

Assessment of RCUT Intersections on the Miller Trunk Highway Corridor

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Agenda

1. Overview of Existing Conditions
2. RCUT Overview
3. Data Collected:
 - 1) Geometry – Existing & RCUT Alternatives
 - 2) Peak-Hour Traffic Volumes
 - 3) Signal Timing Plans – Existing & RCUTs
4. Study Approach
5. Simulation Results
6. Q&A

Overview of Existing Conditions



Cirrus/Sugar Maple

Stebner

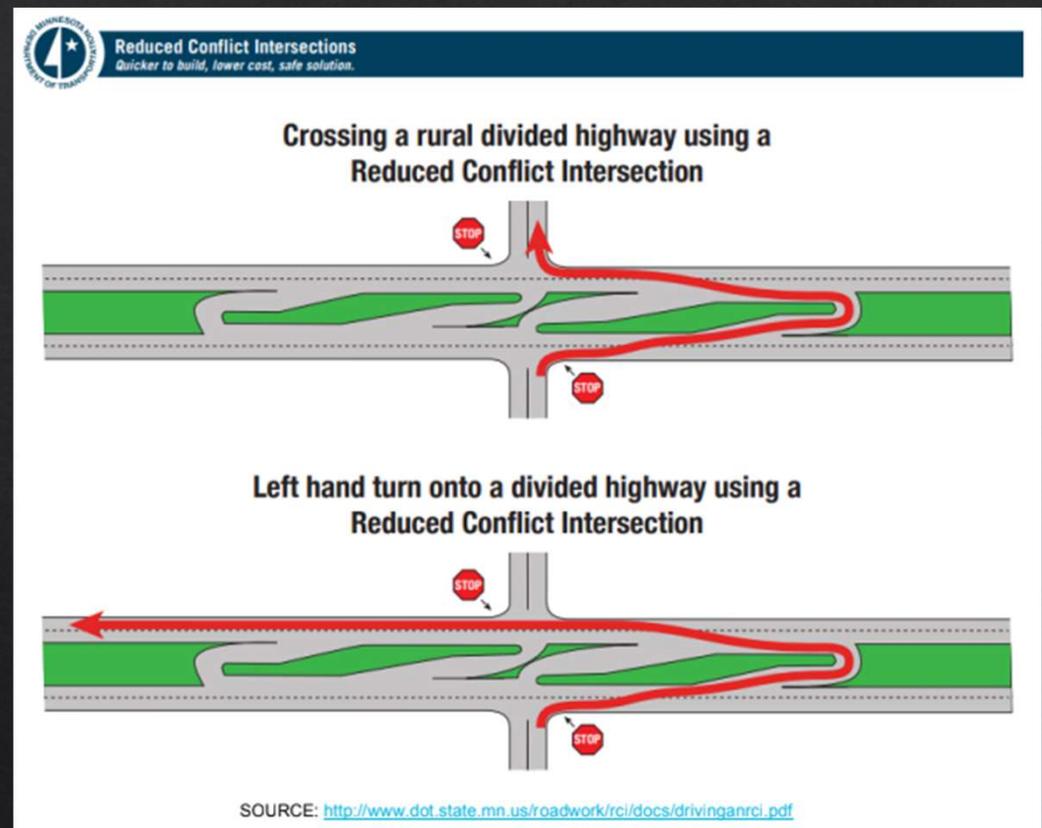
West Arrowhead

RCUT Overview

RCUTs reduce collision points and potential number of crashes

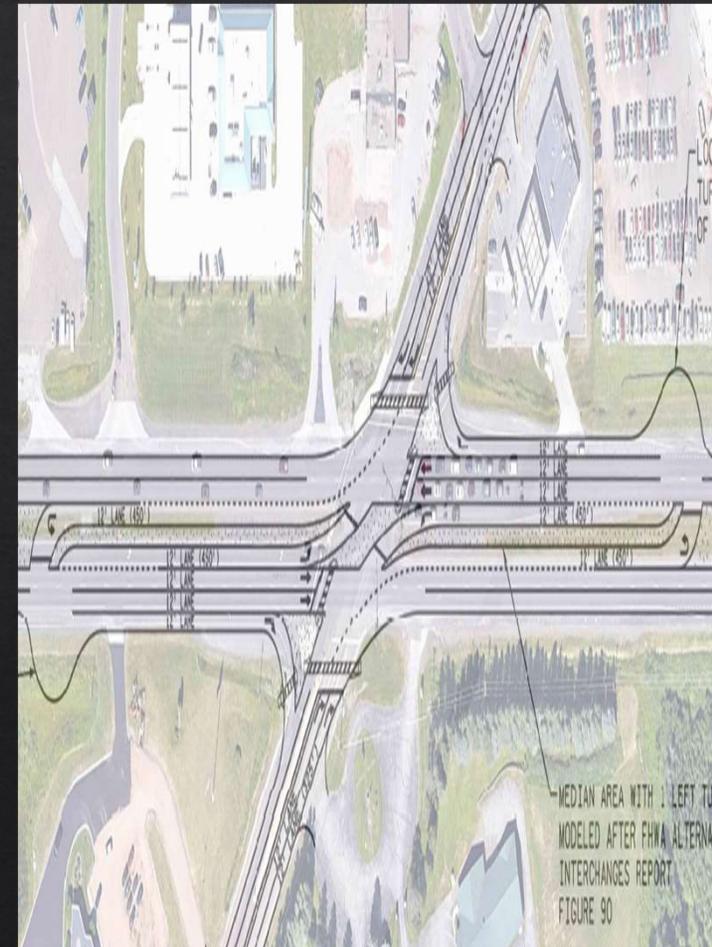
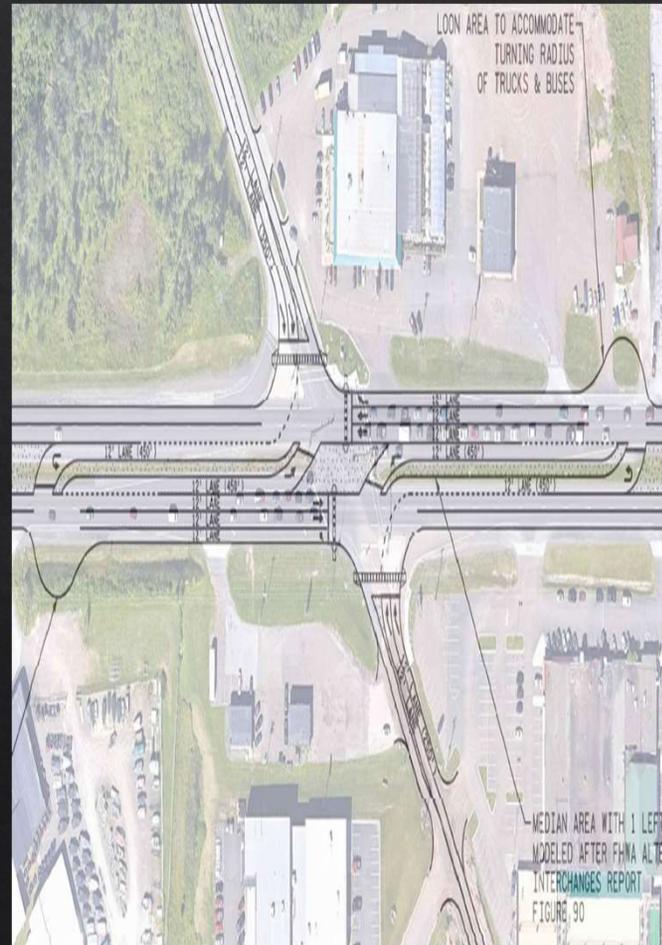
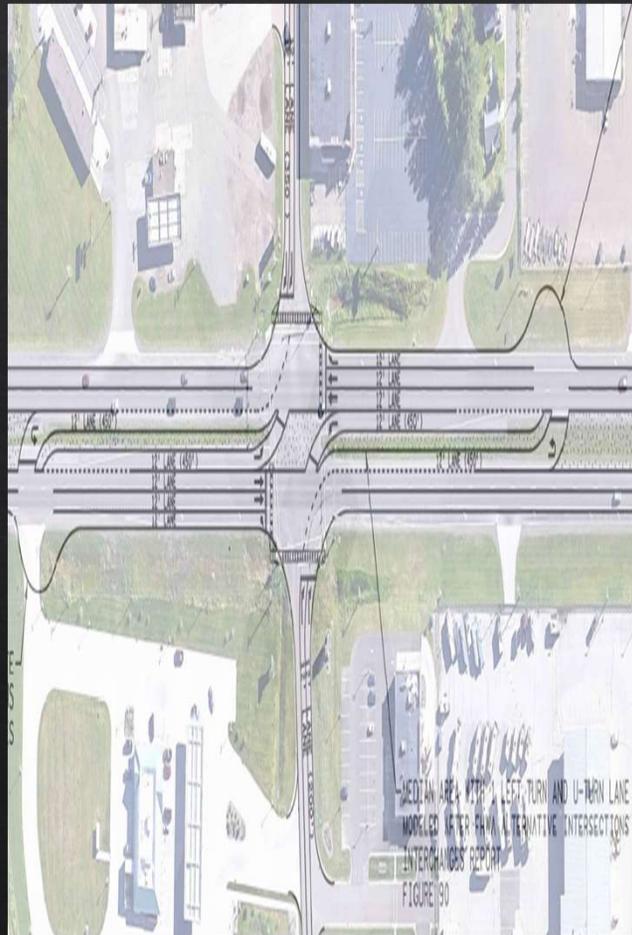
Through and Left Side Street Movements are forced to make a U-turn

