



TMS Engineers, Inc



System Analyses

LOR-611-1.10

PID 114823

City of Lorain, Ohio

January 31, 2025

Prepared for:

**Miller Cable Company
210 S. Broadway
Green Springs, Ohio 44836**

SYSTEM ANALYSES

LOR-611-1.10
PID 114823

City of Lorain, Ohio

January 31, 2025

Prepared For:

Miller Cable Company
210 S. Broadway
Green Springs, Ohio 44836

Prepared By:

TMS Engineers, Inc.
2112 Case Parkway South
Unit #7
Twinsburg, Ohio 44087



REGISTERED ENGINEER NO. E56982
CERTIFICATION NO. 2234

**"This document was prepared consistent with local agency requirements
and/or applicable guidelines contained in this report."**



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Chapter 1

Introduction

1.1 Project Overview

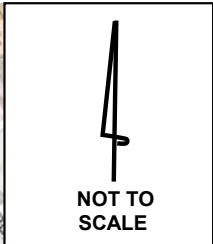
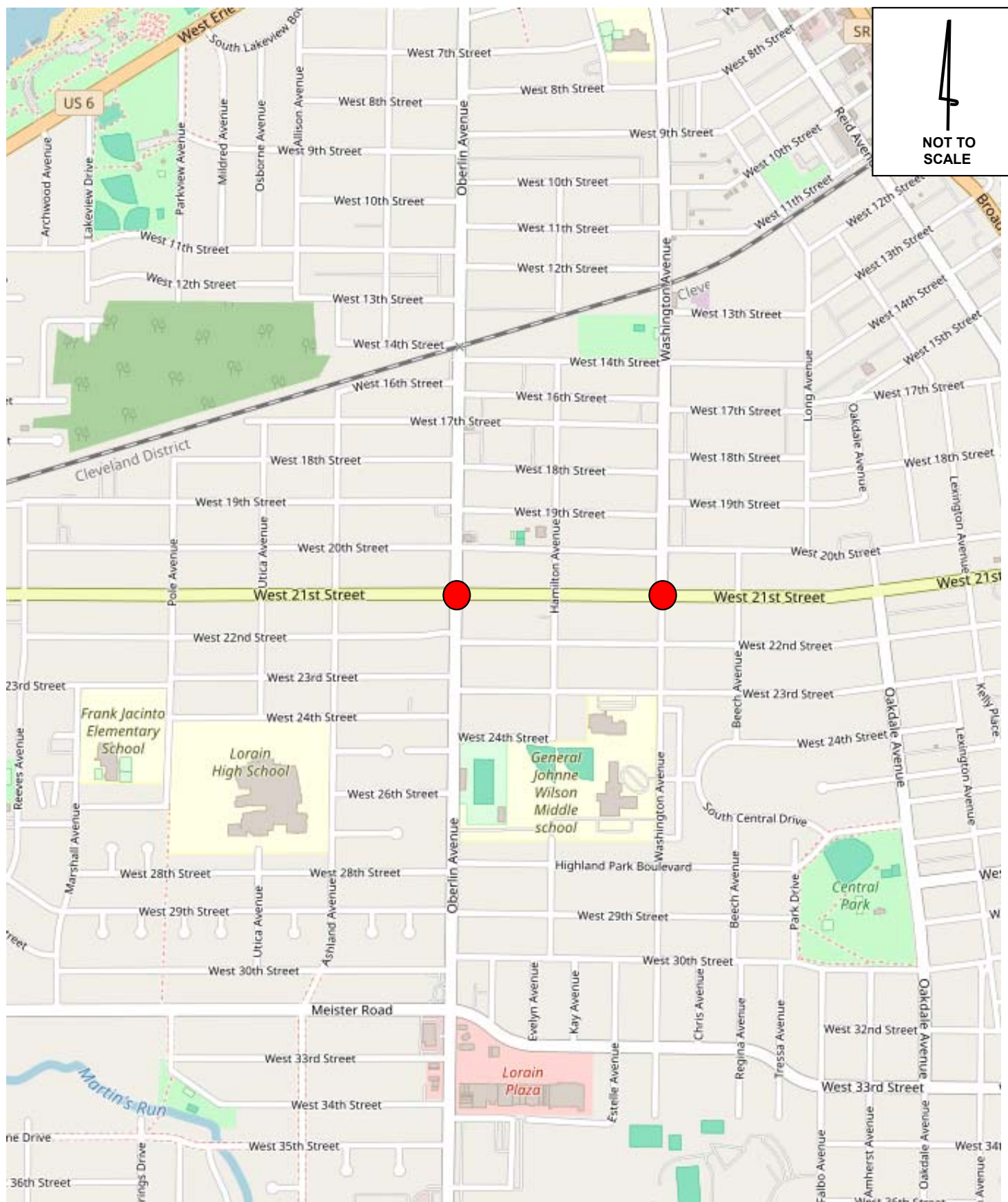
This system analyses study has been prepared for the LOR-611-1.10 project. The LOR-611-1.10 project consist of the full reconstruction of the traffic signals and curb ramps at the intersections of SR 611 / N. Leavitt Road, SR 611 / Oberlin Avenue and SR 611 / Washington Avenue in the City of Lorain, Ohio. The intersection of SR 611 and N. Leavitt Drive was not included in system analyses study since the plans state that intersection will not operate in coordination with the other traffic signals along the corridor.

This system analyses study includes the re-timing of the following two (2) intersections:

1. SR 611 & Oberlin Avenue
2. SR 611 & Washington Avenue

A general location map is shown in **Figure 1, Page 2**. SR 611 has a posted speed limit of 35 miles per hour (mph) for the entire study area.

The two study intersections listed above were upgraded to Econolite Cobalt controllers and they are both running a time of day program.



 - Intersections Included in Analyses



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Transportation Management Services
2112 Case Parkway S., Unit 7, Twinsburg, Ohio 44087
www.TMSEngineers.com

SR 611
City of Lorain, Ohio
System Analysis

Study Area

Figure 1

Page 2

A copy of the signal plans for the LO-611-1.10 project are shown in **Appendix A**. These plans show the current layout of the traffic signal controls and the phasing and timings for the signals.

The ODOT traffic signal timing inspection forms for each of the study intersections were filled out by a certified traffic engineer and are shown in **Appendix B**. These inspections were performed to review and observe the signal equipments within the cabinets to insure there are no malfunctions or irregularities in the signal operations.

1.2 Study Objectives

This study is structured for the following purposes;

- to analyze the signal and coordination timings at the two (2) signalized study intersections in order to optimize the timings along the corridor and develop new coordination patterns;
- and to provide a series of Speed and Delay Studies to document the change in travel time and stopped delay as a means of measuring the efficiency of the timing improvements at the signals along SR 611.

This study documents the methodologies, findings and conclusions of the analysis, including the basis for all assumptions, traffic parameters utilized and conclusions reached.

Chapter 2

Signal Timing Analyses

2.1 Traffic Volumes

Manual intersection traffic counts were performed as the first step to optimize the signal timing for the intersections. Nine-hour turning movement count samples were performed at the two intersections on January 9, 2025. The manual traffic counts were conducted in fifteen (15) minute intervals between the hours of 7:00 AM - 10:00 AM, 11:00 AM - 2:00 PM, and 3:00 PM - 6:00 PM, then hourly totals were calculated. Vehicle classification to determine the extent of trucks and buses was also performed for all counts. Copies of turning movement counts are provided in **Appendix C**.

Twenty-four hour automatic tube count data was also collected on SR 611 from January 7 - 11, 2025. The tube counter was placed between the Washington and the nearby Hamilton Avenue intersections to prevent motorists from queuing on the tubes near the signalized study intersections. This tube data was used to determine the optimal time of day pattern based on the hourly variation of traffic volumes on SR 611. Copies of the automatic tube counts are provided in **Appendix D**.

2.2 Signal Clearance Timings Calculations

The signal clearance timings were recalculated for the study intersections and copies of the clearance timings calculations are shown in **Appendix E**. The final signal timings for the study intersections are shown in **Appendix F**. The new signal timings were installed into the signals prior to the revised coordination timings being installed.

2.3 Synchro Capacity Analyses

The computer program, Synchro 12.1 (Build 0, Revision 30), from Trafficware was used to determine the optimal signal timings for the intersections along the corridor. A cycle evaluation was performed for the nine hours from the manual traffic counts. Copies of the Synchro computer output for the nine time periods are shown in **Appendix G**.

The optimized coordination timings for the signal system were developed based on the Synchro Analyses results and are shown in **Appendix H**. It was determined that the system operate optimally using two patterns for the various peak periods of the day and in the free mode during all other time periods. The AM-Peak and Mid-day hours were determined to operate most efficiently with a 70 second cycle length (Pattern 3). This short cycle length will reduce the delay experienced by motorists on the side street while still maintaining efficient progression along SR 611. The PM-Peak hours were determined to operate most efficiently with a longer 80 second cycle length (Pattern 4) since the higher traffic volumes during the evening peak period will require additional green time to adequately serve these vehicles.

The time of day plans for the coordinated system are also shown in **Appendix H**. The updated coordination timings and the new time of day plans were installed into the controllers prior to the final set of travel runs being performed.

Chapter 3

Speed and Delay Analysis

3.1 Method of Study

A series of travel time studies were conducted for the SR 611 Corridor utilizing the Tru-Traffic software program. The “floating car” technique was used to gather data related to the amount of time it takes to travel from one end of the study area to the other (from Oberlin Avenue to Washington Avenue). The travel time between intersections and amount of stopped time was recorded through the use of a GPS receiver and the Tru-Traffic program

The travel time studies for this study were conducted during four separate time periods. The time periods under study are as follows.

- I. 7:00 AM to 9:00 AM (AM Peak)
- II. 11:00 AM to 1:00 PM (Mid-day Peak)
- III. 4:00 PM to 6:00 PM (PM Peak)
- IV. 9:00 AM to 11:00 AM (Off Peak)

The travel time runs were performed in both directions along the corridors by a test car. A minimum of six (6) runs were conducted in each direction for each time period. The travel studies were conducted during dry weather conditions while observing the posted speed limit.

The data obtained from the travel studies was averaged in the following categories for each of the time periods under study.

- A. Trip Time (minutes)
- B. Stop Time (minutes)
- C. Travel Speed (mph)
- D. Running Speed (mph)

3.2 Travel Run Comparison

The individual travel run results are found in **Appendix I**. The travel run comparison tables and graphical results of the travel time studies are found in **Appendix J**. The overall summary for each corridor is shown below.

SR 611
Pre-Study vs. Optimized Timings
Cumulative Analysis

Timing	Travel Time (sec)	Vehicle Delay (sec)	Stopped Delay (sec)	Stops	Average Speed (mph)
CUMULATIVE					
Pre-Study	45	7	7	0.5	26.1
Optimized	37	1	2	0.2	31.3
% Change	-18%	-86%	-71%	-60%	20%

	Reduction
	No Change
	Increase

(Note: in the case of average speed, green means an increase in overall travel speed, whereas red means a reduction in overall travel speed)

The optimized signal timings have resulted in a net reduction of the average travel time along SR 611 by 18%, a reduction of 86% in vehicle delay and a reduction in stopped delay by 71%. The reduced stopped time has resulted in increased travel speeds from 26.1 mph to 31.3 mph. This is a 20% increase in travel speeds.

The re-timing of the two study intersections on SR 611 has provided benefits to the motorists and residents within the City of Lorain due to the reduction in delay, anticipated reduction in motor vehicle crashes, and increase in travel speeds. The estimated annual signal re-timing benefits (in dollars) are shown in **Appendix K**. The re-timing is expected to save \$38,047 to motorists using SR 611 with a benefit to cost ratio of 2:1.

Appendix A - Signals Plans



○ PROJECT LOCATION

LOCATION MAP

LATITUDE: 41°27'03" LONGITUDE: 82°12'08"



PORTION TO BE IMPROVED _____
INTERSTATE HIGHWAY _____
FEDERAL ROUTES _____
STATE ROUTES _____
COUNTY & TOWNSHIP ROADS _____
OTHER ROADS _____

DESIGN DESIGNATION

CURRENT ADT (2021) _____ 9,350
DESIGN YEAR ADT (2023) _____ 9,350
LEGAL SPEED _____ 35 MPH

DESIGN FUNCTIONAL CLASSIFICATION:
URBAN PRINCIPAL ARTERIAL

NHS PROJECT _____ N/A

DESIGN EXCEPTIONS

NONE REQUIRED

UNDERGROUND UTILITIES
CONTACT TWO WORKING DAYS
BEFORE YOU DIG

OHIO811, 8-1-1, 1-800-362-2764
(Non-members must be called directly)

PLANS PREPARED BY:

GPD GROUP®
Glaus, Pyle, Schomer, Burns & DeHaven, Inc.

5595 Transportation Blvd, Suite 100
Cleveland, OH 44125
216.518.5544 Fax 216.518.5545

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STATE OF OHIO

DEPARTMENT OF TRANSPORTATION

LOR-611-1.10

CITY OF LORAIN

LORAIN COUNTY

PROJECT DESCRIPTION

THIS PROJECT CONSISTS OF THE FULL RECONSTRUCTION OF THE TRAFFIC SIGNALS AND CURB RAMPS AT THE INTERSECTIONS OF S.R. 611 / N. LEAVITT RD. (S.R. 58), S.R. 611 / OBERLIN AVE., AND S.R. 611 / WASHINGTON AVE.

PROJECT EARTH DISTURBED AREA: N/A* ACRES
ESTIMATED CONTRACTOR EARTH DISTURBED AREA: N/A* ACRES
NOTICE OF INTENT EARTH DISTURBED AREA: N/A* ACRES
*MAINTENANCE PROJECT

2019 SPECIFICATIONS

THE STANDARD SPECIFICATIONS OF THE STATE OF OHIO, DEPARTMENT OF TRANSPORTATION, INCLUDING CHANGES AND SUPPLEMENTAL SPECIFICATIONS LISTED IN THE PROPOSAL SHALL GOVERN THIS IMPROVEMENT.

INDEX OF SHEETS:

- TITLE SHEET

1
- SCHEMATIC PLAN

2 - 3
- GENERAL NOTES

4 - 5
- MAINTENANCE OF TRAFFIC

6 - 7
- GENERAL SUMMARY

8 - 9
- SUBSUMMARY

10
- CURB RAMP PLANS

11 - 13
- CURB RAMP DETAILS

14 - 16
- TRAFFIC CONTROL

17 - 23
- TRAFFIC SIGNALS

24 - 42

I HEREBY APPROVED THESE PLANS AND DECLARE THAT THE MAKING OF THIS IMPROVEMENT WILL NOT REQUIRE THE CLOSING TO TRAFFIC OF THE HIGHWAY AND THAT PROVISIONS FOR THE MAINTENANCE AND SAFETY OF TRAFFIC WILL BE AS SET FORTH ON THE PLANS AND ESTIMATES.

