 1: U-Turn Yield to Right Turn on mast arms 2: Next Signal Intersection signs, 2: No U-Turn Sign (EB) 3: Next Signal Intersection signs 3: School Crossing Signs
Yellow Retroreflective Tape	.	✓	✓	✓	✓	.	1, 3: EB/WB
High Visibility Pavement Markings	✓	✓	✓	✓	✓	✓	
Skip guidelines markings	✓	✓	✓	✓	✓	✓	
Pedestrian Signals	✓	✓	✓	✓	✓	✓	
Lighting	✓ <sup>4</sup>	✓	✓	✓	✓	.	
One Signal Head per Lane	.	✓	✓	✓	.	✓	
Exclusive Left Turn Lanes	✓	✓	✓	✓	✓	N/A	
Exclusive Right Turn Lanes	✓	✓	✓	.	.	N/A	1: EB
Bike Lanes	.	✓	✓	.	.	✓	
Other			Green Colored Bike lanes NB/SB			One Way (WB)	

<sup>1</sup> Only on south leg

<sup>2</sup> EB/WB

<sup>3</sup> Next Signal Signs

<sup>4</sup> Determine the need

# Powerline Rd & Commercial Blvd - Planned Work Program Improvements & Potential Improvements Via Push Button

## Safety Study Proposed Improvements:

Extend all left-turn and right-turn storage lanes, Provide high emphasis crosswalks, Signal improvements (backplates, yellow reflective borders); Pedestrian Signage, Head-On crashes prevention signage (driveways).

## Planned Work Program Projects:

- **FM 446196.1:** Lighting Retrofit, Pedestrian Signalization Upgrades, Replacement of detection Loops. This project will incorporate some elements from the safety study: Pedestrian Signage, high emphasis crosswalks, Head-on crashes prevention signage (driveways)

Estimated Work Begin Date: 12/04/24

- **FM 441944.1 & 441944.2:** Install & Deploy Adaptive Traffic Controllers & Vehicle Detection

Estimated Work Begin Date: 12/04/24

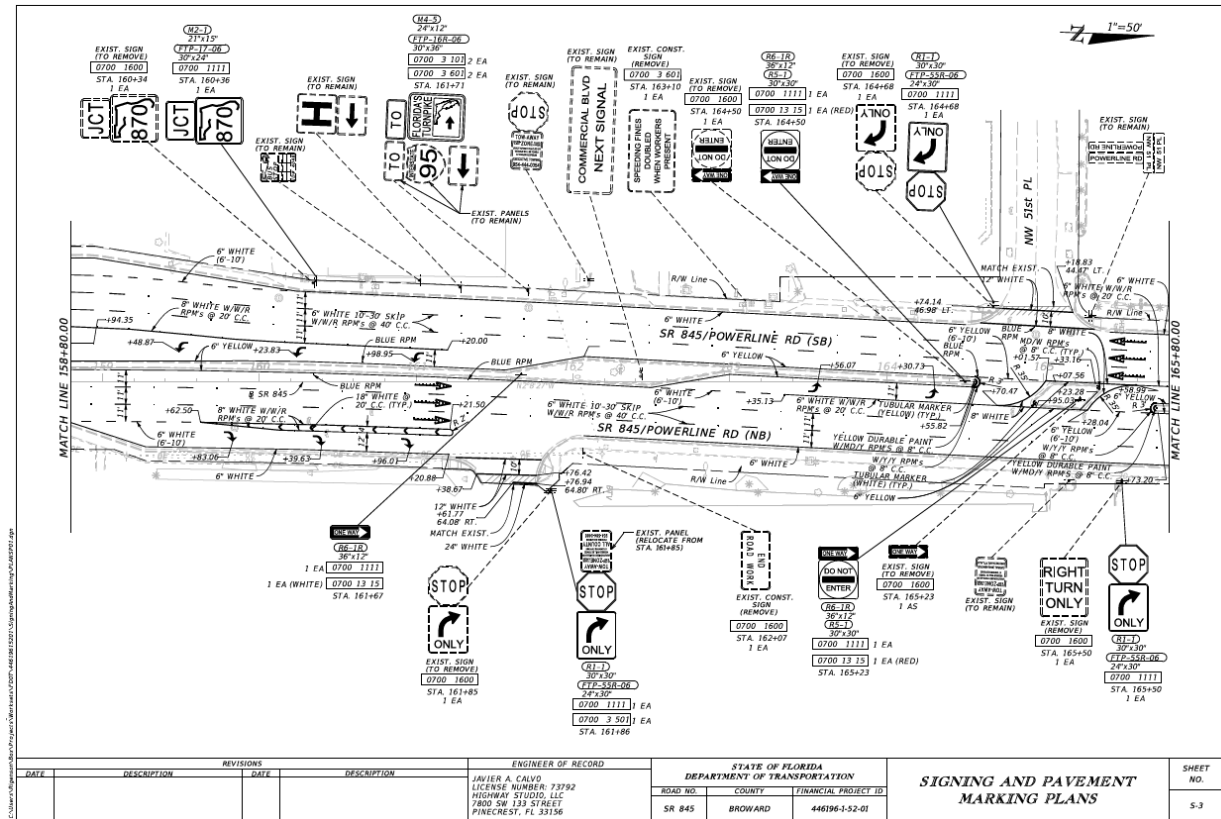
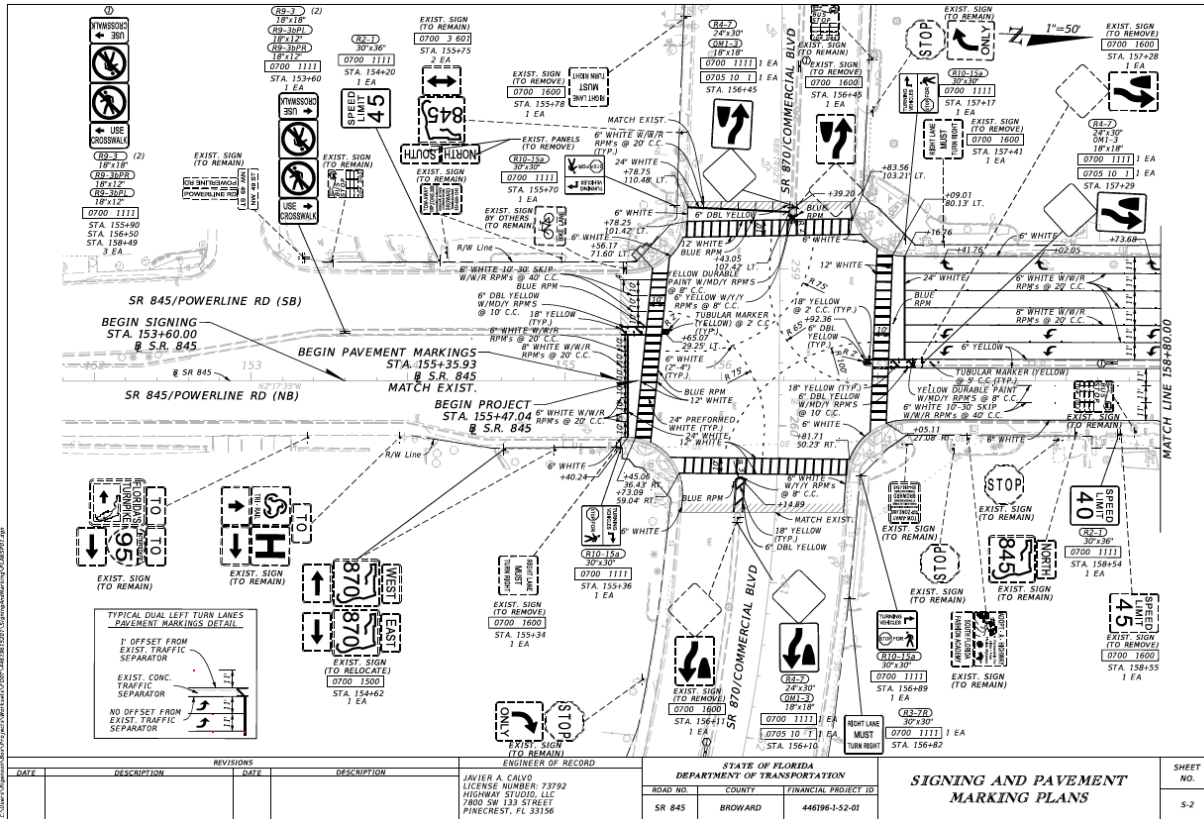
- **FM 448408.1:** The resurfacing project along Commercial Blvd excludes this intersection for now. However, its boundaries may expand pending safety funding to extend all left-turn and right-turn storage lanes as recommended in the safety report.