This results in longer travel time and higher delays



Given Data

- ◆ RCUT Geometry Alternatives: *Dual-lane Side Street (Given-below) vs Single-lane Side Street – Assumed*

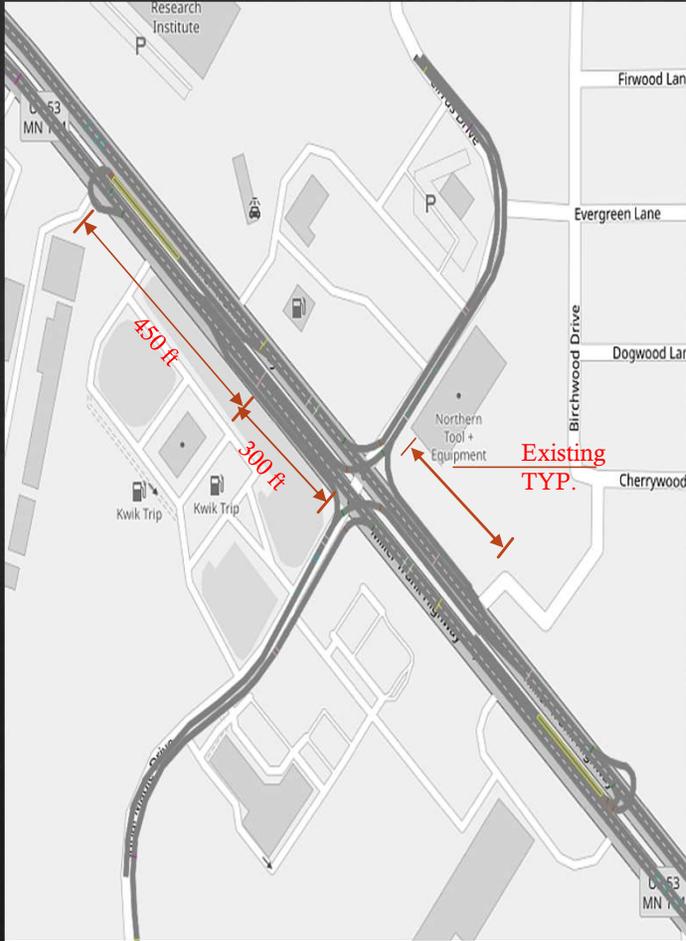


Modeling Existing & RCUT Alternatives

Existing Geometry

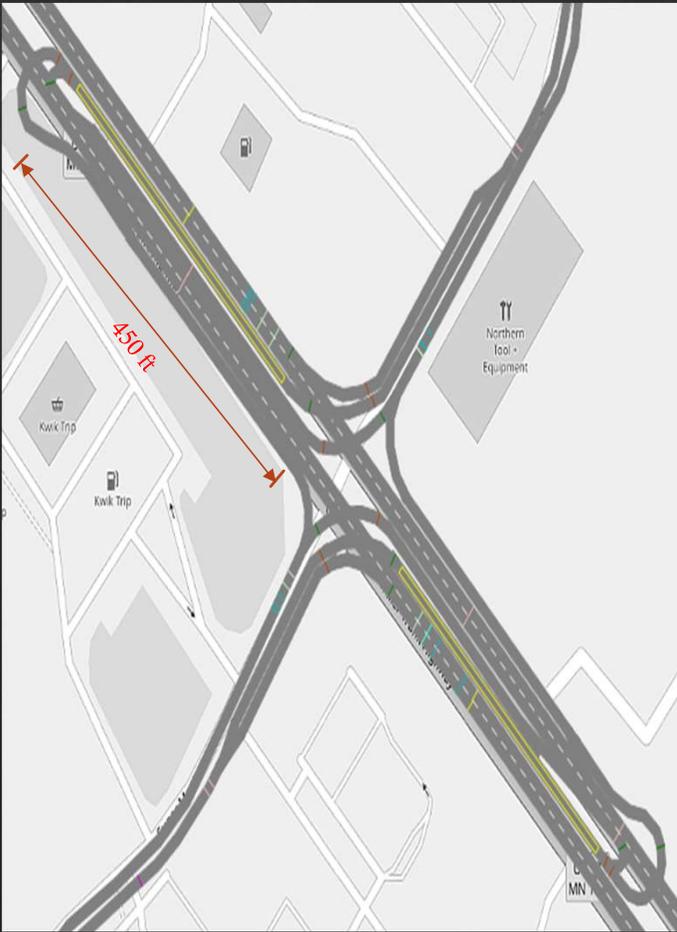


RCUT - Single Lane Side Street



Existing
TYP.

RCUT - Dual Lane Side Street



Given Data

- ◇ Traffic Volumes:
 - ◇ PM Peak Hour Volumes – Synchro Data

Cirrus

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Traffic Volume (vph)	36	668	44	132	948	52	80	20	80	136	32	160

Stebner

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Traffic Volume (vph)	44	572	52	108	952	48	128	40	76	92	116	84

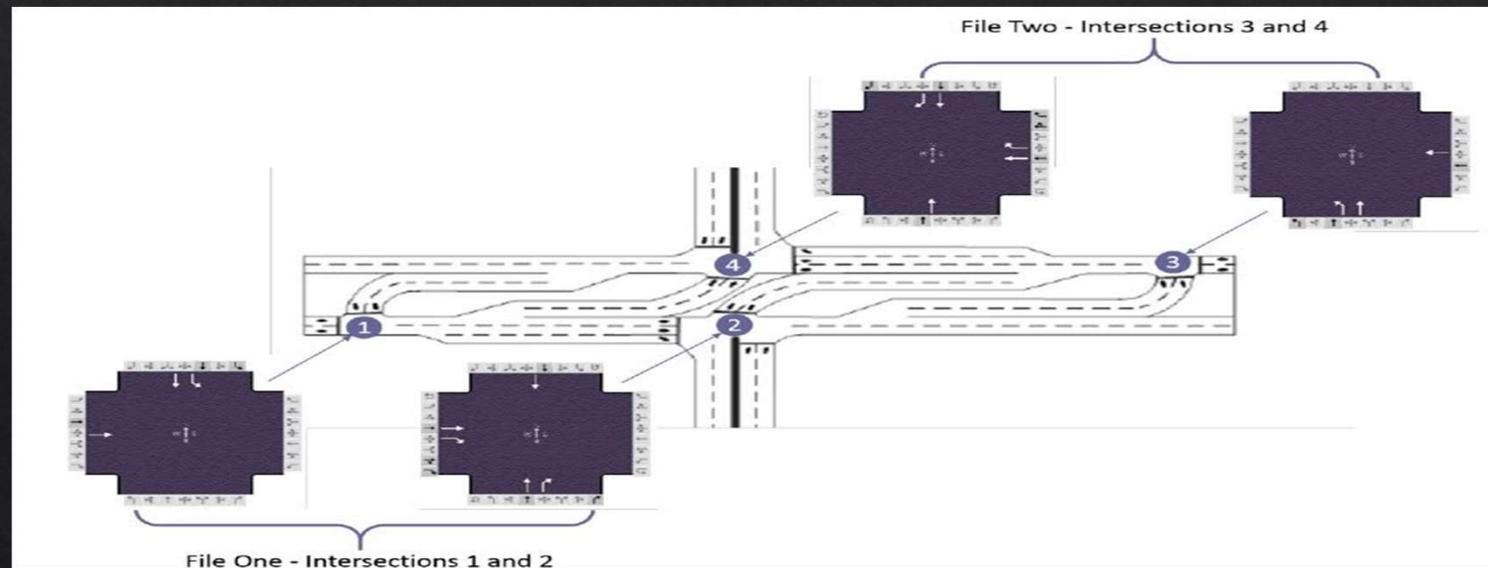
West Arrowhead

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Traffic Volume (vph)	272	590	8	104	724	160	32	176	100	244	380	276

Intersection Control Options

- ◇ Existing Intersection => Signal Control
- ◇ RCUT Intersections
 - #1) *No Control*
 - Stop Control on Side Streets
 - Yield Signs for Left Movements off of Mainline
 - No Control on Mainline Through Traffic