APPROVED

DATE

CITY OF LORAIN, ENGINEER

APPROVED

DATE

DISTRICT DEPUTY DIRECTOR

APPROVED

DATE

DIRECTOR, DEPARTMENT OF TRANSPORTATION

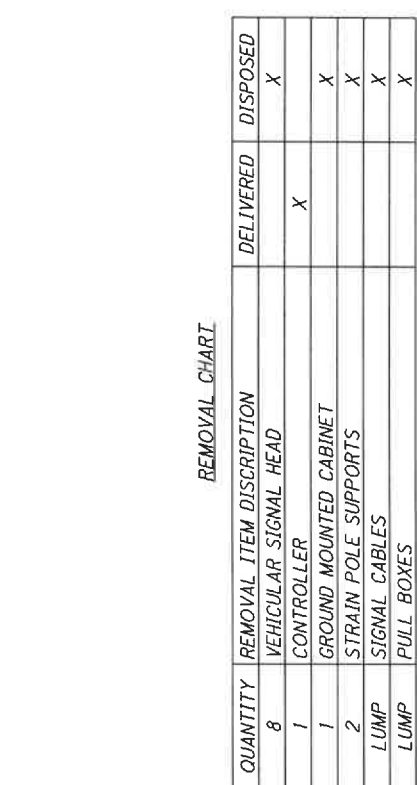
STANDARD CONSTRUCTION DRAWINGS				SUPPLEMENTAL SPECIFICATIONS	SPECIAL PROVISIONS
BP-3.1	1/21/22	HL-30.11	1/15/22	TC-16.22	7/16/21
		HL-30.22	1/15/22	TC-21.21	1/20/23
				TC-41.20	10/18/13
		MT-95.31	7/19/19	TC-41.40	10/18/13
		MT-95.50	7/21/17	TC-42.20	10/18/13
		MT-97.10	4/19/19	TC-52.10	10/18/13
		MT-101.90	7/17/20	TC-52.20	1/15/21
		MT-105.10	1/17/20	TC-71.10	7/15/22
		MT-110.10	7/19/13	TC-74.10	1/20/23
				TC-81.22	7/15/22
				TC-83.20	7/15/22
				TC-85.10	10/21/22
				TC-85.20	7/20/18

ENGINEERS SEAL:



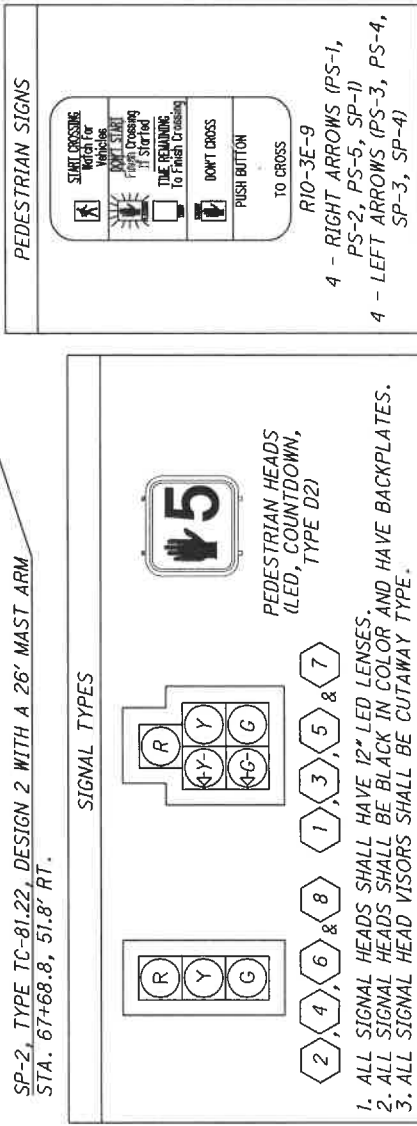
SIGNED Michael A. Glaus
DATE: 04/20/23

PS-1 WITH A PEDESTRIAN SIGNAL HEAD AND
PUSHBUTTON 'P6B'
STA. 67+69.6, 40.8' LT.
(1)-2" CONDUIT WITH (1)-5C AND (1)-2C LEAD-IN
IN TRENCH = 14'
PB-1
(1)-3" CONDUIT WITH (1)-7C, (1)-5C, (2)-2C LEAD-IN AND
(1)-VIDEO
IN TRENCH = 15'
SP-1, TYPE TC-81.22, DESIGN 4 WITH A 29' MAST ARM,
PEDESTRIAN SIGNAL HEAD AND PUSHBUTTON 'P4A'
STA. 67+49.5, 25.6' LT.
(1)-4" CONDUIT WITH (2)-7C, (4)-5C, (6)-2C LEAD-IN
AND (2)-VIDEO
JACKED OR DRILLED = 72'



NOTES:

1. THE CONTRACTOR SHALL ENSURE THAT ALL SIGNAL FACES ARE CLEARLY VISIBLE TO ALL ONCOMING VEHICLES; CLEAR OF ANY OBSTRUCTION ONCE MOUNTED TO THE MAST ARMS.
2. THE CONTRACTOR SHALL FIELD VERIFY THE LOCATIONS OF ALL UTILITIES PRIOR TO EXCAVATION.
3. FOR REFERENCE TO SIGNS (A), (B), (C) & (D), SEE SHEET 22.
4. FOR LEGEND, REFERENCE SHEET 28.



SIGNAL TIMING CHART

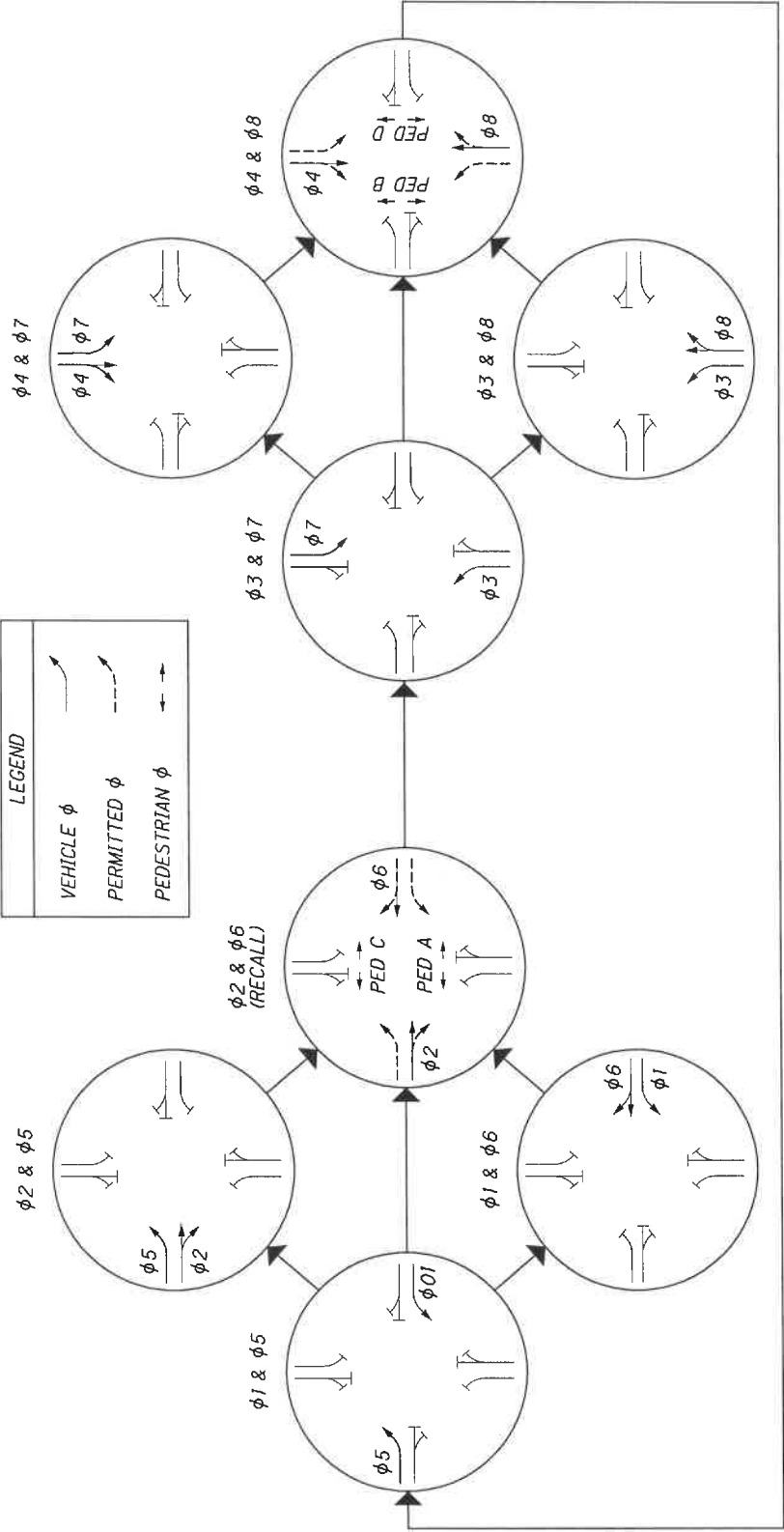
INTERSECTION: W. 21ST ST. (S.R. 611) / OBERLIN AVE.										
MAINTAINING AGENCY: CITY OF LORAIN										
START IN: ALL-RED FLASH TIME FOR: FLASH , ALL RED (SEC.): 9, 6 FIRST PHASE(S): 2 & 6 COLOR DISPLAYED: GREEN	START UP	DUAL ENTRY:		YES	PHASES:		2, 4, 6, 8			
		REST IN RED:		RING 1		RING 2				
	OVERLAP			A		B		C		
	PHASES			-		-		-		
INTERVAL OR FEATURE		CONTROLLER MOVEMENT NO.								
INTERSECTION MOVEMENT (PHASE)		1	2	3	4	5	6	7	8	
DIRECTION		WB LT	EB	NB LT	SB	EB LT	WB	SB LT	NB	
MINIMUM GREEN (INITIAL)	(SEC.)	7	20	7	10	7	20	7	10	
ADDED INITIAL	*(SEC./ACTUATION)	-	-	-	-	-	-	-	-	
MAXIMUM INITIAL	*(SEC.)	-	-	-	-	-	-	-	-	
PASSAGE TIME (PRESET GAP)	(SEC.)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
TIME BEFORE REDUCTION	*(SEC.)	-	-	-	-	-	-	-	-	
MINIMUM GAP	*(SEC.)	-	-	-	-	-	-	-	-	
TIME TO REDUCE	*(SEC.)	-	-	-	-	-	-	-	-	
MAXIMUM GREEN I	(SEC.)	15	60	15	30	15	60	15	30	
MAXIMUM GREEN II	(SEC.)	-	-	-	-	-	-	-	-	
YELLOW CHANGE	(SEC.)	3.2	4.1	3.2	4.1	3.2	4.1	3.2	4.1	
ALL RED CLEARANCE	(SEC.)	1.5	1.0	1.6	1.0	1.5	1.0	1.6	1.0	
DELAYED GREEN (LPI) #	(SEC.)	-	-	-	-	-	-	-	-	
FLASHING YELLOW ARROW DELAY^	(SEC.)	-	-	-	-	-	-	-	-	
WALK	(SEC.)	-	7	-	7	-	7	-	7	
PEDESTRIAN CLEARANCE	(SEC.)	-	8	-	12	-	8	-	12	
RECALL	MAXIMUM (ON/OFF)	-	-	-	-	-	-	-	-	
	MINIMUM (ON/OFF)	-	ON	-	-	-	ON	-	-	
	PEDESTRIAN (ON/OFF)	-	-	-	-	-	-	-	-	
MEMORY	(ON/OFF)	-	-	-	-	-	-	-	-	

- NOTES:
- ALL MOVEMENTS SHALL BE ACTUATED. THE PRIMARY THRU MOVEMENT SHOULD HAVE MIN RECALL ACTIVE TO REST IN GREEN.
 - FOR PROTECTED/PERMISSIVE PHASES, IMPLEMENT CALL OMTS TO AVOID YELLOW BALL TRAP.
 - COUNTDOWN PEDESTRIAN SIGNALS SHALL GO TO ZERO ON YELLOW PER OMUTCD FIGURE 4E-2.
 - ALL DETECTOR DELAYS SHALL BE PLACED IN THE CONTROLLER.

VIDEO DETECTOR CHART

DETECTION ZONE	SIZE	PULSE OR PRESENCE	ASSOCIATED PHASE	DELAY (SEC.)	DISCRPTION
D1	8 X 40	PRESENCE	φ1	5	WB LEFT CALL
D2	8 X 40	PRESENCE	φ2	-	EB CALL
D3	8 X 40	PRESENCE	φ3	-	NB LEFT CALL
D4	8 X 40	PRESENCE	φ4	-	SB CALL
D5	8 X 40	PRESENCE	φ5	5	EB LEFT CALL
D6	8 X 40	PRESENCE	φ6	-	WB CALL
D7	8 X 40	PRESENCE	φ7	-	SB LEFT CALL
D8	8 X 40	PRESENCE	φ8	-	NB CALL

PHASING DIAGRAM

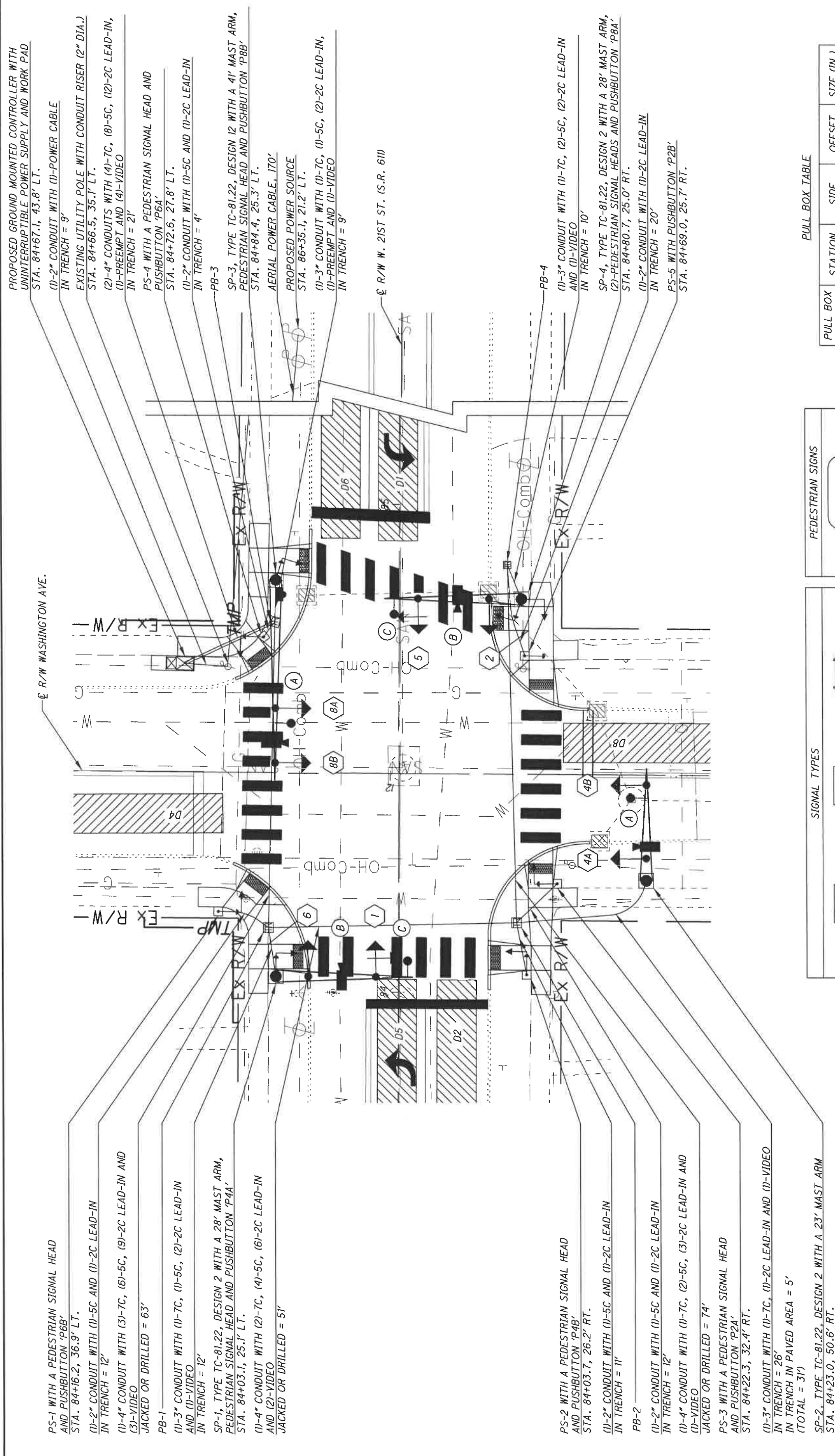


PREEMPT CHANNELS

- CHANNEL 1 = φ(2+5) (EASTBOUND ONLY)
CHANNEL 2 = φ(4+7) (SOUTHBOUND ONLY)
CHANNEL 3 = φ(1+6) (WESTBOUND ONLY)
CHANNEL 4 = φ(3+8) (NORTHBOUND ONLY)

PREEMPT NOTES:

- UPON PREEMPTION, ACTIVE WALK INDICATIONS SHALL IMMEDIATELY BE TERMINATED, FOLLOWED BY THE TIMING OF THE PEDESTRIAN CLEARANCE INTERVAL.
- IF ANY ACTIVE PHASE OPPOSES THE PREEMPT PHASE, ALL ACTIVE PHASES SHALL TIME THEIR YELLOW AND ALL RED CLEARANCE INTERVALS UPON COMPLETION OF ANY PEDESTRIAN INTERVALS PRIOR TO TRANSITIONING TO THE PREEMPT PHASE IN ORDER TO AVOID THE POTENTIAL FOR YELLOW BALL TRAP.
- AFTER RELEASE FROM PREEMPT, YELLOW AND ALL RED CLEARANCE INTERVALS SHALL BE DISPLAYED AND RETURN PHASE SHALL BE φ(2+6).



NOTES:

1. THE CONTRACTOR SHALL ENSURE THAT ALL SIGNAL FACES ARE CLEARLY VISIBLE TO ALL ONCOMING VEHICLES; CLEAR OF ANY OBSTRUCTION ONCE MOUNTED TO THE MAST ARMS.
2. THE CONTRACTOR SHALL FIELD VERIFY THE LOCATIONS OF ALL UTILITIES PRIOR TO EXCAVATION.
3. FOR REFERENCE TO SIGNS (A), (B) & (C), SEE SHEET 23.
4. FOR LEGEND, REFERENCE SHEET 28.