Estimated Work Begin Date: 10/14/25



# Powerline Rd & Commercial Blvd - Planned Work Program Improvements

FM 446196.1



# Implementation Advantages/ Challenges

## Advantages

- Safety benefit achieved through quick implementation of short-term improvements
- Consistent application of potential countermeasures (less deviation from driver expectancy)
- Collaboration - shared responsibility for Safety

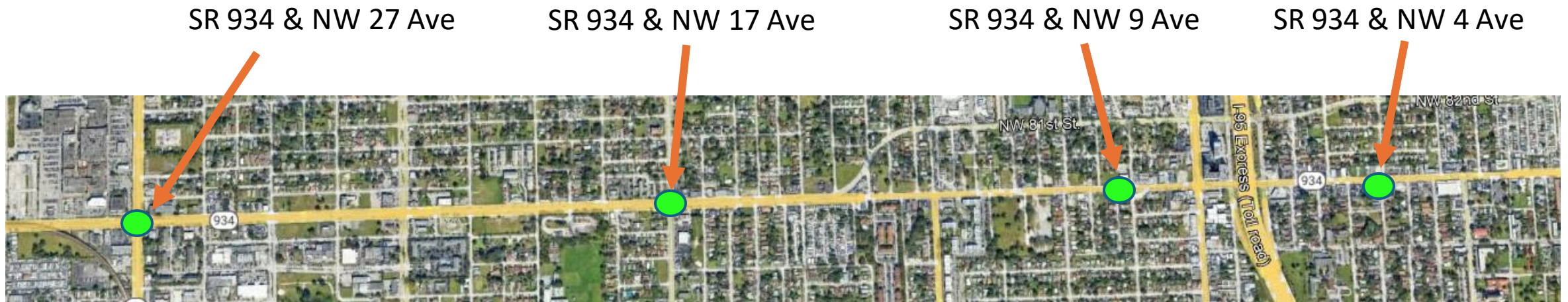
## Challenges

- ROW and Budget limitations
- Improvements through programmed projects may take longer
- Need for additional analysis/feasibility studies

# District 6 STRIDES 2 Zero Implementation

- Presentation Outline

- Four intersections along SR 934/NW 79th St
- Background, Implementation, and Challenges

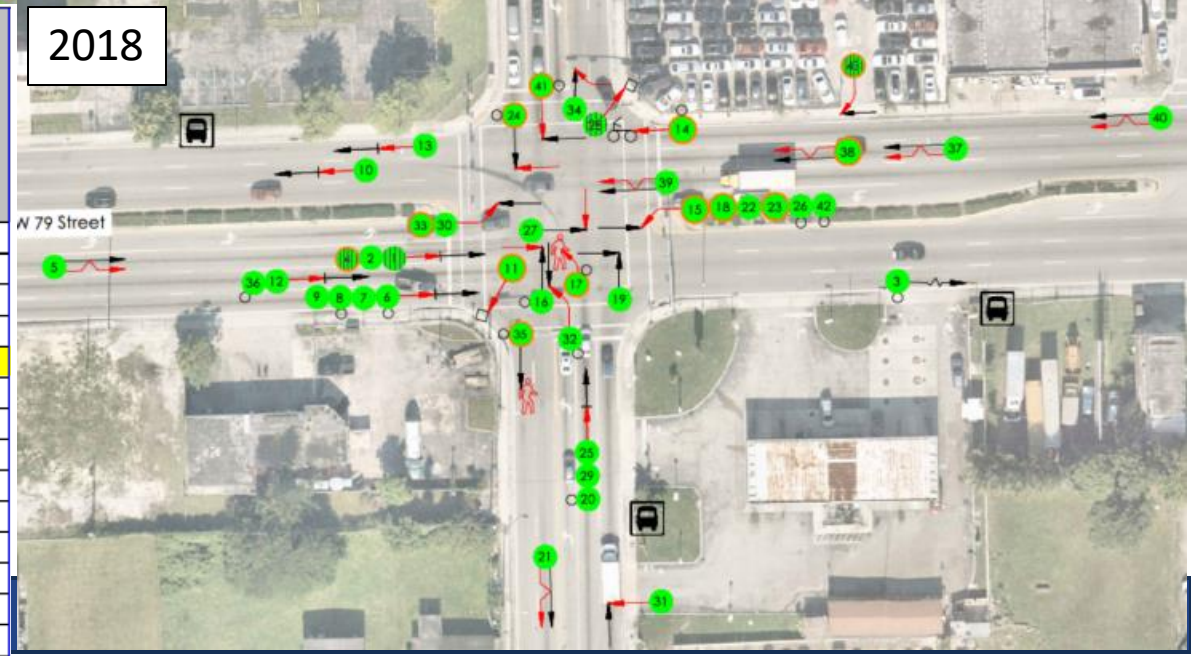
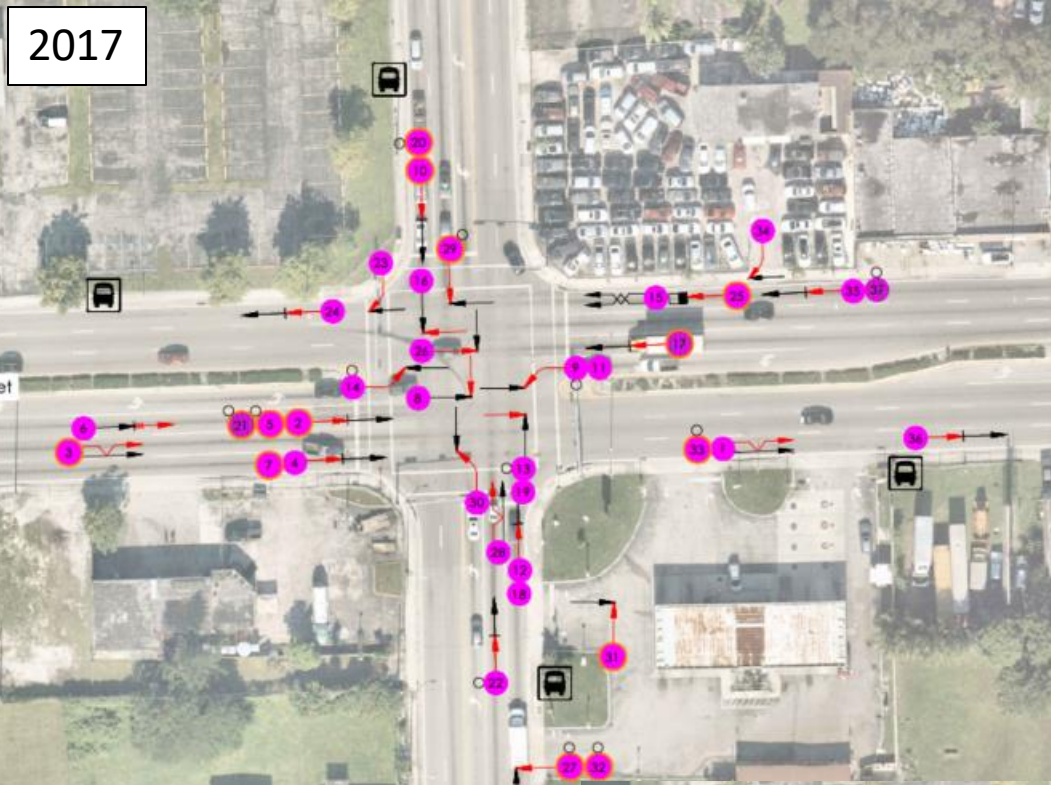
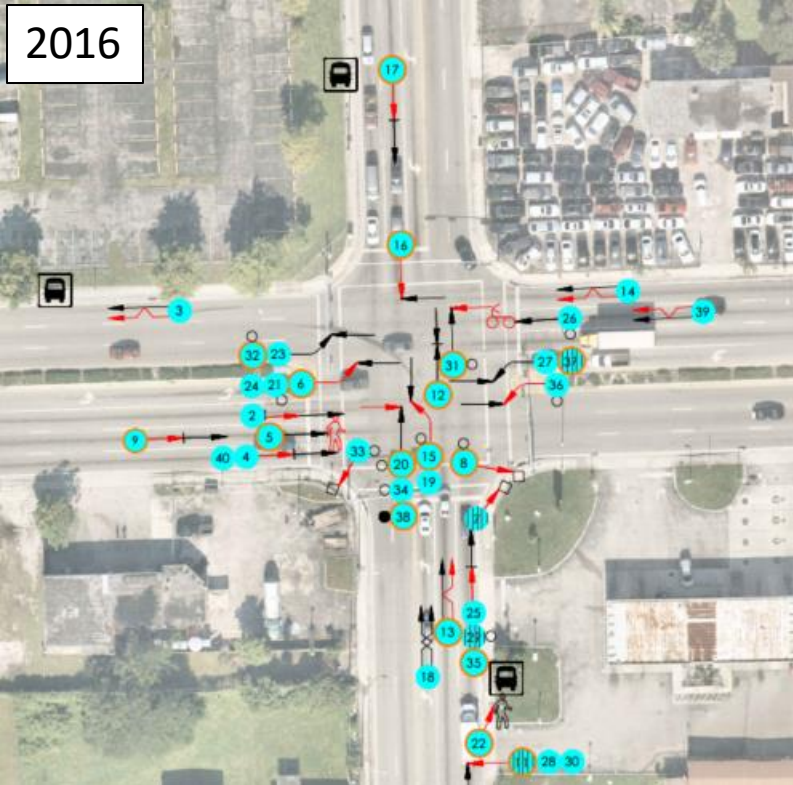