#2) *Signal Control*



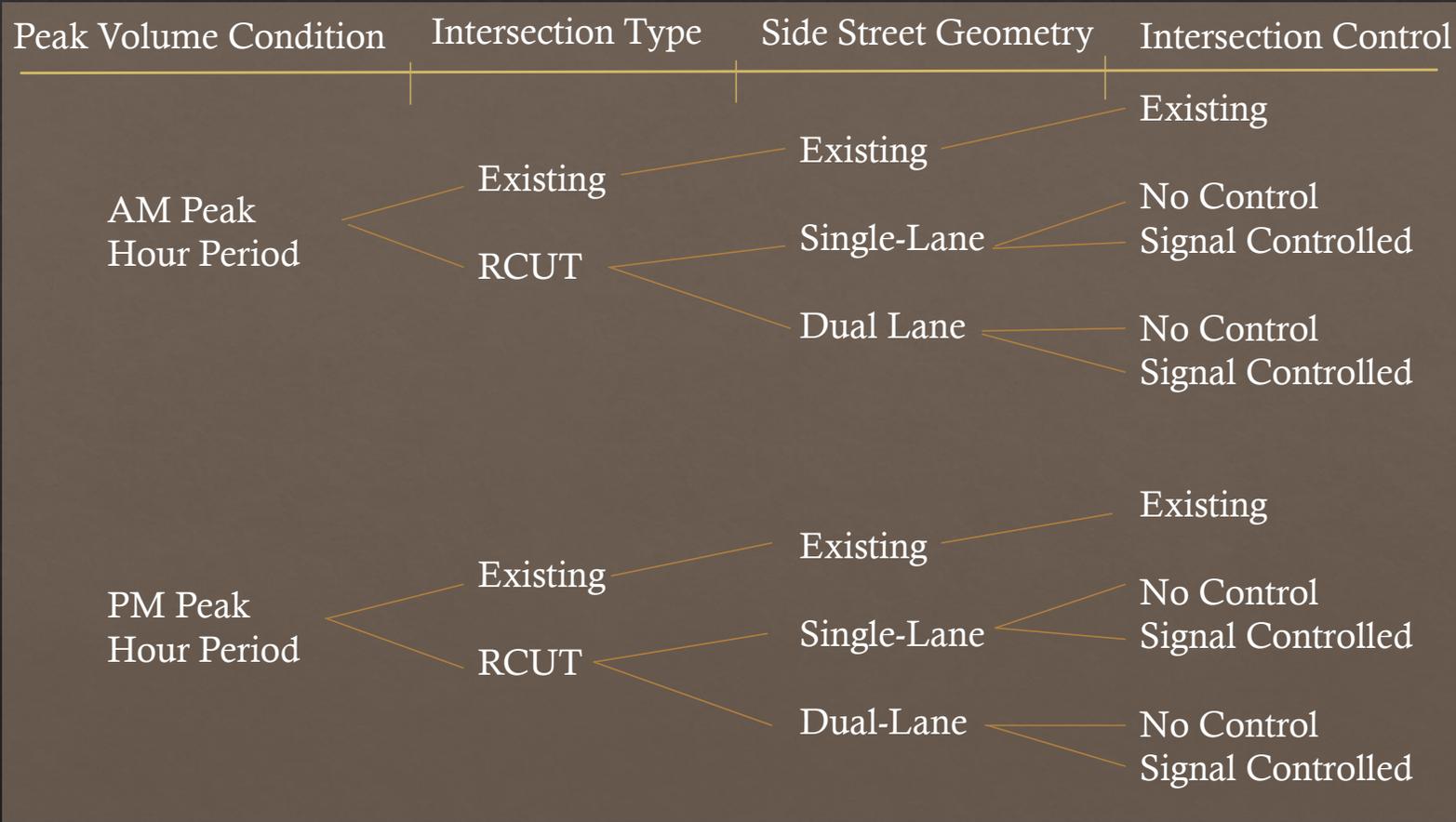
Performance Measures

- ◇ Stops - Number of vehicle stops without stops at PT stops and in parking lots
- ◇ Stopped Delay - Stopped delay in seconds without stops at PT stops and in parking lots
- ◇ Vehicle Delay - Delay of all vehicles
- ◇ Travel Time - Average travel time[s] of vehicles in the network

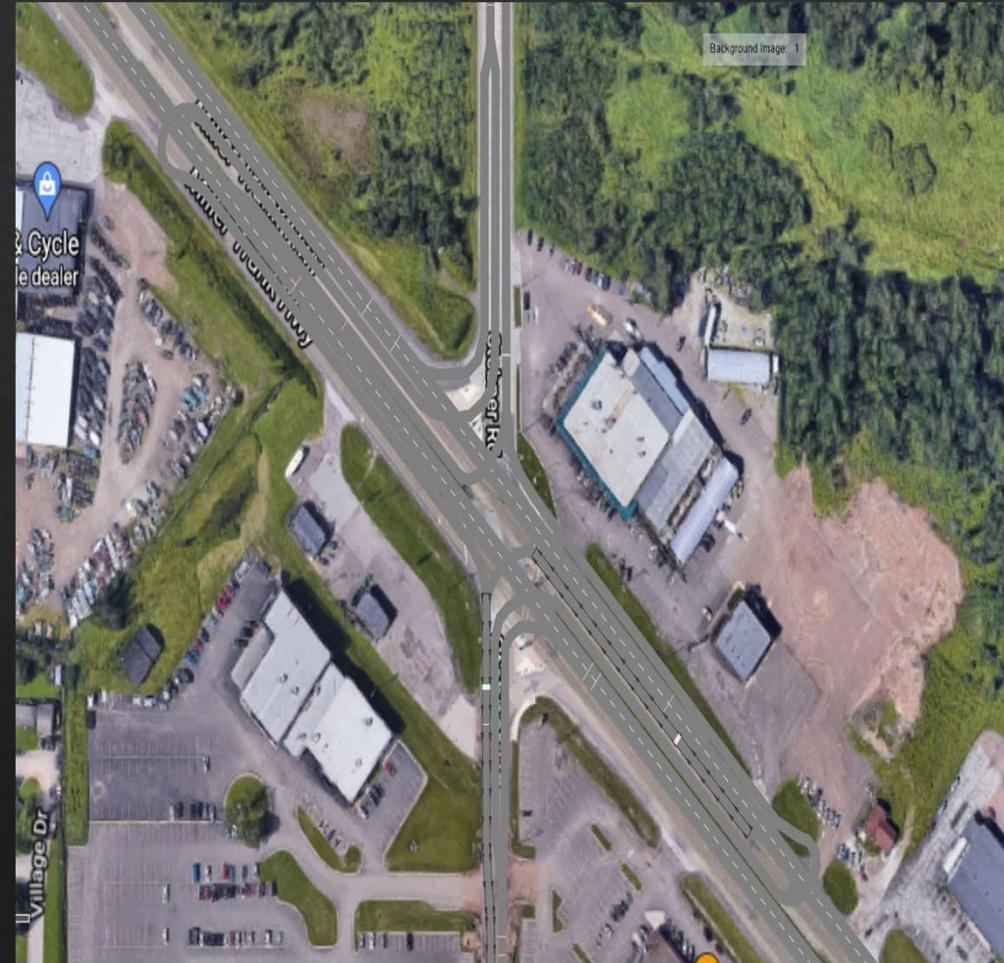
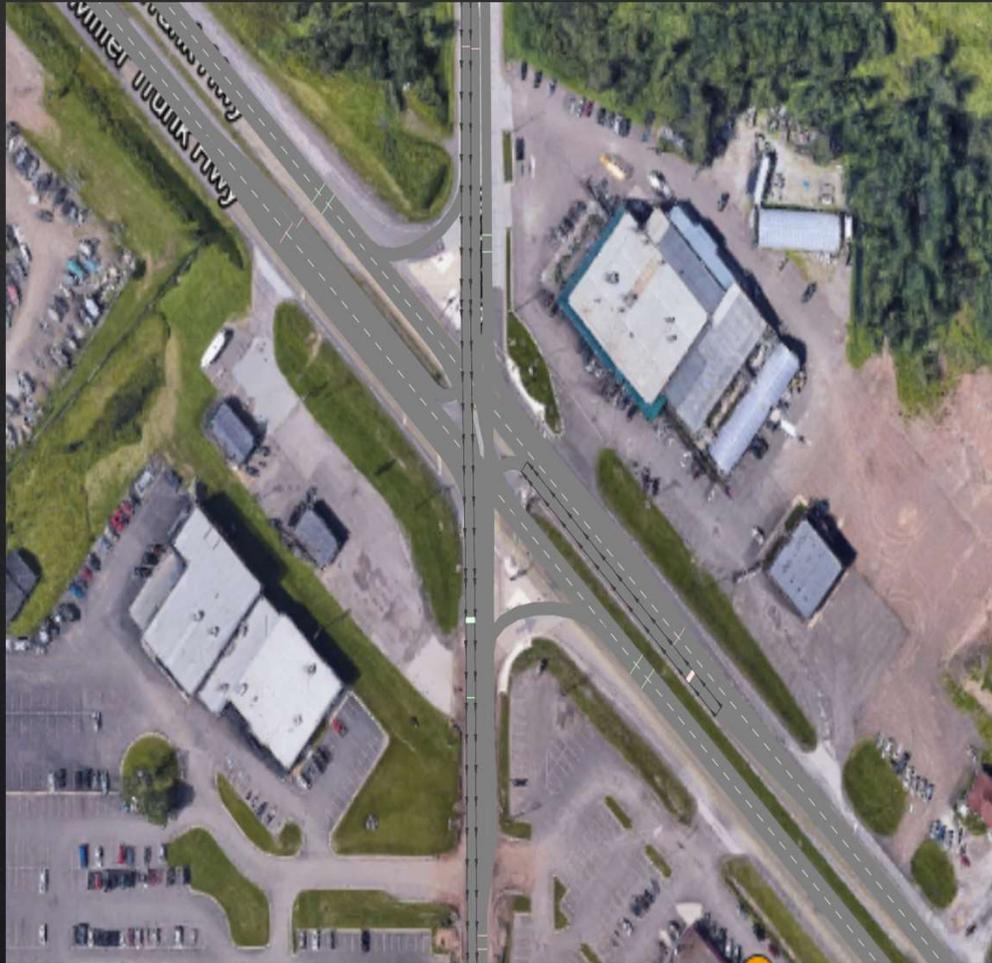
Simulation Cases

These scenarios were applied to the entire corridor.

Each intersection was analyzed separately within each corridor.