PULL BOX TABLE

PULL BOX #	STATION	SIDE	OFFSET	SIZE (IN.)
PB-1	84+13.0	LT	26.7'	24 X 24
PB-2	84+14.3	RT	24.1'	24 X 24
PB-3	84+15.8	LT	25.5'	24 X 24
PB-4	84+87.8	RT	22.1'	18 X 18

REMOVAL CHART

QUANTITY	REMOVAL ITEM DESCRIPTION	DELIVERED	DISPOSED
1	VEHICULAR SIGNAL HEAD; 4-WAY		X
2	VEHICULAR SIGNAL HEAD; 2-WAY		X
1	CONTROLLER		X
1	POLE MOUNTED CABINET		X
LUMP	SIGNAL CABLES		X

SIGNAL TIMING CHART

INTERSECTION: W. 21ST ST. (S.R. 611) / WASHINGTON AVE.											
MAINTAINING AGENCY: CITY OF LORAIN											
START IN: TIME FOR: FLASH , ALL RED (SEC.): 9, 6 FIRST PHASE(S): 2 & 6 COLOR DISPLAYED: GREEN	START UP		DUAL ENTRY:		YES		PHASES:		2, 4, 6, 8		
	REST IN RED:		RING 1		-		RING 2		-		
	OVERLAP		A		B		C		D		
	PHASES		-		-		-		-		
INTERVAL OR FEATURE			CONTROLLER MOVEMENT NO.								
INTERSECTION MOVEMENT (PHASE)			1	2	3	4	5	6	7	8	
DIRECTION			WB LT	EB	NB LT	SB	EB LT	WB	SB LT	NB	
MINIMUM GREEN (INITIAL)			7	20	-	10	7	20	-	10	
ADDED INITIAL			-	-	-	-	-	-	-	-	
MAXIMUM INITIAL			-	-	-	-	-	-	-	-	
PASSAGE TIME (PRESET GAP)			3.0	3.0	-	3.0	3.0	3.0	-	3.0	
TIME BEFORE REDUCTION			*(SEC.)	-	-	-	-	-	-	-	
MINIMUM GAP			*(SEC.)	-	-	-	-	-	-	-	
TIME TO REDUCE			*(SEC.)	-	-	-	-	-	-	-	
MAXIMUM GREEN I			(SEC.)	15	60	-	30	15	60	30	
MAXIMUM GREEN II			(SEC.)	-	-	-	-	-	-	-	
YELLOW CHANGE			(SEC.)	3.2	4.1	-	4.1	3.2	4.1	4.1	
ALL RED CLEARANCE			(SEC.)	1.2	1.0	-	1.0	1.2	1.0	1.0	
DELAYED GREEN (LPI) #			(SEC.)	-	-	-	-	-	-	-	
FLASHING YELLOW ARROW DELAY^			(SEC.)	-	-	-	-	-	-	-	
WALK			(SEC.)	-	7	-	7	-	7	7	
PEDESTRIAN CLEARANCE			(SEC.)	-	9	-	8	-	9	8	
RECALL			MAXIMUM (ON/OFF)	-	-	-	-	-	-	-	
			MINIMUM (ON/OFF)	-	ON	-	-	-	ON	-	-
			PEDESTRIAN (ON/OFF)	-	-	-	-	-	-	-	-
MEMORY			(ON/OFF)	-	-	-	-	-	-	-	
*VOLUME DENSITY CONTROLS											

- NOTES:
- ALL MOVEMENTS SHALL BE ACTUATED. THE PRIMARY THRU MOVEMENT SHOULD HAVE MIN RECALL ACTIVE TO REST IN GREEN.
 - FOR PROTECTED/PERMISSIVE PHASES, IMPLEMENT CALL OMITTS TO AVOID YELLOW BALL TRAP.
 - COUNTDOWN PEDESTRIAN SIGNALS SHALL GO TO ZERO ON YELLOW PER OMUTCD FIGURE 4E-2.
 - ALL DETECTOR DELAYS SHALL BE PLACED IN THE CONTROLLER.

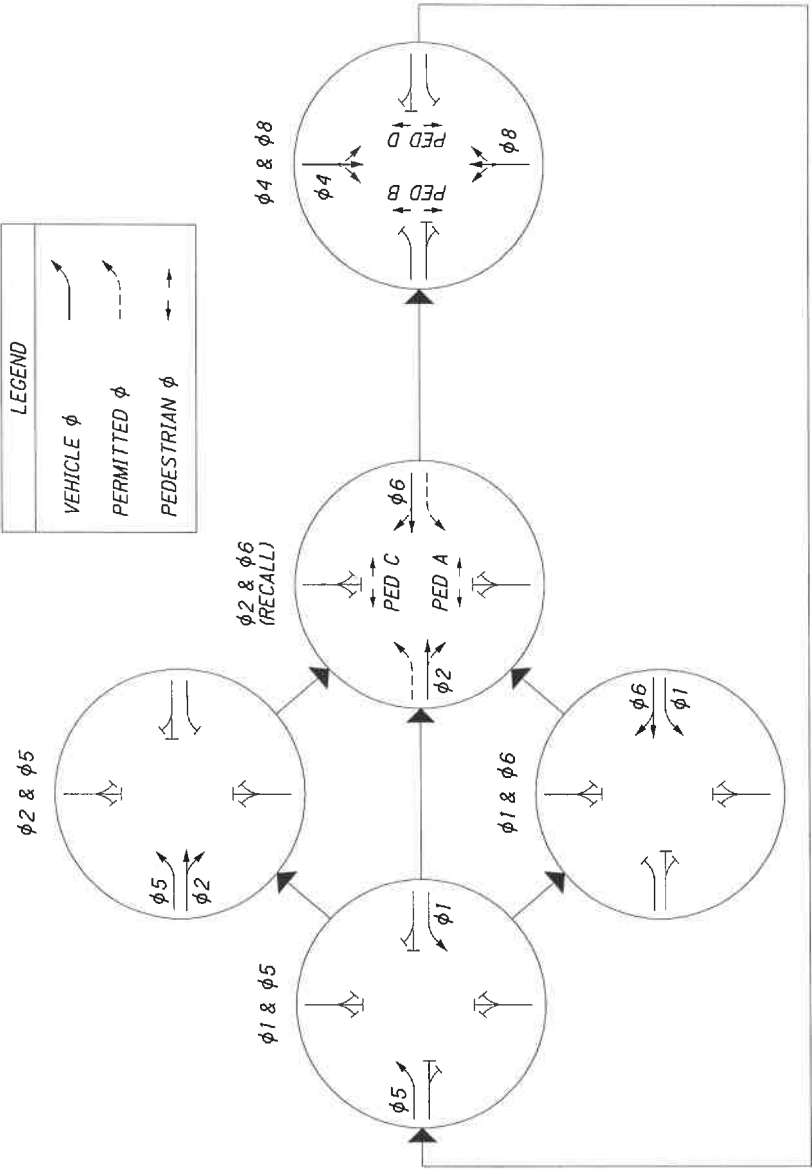
VIDEO DETECTOR CHART

DETECTION ZONE	SIZE	PULSE OR PRESENCE	ASSOCIATED PHASE	DELAY (SEC.)	DISCRPTION
D1	8 X 40	PRESENCE	φ1	5	WB LEFT CALL
D2	8 X 40	PRESENCE	φ2	-	EB CALL
D4	8 X 40	PRESENCE	φ4	10	SB CALL
D5	8 X 40	PRESENCE	φ5	5	EB LEFT CALL
D6	8 X 40	PRESENCE	φ6	-	WB CALL
D8	8 X 40	PRESENCE	φ8	10	NB CALL

- PREEMPT CHANNELS
- CHANNEL 1 = φ(2+5) (EASTBOUND ONLY)
 - CHANNEL 2 = φ4 (SOUTHBOUND ONLY)
 - CHANNEL 3 = φ(1+6) (WESTBOUND ONLY)
 - CHANNEL 4 = φ8 (NORTHBOUND ONLY)

- PREEMPT NOTES:
- UPON PREEMPTION, ACTIVE WALK INDICATIONS SHALL IMMEDIATELY BE TERMINATED, FOLLOWED BY THE TIMING OF THE PEDESTRIAN CLEARANCE INTERVAL.
 - IF ANY ACTIVE PHASE OPPOSES THE PREEMPT PHASE, ALL ACTIVE PHASES SHALL TIME THEIR YELLOW AND ALL RED CLEARANCE INTERVALS UPON COMPLETION OF ANY PEDESTRIAN INTERVALS PRIOR TO TRANSITIONING TO THE PREEMPT PHASE IN ORDER TO AVOID THE POTENTIAL FOR YELLOW BALL TRAP.
 - AFTER RELEASE FROM PREEMPT, YELLOW AND ALL RED CLEARANCE INTERVALS SHALL BE DISPLAYED AND RETURN PHASE SHALL BE φ(2+6).

PHASING DIAGRAM





NOT TO SCALE

W. 21ST ST. (S.R. 611) / WASHINGTON AVE.

W. 21ST ST. (S.R. 611) / WASHINGTON AVE.									
PHASE DIRECTION	1		2		3		4		8
	WB LT	EB	WB LT	EB	WB LT	EB	WB LT	EB	
PLAN NO. OR C/S/O	SPLITS (G+Y+AR) IN SECONDS								
1/1/1	15	40	-	25	15	40	-	25	50
1/1/2	15	40	-	25	15	40	-	25	55

COORDINATION TIMING PLANS			
DAY(S) OF WEEK	HOURS	CYCLE/SPLIT/ OFFSET	CYCLE LENGTH (SEC)
MON - FRI	00:00 - 07:00	-	FREE
MON - FRI	07:00 - 11:00	1/1/1	80
MON - FRI	11:00 - 18:00	1/1/2	80
MON - FRI	18:00 - 24:00	-	FREE
SAT - SUN	00:00 - 24:00	-	FREE

Appendix B - ODOT Traffic Signal Inspection Forms



TRAFFIC SIGNAL TIMING INSPECTION FORM

INTERSECTION NAME: W 21st + Oberlin Ave

DATE: 1/23/25

INSPECTED BY: ATP

CABINET Type: ☐ 332 ☐ 336 ☐ TS-2 ☒ TS-1 Mounting: ☐ Pole ☒ Ground

CONTROLLER Make & Model: Ecovolt Cobalt Firmware Version: _____

Address: _____ Time Synced? ☒ YES ☐ NO Ethernet Port? ☒ YES ☐ NO Master? ☐ YES ☒ NO

COMMUNICATION Type: ☒ Radio ☐ Cell Modem ☐ Interconnect ☐ Other Brand: Applied Information

Working Properly? ☒ YES ☐ NO; Issues found: _____

DETECTION Type: ☐ Radar ☒ Video ☐ Loops ☐ Other Brand: Miovision

Working Properly? ☒ YES ☐ NO; Issues found: _____

Left Turn 1st/2nd NB SB EB WB Detector $\phi 1$ $\phi 2$ $\phi 3$ $\phi 4$ $\phi 5$ $\phi 6$ $\phi 7$ $\phi 8$
Car Detection: 1st ☐ ☐ ☐ ☐ Delay (sec): ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐
2nd ☐ ☐ ☐ ☐

PUSHBUTTONS Provided? ☒ YES, Phase(s): 2, 4, 6 + 8 ☐ NO

Working Properly? ☒ YES ☐ NO; Issues found: _____

PHASING Is split phasing used? ☐ YES, Phase(s): _____ ☒ NO

Do yellow ball traps exist? ☐ YES, Phase(s): _____ ☒ NO Offset Reference: Yellow

TASKS ☐ Take pictures on each approach ☐ Take pictures in cabinet (both sides)

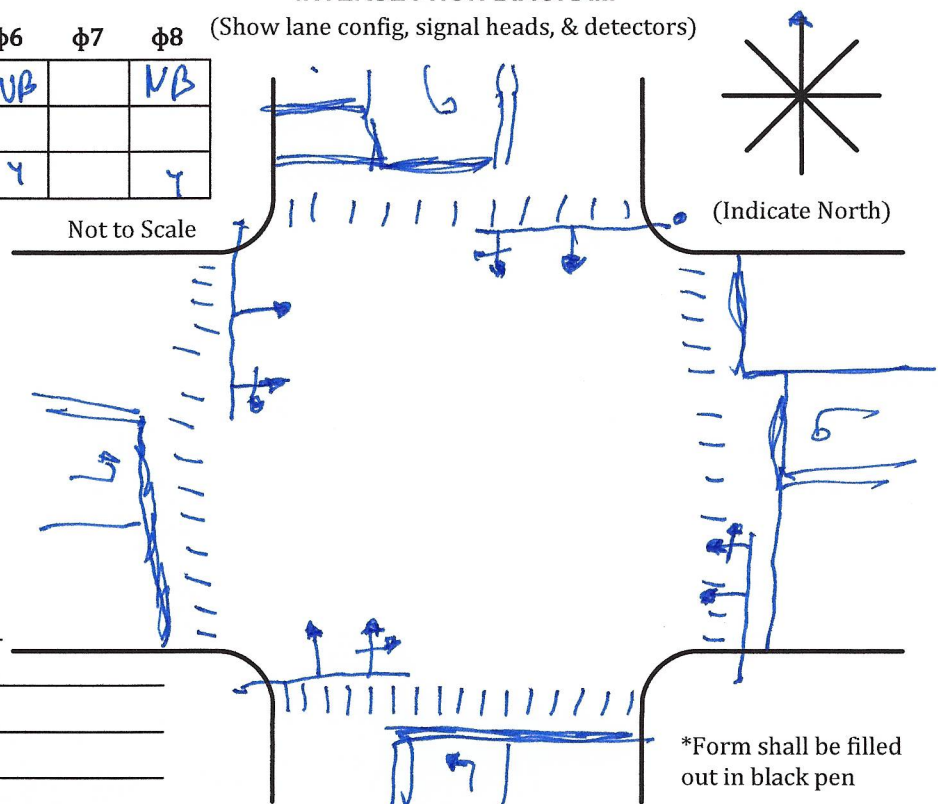
☐ Upload existing field data or populate standard timing sheet

ASSOCIATED PHASES

	$\phi 1$	$\phi 2$	$\phi 3$	$\phi 4$	$\phi 5$	$\phi 6$	$\phi 7$	$\phi 8$
Dir.	WBL	EB		SB	EBH	WB		NB
OVL								
PED		Y		Y		Y		Y

INTERSECTION DIAGRAM

(Show lane config, signal heads, & detectors)



LEGEND

- ☒ CABINET
- $\rightarrow$ PED. PUSHBUTTON
- $\rightarrow$ 3-SECTION HEAD
- $\rightarrow$ 5-SECTION HEAD
- $\rightarrow$ 3-SECTION HEAD W/ ARROWS
- $\rightarrow$ 4-SECTION HEAD W/ ARROWS
- ☐ VIDEO DETECTION

COMMENTS

*Form shall be filled out in black pen



TRAFFIC SIGNAL TIMING INSPECTION FORM

INTERSECTION NAME: N. 21st & Washington DATE: 1/23/25

INSPECTED BY: ATP

CABINET Type: ☐ 332 ☐ 336 ☐ TS-2 ☒ TS-1 Mounting: ☐ Pole ☒ Ground

CONTROLLER Make & Model: Econolite Cobalt Firmware Version: _____

Address: _____ Time Synced? ☒ YES ☐ NO Ethernet Port? ☒ YES ☐ NO Master? ☐ YES ☒ NO

COMMUNICATION Type: ☒ Radio ☐ Cell Modem ☐ Interconnect ☐ Other Brand: Applied Information

Working Properly? ☒ YES ☐ NO; Issues found: _____

DETECTION Type: ☐ Radar ☒ Video ☐ Loops ☐ Other Brand: Miovision

Working Properly? ☒ YES ☐ NO; Issues found: _____

Left Turn 1st/2nd NB SB EB WB
Car Detection: 1st ☐ ☐ ☒ ☒
2nd ☐ ☐ ☐ ☐
Detector Delay (sec):

φ1	φ2	φ3	φ4	φ5	φ6	φ7	φ8

PUSHBUTTONS Provided? ☒ YES, Phase(s): 2, 4, 6 & 8 ☐ NO

Working Properly? ☒ YES ☐ NO; Issues found: _____

PHASING Is split phasing used? ☐ YES, Phase(s): _____ ☒ NO

Do yellow ball traps exist? ☐ YES, Phase(s): _____ ☒ NO Offset Reference: Yellow

TASKS ☐ Take pictures on each approach ☐ Take pictures in cabinet (both sides)

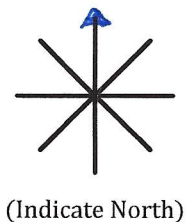
☐ Upload existing field data or populate standard timing sheet

ASSOCIATED PHASES

	φ1	φ2	φ3	φ4	φ5	φ6	φ7	φ8
Dir.	WB	EB		SB	EB	WB		WB
OVL								
PED		Y		Y		Y		Y

INTERSECTION DIAGRAM

(Show lane config, signal heads, & detectors)



LEGEND

- ☒ CABINET
- PED. PUSHBUTTON
- 3-SECTION HEAD
- 5-SECTION HEAD
- 3-SECTION HEAD W/ ARROWS
- 4-SECTION HEAD W/ ARROWS
- ☐ VIDEO DETECTION

COMMENTS

*Form shall be filled out in black pen

Appendix C - Manual Counts

VEHICULAR TRAFFIC COUNT SUMMARY

Municipality: Lorain

At Intersection of: West 2 1st Street and Oberlin Avenue

Date: 1/9/2025 Day: Thu. Comments: _____

Project: 23-141

Weather: Clear Recorder(s): DJS

Date entered: Jan. 10, 2025

W/2 1st St. s Oberlin Ave 010925

TIME BEGINS	Oberlin Ave. FROM NORTH					Oberlin Ave. FROM SOUTH					TOTAL NORTH SOUTH		W/2 1st St. FROM EAST					W/2 1st St. FROM WEST					TOTAL EAST WEST		TOTAL ALL DIREC.		PEAK HOUR FACTOR				
	Left	Thru	Right	Total	Bus	Left	Thru	Right	Total	Bus	Left	Thru	Right	Total	Bus	Left	Thru	Right	Total	Trk	Bus	Left	Thru	Right	Total	Trk	Bus	North	South	East	West
06:00																															
07:00	35	191	51	277	2	1	17	160	76	253	5	4	530	97	172	20	289	7	6	70	232	29	331	13	6	620	1150	0.834	0.843	0.794	0.781
08:00	56	156	23	235	3	2	33	148	56	237	4	3	472	61	128	17	206	5	0	30	159	13	202	5	1	408	880	0.783	0.723	0.920	0.886
09:00	32	125	29	186	4	1	25	113	69	207	4	4	393	59	114	16	189	5	3	24	139	23	186	9	1	375	768	0.802	0.848	0.788	0.894
10:00																															
11:00	34	144	42	220	5	1	22	129	47	198	7	2	418	52	163	23	238	10	0	42	168	29	239	10	0	477	895	0.873	0.825	0.875	0.807
12:00	32	163	33	228	3	0	32	168	68	268	3	0	496	98	164	25	287	13	1	44	213	32	289	10	1	576	1072	0.905	0.848	0.886	0.915
1:00	43	200	36	279	2	1	25	199	74	298	1	1	577	87	197	28	312	5	12	30	193	41	264	5	2	576	1153	0.861	0.847	0.897	0.857
2:00																															
3:00	32	268	45	345	5	2	53	294	87	434	1	5	779	116	285	37	438	4	3	55	240	52	347	4	5	785	1564	0.837	0.919	0.876	0.859
4:00	37	245	53	335	1	0	40	287	85	412	0	3	747	115	258	42	415	3	1	62	261	48	371	8	4	786	1533	0.920	0.831	0.894	0.760
5:00	47	249	41	337	2	0	36	245	74	355	0	1	692	106	230	53	389	5	0	46	214	41	301	3	0	690	1382	0.878	0.853	0.917	0.875
6:00																															
7:00																															
8:00																															
9:00																															
TOTALS	348	1741	383	2442	27	8	283	1743	636	2662	25	23	5104	791	1711	261	2763	57	26	403	1819	308	2530	67	20	5293	10397				
ADT	485	2424	492	3400			394	2427	886	3707		1.8%	7107	1118	2417	369	3904		3.0%	569	2570	435	3575		3.4%	7478	14585				

N Log Hourly Factor: 1.58

S Log Hourly Factor: 1.58

N Log Monthly Factor: 0.88

S Log Monthly Factor: 0.88

E Log Hourly Factor: 1.61

W Log Hourly Factor: 1.61

E Log Monthly Factor: 0.88

W Log Monthly Factor: 0.88

N Log Combined Factor: 1.39

S Log Combined Factor: 1.39

E Log Combined Factor: 1.41

W Log Combined Factor: 1.41

TMS ENGINEERS, INC.