# History

- Originally, the Department programmed a RRR project along SR 934/NW 79 Street from NW 25 Avenue to NW 1 Place under FM 410646-4
- Back in fiscal year 2019 a RRR Safety Review was performed and discovered a pattern of pedestrian and bicyclist crashes occurring at some of the intersection within the corridor.
- After an additional safety study was conducted, all safety improvements were presented and approved to be under FM 410646-7.
- When Safe Strides to Zero began, one of the intersections on the list provided by Central Office was along NW 79 Street at NW 27 Avenue, and at NW 17 Avenue.
- An additional study for SS2Z was conducted in 2021, and those improvements were presented and approved to be added to the scope of the safety project FM 410646-7.

# SR 934 and NW 17 Avenue



SR 934/NW 79 Street and NW 17 Avenue  6 Lane x 4 Lane, Signalized, with Turn Lanes, 4 Leg Intersection		Number of Crashes			3 Year Total Crashes	Mean Crashes Per Year	%	Expected Annual Crash Value		Abnormal 90th Percentile	Abnormal 95th Percentile
		Year						Abnormally High Crashes per year			
		2016	2017	2018					90th percentile		
		CRASH TYPE	2016	2017				2018	3 Year Total Crashes		
Rear End	9	15	14	38	12.67	31.7%	45.88	50.22			
Head On	0	0	0	0	0.00	0.0%	0.27	0.31			
Angle	8	8	6	22	7.33	18.3%	13.89	15.11			
Left Turn	11	4	9	24	8.00	20.0%	8.51	9.37			
Right Turn	0	2	2	4	1.33	3.3%	0.99	1.11	X	X	
Sideswipe	6	5	6	17	5.67	14.2%	13.37	14.65			
Backed Into	0	1	0	1	0.33	0.8%	0.54	0.61			
Pedestrian	2	0	2	4	1.33	3.3%	1.75	1.96			
Bicycle	1	0	1	2	0.67	1.7%	1.02	1.15			
Fixed Object	3	0	2	5	1.67	4.2%	1.70	1.89			
Other Non-Collisions	0	0	0	0	0.00	0.0%	1.65	1.85			
Overturn/Rollover	0	0	0	0	0.00	0.0%	0.59	0.67			
Others	0	2	1	3	1.00	2.5%	6.89	7.62			
<b>Total Crashes</b>	<b>40</b>	<b>37</b>	<b>43</b>	<b>120</b>	<b>40.00</b>	<b>100.0%</b>	<b>85.28</b>	<b>92.50</b>			





# B/C Analysis at NW 17 Avenue

Cost Component	Cost
Roadway	\$47,758
Signing and Pavement Markings	\$28,157
Signalization	\$18,332
<b>Sub Total</b>	<b>\$94,247</b>
Mobilization - 10%	\$9,425
Maintenance of Traffic - 10%	\$9,424
Contingency - 30%	\$28,274
<b>Total Construction Cost</b>	<b>\$141,370</b>
Preliminary Engineering (PE) - 40%	\$56,548
Construction Engineering and Inspection (CEI) - 20%	\$28,274
Post Design - 8%	\$11,310
<b>Total Cost</b>	<b>\$237,502</b>

<b>Annualized safety benefits</b>	<b>\$860,407</b>
<b>Annualized project cost</b>	<b>\$19,884</b>
<b>B/C Ratio</b>	<b>43.3</b>
<b>NPV</b>	<b>\$5,740,935</b>