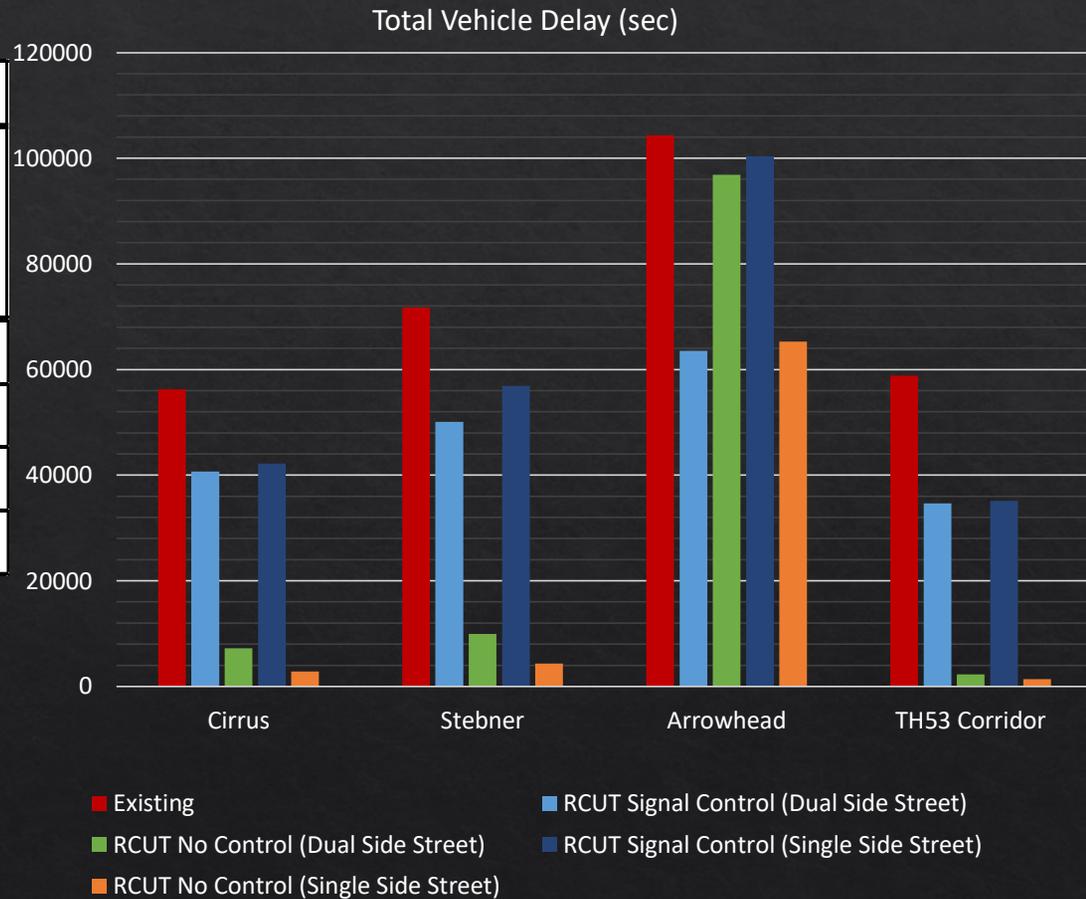


Travel Time Measurement Sections



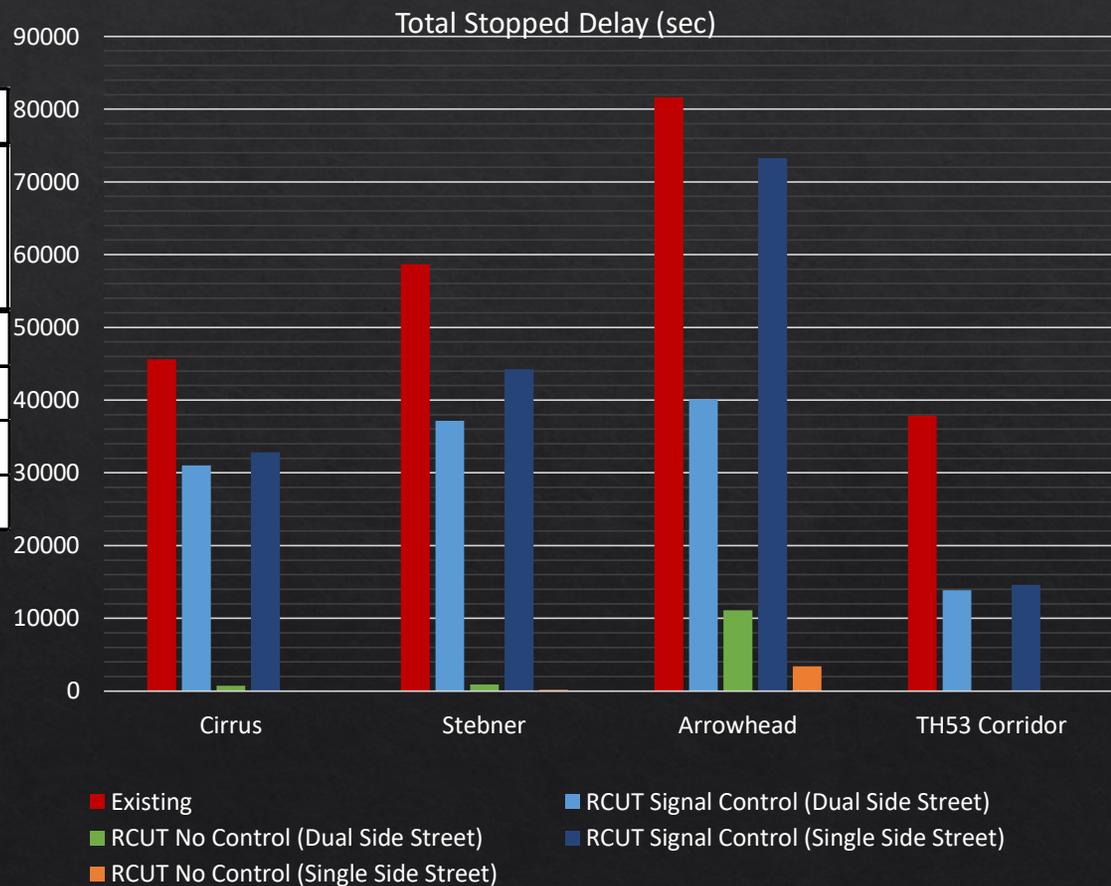
PM Intersection Total Performance Measures

Total Vehicle Delay (sec)	Existing	RCUT Dual Side-Street		RCUT Single Side-Street	
		RCUT Signal Control	RCUT No Control	RCUT Signal Control	RCUT No Control
Intersection					
Cirrus	56261	40683	7234	42196	2811
Stebner	71720	50087	9967	56899	4328
Arrowhead	104344	63553	96868	100355	65303
TH53 Corridor	58818	34652	2299	35110	1397



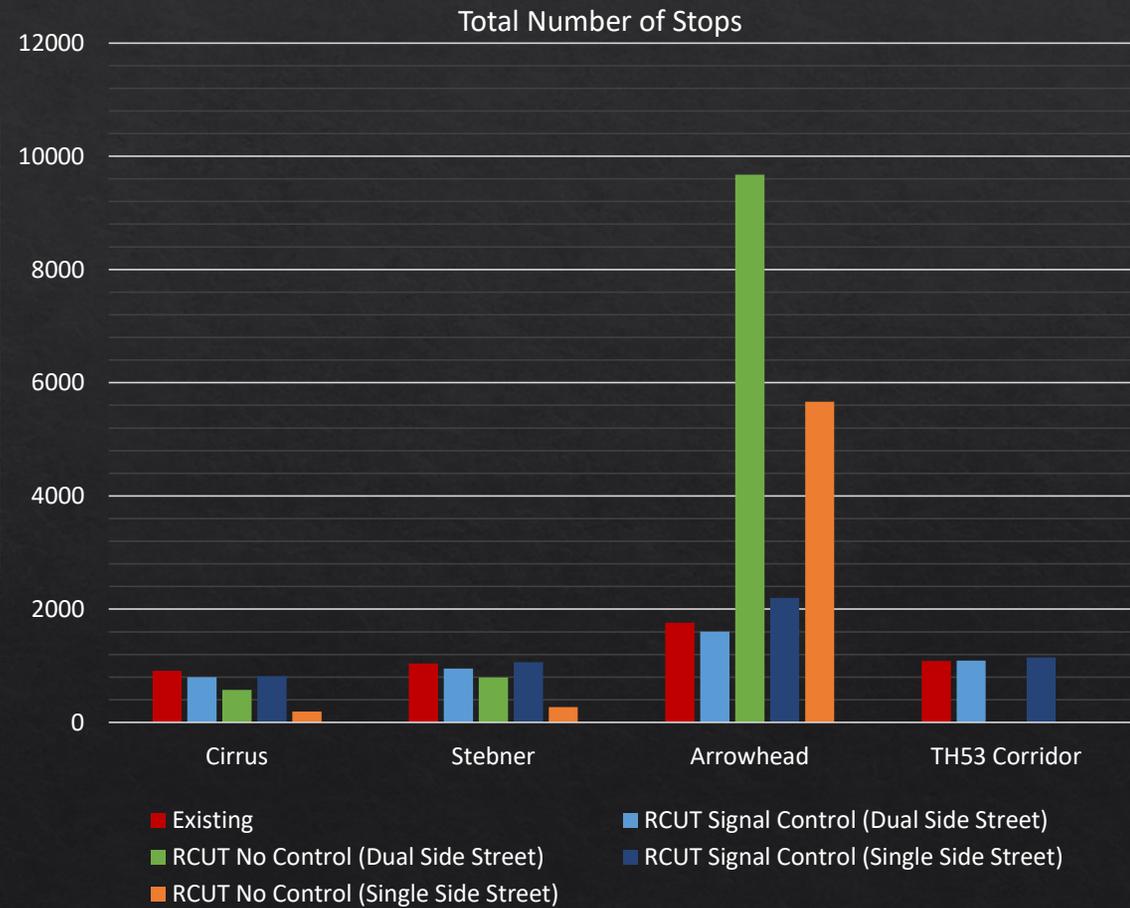
PM Intersection Total Performance Measures