2112 Case Parkway South #7

Twinsburg, Ohio 44037

(330) 686-6402 FAX: (330) 686-6417

Figure #:

Page #:

VEHICULAR TRAFFIC COUNT SUMMARY

Municipality: <u>Lorain</u>		At Intersection of: <u>West 2 1st Street</u> and <u>Washington Avenue</u>	
Date: <u>1/9/2025</u>	Day: <u>Thu.</u>	Comments: <u>23-141</u>	
Weather: <u>Clear</u>	Recorder(s): <u>KPB</u>	Date entry by: <u>JUO</u>	Date entered: <u>Jan. 10, 2025</u>
Project: <u>W/21st St & Washington Ave</u>		Project: <u>23-141</u>	
010925		010925	

TIME BEGINS	Washington Avenue FROM NORTH				Washington Avenue FROM SOUTH				TOTAL NORTH SOUTH		W/21st St. FROM EAST				W/21st St. FROM WEST				TOTAL EAST WEST		TOTAL ALL DIREC.	PEAK HOUR FACTOR									
	Left	Thru	Right	Total	Trk	Bus	Left	Thru	Right	Total	Trk	Bus	Left	Thru	Right	Total	Trk	Bus	North	South		East	West								
06:00																															
07:00	60	36	42	138	2	5	5	20	11	36	2	1	174	18	225	42	285	9	9	35	259	8	302	16	6	587	761	0.719	0.563	0.792	0.803
08:00	52	64	52	168	3	1	11	42	37	90	1	4	258	27	210	33	270	6	4	20	246	25	291	9	4	561	819	0.778	0.938	0.951	0.817
09:00	24	22	30	76	0	1	3	22	11	36	0	0	112	8	166	28	202	9	2	19	188	6	213	8	4	415	527	0.864	0.600	0.935	0.845
10:00																															
11:00	35	28	23	86	1	0	2	17	7	26	0	0	112	5	180	32	217	7	0	19	181	9	209	8	1	426	538	0.860	0.542	0.753	0.950
12:00	27	21	34	82	0	0	7	12	6	25	0	1	107	4	209	28	241	11	2	30	219	2	251	11	1	492	599	0.854	0.694	0.927	0.937
1:00	50	41	42	133	2	2	1	28	13	42	0	0	175	8	247	34	289	10	15	19	253	6	278	8	1	567	742	0.831	0.700	0.761	0.891
2:00																															
3:00	42	60	64	166	1	3	16	64	22	102	1	2	268	33	319	49	401	4	3	41	254	13	308	6	6	709	977	0.728	0.531	0.842	0.865
4:00	55	36	54	145	0	1	9	41	14	64	2	2	209	19	333	59	411	1	3	28	291	7	326	4	8	737	946	0.740	0.727	0.934	0.823
5:00	45	37	54	136	1	1	7	35	16	58	0	0	194	10	325	46	381	3	0	40	281	6	327	4	1	708	902	0.829	0.853	0.882	0.919
6:00																															
7:00																															
8:00																															
9:00																															
TOTALS	390	345	395	1130	10	14	61	281	137	479	6	10	1609	132	2214	351	2697	60	38	251	2172	82	2505	74	32	5202	6811				
ADT	527	466	534	1527	2.1%	82	380	185	647	3.3%			2175	187	3128	496	3811	3.6%		355	3069	116	3539	4.2%		7350	9525				

N Log Hourly Factor: <u>1.54</u>	E Log Hourly Factor: <u>1.61</u>	N Log Combined Factor: <u>1.35</u>	E Log Combined Factor: <u>1.41</u>
S Log Hourly Factor: <u>1.54</u>	W Log Hourly Factor: <u>1.61</u>	S Log Combined Factor: <u>1.35</u>	W Log Combined Factor: <u>1.41</u>
E Log Monthly Factor: <u>0.88</u>			
S Log Monthly Factor: <u>0.88</u>			

TMS ENGINEERS, INC.
2112 Case Parkway South #7
Twinsburg, Ohio 44037
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Figure #:
Page #:

Appendix D - 24-Hour Automatic Tube Count

TMS Engineers
Tube Count Report
24-122: City of Medina

Site Code: W 21st ST
Location 1: W. 21st St., b/w
Location 2: Washington & Hamilton Ave.
Location 3: Lorain, Oh.
Location 4:

Start Date: 1/7/2025
End Date: 1/11/2025
Date Printed: 1/13/2025
Latitude: 0.000000
Longitude: 0.000000

1/6/2025		1/7/2025		1/8/2025		1/9/2025		1/10/2025		1/11/2025		1/12/2025	
Time	A to B, EB	B to A, WB	A to B, EB	B to A, WB	A to B, EB	B to A, WB	A to B, EB	B to A, WB	A to B, EB	B to A, WB	A to B, EB	B to A, WB	A to B, EB
12:00 AM	*	*	*	*	36	47	45	46	44	45	50	45	*
1:00	*	*	*	*	23	26	26	20	29	27	45	31	*
2:00	*	*	*	*	26	24	28	21	19	24	26	3	*
3:00	*	*	*	*	23	15	13	19	21	16	26	3	*
4:00	*	*	*	*	47	24	25	41	21	23	14	3	*
5:00	*	*	*	*	134	71	81	109	62	71	16	0	*
6:00	*	*	*	*	134	159	139	120	130	143	0	0	*
7:00	*	*	*	*	354	272	273	289	254	266	0	0	*
8:00	*	*	*	*	302	274	257	276	241	257	0	0	*
9:00	*	*	*	*	236	241	223	251	231	232	0	0	*
10:00	*	*	*	*	251	238	239	220	249	242	0	0	*
11:00	*	*	*	*	220	246	224	281	300	250	0	0	*
12:00 PM	*	*	*	*	271	307	279	304	280	289	*	*	*
1:00	*	*	*	*	277	306	314	298	338	319	*	*	*
2:00	*	*	*	*	339	395	428	397	462	428	*	*	*
3:00	*	*	413	371	380	411	431	369	448	426	*	*	*
4:00	*	*	383	363	364	426	405	413	444	414	*	*	*
5:00	*	*	354	280	305	345	360	311	365	356	*	*	*
6:00	*	*	247	249	247	272	276	315	278	261	*	*	*
7:00	*	*	210	190	194	220	201	180	217	212	*	*	*
8:00	*	*	169	144	166	162	175	160	183	172	*	*	*
9:00	*	*	144	120	131	159	143	147	155	150	*	*	*
10:00	*	*	96	94	86	109	98	124	127	108	*	*	*
11:00	*	*	57	65	57	64	61	113	74	64	*	*	*
Total	0	0	1876	3949	4603	4813	4744	4824	4972	4808	177	85	0
Day	0	0			9416		9302	9796		9440	262	0	0
AM Peak Volume					7:00	8:00	7:00	7:00	11:00	7:00	12:00 AM	12:00 AM	
PM Peak Volume			3:00	3:00	3:00	4:00	3:00	4:00	2:00	2:00	50	45	
Comb Total	0		371	413	380	426	431	413	462	428			
ADT		ADT: 8,801	3949	AADT: 8,801	9416		9302	9796		9440	262	0	

Appendix E - Clearance Timing Calculations

W. 21st Street & Oberlin Avenue

ASSOCIATED PHASE	DIRECTION	IS THIS A LEFT TURN PHASE?	VEHICLE CLEARANCE CALC'S										PEDESTRIAN TIMING CALC'S										3 f/s CHECKS (OMUTCD 4E.06-14)				FINAL PED TIMING																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
			FACTORS										CALCULATED				PED MOVEMENT (LEG)				ASSOCIATED PHASE				CROSSWALK LENGTH ⁵	PUSHBUTTON PROVIDED		DISTANCE TO PUSHBUTTON	WALK INTERVAL (4-7s TYP)		CALCULATED PED CLEARANCE = 3.5 f/s WALK TIME 3 sec	PED CHANGE INTERVAL (FDW) = 3.5 f/s WALK TIME - 3 sec BUFFER	(L+P)/(3 f/s) (NOTE: P=6 IF NO PUSHBUTTON)	WALK + PED CHANGE INTERVALS	IS Y>=X?	ADDITIONAL WALK INTERVAL REQUIRED	FINAL WALK INTERVAL	FINAL PED CHANGE INTERVAL (FDW)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
			PERCEPTION/REACTION TIME (1s TYP)	POSTED SPEED	TEM 403-2 SPEED FOR USE IN YELLOW CALC.	TEM 403-2 SPEED FOR USE IN ALL RED CALC.	APPROACH SPEED FOR USE IN YELLOW CALC.	APPROACH SPEED FOR USE IN ALL RED CALC.	DECELERATION RATE (10 sq. f/s TYP)	WIDTH OF INTERSECTION	LENGTH OF VEHICLE (20 ft TYP)	APPROACH GRADE ⁴	YELLOW	ALL RED	Y + AR	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT		SEC	FT		SEC	FT									SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT	SEC	FT

NOTES:

- Width of intersection shall be measured from the approach movement stop-bar to the far side of the intersection as defined by the extension of the curb line, outside edge of the farthest travel lane, or the far side of the pedestrian crosswalk. (TEM 403-2) A pedestrian crossing equipped with pedestrian signals on a receiving lane should not be considered unless the nearest crossing line is 40 feet or more from the extension of the farthest edge of the farthest conflicting traffic lane. If this condition exists, the intersection width should be measured from the back-up stream edge of the approaching movement stop line to the nearest pedestrian crossing lane.
- If no pedestrian pushbutton is provided, 6 feet is used in the 3 f/s check (per OMUTCD 4E.06 -14).
- Walk interval can be increased for special conditions such as school crossings and large pedestrian volumes walking in more than 1 row.
- Use 0% for uphill grade.
- Measured from curb to curb in the middle of crosswalk.

W. 21st Street & Washington Avenue

[illegible]

NOTES:

- 1 Width of intersection shall be measured from the approach movement stop-bar to the far side of the intersection as defined by the extension of the curb line, outside edge of the farthest travel lane, or the far side of the pedestrian crosswalk. (TEH 403-2) A pedestrian crossing equipped with pedestrian signals on a receiving lane should not be considered unless the nearest crossing line is 40 feet or more from the extension of the farthest edge of the farthest conflicting traffic lane. If this condition exists, the intersection width should be measured from the back/upstream edge of the approaching movement stop line to the nearest pedestrian crossing lane.
- 2 If no pedestrian pushbutton is provided, 6 feet is used in the 3 fps check (per OMUTCD 4E-06-14).
- 3 Walk interval can be increased for special conditions such as school crossings and large pedestrian volumes walking in more than 1 row.
- 4 Use 0% for uphill grade.
- 5 Measured from curb to curb in the middle of crosswalk.

Appendix F - Final Signal Timing Charts

SIGNAL TIMING CHART

INTERSECTION: MAINTAINING AGENCY:				W. 21st Street & Oberlin Avenue Lorain											
START UP START IN: FLASH TIME FOR FLASH OR ALL RED: 7 FIRST PHASE(S): 2 COLOR DISPLAYED: G 6				DUAL ENTRY:		Yes		PHASES:		2,6					
				REST IN RED:		RING 1		-		RING 2		-			
				OVERLAP				A		B		C		D	
				PHASES				-		-		-		-	
INTERVAL OR FEATURE				CONTROLLER MOVEMENT NO.											
INTERSECTION MOVEMENT (PHASE)				1	2	3	4	5	6	7	8				
DIRECTION				WB L	EB	NB L	SB	EB L	WB	SB L	NB				
MINIMUM GREEN (INITIAL) (SEC.)				7	20	7	10	7	20	7	10				
ADDED INITIAL *(SEC./ACTUATION)				-	-	-	-	-	-	-	-				
MAXIMUM INITIAL *(SEC.)				-	-	-	-	-	-	-	-				
PASSAGE TIME (PRESET GAP) (SEC.)				2.5	4.0	2.5	4.0	2.5	4.0	2.5	4.0				
TIME BEFORE REDUCTION *(SEC.)				-	-	-	-	-	-	-	-				
MINIMUM GAP *(SEC.)				-	-	-	-	-	-	-	-				
TIME TO REDUCE *(SEC.)				-	-	-	-	-	-	-	-				
MAXIMUM GREEN I (SEC.)				15	50	15	30	15	50	15	30				
MAXIMUM GREEN II (SEC.)				15	50	15	30	15	50	15	30				
YELLOW CHANGE (SEC.)				3.2	4.1	3.0	3.3	3.2	4.1	3.0	3.3				
ALL RED CLEARANCE (SEC.)				1.0	1.0	1.6	1.0	1.0	1.0	1.6	1.0				
WALK (SEC.)				-	8	-	8	-	8	-	8				
PEDESTRIAN CLEARANCE (SEC.)				-	13	-	13	-	13	-	13				
RECALL	MAXIMUM (ON/OFF)	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF				
	MINIMUM (ON/OFF)	OFF	ON	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF				
	PEDESTRIAN (ON/OFF)	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF				
MEMORY (ON/OFF)				OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF				

*VOLUME DENSITY CONTROLS

NOTES:

- Maximum recall should normally be set to OFF for all used phases, particularly on the coordinated phases during coordinated operation.
- Pedestrian recall should be set to OFF for all used phase
- Set minimum recall to ON for the major street phases if the intersection consist of a major street and a minor street with significantly higher volumes on the major street.
- Set minimum recall to OFF when the intersection consists of two streets with equal volumes and set-back detectors on both streets.

SIGNAL TIMING CHART

INTERSECTION: MAINTAINING AGENCY:					W. 21st Street & Washington Avenue Lorain							
START UP START IN: FLASH TIME FOR FLASH OR ALL RED: 7 FIRST PHASE(S): 2 COLOR DISPLAYED: G 6					DUAL ENTRY: Yes		PHASES: 2,6					
					REST IN RED:		RING 1 - RING 2 -					
					OVERLAP		A	B	C	D		
					PHASES		-	-	-	-		
INTERVAL OR FEATURE					CONTROLLER MOVEMENT NO.							
INTERSECTION MOVEMENT (PHASE)					1	2	-	4	5	6	-	8
DIRECTION					WB L	EB	-	SB	EB L	WB	-	NB
MINIMUM GREEN (INITIAL) (SEC.)					7	20	-	10	7	20	-	10
ADDED INITIAL *(SEC./ACTUATION)					-	-	-	-	-	-	-	-
MAXIMUM INITIAL *(SEC.)					-	-	-	-	-	-	-	-
PASSAGE TIME (PRESET GAP) (SEC.)					2.5	4.0	-	4.0	2.5	4.0	-	4.0
TIME BEFORE REDUCTION *(SEC.)					-	-	-	-	-	-	-	-
MINIMUM GAP *(SEC.)					-	-	-	-	-	-	-	-
TIME TO REDUCE *(SEC.)					-	-	-	-	-	-	-	-
MAXIMUM GREEN I (SEC.)					15	50	-	30	15	50	-	30
MAXIMUM GREEN II (SEC.)					15	50	-	30	15	50	-	30
YELLOW CHANGE (SEC.)					3.2	4.1	-	3.3	3.2	4.1	-	3.3
ALL RED CLEARANCE (SEC.)					1.0	1.0	-	1.0	1.0	1.0	-	1.0
WALK (SEC.)					-	7	-	7	-	7	-	7
PEDESTRIAN CLEARANCE (SEC.)					-	7	-	9	-	7	-	9
RECALL	MAXIMUM (ON/OFF)	OFF	OFF	-	OFF	OFF	OFF	OFF	-	OFF		
	MINIMUM (ON/OFF)	OFF	ON	-	OFF	OFF	ON	-	OFF			
	PEDESTRIAN (ON/OFF)	OFF	OFF	-	OFF	OFF	OFF	OFF	-	OFF		
MEMORY (ON/OFF)					OFF	OFF	-	OFF	OFF	OFF	-	OFF

*VOLUME DENSITY CONTROLS

NOTES:

- Maximum recall should normally be set to OFF for all used phases, particularly on the coordinated phases during coordinated operation.
- Pedestrian recall should be set to OFF for all used phase
- Set minimum recall to ON for the major street phases if the intersection consist of a major street and a minor street with significantly higher volumes on the major street.
- Set minimum recall to OFF when the intersection consists of two streets with equal volumes and set-back detectors on both streets.