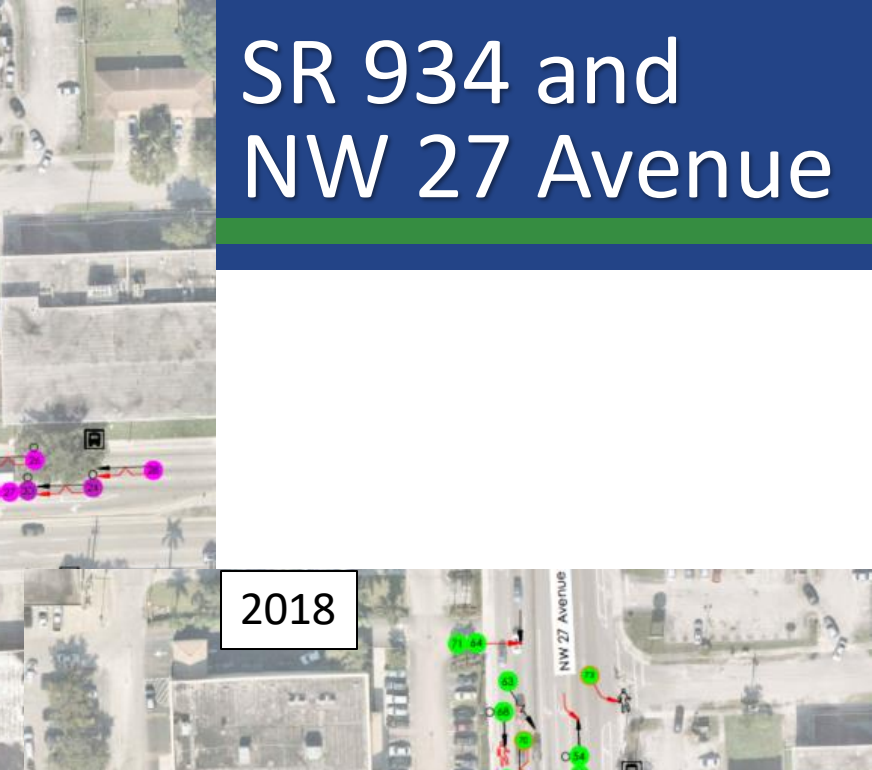
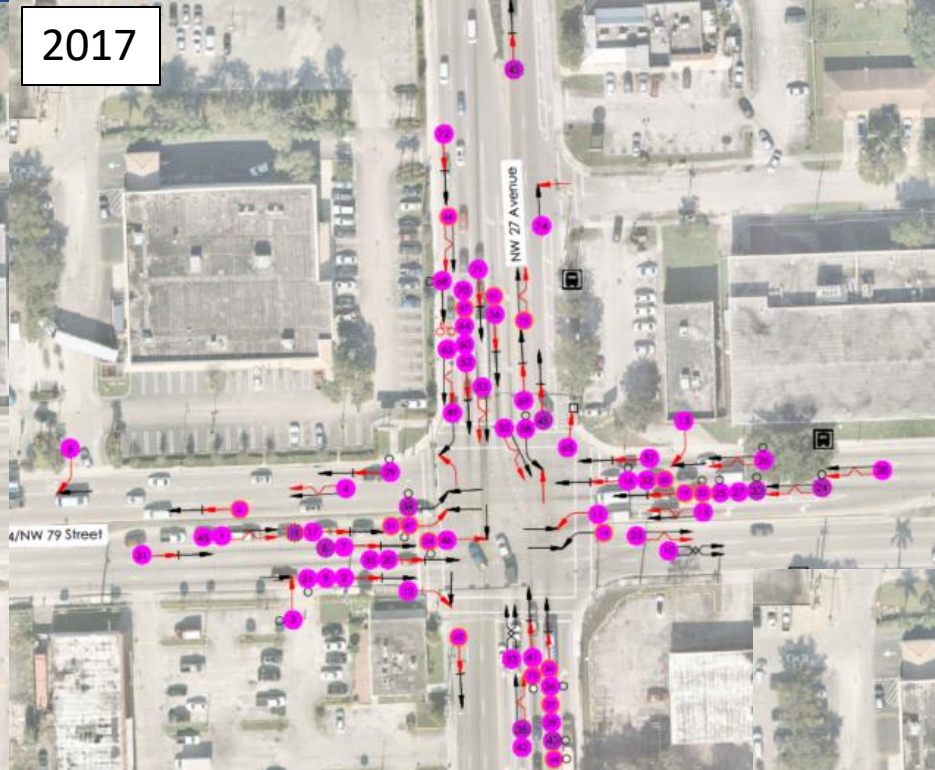
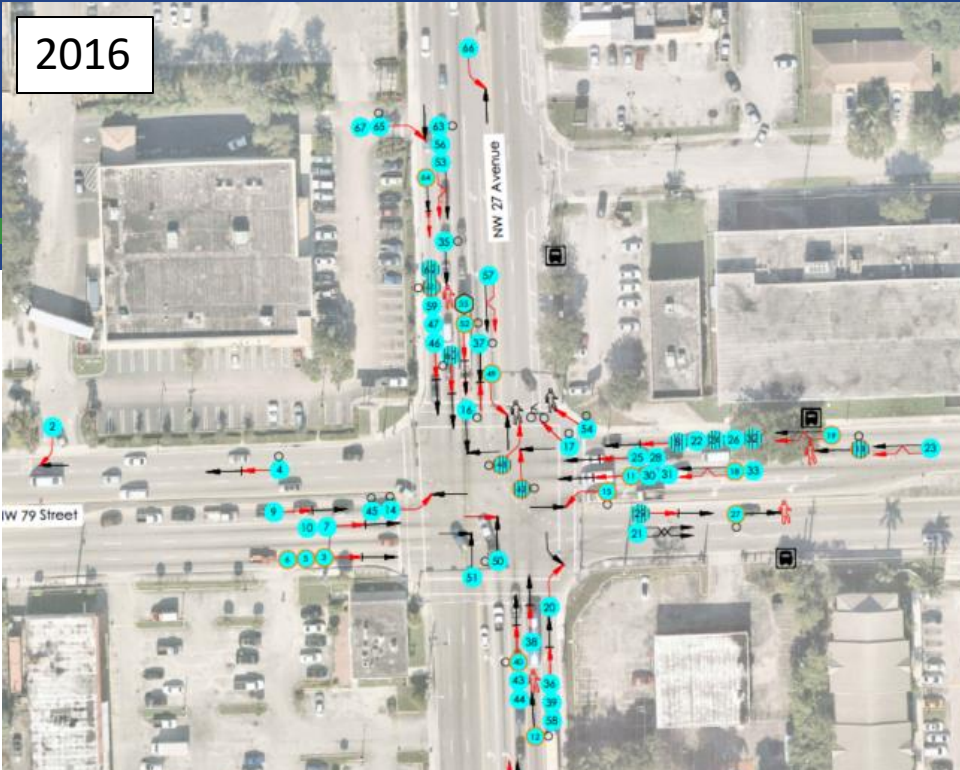
Countermeasure	CRF <sup>1</sup>
Add a supplementary signal head facing eastbound and westbound traffic	0.14 <sup>2</sup>
Add backplates and retroreflective borders to all signals	0.20
Offset eastbound and westbound left turn lanes	0.38
Install special emphasis crosswalk markings	0.40

Note: 1. Crash Modification Factor Clearinghouse

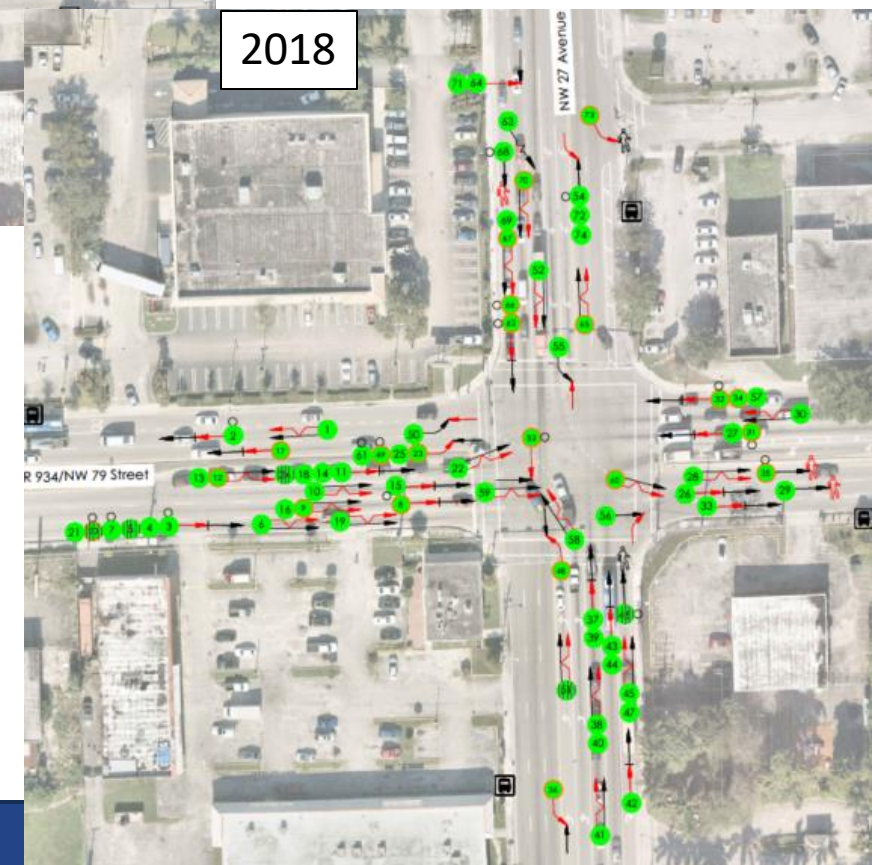
2. 50% of CRF 0.28 for installing a primary signal head is applied for a conservative estimate since the signals are mounted on the mast arm upright