Total Stop Delay (sec)	Existing	RCUT Dual Side-Street		RCUT Single Side-Street	
		RCUT Signal Control	RCUT No Control	RCUT Signal Control	RCUT No Control
Cirrus	45582	31032	719	32801	89
Stebner	58709	37143	895	44226	162
Arrowhead	81633	40080	11100	73247	3380
TH53 Corridor	37864	13864	7	14595	0



PM Intersection Total Performance Measures

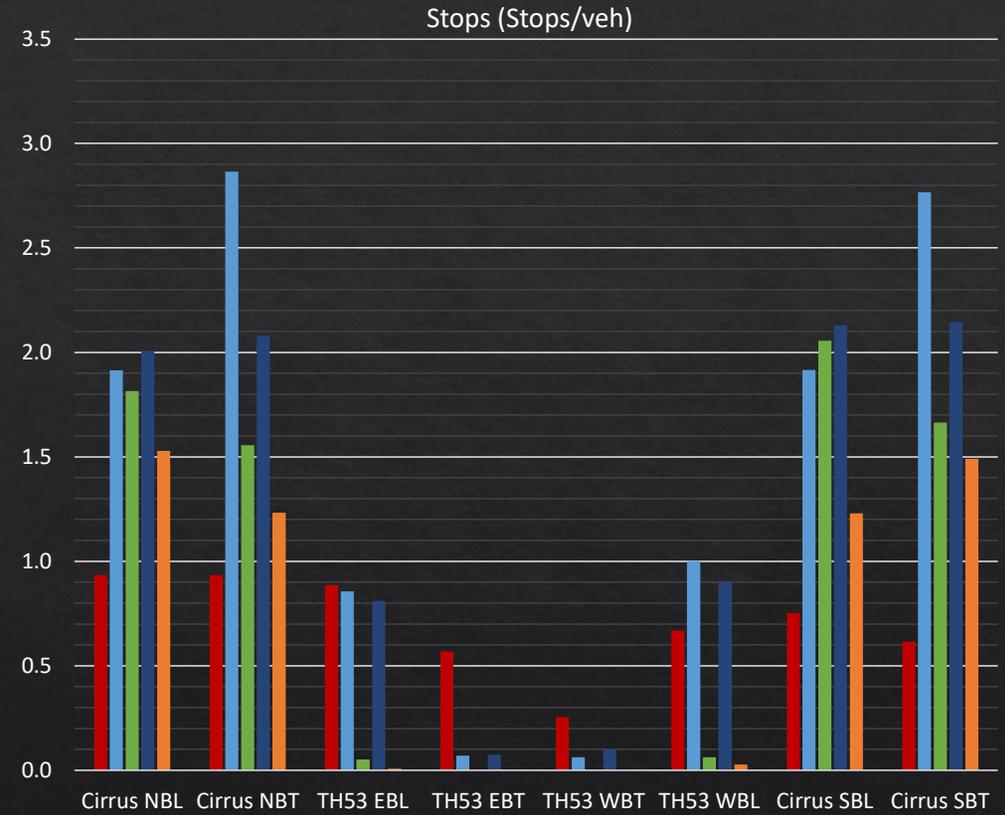
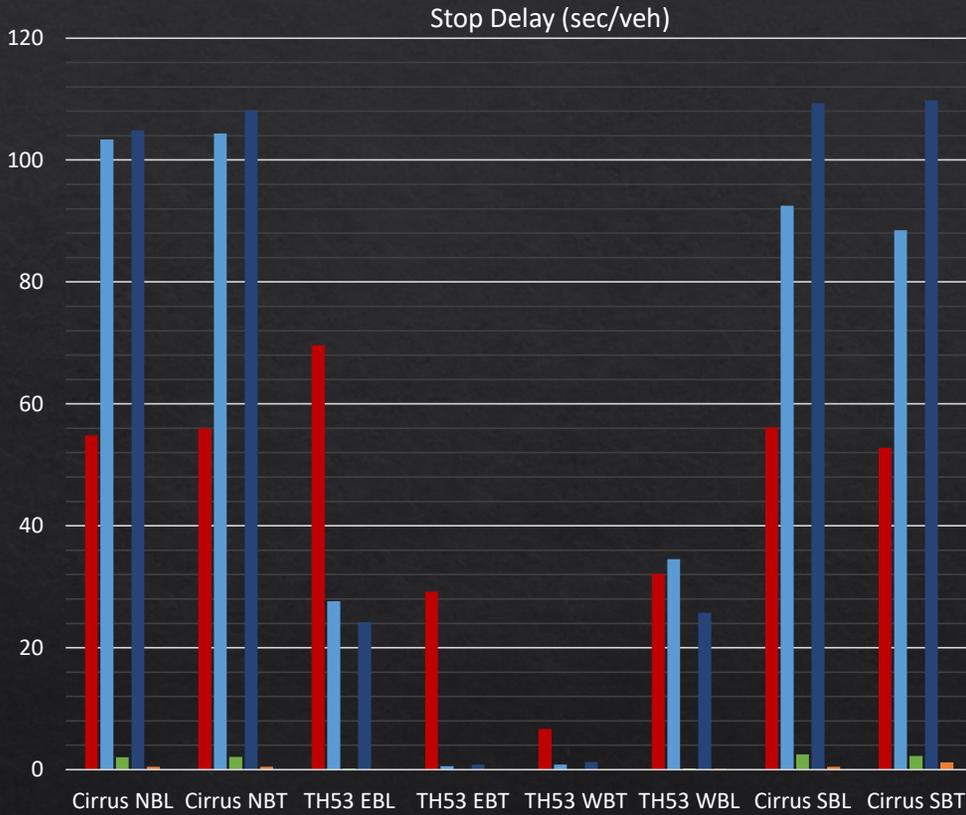
Total Number of Stops	Existing	RCUT Dual Side-Street		RCUT Single Side-Street	
Intersection		RCUT Signal Control	RCUT No Control	RCUT Signal Control	RCUT No Control
Cirrus	914	799	572	813	190
Stebner	1043	950	793	1062	272
Arrowhead	1763	1604	9676	2198	5663
TH53 Corridor	1086	1090	1	1148	0



Recap of Total Measurements

- ◇ Cirrus and Stebner showed the largest improvement under the RCUT No Control with a Single Side-Street
- ◇ West Arrowhead some improvements under the RCUT Signal Control with Dual Side-Streets