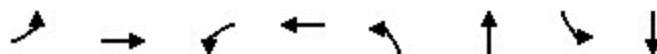
Appendix G - Synchro Analyses Outputs

Timings

3: Oberlin Avenue & W. 21st St

7:00 - 8:00 AM

01/22/2025



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	70	232	97	172	17	160	35	191
Future Volume (vph)	70	232	97	172	17	160	35	191
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	7.0	20.0	7.0	20.0	10.0	10.0	10.0	10.0
Minimum Split (s)	12.2	27.1	12.2	27.1	26.3	26.3	26.3	26.3
Total Split (s)	13.0	30.0	13.0	30.0	27.0	27.0	27.0	27.0
Total Split (%)	18.6%	42.9%	18.6%	42.9%	38.6%	38.6%	38.6%	38.6%
Yellow Time (s)	3.2	4.1	3.2	4.1	3.3	3.3	3.3	3.3
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.2	5.1	4.2	5.1	4.3	4.3	4.3	4.3
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	C-Min	None	C-Min	None	None	None	None
Act Effect Green (s)	41.8	34.8	42.6	35.2	16.0	16.0	16.0	16.0
Actuated g/C Ratio	0.60	0.50	0.61	0.50	0.23	0.23	0.23	0.23
v/c Ratio	0.12	0.37	0.19	0.26	0.13	0.65	0.26	0.68
Control Delay (s/veh)	6.4	14.7	5.0	9.3	21.1	27.7	24.5	30.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	6.4	14.7	5.0	9.3	21.1	27.7	24.5	30.7
LOS	A	B	A	A	C	C	C	C
Approach Delay (s/veh)		12.9		7.8		27.3		29.9
Approach LOS		B		A		C		C

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow, Master Intersection

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay (s/veh): 18.6

Intersection LOS: B

Intersection Capacity Utilization 58.9%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 3: Oberlin Avenue & W. 21st St



Timings
6: Washington Ave & W. 21st St

7:00 - 8:00 AM
01/22/2025

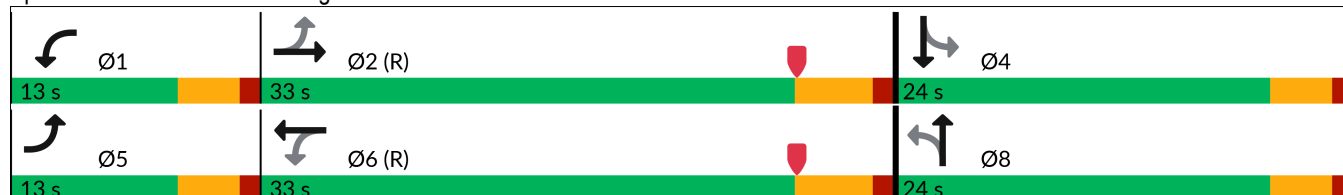
								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	35	259	18	225	5	20	60	36
Future Volume (vph)	35	259	18	225	5	20	60	36
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	7.0	20.0	7.0	20.0	10.0	10.0	10.0	10.0
Minimum Split (s)	12.2	26.1	12.2	26.1	21.3	21.3	21.3	21.3
Total Split (s)	13.0	33.0	13.0	33.0	24.0	24.0	24.0	24.0
Total Split (%)	18.6%	47.1%	18.6%	47.1%	34.3%	34.3%	34.3%	34.3%
Yellow Time (s)	3.2	4.1	3.2	4.1	3.3	3.3	3.3	3.3
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)	4.2	5.1	4.2	5.1		4.3		4.3
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	C-Min	None	C-Min	None	None	None	None
Act Effect Green (s)	46.5	42.7	45.6	40.5		13.4		13.4
Actuated g/C Ratio	0.66	0.61	0.65	0.58		0.19		0.19
v/c Ratio	0.06	0.30	0.03	0.33		0.19		0.61
Control Delay (s/veh)	5.6	10.2	4.8	10.6		17.9		29.4
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay (s/veh)	5.6	10.2	4.8	10.6		17.9		29.4
LOS	A	B	A	B		B		C
Approach Delay (s/veh)		9.7		10.2		17.9		29.4
Approach LOS		A		B		B		C

Intersection Summary

Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 4 (6%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.61
 Intersection Signal Delay (s/veh): 14.2
 Intersection Capacity Utilization 48.3%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 6: Washington Ave & W. 21st St



Timings
3: Oberlin Avenue & W. 21st St

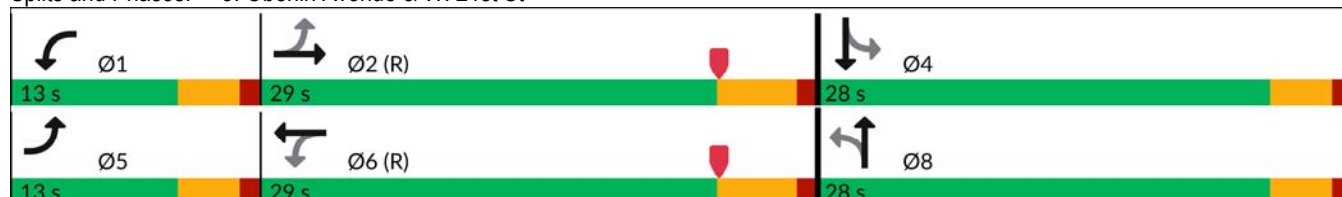
8:00 - 9:00 AM
01/22/2025

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	30	159	61	128	33	148	56	156
Future Volume (vph)	30	159	61	128	33	148	56	156
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	7.0	20.0	7.0	20.0	10.0	10.0	10.0	10.0
Minimum Split (s)	12.2	27.1	12.2	27.1	26.3	26.3	26.3	26.3
Total Split (s)	13.0	29.0	13.0	29.0	28.0	28.0	28.0	28.0
Total Split (%)	18.6%	41.4%	18.6%	41.4%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	3.2	4.1	3.2	4.1	3.3	3.3	3.3	3.3
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.2	5.1	4.2	5.1	4.3	4.3	4.3	4.3
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	C-Min	None	C-Min	None	None	None	None
Act Effct Green (s)	43.1	38.0	44.4	40.5	15.6	15.6	15.6	15.6
Actuated g/C Ratio	0.62	0.54	0.63	0.58	0.22	0.22	0.22	0.22
v/c Ratio	0.04	0.20	0.09	0.15	0.23	0.67	0.48	0.55
Control Delay (s/veh)	6.0	11.5	4.4	7.2	23.3	29.8	32.9	27.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	6.0	11.5	4.4	7.2	23.3	29.8	32.9	27.1
LOS	A	B	A	A	C	C	C	C
Approach Delay (s/veh)		10.7		6.3		28.9		28.5
Approach LOS		B		A		C		C

Intersection Summary

Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow, Master Intersection
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.67
 Intersection Signal Delay (s/veh): 20.3
 Intersection LOS: C
 Intersection Capacity Utilization 56.9%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 3: Oberlin Avenue & W. 21st St



Timings
6: Washington Ave & W. 21st St

8:00 - 9:00 AM
01/22/2025

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	20	246	27	210	11	42	52	64
Future Volume (vph)	20	246	27	210	11	42	52	64
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	7.0	20.0	7.0	20.0	10.0	10.0	10.0	10.0
Minimum Split (s)	12.2	26.1	12.2	26.1	21.3	21.3	21.3	21.3
Total Split (s)	13.0	32.0	13.0	32.0	25.0	25.0	25.0	25.0
Total Split (%)	18.6%	45.7%	18.6%	45.7%	35.7%	35.7%	35.7%	35.7%
Yellow Time (s)	3.2	4.1	3.2	4.1	3.3	3.3	3.3	3.3
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)	4.2	5.1	4.2	5.1		4.3		4.3
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	C-Min	None	C-Min	None	None	None	None
Act Effect Green (s)	45.8	42.1	45.8	42.1		14.0		14.0
Actuated g/C Ratio	0.65	0.60	0.65	0.60		0.20		0.20
v/c Ratio	0.03	0.30	0.04	0.24		0.26		0.63
Control Delay (s/veh)	3.3	8.0	5.0	9.2		16.1		29.3
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay (s/veh)	3.3	8.0	5.0	9.2		16.1		29.3
LOS	A	A	A	A		B		C
Approach Delay (s/veh)		7.7		8.8		16.1		29.3
Approach LOS		A		A		B		C

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 3 (4%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.63

Intersection Signal Delay (s/veh): 13.8

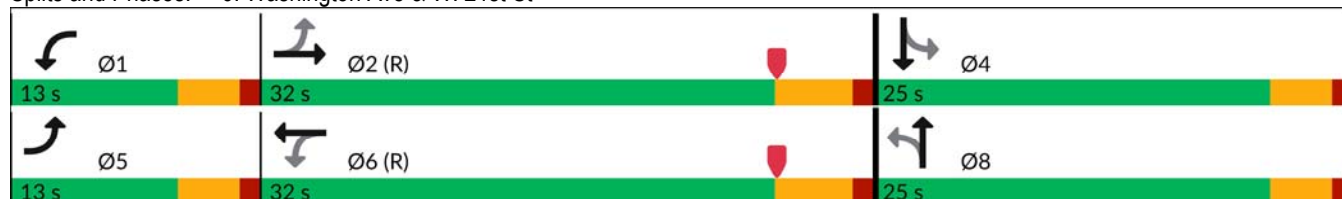
Intersection LOS: B

Intersection Capacity Utilization 46.4%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: Washington Ave & W. 21st St

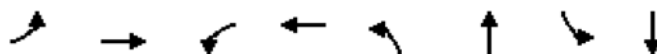


Timings

3: Oberlin Avenue & W. 21st St

9:00 - 10:00 AM

01/22/2025



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	24	139	59	114	25	113	32	125
Future Volume (vph)	24	139	59	114	25	113	32	125
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	7.0	20.0	7.0	20.0	10.0	10.0	10.0	10.0
Minimum Split (s)	12.2	27.1	12.2	27.1	26.3	26.3	26.3	26.3
Total Split (s)	13.0	30.0	13.0	30.0	27.0	27.0	27.0	27.0
Total Split (%)	18.6%	42.9%	18.6%	42.9%	38.6%	38.6%	38.6%	38.6%
Yellow Time (s)	3.2	4.1	3.2	4.1	3.3	3.3	3.3	3.3
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.2	5.1	4.2	5.1	4.3	4.3	4.3	4.3
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	C-Min	None	C-Min	None	None	None	None
Act Effct Green (s)	45.1	38.6	47.2	43.3	12.8	12.8	12.8	12.8
Actuated g/C Ratio	0.64	0.55	0.67	0.62	0.18	0.18	0.18	0.18
v/c Ratio	0.03	0.18	0.09	0.15	0.17	0.60	0.26	0.55
Control Delay (s/veh)	4.5	9.6	3.7	6.2	24.8	27.1	27.5	29.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	4.5	9.6	3.7	6.2	24.8	27.1	27.5	29.2
LOS	A	A	A	A	C	C	C	C
Approach Delay (s/veh)		9.0		5.4		26.8		28.9
Approach LOS		A		A		C		C

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow, Master Intersection

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.60

Intersection Signal Delay (s/veh): 17.8

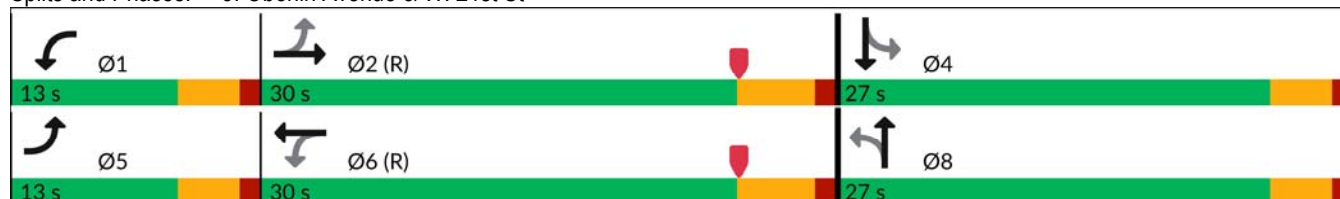
Intersection LOS: B

Intersection Capacity Utilization 55.9%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 3: Oberlin Avenue & W. 21st St



Timings
6: Washington Ave & W. 21st St

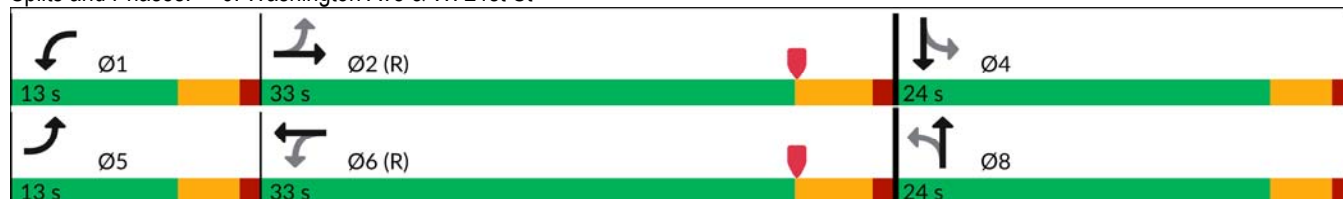
9:00 - 10:00 AM
01/22/2025

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	19	188	8	166	3	22	24	22
Future Volume (vph)	19	188	8	166	3	22	24	22
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	7.0	20.0	7.0	20.0	10.0	10.0	10.0	10.0
Minimum Split (s)	12.2	26.1	12.2	26.1	21.3	21.3	21.3	21.3
Total Split (s)	13.0	33.0	13.0	33.0	24.0	24.0	24.0	24.0
Total Split (%)	18.6%	47.1%	18.6%	47.1%	34.3%	34.3%	34.3%	34.3%
Yellow Time (s)	3.2	4.1	3.2	4.1	3.3	3.3	3.3	3.3
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)	4.2	5.1	4.2	5.1		4.3		4.3
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	C-Min	None	C-Min	None	None	None	None
Act Effct Green (s)	53.2	51.9	52.4	49.7		10.3		10.3
Actuated g/C Ratio	0.76	0.74	0.75	0.71		0.15		0.15
v/c Ratio	0.02	0.17	0.01	0.16		0.22		0.34
Control Delay (s/veh)	1.7	3.9	2.9	5.9		22.2		21.9
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay (s/veh)	1.7	3.9	2.9	5.9		22.2		21.9
LOS	A	A	A	A		C		C
Approach Delay (s/veh)		3.7		5.8		22.2		21.9
Approach LOS		A		A		C		C

Intersection Summary

Cycle Length: 70	
Actuated Cycle Length: 70	
Offset: 4 (6%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.34	
Intersection Signal Delay (s/veh): 8.9	Intersection LOS: A
Intersection Capacity Utilization 35.2%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 6: Washington Ave & W. 21st St

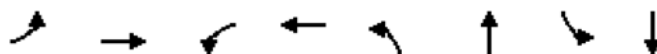


Timings

3: Oberlin Avenue & W. 21st St

11:00 - 12:00 PM

01/22/2025



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	42	168	52	163	22	129	34	144
Future Volume (vph)	42	168	52	163	22	129	34	144
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	7.0	20.0	7.0	20.0	10.0	10.0	10.0	10.0
Minimum Split (s)	12.2	27.1	12.2	27.1	26.3	26.3	26.3	26.3
Total Split (s)	13.0	30.0	13.0	30.0	27.0	27.0	27.0	27.0
Total Split (%)	18.6%	42.9%	18.6%	42.9%	38.6%	38.6%	38.6%	38.6%
Yellow Time (s)	3.2	4.1	3.2	4.1	3.3	3.3	3.3	3.3
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.2	5.1	4.2	5.1	4.3	4.3	4.3	4.3
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	C-Min	None	C-Min	None	None	None	None
Act Effect Green (s)	45.5	40.3	45.6	40.3	13.5	13.5	13.5	13.5
Actuated g/C Ratio	0.65	0.58	0.65	0.58	0.19	0.19	0.19	0.19
v/c Ratio	0.06	0.23	0.07	0.20	0.16	0.58	0.23	0.59
Control Delay (s/veh)	4.8	9.8	4.2	7.6	24.0	28.1	25.8	29.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	4.8	9.8	4.2	7.6	24.0	28.1	25.8	29.3
LOS	A	A	A	A	C	C	C	C
Approach Delay (s/veh)		9.0		6.8		27.6		28.7
Approach LOS		A		A		C		C