# SR 934 and NW 27 Avenue

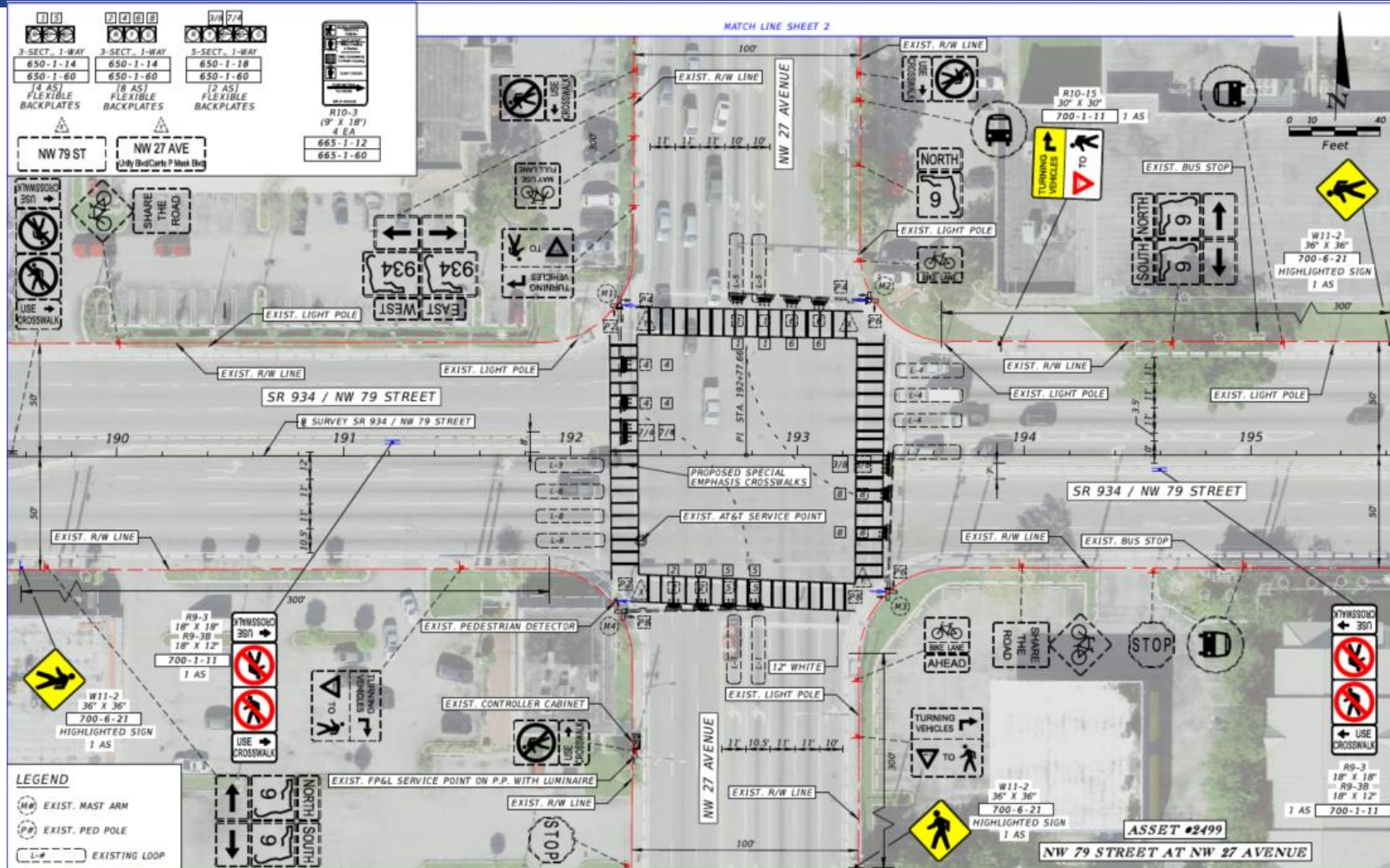


SR 934/NW 79 Street and SR 9/NW 27 Avenue 6 Lane x 4 Lane, Signalized, with Turn Lanes, 4 Leg Intersection		Number of Crashes			3 Year Total Crashes	Mean Crashes Per Year	%	Expected Annual Crash Value		Abnormal 90th Percentile	Abnormal 95th Percentile	
		Year						Abnormally High Crashes per year	Abnormal 90th Percentile			Abnormal 95th Percentile
		2016	2017	2018								
CRASH TYPE	Rear End	33	42	28	103	34.33	47.7%	45.88	50.22			
	Head On	1	0	0	1	0.33	0.5%	0.27	0.31	X	X	
	Angle	5	4	3	12	4.00	5.6%	13.89	15.11			
	Left Turn	6	7	11	24	8.00	11.1%	8.51	9.37			
	Right Turn	4	3	1	8	2.67	3.7%	0.99	1.11	X	X	
	Sideswipe	10	17	25	52	17.33	24.1%	13.37	14.65	X	X	
	Backed Into	1	0	0	1	0.33	0.5%	0.54	0.61			
	Pedestrian	6	0	5	11	3.67	5.1%	1.75	1.96	X	X	
	Bicycle	1	1	0	2	0.67	0.9%	1.02	1.15			
	Fixed Object	0	1	0	1	0.33	0.5%	1.70	1.89			
	Other Non-Collisions	0	0	0	0	0.00	0.0%	1.65	1.85			
	Overturn/Rollover	0	0	0	0	0.00	0.0%	0.59	0.67			
	Others	0	0	1	1	0.33	0.5%	6.89	7.62			
	<b>Total Crashes</b>	<b>67</b>	<b>75</b>	<b>74</b>	<b>216</b>	<b>72.00</b>	<b>100.0%</b>	<b>85.28</b>	<b>92.50</b>			





# Recommendations



# B/C Analysis at NW 27 Avenue

Cost Component	Cost
Roadway	\$1,897
Signing and Pavement Markings	\$42,228
Signalization	\$17,955
<b>Sub Total</b>	<b>\$62,080</b>
Mobilization - 10%	\$6,208
Maintenance of Traffic - 10%	\$6,208
Contingency - 30%	\$18,624
<b>Total Construction Cost</b>	<b>\$93,120</b>
Preliminary Engineering (PE) - 50%	\$46,560
Construction Engineering and Inspection (CEI) - 20%	\$18,624
Post Design - 8%	\$7,450
<b>Total Cost</b>	<b>\$165,754</b>