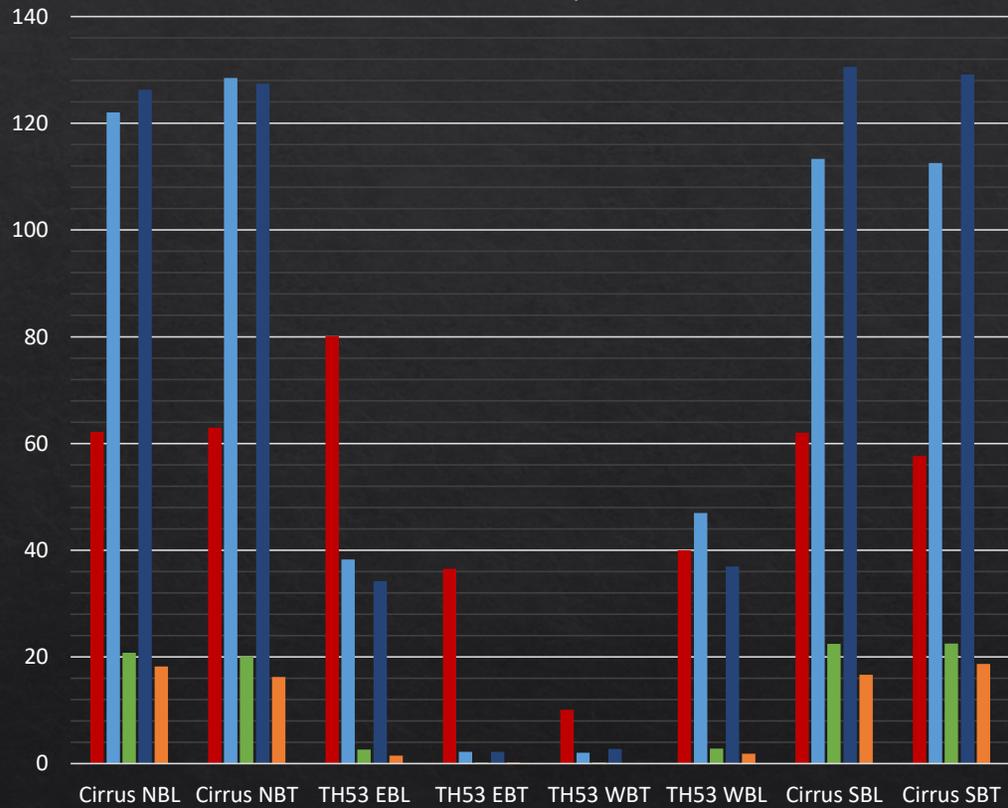
P.M. Cirrus-TH53 Intersection



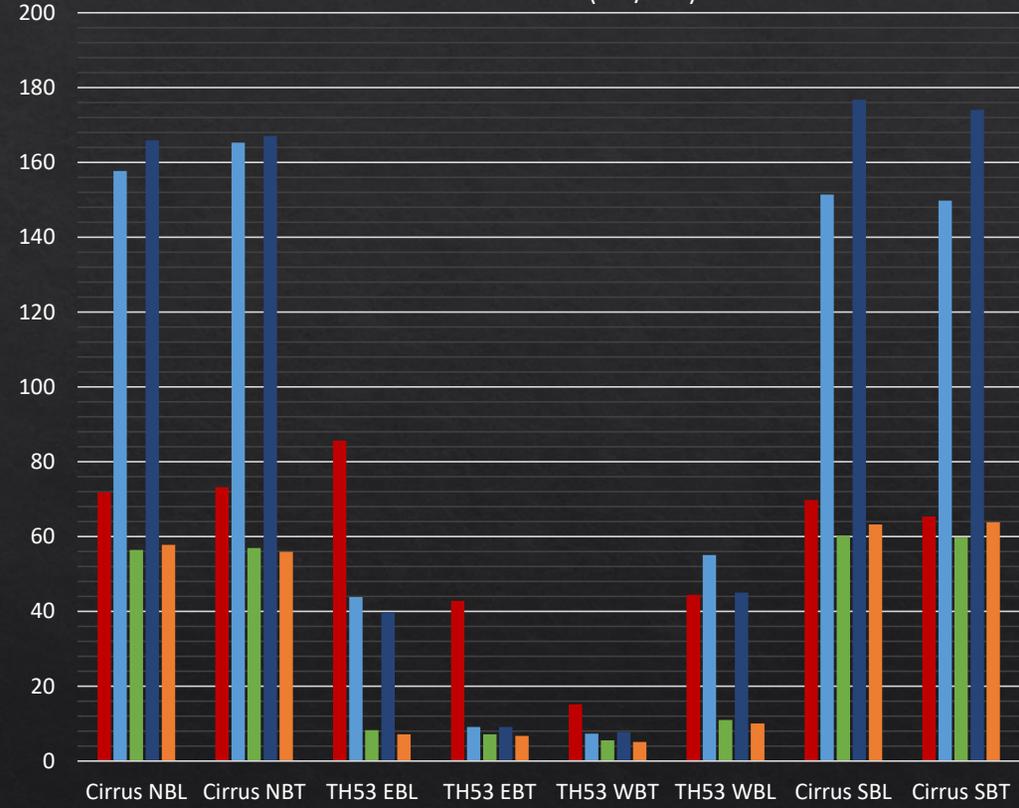
- Existing
- RCUT No Control (Dual Side Street)
- RCUT No Control (Single Side Street)
- RCUT Signal Control (Dual Side Street)
- RCUT Signal Control (Single Side Street)

P.M. Cirrus-TH53 Intersection

Vehicle Delay (sec/veh)



Travel Time (sec/veh)



- Existing
- RCUT No Control (Dual Side Street)
- RCUT No Control (Single Side Street)

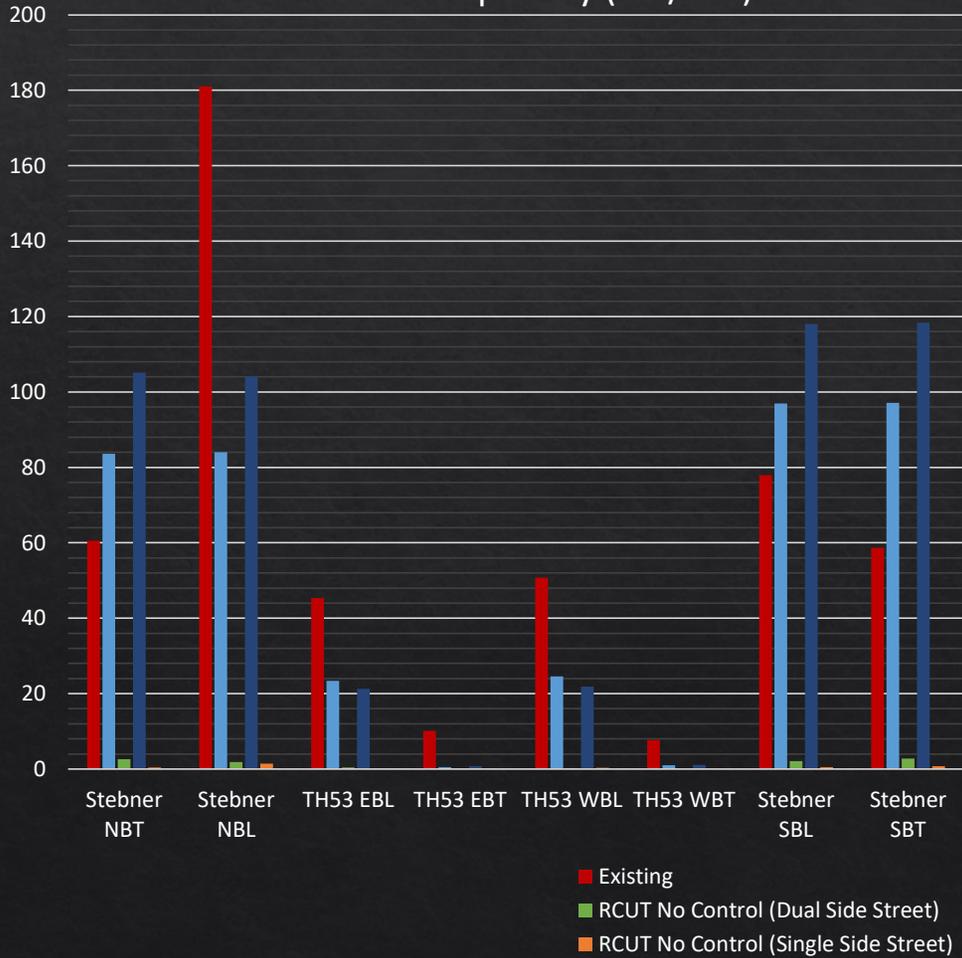
- RCUT Signal Control (Dual Side Street)
- RCUT Signal Control (Single Side Street)

PM Cirrus Intersection Recap

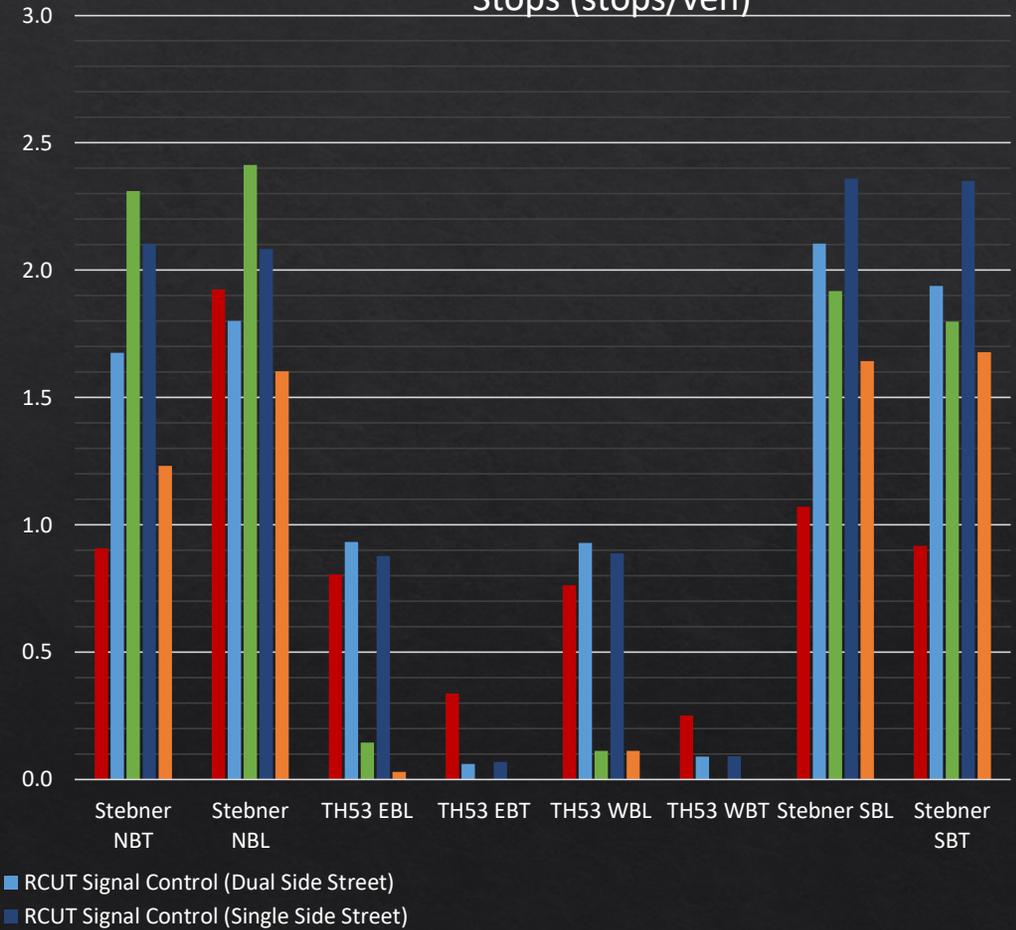
- ◆ The *RCUT No-Control with the Single Side-Street* shows the best overall results compared to the existing and other RCUT alternates.