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow, Master Intersection

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.59

Intersection Signal Delay (s/veh): 17.4

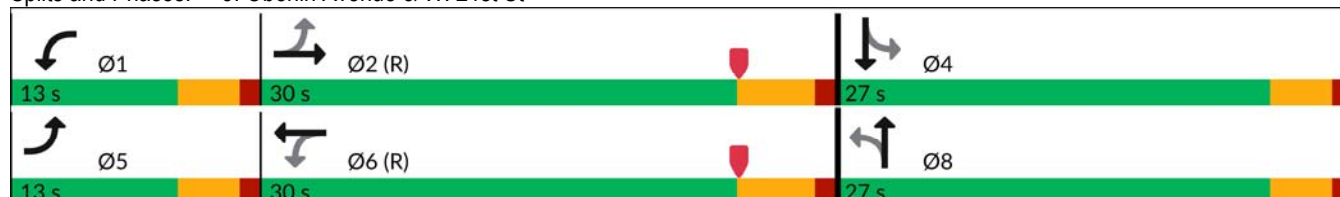
Intersection LOS: B

Intersection Capacity Utilization 55.9%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 3: Oberlin Avenue & W. 21st St



Timings
6: Washington Ave & W. 21st St

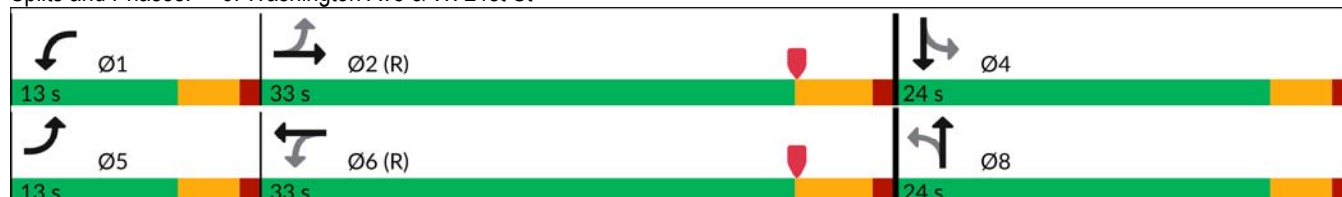
11:00 - 12:00 PM
01/22/2025

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	19	181	5	180	2	17	35	28
Future Volume (vph)	19	181	5	180	2	17	35	28
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	7.0	20.0	7.0	20.0	10.0	10.0	10.0	10.0
Minimum Split (s)	12.2	26.1	12.2	26.1	21.3	21.3	21.3	21.3
Total Split (s)	13.0	33.0	13.0	33.0	24.0	24.0	24.0	24.0
Total Split (%)	18.6%	47.1%	18.6%	47.1%	34.3%	34.3%	34.3%	34.3%
Yellow Time (s)	3.2	4.1	3.2	4.1	3.3	3.3	3.3	3.3
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)	4.2	5.1	4.2	5.1		4.3		4.3
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	C-Min	None	C-Min	None	None	None	None
Act Effct Green (s)	52.9	51.6	52.9	51.6		10.6		10.6
Actuated g/C Ratio	0.76	0.74	0.76	0.74		0.15		0.15
v/c Ratio	0.02	0.15	0.01	0.21		0.18		0.40
Control Delay (s/veh)	2.3	4.3	3.0	5.3		21.8		25.6
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay (s/veh)	2.3	4.3	3.0	5.3		21.8		25.6
LOS	A	A	A	A		C		C
Approach Delay (s/veh)		4.1		5.3		21.8		25.6
Approach LOS		A		A		C		C

Intersection Summary

Cycle Length: 70
Actuated Cycle Length: 70
Offset: 9 (13%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.40
Intersection Signal Delay (s/veh): 9.2
Intersection Capacity Utilization 36.0%
Analysis Period (min) 15
Intersection LOS: A
ICU Level of Service A

Splits and Phases: 6: Washington Ave & W. 21st St

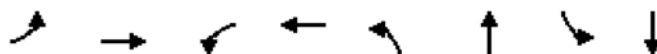


Timings

3: Oberlin Avenue & W. 21st St

12:00 - 1:00 PM

01/22/2025



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	44	213	98	164	32	168	32	163
Future Volume (vph)	44	213	98	164	32	168	32	163
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	7.0	20.0	7.0	20.0	10.0	10.0	10.0	10.0
Minimum Split (s)	12.2	27.1	12.2	27.1	26.3	26.3	26.3	26.3
Total Split (s)	13.0	30.0	13.0	30.0	27.0	27.0	27.0	27.0
Total Split (%)	18.6%	42.9%	18.6%	42.9%	38.6%	38.6%	38.6%	38.6%
Yellow Time (s)	3.2	4.1	3.2	4.1	3.3	3.3	3.3	3.3
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.2	5.1	4.2	5.1	4.3	4.3	4.3	4.3
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	C-Min	None	C-Min	None	None	None	None
Act Effct Green (s)	42.2	35.6	44.2	38.4	15.4	15.4	15.4	15.4
Actuated g/C Ratio	0.60	0.51	0.63	0.55	0.22	0.22	0.22	0.22
v/c Ratio	0.06	0.29	0.15	0.21	0.19	0.67	0.23	0.52
Control Delay (s/veh)	5.9	13.0	5.2	8.7	22.4	29.6	24.3	26.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	5.9	13.0	5.2	8.7	22.4	29.6	24.3	26.1
LOS	A	B	A	A	C	C	C	C
Approach Delay (s/veh)		12.0		7.5		28.8		25.9
Approach LOS		B		A		C		C

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow, Master Intersection

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.67

Intersection Signal Delay (s/veh): 18.1

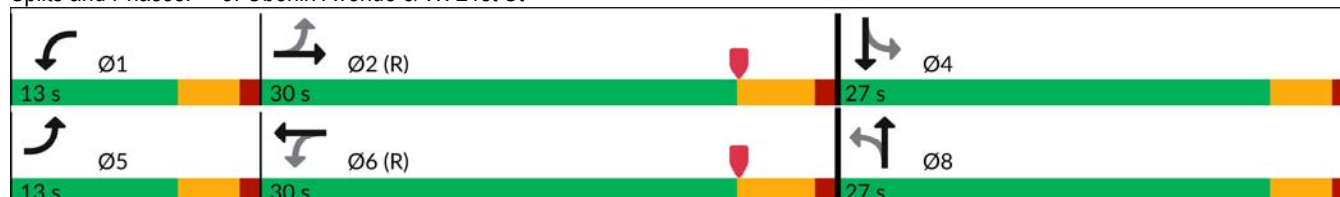
Intersection LOS: B

Intersection Capacity Utilization 58.7%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 3: Oberlin Avenue & W. 21st St



Timings
6: Washington Ave & W. 21st St

12:00 - 1:00 PM
01/22/2025

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	30	219	4	209	7	12	27	21
Future Volume (vph)	30	219	4	209	7	12	27	21
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	7.0	20.0	7.0	20.0	10.0	10.0	10.0	10.0
Minimum Split (s)	12.2	26.1	12.2	26.1	21.3	21.3	21.3	21.3
Total Split (s)	13.0	33.0	13.0	33.0	24.0	24.0	24.0	24.0
Total Split (%)	18.6%	47.1%	18.6%	47.1%	34.3%	34.3%	34.3%	34.3%
Yellow Time (s)	3.2	4.1	3.2	4.1	3.3	3.3	3.3	3.3
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)	4.2	5.1	4.2	5.1		4.3		4.3
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	C-Min	None	C-Min	None	None	None	None
Act Effct Green (s)	53.1	51.9	52.3	49.6		10.4		10.4
Actuated g/C Ratio	0.76	0.74	0.75	0.71		0.15		0.15
v/c Ratio	0.04	0.17	0.00	0.20		0.14		0.37
Control Delay (s/veh)	1.9	3.9	3.0	6.3		22.3		21.7
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay (s/veh)	1.9	3.9	3.0	6.3		22.3		21.7
LOS	A	A	A	A		C		C
Approach Delay (s/veh)		3.7		6.2		22.3		21.7
Approach LOS		A		A		C		C

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 6 (9%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.37

Intersection Signal Delay (s/veh): 8.3

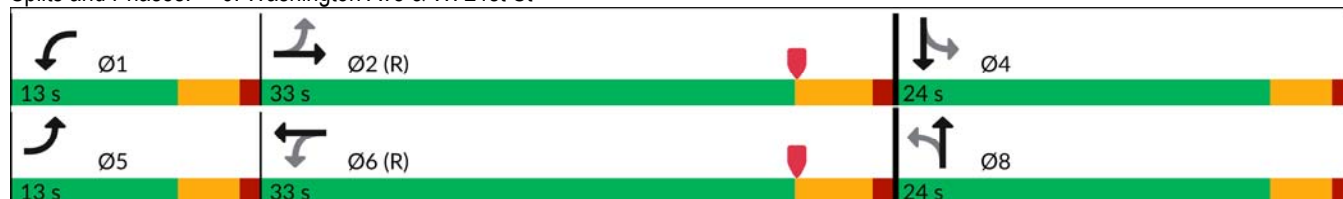
Intersection LOS: A

Intersection Capacity Utilization 41.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: Washington Ave & W. 21st St



Timings

3: Oberlin Avenue & W. 21st St

1:00 - 2:00 PM

01/22/2025

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	30	193	87	197	25	199	43	200
Future Volume (vph)	30	193	87	197	25	199	43	200
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	7.0	20.0	7.0	20.0	10.0	10.0	10.0	10.0
Minimum Split (s)	12.2	27.1	12.2	27.1	26.3	26.3	26.3	26.3
Total Split (s)	13.0	30.0	13.0	30.0	27.0	27.0	27.0	27.0
Total Split (%)	18.6%	42.9%	18.6%	42.9%	38.6%	38.6%	38.6%	38.6%
Yellow Time (s)	3.2	4.1	3.2	4.1	3.3	3.3	3.3	3.3
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.2	5.1	4.2	5.1	4.3	4.3	4.3	4.3
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	C-Min	None	C-Min	None	None	None	None
Act Effct Green (s)	40.5	34.0	43.4	39.0	17.0	17.0	17.0	17.0
Actuated g/C Ratio	0.58	0.49	0.62	0.56	0.24	0.24	0.24	0.24
v/c Ratio	0.05	0.31	0.14	0.25	0.16	0.70	0.34	0.61
Control Delay (s/veh)	6.8	14.2	6.7	10.1	20.5	30.0	26.4	27.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	6.8	14.2	6.7	10.1	20.5	30.0	26.4	27.2
LOS	A	B	A	B	C	C	C	C
Approach Delay (s/veh)		13.3		9.2		29.2		27.1
Approach LOS		B		A		C		C

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow, Master Intersection

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay (s/veh): 19.8

Intersection LOS: B

Intersection Capacity Utilization 60.7%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 3: Oberlin Avenue & W. 21st St



Timings
6: Washington Ave & W. 21st St

1:00 - 2:00 PM
01/22/2025

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	19	253	8	247	1	28	50	41
Future Volume (vph)	19	253	8	247	1	28	50	41
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	7.0	20.0	7.0	20.0	10.0	10.0	10.0	10.0
Minimum Split (s)	12.2	26.1	12.2	26.1	21.3	21.3	21.3	21.3
Total Split (s)	13.0	33.0	13.0	33.0	24.0	24.0	24.0	24.0
Total Split (%)	18.6%	47.1%	18.6%	47.1%	34.3%	34.3%	34.3%	34.3%
Yellow Time (s)	3.2	4.1	3.2	4.1	3.3	3.3	3.3	3.3
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)	4.2	5.1	4.2	5.1		4.3		4.3
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	C-Min	None	C-Min	None	None	None	None
Act Effct Green (s)	48.6	46.3	48.6	46.3		12.1		12.1
Actuated g/C Ratio	0.69	0.66	0.69	0.66		0.17		0.17
v/c Ratio	0.03	0.24	0.01	0.31		0.19		0.55
Control Delay (s/veh)	2.7	5.2	4.0	7.3		19.0		27.8
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay (s/veh)	2.7	5.2	4.0	7.3		19.0		27.8
LOS	A	A	A	A		B		C
Approach Delay (s/veh)		5.0		7.2		19.0		27.8
Approach LOS		A		A		B		C

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 6 (9%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.55

Intersection Signal Delay (s/veh): 10.9

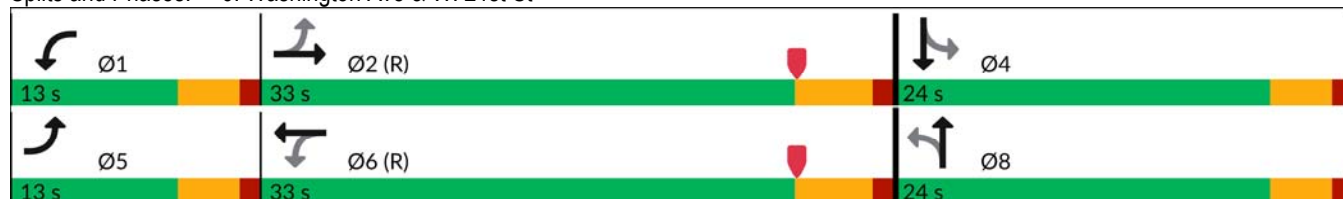
Intersection LOS: B

Intersection Capacity Utilization 38.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: Washington Ave & W. 21st St



Timings
3: Oberlin Avenue & W. 21st St

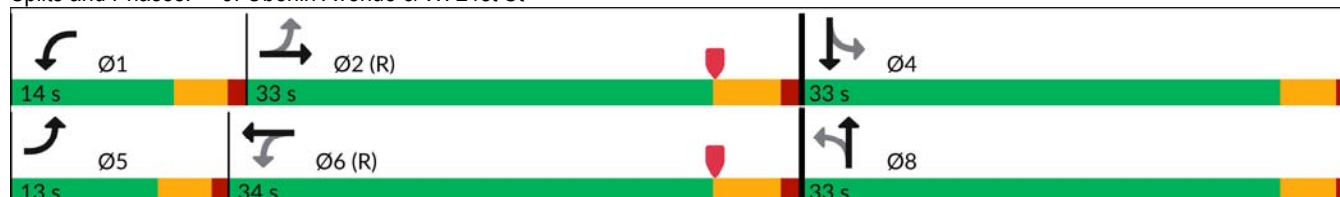
3:00 - 4:00 PM
01/22/2025

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	55	240	116	285	53	294	32	268
Future Volume (vph)	55	240	116	285	53	294	32	268
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	7.0	20.0	7.0	20.0	10.0	10.0	10.0	10.0
Minimum Split (s)	12.2	27.1	12.2	27.1	26.3	26.3	26.3	26.3
Total Split (s)	13.0	33.0	14.0	34.0	33.0	33.0	33.0	33.0
Total Split (%)	16.3%	41.3%	17.5%	42.5%	41.3%	41.3%	41.3%	41.3%
Yellow Time (s)	3.2	4.1	3.2	4.1	3.3	3.3	3.3	3.3
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.2	5.1	4.2	5.1	4.3	4.3	4.3	4.3
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	C-Min	None	C-Min	None	None	None	None
Act Effct Green (s)	44.3	37.5	46.1	38.3	22.9	22.9	22.9	22.9
Actuated g/C Ratio	0.55	0.47	0.58	0.48	0.29	0.29	0.29	0.29
v/c Ratio	0.11	0.40	0.22	0.42	0.38	0.78	0.31	0.70
Control Delay (s/veh)	8.7	17.9	8.0	14.2	28.4	35.2	27.5	31.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	8.7	17.9	8.0	14.2	28.4	35.2	27.5	31.5
LOS	A	B	A	B	C	D	C	C
Approach Delay (s/veh)		16.4		12.6		34.3		31.1
Approach LOS		B		B		C		C

Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow, Master Intersection
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.78
 Intersection Signal Delay (s/veh): 23.5 Intersection LOS: C
 Intersection Capacity Utilization 67.1% ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 3: Oberlin Avenue & W. 21st St