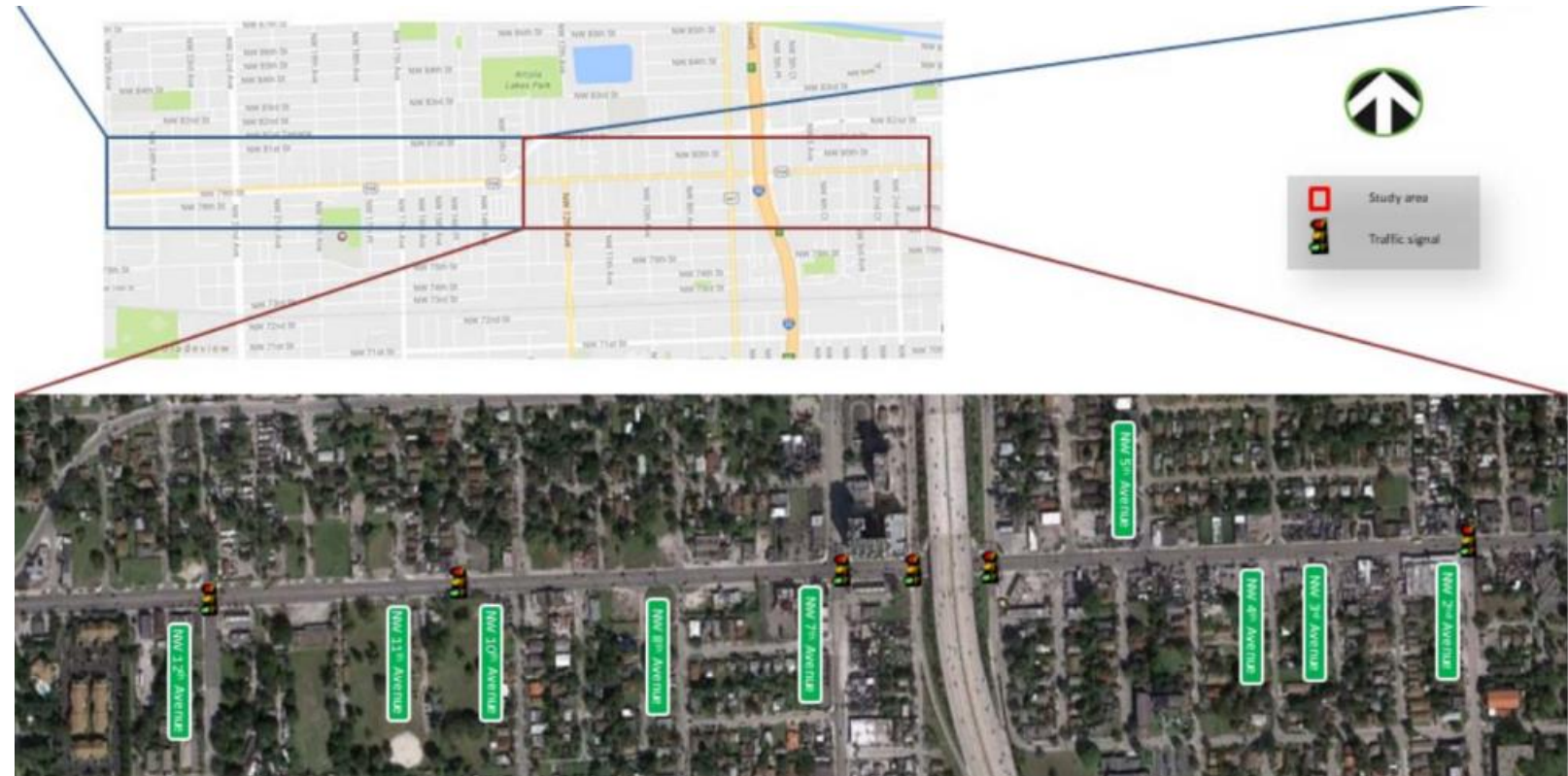
<b>Annualized safety benefits</b>	<b>\$1,013,503</b>
<b>Annualized project cost</b>	<b>\$14,057</b>
<b>B/C Ratio</b>	<b>72.1</b>
<b>NPV</b>	<b>\$7,369,413</b>

Countermeasure	CRF <sup>1</sup>
Add backplates and retroreflective borders to all signals	0.20
Special emphasis crosswalk markings	0.40
Prohibit left turns (with delineators) at NW 79 Terrace	0.64

Note: 1. Crash Modification Factor Clearinghouse

# Challenges

- SR 934/NW 79 Street is one of the top locations for pedestrian and bicycle crashes in District 6.
- In addition to the Safe Strides to Zero Initiative, the safety study made recommendations to add midblock crossings and signalize existing stop-controlled intersections.
- Crash analyses, pedestrian counts, adequate spacing, and existing grid conditions were taken into consideration for all recommendations.
- For this presentation we will be highlighting NW 9 Avenue and NW 4 Avenue as the recommendations have changed due to challenges encountered during the design phase.