P.M. Stebner-TH53 Intersection

Stop Delay (sec/veh)

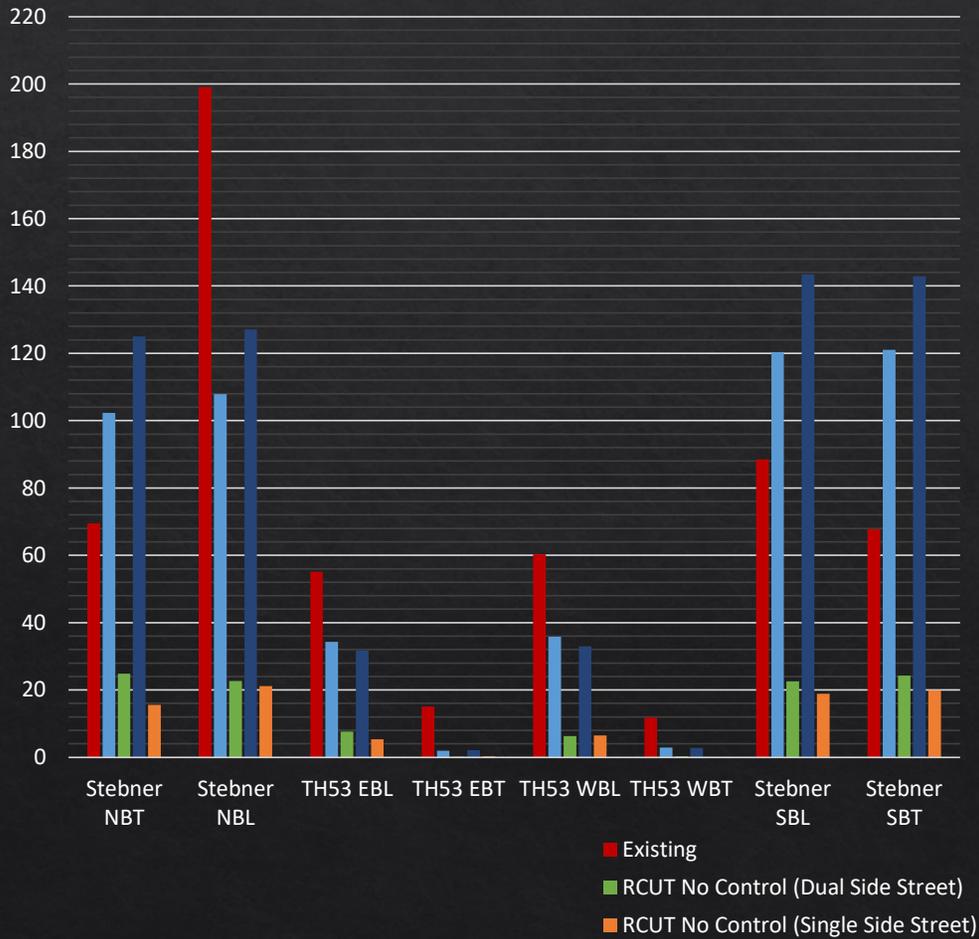


Stops (stops/veh)

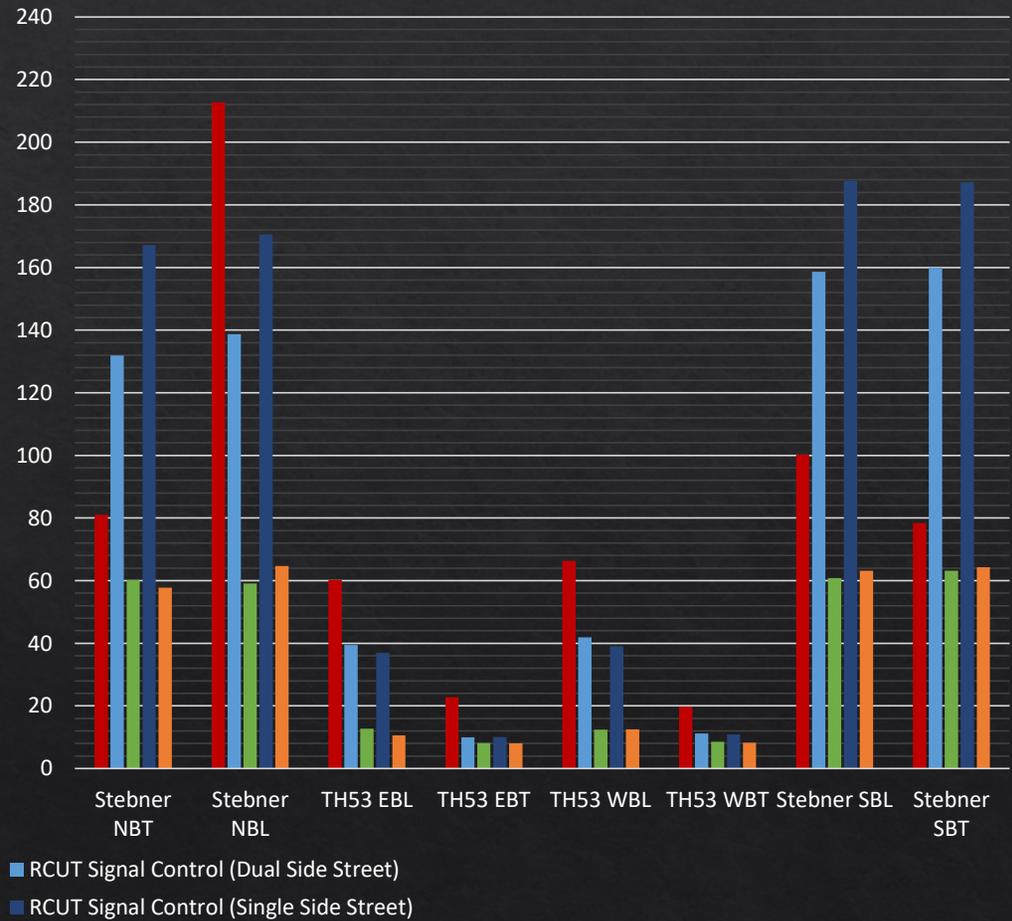


P.M. Stebner-TH53 Intersection

Vehicle Delay (sec/veh)



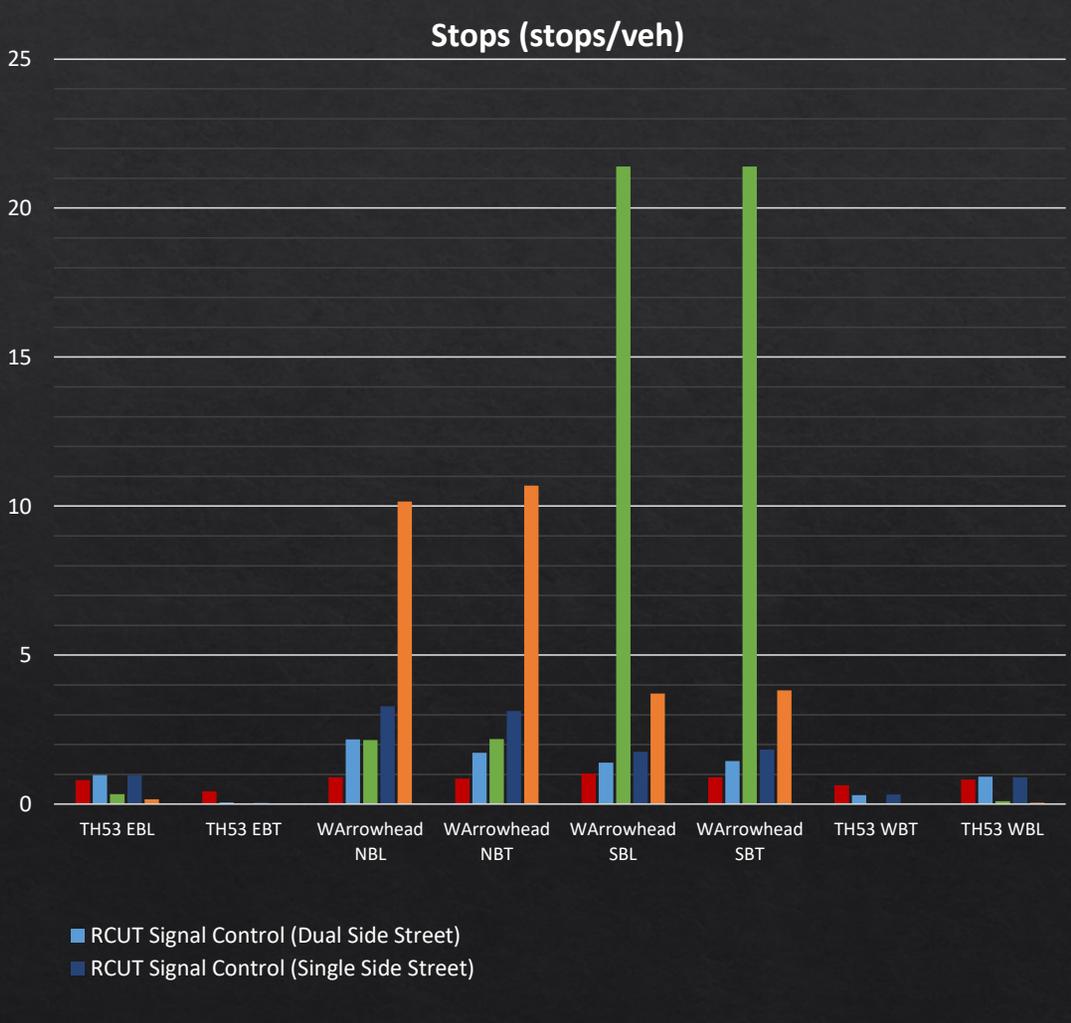
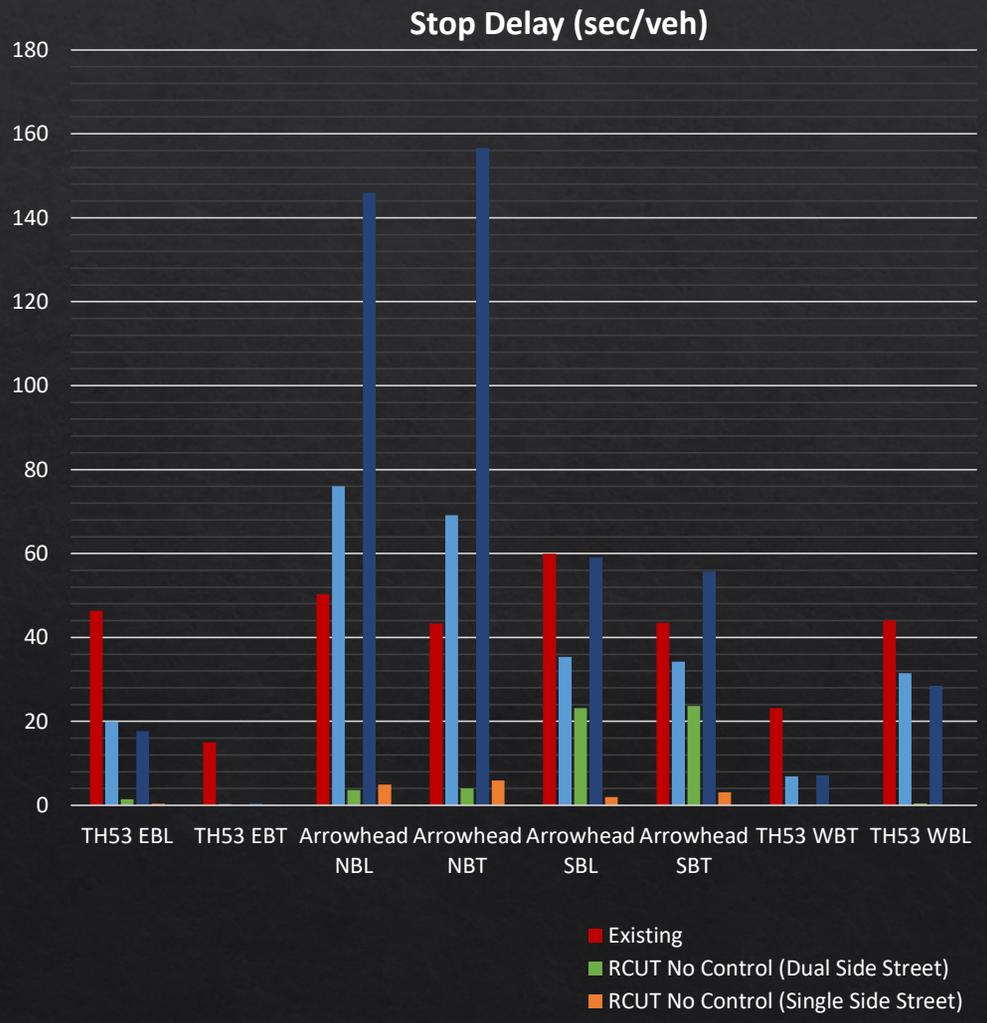
Travel Time (sec/veh)