Timings
6: Washington Ave & W. 21st St

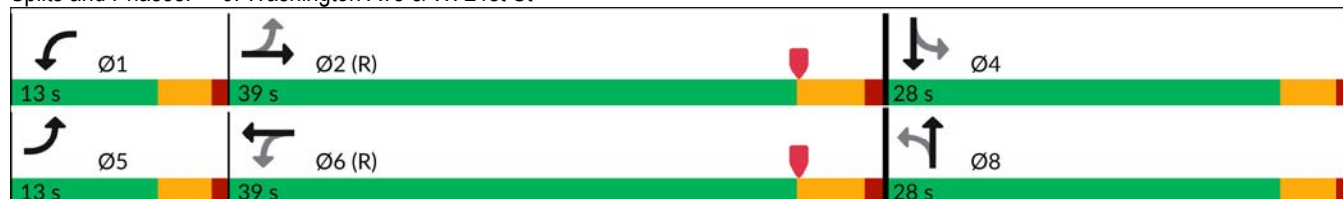
3:00 - 4:00 PM
01/22/2025

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	41	254	33	319	16	64	42	60
Future Volume (vph)	41	254	33	319	16	64	42	60
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	7.0	20.0	7.0	20.0	10.0	10.0	10.0	10.0
Minimum Split (s)	12.2	26.1	12.2	26.1	21.3	21.3	21.3	21.3
Total Split (s)	13.0	39.0	13.0	39.0	28.0	28.0	28.0	28.0
Total Split (%)	16.3%	48.8%	16.3%	48.8%	35.0%	35.0%	35.0%	35.0%
Yellow Time (s)	3.2	4.1	3.2	4.1	3.3	3.3	3.3	3.3
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)	4.2	5.1	4.2	5.1		4.3		4.3
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	C-Min	None	C-Min	None	None	None	None
Act Effect Green (s)	53.7	48.5	53.6	48.4		15.4		15.4
Actuated g/C Ratio	0.67	0.61	0.67	0.61		0.19		0.19
v/c Ratio	0.07	0.28	0.05	0.40		0.60		0.75
Control Delay (s/veh)	4.2	8.6	5.1	11.7		33.6		39.9
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay (s/veh)	4.2	8.6	5.1	11.7		33.6		39.9
LOS	A	A	A	B		C		D
Approach Delay (s/veh)		8.0		11.2		33.6		39.9
Approach LOS		A		B		C		D

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 9 (11%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.75
Intersection Signal Delay (s/veh): 19.0
Intersection Capacity Utilization 52.1%
Analysis Period (min) 15
Intersection LOS: B
ICU Level of Service A

Splits and Phases: 6: Washington Ave & W. 21st St



Timings
3: Oberlin Avenue & W. 21st St

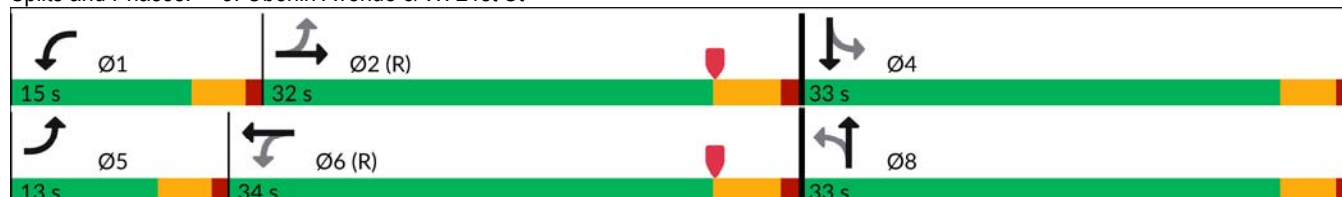
4:00 - 5:00 PM
01/22/2025

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	62	261	115	258	40	287	37	245
Future Volume (vph)	62	261	115	258	40	287	37	245
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	7.0	20.0	7.0	20.0	10.0	10.0	10.0	10.0
Minimum Split (s)	12.2	27.1	12.2	27.1	26.3	26.3	26.3	26.3
Total Split (s)	13.0	32.0	15.0	34.0	33.0	33.0	33.0	33.0
Total Split (%)	16.3%	40.0%	18.8%	42.5%	41.3%	41.3%	41.3%	41.3%
Yellow Time (s)	3.2	4.1	3.2	4.1	3.3	3.3	3.3	3.3
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.2	5.1	4.2	5.1	4.3	4.3	4.3	4.3
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	C-Min	None	C-Min	None	None	None	None
Act Effct Green (s)	43.2	36.1	44.9	37.0	24.1	24.1	24.1	24.1
Actuated g/C Ratio	0.54	0.45	0.56	0.46	0.30	0.30	0.30	0.30
v/c Ratio	0.14	0.50	0.25	0.40	0.23	0.81	0.35	0.58
Control Delay (s/veh)	9.3	20.6	9.1	15.0	22.0	36.2	29.4	26.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	9.3	20.6	9.1	15.0	22.0	36.2	29.4	26.3
LOS	A	C	A	B	C	D	C	C
Approach Delay (s/veh)		18.7		13.4		34.8		26.6
Approach LOS		B		B		C		C

Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow, Master Intersection
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.81
 Intersection Signal Delay (s/veh): 23.3
 Intersection LOS: C
 Intersection Capacity Utilization 66.6%
 ICU Level of Service C
 Analysis Period (min) 15

Splits and Phases: 3: Oberlin Avenue & W. 21st St



Timings
6: Washington Ave & W. 21st St

4:00 - 5:00 PM
01/22/2025

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	28	291	19	333	9	41	55	36
Future Volume (vph)	28	291	19	333	9	41	55	36
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	7.0	20.0	7.0	20.0	10.0	10.0	10.0	10.0
Minimum Split (s)	12.2	26.1	12.2	26.1	21.3	21.3	21.3	21.3
Total Split (s)	13.0	39.0	13.0	39.0	28.0	28.0	28.0	28.0
Total Split (%)	16.3%	48.8%	16.3%	48.8%	35.0%	35.0%	35.0%	35.0%
Yellow Time (s)	3.2	4.1	3.2	4.1	3.3	3.3	3.3	3.3
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)	4.2	5.1	4.2	5.1		4.3		4.3
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	C-Min	None	C-Min	None	None	None	None
Act Effct Green (s)	55.5	51.8	54.7	49.6		14.3		14.3
Actuated g/C Ratio	0.69	0.65	0.68	0.62		0.18		0.18
v/c Ratio	0.05	0.31	0.03	0.38		0.27		0.65
Control Delay (s/veh)	3.8	7.4	4.6	10.6		23.8		34.0
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay (s/veh)	3.8	7.4	4.6	10.6		23.8		34.0
LOS	A	A	A	B		C		C
Approach Delay (s/veh)		7.1		10.3		23.8		34.0
Approach LOS		A		B		C		C

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 16 (20%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.65

Intersection Signal Delay (s/veh): 14.4

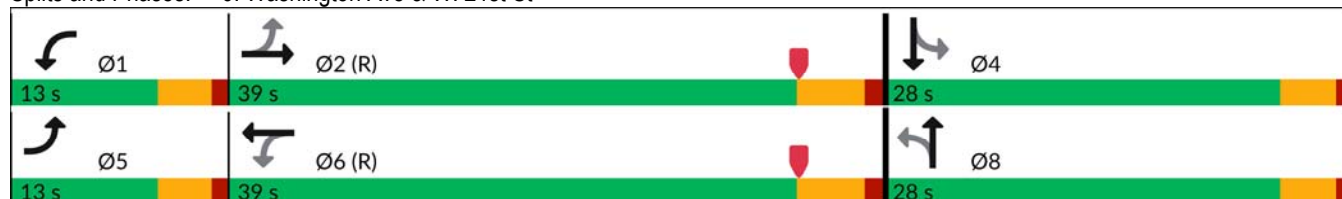
Intersection LOS: B

Intersection Capacity Utilization 46.0%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: Washington Ave & W. 21st St

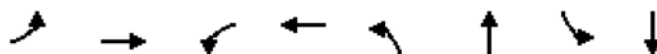


Timings

3: Oberlin Avenue & W. 21st St

5:00 - 6:00 PM

01/22/2025



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	46	214	106	230	36	245	42	249
Future Volume (vph)	46	214	106	230	36	245	42	249
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	7.0	20.0	7.0	20.0	10.0	10.0	10.0	10.0
Minimum Split (s)	12.2	27.1	12.2	27.1	26.3	26.3	26.3	26.3
Total Split (s)	13.0	34.0	13.0	34.0	33.0	33.0	33.0	33.0
Total Split (%)	16.3%	42.5%	16.3%	42.5%	41.3%	41.3%	41.3%	41.3%
Yellow Time (s)	3.2	4.1	3.2	4.1	3.3	3.3	3.3	3.3
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.2	5.1	4.2	5.1	4.3	4.3	4.3	4.3
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	C-Min	None	C-Min	None	None	None	None
Act Effct Green (s)	45.7	39.0	48.4	42.2	21.5	21.5	21.5	21.5
Actuated g/C Ratio	0.57	0.49	0.61	0.53	0.27	0.27	0.27	0.27
v/c Ratio	0.08	0.33	0.18	0.32	0.25	0.75	0.37	0.66
Control Delay (s/veh)	8.1	16.2	6.6	10.2	24.6	34.5	30.0	30.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (s/veh)	8.1	16.2	6.6	10.2	24.6	34.5	30.0	30.8
LOS	A	B	A	B	C	C	C	C
Approach Delay (s/veh)		15.0		9.3		33.5		30.7
Approach LOS		B		A		C		C

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow, Master Intersection

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay (s/veh): 22.2

Intersection LOS: C

Intersection Capacity Utilization 63.2%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 3: Oberlin Avenue & W. 21st St



Timings
6: Washington Ave & W. 21st St

5:00 - 6:00 PM
01/22/2025

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	40	281	10	325	7	35	45	37
Future Volume (vph)	40	281	10	325	7	35	45	37
Turn Type	pm+pt	NA	pm+pt	NA	Perm	NA	Perm	NA
Protected Phases	5	2	1	6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	1	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	7.0	20.0	7.0	20.0	10.0	10.0	10.0	10.0
Minimum Split (s)	12.2	26.1	12.2	26.1	21.3	21.3	21.3	21.3
Total Split (s)	13.0	42.0	13.0	42.0	25.0	25.0	25.0	25.0
Total Split (%)	16.3%	52.5%	16.3%	52.5%	31.3%	31.3%	31.3%	31.3%
Yellow Time (s)	3.2	4.1	3.2	4.1	3.3	3.3	3.3	3.3
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0		0.0
Total Lost Time (s)	4.2	5.1	4.2	5.1		4.3		4.3
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	C-Min	None	C-Min	None	None	None	None
Act Effct Green (s)	58.0	55.7	56.3	51.2		12.7		12.7
Actuated g/C Ratio	0.73	0.70	0.70	0.64		0.16		0.16
v/c Ratio	0.06	0.25	0.01	0.37		0.24		0.58
Control Delay (s/veh)	2.7	4.9	3.9	9.4		23.7		31.4
Queue Delay	0.0	0.0	0.0	0.0		0.0		0.0
Total Delay (s/veh)	2.7	4.9	3.9	9.4		23.7		31.4
LOS	A	A	A	A		C		C
Approach Delay (s/veh)		4.6		9.3		23.7		31.4
Approach LOS		A		A		C		C

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 13 (16%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.58

Intersection Signal Delay (s/veh): 12.2

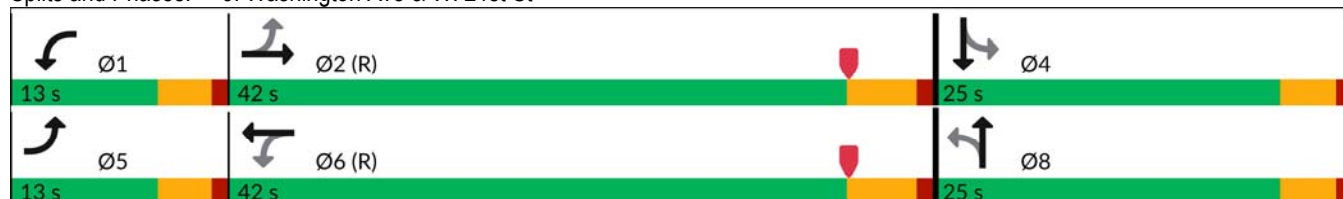
Intersection LOS: B

Intersection Capacity Utilization 51.5%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: Washington Ave & W. 21st St



Appendix H - Optimized Coordination Timing and Time of Day Plans

W. 21st Street - Lorain - Proposed Hourly Signal Splits and Offsets 1/22/2025

W. 21st Street & Oberlin Avenue		Phase									Offset 1 Synchro
Time of Day	Cycle	1 - WB LT	2 - EB	3 - OMIT	4 - SB	5 - EB LT	6 - WB	7 - OMIT	8 - NB		
7:00	70	13	30		27	13	30		27		0
8:00	70	13	29		28	13	29		28		0
9:00	70	13	30		27	13	30		27		0
11:00	70	13	30		27	13	30		27		0
12:00	70	13	30		27	13	30		27		0
13:00	70	13	30		27	13	30		27		0
15:00	80	14	33		33	13	34		33		0
16:00	80	15	32		33	13	34		33		0
17:00	80	13	34		33	13	34		33		0

W. 21st Street & Oberlin Avenue		Phase									Offset 1 Synchro
Time of Day	Cycle	1 - WB LT	2 - EB	3	4 - SB	5 - EB LT	6 - WB	7	8 - NB		
7:00	70	13	33		24	13	33		24		4
8:00	70	13	32		25	13	32		25		3
9:00	70	13	33		24	13	33		24		4
11:00	70	13	33		24	13	33		24		9
12:00	70	13	33		24	13	33		24		6
13:00	70	13	33		24	13	33		24		6
15:00	80	13	39		28	13	39		28		9
16:00	80	13	39		28	13	39		28		16
17:00	80	13	42		25	13	42		25		13

Note: Phase timing intervals in above chart are in seconds. Offsets are shown in seconds.

W. 21st Street - Lorain - Proposed Patterns and Time of Day Schedule 1/22/2025

W. 21st Street & Oberlin Avenue		Phase									Offset 1 Synchro
Patterns	Cycle	1 - WB LT	2 - EB	3 - OMIT	4 - SB	5 - EB LT	6 - WB	7 - OMIT	8 - NB		
3	70	13	30		27	13	30		27		0
4	80	15	32		33	13	34		33		0

W. 21st Street & Oberlin Avenue		Phase									Offset 1 Synchro
Patterns	Cycle	1 - WB LT	2 - EB	3	4 - SB	5 - EB LT	6 - WB	7	8 - NB		
3	70	13	33		24	13	33		24		13
4	80	13	40		27	13	40		27		9

Time of Day Plans				
Mon-Fri	12:00 AM	FREE		
Mon-Fri	7:00 AM	3	70 sec	
Mon-Fri	2:00 PM	4	80 sec	
Mon-Fri	6:00 PM	3	70 sec	
Mon-Fri	8:30 PM	FREE		

Time of Day Plans				
Sat - Sun	12:00 AM	FREE		
Sat - Sun	9:00 AM	3	70 sec	
Sat - Sun	7:00 PM	FREE		

Note: Phase timing intervals in above chart are in seconds. Offsets are shown in seconds.

Appendix I - Tru-Traffic Travel Run Results

Signal Plan Timing Runs

Thursday 1/30/2025 12:16:50 PM

Travel Time & Delay Report for W. 21st St./S.R. 611**Legend:**

CTT:	Summarized Cumulative Travel Time since beginning of Run (seconds)
CTL:	Summarized Cumulative Travel Distance since beginning of Run (feet)
CDL:	Summarized Cumulative User-specified Design Distance since beginning of Run (feet)
CD:	Summarized Cumulative Delay since beginning of Run (seconds) = CTT - CRT
CRT:	Summarized Cumulative Running Time (seconds) = accumulation of DL/DS since beginning of Run
CPLSD:	Summarized Cumulative Posted Speed Limit Delay since beginning of Run (seconds)
CPLRT:	Summarized Cumulative Posted Speed Limit Running Time, or Travel Time since beginning of Run if maintaining Posted Speed Limit (seconds) = accumulation of DL/PLS since beginning of Run
CMxSD:	Summarized Cumulative Maximum-Speed Delay since beginning of Run (seconds)
CMinRT:	Summarized Cumulative Minimum Running Time, or Travel Time since beginning of Run if maintaining Maximum Speed (seconds) = accumulation of DL/MxS since beginning of Run
CStopD:	Summarized Cumulative Stopped Delay since beginning of Run (seconds). The "Stopped Delay" is counted from when the speed drops below 5 mph after exceeding 15 mph until it exceeds 15 mph once again
CBS1T:	Summarized Cumulative Time spent Below Speed #1 (10 mph) since beginning of Run (seconds)
CAS1T:	Summarized Cumulative Free-Flow Travel Time (spent Above Speed #1 (10 mph)) since beginning of Run (seconds) = CTT - CBS1T
CBS2T:	Summarized Cumulative Time spent Below Speed #2 (30 mph) since beginning of Run (seconds)
CAS2T:	Summarized Cumulative Free-Flow Travel Time (spent Above Speed #2 (30 mph)) since beginning of Run (seconds) = CTT - CBS2T
CAS:	Summarized Cumulative Actual Average Speed since beginning of Run (mph) = CTL/CTT
CStops:	Summarized Cumulative number of Stops in Run. A "Stop" is counted when the speed drops below 5 mph after exceeding 15 mph
CGST:	Summarized Cumulative Time Elapsed from presumed Start of Through Green to Vehicle Startup (seconds). A "Stop" is counted when the speed drops below 5 mph after exceeding 15 mph
CGCT:	Summarized Cumulative Time Elapsed from presumed Start of Through Green to this Node Crossing (seconds)
CQDL:	Summarized Cumulative Travel Distance from Vehicle Startup after last Stop to Node Crossing (feet). A "Stop" is counted when the speed drops below 5 mph after exceeding 15 mph
CLN:	Summarized Cumulative Number of Links in Run
TV:	Summarized Through Volume (vph)

Cumulative Summary of runs Westbound from Washington Ave. (#1)

7 Neither-type runs, collected Wednesday 1/15/2025 to Wednesday 1/15/2025, over day(s) Wed, with starting times during 7:34:33 AM to 8:26:19 AM