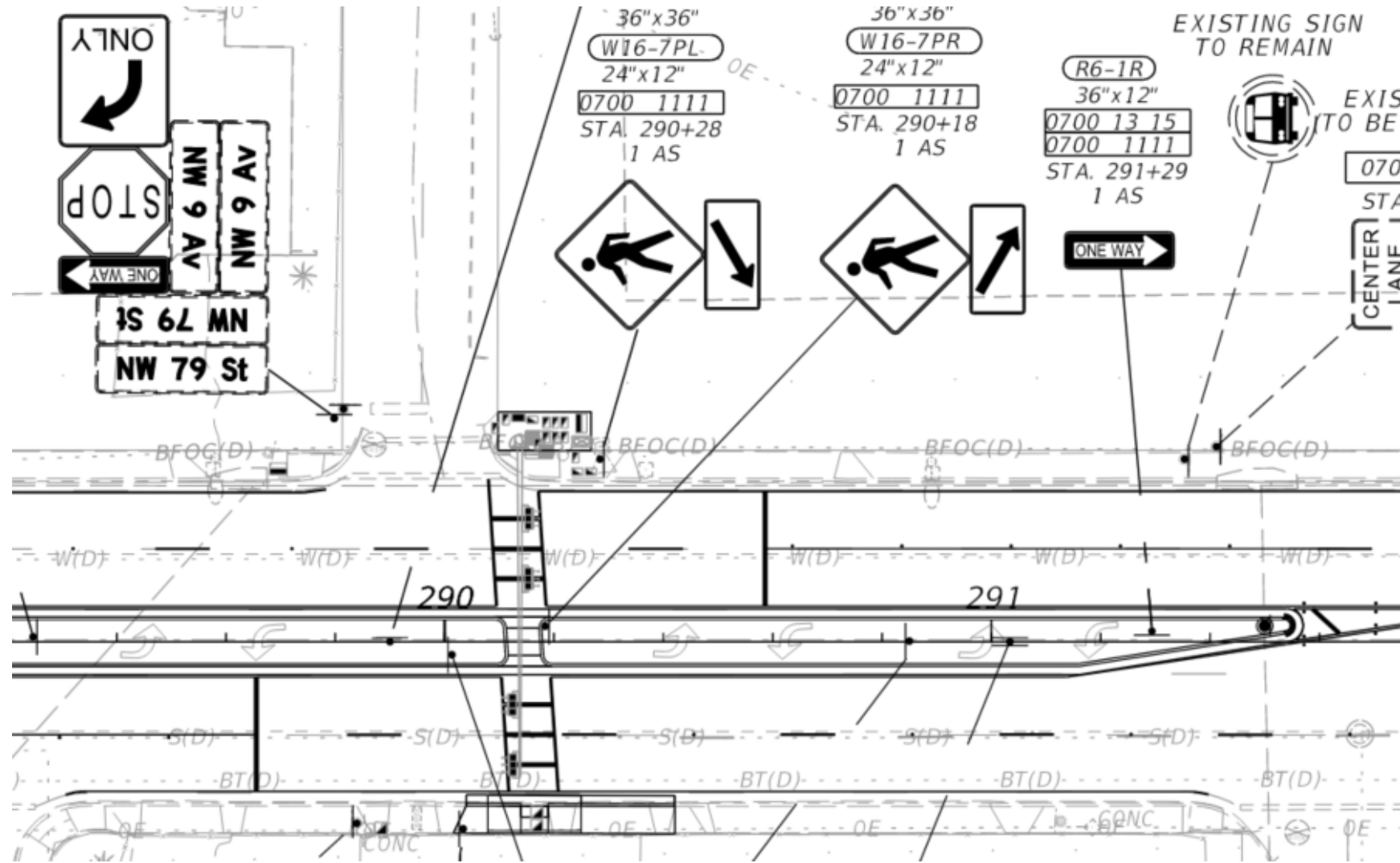




# NW 9 Avenue Challenges and Solutions



# NW 9 Avenue Challenges and Solutions

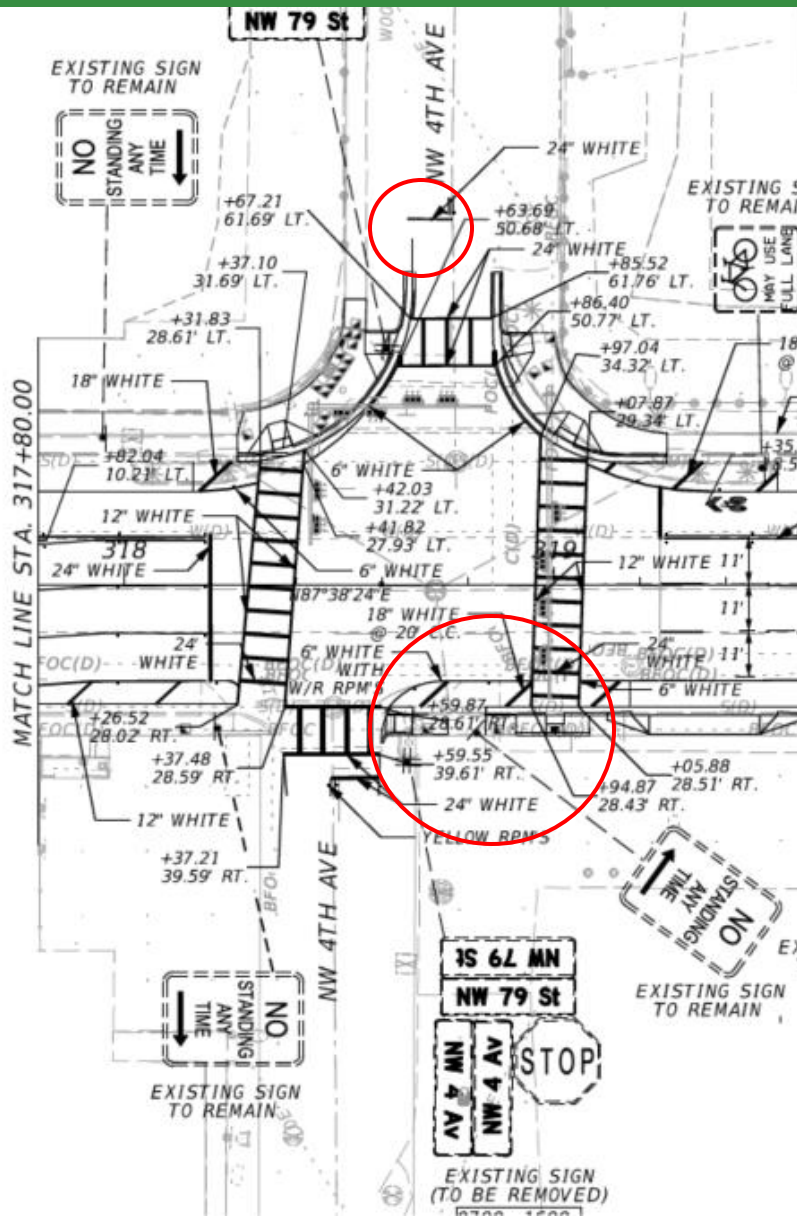




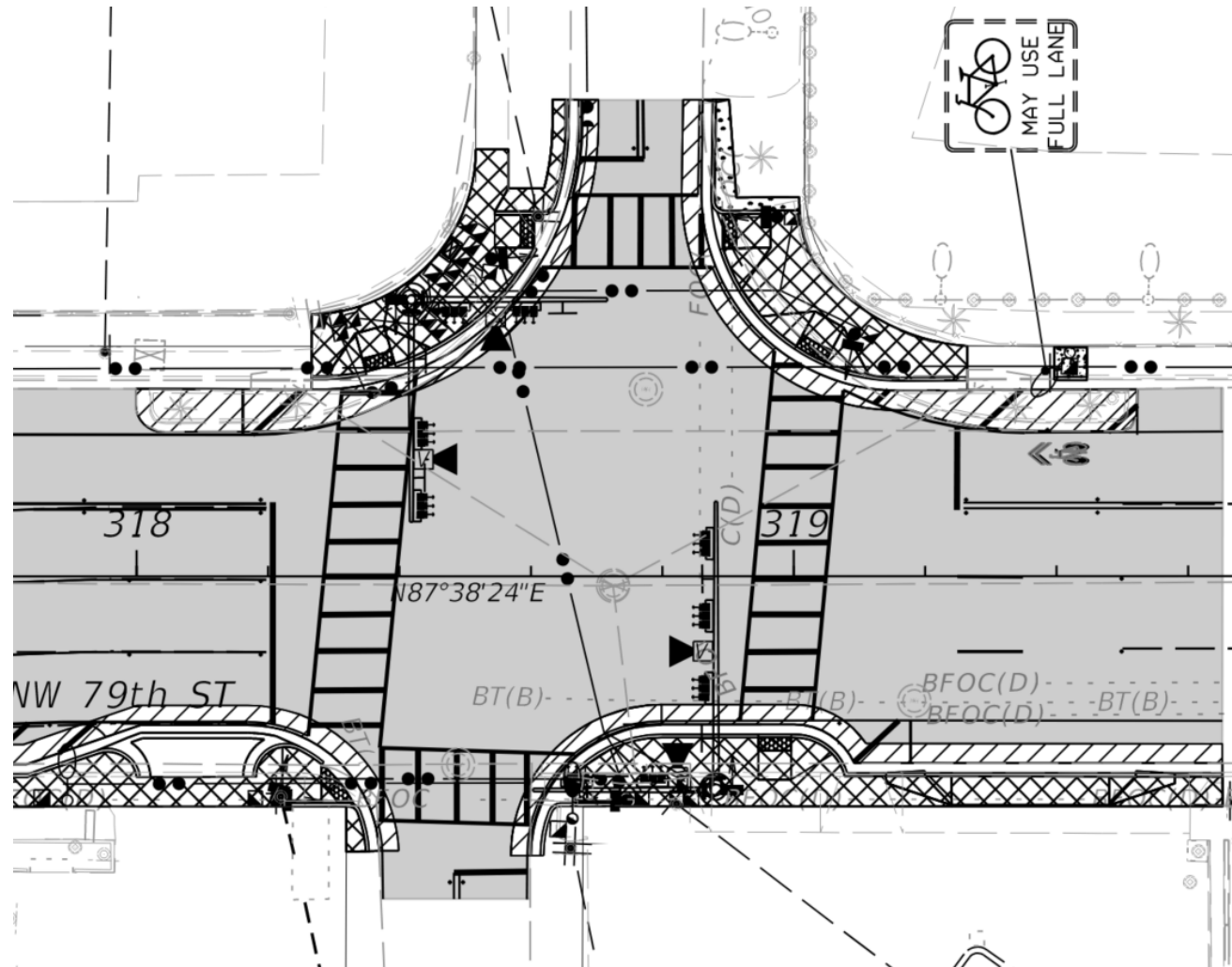




# NW 4 Avenue Challenges and Solutions



# NW 4 Avenue Challenges and Solutions





# Other Activities: Extension to Roadway Segments

FDOT Roadway Safety Management Application  
Version 1.0

District: All
Context Class: All
Statewide Rank: Any
District Rank: Any
Ranking Method: FI Excess Expected

Reset Filters
CLEAR
REFRESH
☰

## Segment Network Screening Analysis

Listed by SHS Roadway Segment Ranking

State Road Designation: **SR-55**  
 Roadway ID: **15150000**  
 Milepost: **25.11 - 25.41 (0.30 mi)**  
 District: **D7**  
 Context Class: **C3C**

Statewide Rank by FI Excess Expected Crashes: #1  
 District Rank by FI Excess Expected Crashes: #1

Statewide Rank by Total Excess Expected Crashes: #9  
 District Rank by Total Excess Expected Crashes: #1

Total Excess Expected Crashes: **173.33 per year per mile**  
 FI Excess Expected Crashes: **99.42 per year per mile**

### Notes

- Rank shows Empirical Bayes (EB)-Adjusted Excess Expected Average Crash Frequency based on crashes from 2015 to 2019.
- Rank is available by Fatal and Injury (FI) crashes and Total crashes.
- Limited Access (LA) roads and freeways are not included.
- SHS segments within 350 feet of an Exhibit A TS/IMTS device or a roundabout identified from the 'Median Type TDA' layer in the FDOT Open Data Hub are excluded.