PM Stebner Intersection Recap

- ◆ The *RCUT No-Control with the Single Side-Street* shows the best overall results compared to the existing and other RCUT alternates.

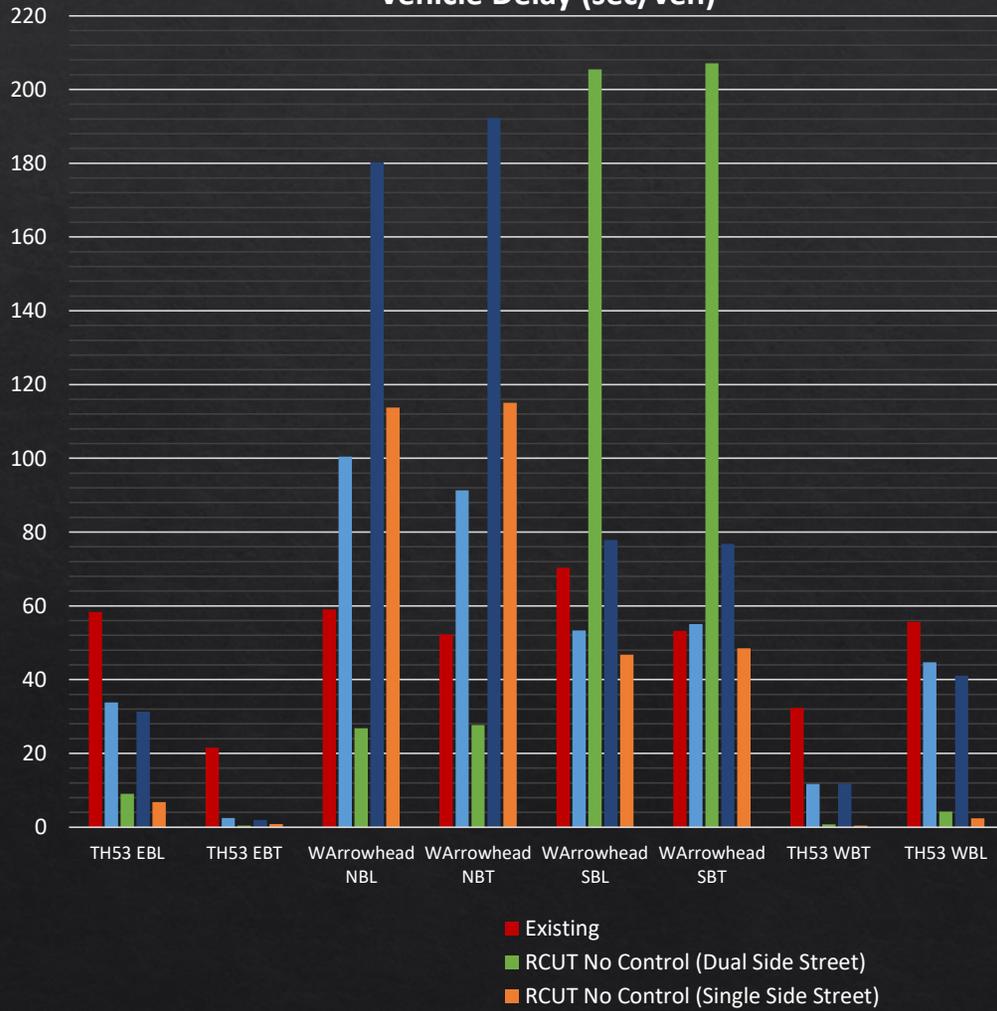
P.M. Arrowhead-TH53 Intersection



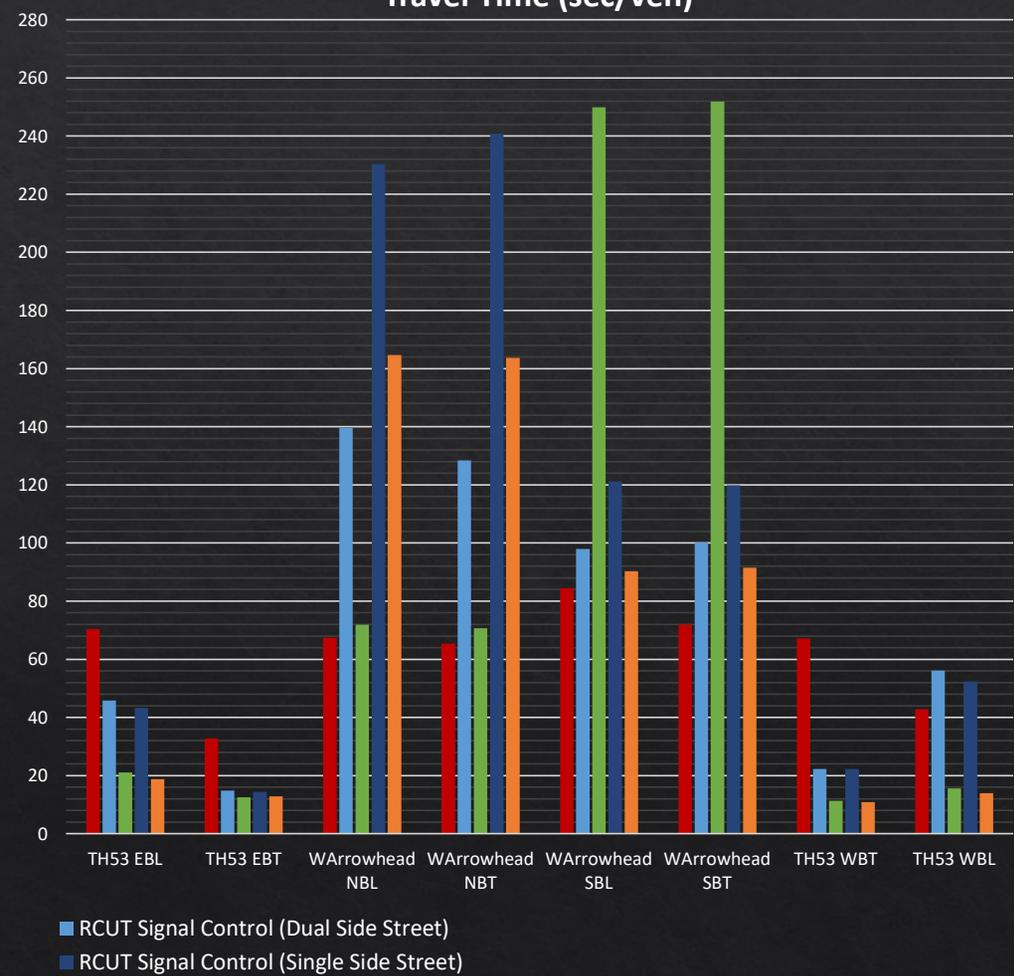
- Existing
- RCUT Signal Control (Dual Side Street)
- RCUT No Control (Dual Side Street)
- RCUT No Control (Single Side Street)
- RCUT Signal Control (Single Side Street)

P.M. Arrowhead-TH53 Intersection

Vehicle Delay (sec/veh)



Travel Time (sec/veh)



West Arrowhead Intersection Recap

- ◇ No definite scenario performed the best throughout the simulations, therefore no alternative can be recommended.

Thank you

Any Questions?