FDEP, Esri, TomTom, Garmin, FAO, NOAA, USGS, EPA | Florida Department of Transportation. 605 Suwannee St, Tallahassee, FL, 32399, (850) 414-4100. Powered by Esri

### Centerline Miles by District

District	Centerline Miles
1	1,391.7
2	1,908.2
3	1,983.3
4	871.8
5	1,553
6	333.3
7	633.2

### Max Sliding Window Crashes

Year	Observed	Expected	Predicted
2015	42k	38k	25k
2016	44k	39k	26k
2017	45k	40k	26k
2018	46k	40k	26k
2019	44k	38k	27k

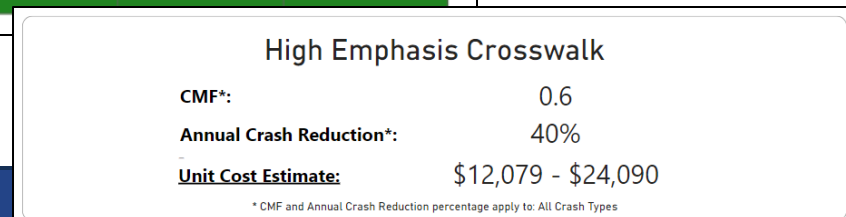
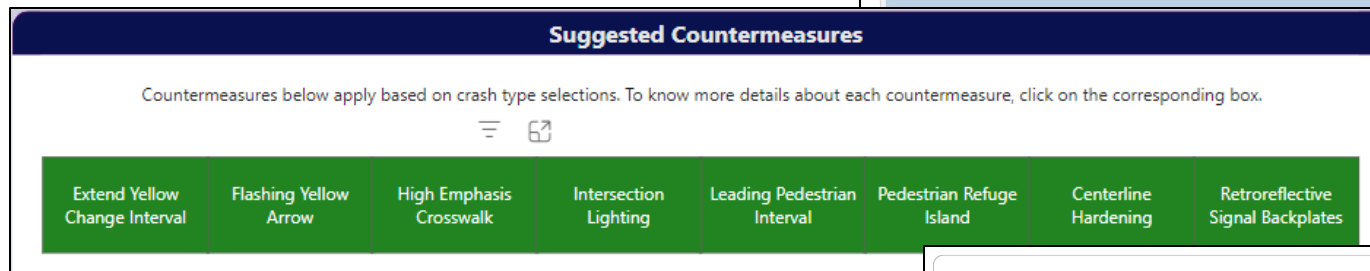
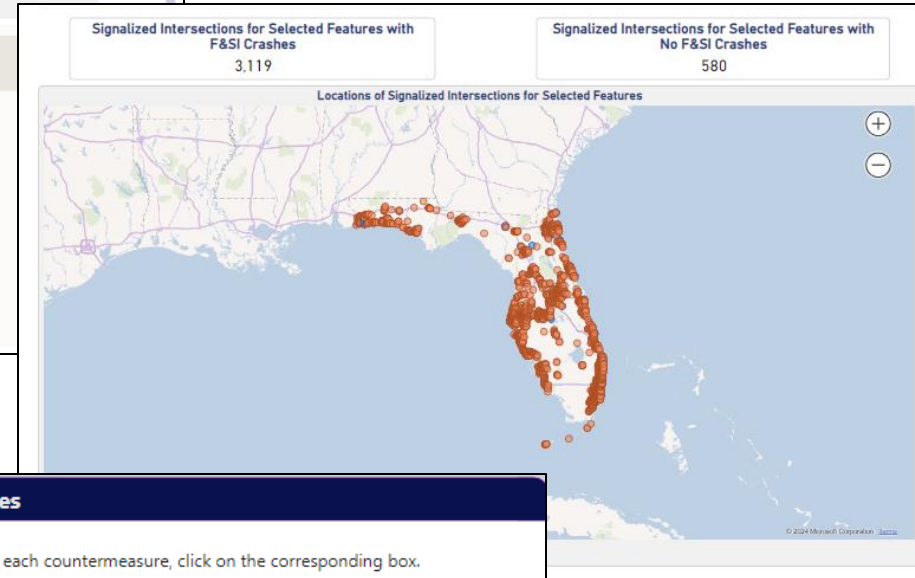
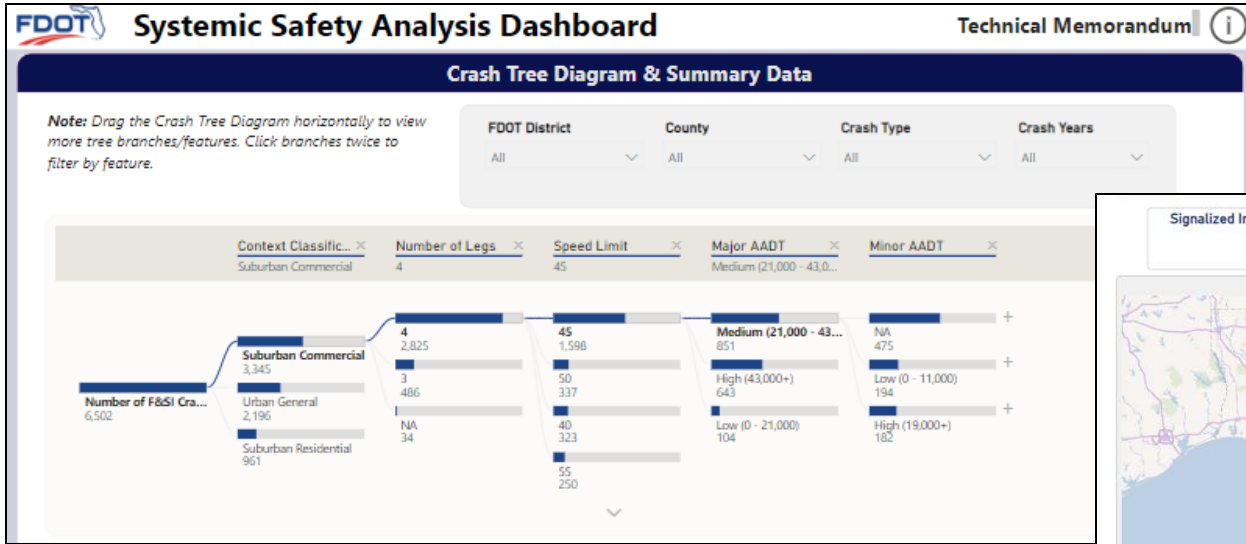
\*Max indicates the numbers are from the sliding window with maximum excess expected crashes.

Max Total Crashes
Max FI Crashes
Max PDO Crashes



Requires FDOT  
ArcGIS for Portal  
Account

# Systemic Safety Analysis of Signalized Intersections



Power BI App  
Publicly  
Accessible



# What Lies Ahead?

- Unsignalized Intersections
- Pedestrian and bicyclist corridor safety
- Midblock pedestrian crossing screening
- Evaluate pedestrian and bicyclist SPFs for Florida per NCHRP Report 1064
- Continue improving process for safety analysis of signalized intersection and roadway segment
- Develop Florida-specific CMFs based on countermeasure implemented

# Safety Message

An isometric illustration of a four-way intersection on a blue road with white lane markings and yellow double lines. A large yellow diamond-shaped sign on the left contains the text 'SHARE THE ROAD' in bold, blue-outlined letters. In the center of the intersection, a person is walking a dog across a crosswalk. A yellow pickup truck is driving through the intersection. A purple semi-truck is stopped at a red octagonal stop sign. A blue sedan is also stopped at a stop sign. A person on a bicycle is riding through the intersection. A motorcycle is in the bottom left corner. A white box truck is on the left side of the road. A yellow van is on the right side of the road. The background is a light blue sky. At the bottom of the graphic, there are logos for FLHSMV (Florida Highway Safety and Motor Vehicles) and the Florida Department of Transportation.

**SHARE THE ROAD**

**TRAFFIC IS NO ONE'S JAM:  
SHARE THE ROAD AND ALLOW EVERYONE  
TO TRAVEL SAFELY TOGETHER.**

*FLHSMV.GOV/ShareTheRoad*

**FLHSMV**  
FLORIDA HIGHWAY SAFETY AND MOTOR VEHICLES

**FLORIDA DEPARTMENT OF TRANSPORTATION**

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SYMPOSIUM**