	CTT	CTL	CDL	CD	CRT	CPLSD	CPLRT	CMxSD	CMinRT	CStopD	CBS1T	CAS1T	CBS2T	CAS2T	CAS	CStops	CGST	CGCT	CQDL	CLN	TV
to Oberlin Ave. (#2)																					
Average Neither (n=7)	52	1655	1650	12	40	7	45	18	34	14	14	38	33	20	22.2	0.7	33.5	55.5	9	1	0
Std Dev Neither (n=7)	10	6	0	10	0	10	0	11	1	12	11	2	7	8	4.0	0.5	34.3	29.2	11	0	0

Cumulative Summary of runs Eastbound from Oberlin Ave. (#2)

7 Neither-type runs, collected Wednesday 1/15/2025 to Wednesday 1/15/2025, over day(s) Wed, with starting times during 7:37:46 AM to 8:23:05 AM

	CTT	CTL	CDL	CD	CRT	CPLSD	CPLRT	CMxSD	CMinRT	CStopD	CBS1T	CAS1T	CBS2T	CAS2T	CAS	CStops	CGST	CGCT	CQDL	CLN	TV
to Washington Ave. (#1)																					
Average Neither (n=7)	46	1654	1650	6	40	1	45	11	35	3	5	42	34	13	25.2	0.1	1.8	27.6	3	1	0
Std Dev Neither (n=7)	11	9	0	11	0	11	0	9	2	9	9	3	20	10	4.7	0.4	4.6	26.1	8	0	0

Cumulative Summary of all runs, either direction through artery

14 Neither-type runs, collected Wednesday 1/15/2025 to Wednesday 1/15/2025, over day(s) Wed, with starting times during 7:34:33 AM to 8:26:19 AM

	CTT	CTL	CDL	CD	CRT	CPLSD	CPLRT	CMxSD	CMinRT	CStopD	CBS1T	CAS1T	CBS2T	CAS2T	CAS	CStops	CGST	CGCT	CQDL	CLN	TV
to End of Artery																					
Average Neither (n=14)	49	1655	1650	9	40	4	45	15	35	9	9	40	33	16	23.7	0.4	17.6	41.6	6	1	0
Std Dev Neither (n=14)	10	8	0	10	0	10	0	10	2	11	11	3	14	9	4.5	0.5	28.7	30.3	9	0	0
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0	0	0
Std Dev Difference	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0	0	0
% Difference	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D

Thursday 1/30/2025 12:29:12 PM

Travel Time & Delay Report for W. 21st St./S.R. 611**Legend:**

CTT:	Summarized Cumulative Travel Time since beginning of Run (seconds)
CTL:	Summarized Cumulative Travel Distance since beginning of Run (feet)
CDL:	Summarized Cumulative User-specified Design Distance since beginning of Run (feet)
CD:	Summarized Cumulative Delay since beginning of Run (seconds) = CTT - CRT
CRT:	Summarized Cumulative Running Time (seconds) = accumulation of DL/DS since beginning of Run
CPLSD:	Summarized Cumulative Posted Speed Limit Delay since beginning of Run (seconds)
CPLRT:	Summarized Cumulative Posted Speed Limit Running Time, or Travel Time since beginning of Run if maintaining Posted Speed Limit (seconds) = accumulation of DL/PLS since beginning of Run
CMxSD:	Summarized Cumulative Maximum-Speed Delay since beginning of Run (seconds)
CMinRT:	Summarized Cumulative Minimum Running Time, or Travel Time since beginning of Run if maintaining Maximum Speed (seconds) = accumulation of DL/MxS since beginning of Run
CStopD:	Summarized Cumulative Stopped Delay since beginning of Run (seconds). The "Stopped Delay" is counted from when the speed drops below 5 mph after exceeding 15 mph until it exceeds 15 mph once again
CBS1T:	Summarized Cumulative Time spent Below Speed #1 (10 mph) since beginning of Run (seconds)
CAS1T:	Summarized Cumulative Free-Flow Travel Time (spent Above Speed #1 (10 mph)) since beginning of Run (seconds) = CTT - CBS1T
CBS2T:	Summarized Cumulative Time spent Below Speed #2 (30 mph) since beginning of Run (seconds)
CAS2T:	Summarized Cumulative Free-Flow Travel Time (spent Above Speed #2 (30 mph)) since beginning of Run (seconds) = CTT - CBS2T
CAS:	Summarized Cumulative Actual Average Speed since beginning of Run (mph) = CTL/CTT
CStops:	Summarized Cumulative number of Stops in Run. A "Stop" is counted when the speed drops below 5 mph after exceeding 15 mph
CGST:	Summarized Cumulative Time Elapsed from presumed Start of Through Green to Vehicle Startup (seconds). A "Stop" is counted when the speed drops below 5 mph after exceeding 15 mph
CGCT:	Summarized Cumulative Time Elapsed from presumed Start of Through Green to this Node Crossing (seconds)
CQDL:	Summarized Cumulative Travel Distance from Vehicle Startup after last Stop to Node Crossing (feet). A "Stop" is counted when the speed drops below 5 mph after exceeding 15 mph
CLN:	Summarized Cumulative Number of Links in Run
TV:	Summarized Through Volume (vph)

Cumulative Summary of runs Westbound from Washington Ave. (#1)

7 Neither-type runs, collected Wednesday 1/15/2025 to Wednesday 1/15/2025, over day(s) Wed, with starting times during 11:30:27 AM to 12:21:05 PM

	CTT	CTL	CDL	CD	CRT	CPLSD	CPLRT	CMxSD	CMinRT	CStopD	CBS1T	CAS1T	CBS2T	CAS2T	CAS	CStops	CGST	CGCT	CQDL	CLN	TV
to Oberlin Ave. (#2)																					
Average Neither (n=7)	49	1652	1650	9	40	4	45	17	32	10	11	38	25	24	23.9	0.6	41.0	57.0	20	1	0
Std Dev Neither (n=7)	12	1	0	12	0	12	0	12	1	13	12	2	11	4	4.7	0.5	39.2	27.6	24	0	0

Cumulative Summary of runs Eastbound from Oberlin Ave. (#2)

7 Neither-type runs, collected Wednesday 1/15/2025 to Wednesday 1/15/2025, over day(s) Wed, with starting times during 11:33:42 AM to 12:23:46 PM

	CTT	CTL	CDL	CD	CRT	CPLSD	CPLRT	CMxSD	CMinRT	CStopD	CBS1T	CAS1T	CBS2T	CAS2T	CAS	CStops	CGST	CGCT	CQDL	CLN	TV
to Washington Ave. (#1)																					
Average Neither (n=7)	38	1651	1650	-2	40	-7	45	4	34	1	1	37	11	27	30.0	0.1	9.2	50.4	4	1	0
Std Dev Neither (n=7)	6	0	0	6	0	6	0	5	3	3	3	5	18	12	4.2	0.4	24.4	22.2	11	0	0

Cumulative Summary of all runs, either direction through artery

14 Neither-type runs, collected Wednesday 1/15/2025 to Wednesday 1/15/2025, over day(s) Wed, with starting times during 11:30:27 AM to 12:23:46 PM

	CTT	CTL	CDL	CD	CRT	CPLSD	CPLRT	CMxSD	CMinRT	CStopD	CBS1T	CAS1T	CBS2T	CAS2T	CAS	CStops	CGST	CGCT	CQDL	CLN	TV
to End of Artery																					
Average Neither (n=14)	44	1651	1650	3	40	-1	45	10	33	5	6	37	18	26	26.9	0.4	25.1	53.7	12	1	0
Std Dev Neither (n=14)	11	1	0	11	0	11	0	11	2	10	10	4	16	9	5.3	0.5	35.4	24.3	19	0	0
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0	0	0
Std Dev Difference	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0	0	0
% Difference	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D

Thursday 1/30/2025 12:35:19 PM

Travel Time & Delay Report for W. 21st St./S.R. 611

Legend:

CTT:	Summarized Cumulative Travel Time since beginning of Run (seconds)
CTL:	Summarized Cumulative Travel Distance since beginning of Run (feet)
CDL:	Summarized Cumulative User-specified Design Distance since beginning of Run (feet)
CD:	Summarized Cumulative Delay since beginning of Run (seconds) = CTT - CRT
CRT:	Summarized Cumulative Running Time (seconds) = accumulation of DL/DS since beginning of Run
CPLSD:	Summarized Cumulative Posted Speed Limit Delay since beginning of Run (seconds)
CPLRT:	Summarized Cumulative Posted Speed Limit Running Time, or Travel Time since beginning of Run if maintaining Posted Speed Limit (seconds) = accumulation of DL/PLS since beginning of Run
CMxSD:	Summarized Cumulative Maximum-Speed Delay since beginning of Run (seconds)
CMinRT:	Summarized Cumulative Minimum Running Time, or Travel Time since beginning of Run if maintaining Maximum Speed (seconds) = accumulation of DL/MxS since beginning of Run
CStopD:	Summarized Cumulative Stopped Delay since beginning of Run (seconds). The "Stopped Delay" is counted from when the speed drops below 5 mph after exceeding 15 mph until it exceeds 15 mph once again
CBS1T:	Summarized Cumulative Time spent Below Speed #1 (10 mph) since beginning of Run (seconds)
CAS1T:	Summarized Cumulative Free-Flow Travel Time (spent Above Speed #1 (10 mph)) since beginning of Run (seconds) = CTT - CBS1T
CBS2T:	Summarized Cumulative Time spent Below Speed #2 (30 mph) since beginning of Run (seconds)
CAS2T:	Summarized Cumulative Free-Flow Travel Time (spent Above Speed #2 (30 mph)) since beginning of Run (seconds) = CTT - CBS2T
CAS:	Summarized Cumulative Actual Average Speed since beginning of Run (mph) = CTL/CTT
CStops:	Summarized Cumulative number of Stops in Run. A "Stop" is counted when the speed drops below 5 mph after exceeding 15 mph
CGST:	Summarized Cumulative Time Elapsed from presumed Start of Through Green to Vehicle Startup (seconds). A "Stop" is counted when the speed drops below 5 mph after exceeding 15 mph
CGCT:	Summarized Cumulative Time Elapsed from presumed Start of Through Green to this Node Crossing (seconds)
CQDL:	Summarized Cumulative Travel Distance from Vehicle Startup after last Stop to Node Crossing (feet). A "Stop" is counted when the speed drops below 5 mph after exceeding 15 mph
CLN:	Summarized Cumulative Number of Links in Run
TV:	Summarized Through Volume (vph)

Cumulative Summary of runs Westbound from Washington Ave. (#1)

7 Neither-type runs, collected Wednesday 1/15/2025 to Wednesday 1/15/2025, over day(s) Wed, with starting times during 4:04:06 PM to 5:02:28 PM

	CTT	CTL	CDL	CD	CRT	CPLSD	CPLRT	CMxSD	CMinRT	CStopD	CBS1T	CAS1T	CBS2T	CAS2T	CAS	CStops	CGST	CGCT	CQDL	CLN	TV
to Oberlin Ave. (#2)																					
Average Neither (n=7)	55	1653	1650	15	40	10	45	22	33	15	16	40	35	20	20.4	1.0	35.9	27.0	67	1	0
Std Dev Neither (n=7)	4	3	0	4	0	4	0	4	1	6	6	3	4	5	1.5	0.0	37.5	34.7	48	0	0

Cumulative Summary of runs Eastbound from Oberlin Ave. (#2)

7 Neither-type runs, collected Wednesday 1/15/2025 to Wednesday 1/15/2025, over day(s) Wed, with starting times during 4:07:08 PM to 5:05:47 PM

	CTT	CTL	CDL	CD	CRT	CPLSD	CPLRT	CMxSD	CMinRT	CStopD	CBS1T	CAS1T	CBS2T	CAS2T	CAS	CStops	CGST	CGCT	CQDL	CLN	TV
to Washington Ave. (#1)																					
Average Neither (n=7)	40	1651	1650	0	40	-5	45	6	34	1	1	39	21	19	28.1	0.1	0.9	49.5	101	1	0
Std Dev Neither (n=7)	3	1	0	3	0	3	0	3	2	2	2	2	12	10	2.2	0.4	2.3	22.5	267	0	0

Cumulative Summary of all runs, either direction through artery

14 Neither-type runs, collected Wednesday 1/15/2025 to Wednesday 1/15/2025, over day(s) Wed, with starting times during 4:04:06 PM to 5:05:47 PM

	CTT	CTL	CDL	CD	CRT	CPLSD	CPLRT	CMxSD	CMinRT	CStopD	CBS1T	CAS1T	CBS2T	CAS2T	CAS	CStops	CGST	CGCT	CQDL	CLN	TV
to End of Artery																					
Average Neither (n=14)	48	1652	1650	8	40	3	45	14	34	8	8	39	28	20	24.2	0.6	18.4	38.2	84	1	0
Std Dev Neither (n=14)	9	2	0	9	0	9	0	9	2	9	8	2	11	7	4.3	0.5	31.3	30.4	185	0	0
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0	0	0
Std Dev Difference	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0	0	0
% Difference	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D

Thursday 1/30/2025 12:40:40 PM

Travel Time & Delay Report for W. 21st St./S.R. 611**Legend:**

CTT:	Summarized Cumulative Travel Time since beginning of Run (seconds)
CTL:	Summarized Cumulative Travel Distance since beginning of Run (feet)
CDL:	Summarized Cumulative User-specified Design Distance since beginning of Run (feet)
CD:	Summarized Cumulative Delay since beginning of Run (seconds) = CTT - CRT
CRT:	Summarized Cumulative Running Time (seconds) = accumulation of DL/DS since beginning of Run
CPLSD:	Summarized Cumulative Posted Speed Limit Delay since beginning of Run (seconds)
CPLRT:	Summarized Cumulative Posted Speed Limit Running Time, or Travel Time since beginning of Run if maintaining Posted Speed Limit (seconds) = accumulation of DL/PLS since beginning of Run
CMxSD:	Summarized Cumulative Maximum-Speed Delay since beginning of Run (seconds)
CMinRT:	Summarized Cumulative Minimum Running Time, or Travel Time since beginning of Run if maintaining Maximum Speed (seconds) = accumulation of DL/MxS since beginning of Run
CStopD:	Summarized Cumulative Stopped Delay since beginning of Run (seconds). The "Stopped Delay" is counted from when the speed drops below 5 mph after exceeding 15 mph until it exceeds 15 mph once again
CBS1T:	Summarized Cumulative Time spent Below Speed #1 (10 mph) since beginning of Run (seconds)
CAS1T:	Summarized Cumulative Free-Flow Travel Time (spent Above Speed #1 (10 mph)) since beginning of Run (seconds) = CTT - CBS1T
CBS2T:	Summarized Cumulative Time spent Below Speed #2 (30 mph) since beginning of Run (seconds)
CAS2T:	Summarized Cumulative Free-Flow Travel Time (spent Above Speed #2 (30 mph)) since beginning of Run (seconds) = CTT - CBS2T
CAS:	Summarized Cumulative Actual Average Speed since beginning of Run (mph) = CTL/CTT
CStops:	Summarized Cumulative number of Stops in Run. A "Stop" is counted when the speed drops below 5 mph after exceeding 15 mph
CGST:	Summarized Cumulative Time Elapsed from presumed Start of Through Green to Vehicle Startup (seconds). A "Stop" is counted when the speed drops below 5 mph after exceeding 15 mph
CGCT:	Summarized Cumulative Time Elapsed from presumed Start of Through Green to this Node Crossing (seconds)
CQDL:	Summarized Cumulative Travel Distance from Vehicle Startup after last Stop to Node Crossing (feet). A "Stop" is counted when the speed drops below 5 mph after exceeding 15 mph
CLN:	Summarized Cumulative Number of Links in Run
TV:	Summarized Through Volume (vph)

Cumulative Summary of runs Westbound from Washington Ave. (#1)

7 Neither-type runs, collected Wednesday 1/15/2025 to Wednesday 1/15/2025, over day(s) Wed, with starting times during 9:24:57 AM to 10:11:38 AM

	CTT	CTL	CDL	CD	CRT	CPLSD	CPLRT	CMxSD	CMinRT	CStopD	CBS1T	CAS1T	CBS2T	CAS2T	CAS	CStops	CGST	CGCT	CQDL	CLN	TV
to Oberlin Ave. (#2)																					
Average Neither (n=7)	47	1692	1650	7	40	2	45	15	32	9	9	38	23	24	24.6	1.0	39.8	30.4	58	1	0
Std Dev Neither (n=7)	4	42	0	4	0	4	0	5	1	4	4	1	5	3	1.7	0.0	37.1	36.2	46	0	0

Cumulative Summary of runs Eastbound from Oberlin Ave. (#2)

7 Neither-type runs, collected Wednesday 1/15/2025 to Wednesday 1/15/2025, over day(s) Wed, with starting times during 9:38:26 AM to 10:15:16 AM

	CTT	CTL	CDL	CD	CRT	CPLSD	CPLRT	CMxSD	CMinRT	CStopD	CBS1T	CAS1T	CBS2T	CAS2T	CAS	CStops	CGST	CGCT	CQDL	CLN	TV
to Washington Ave. (#1)																					
Average Neither (n=7)	34	1651	1650	-6	40	-11	45	2	33	0	0	34	4	31	32.8	0.0	0.0	48.9	0	1	0
Std Dev Neither (n=7)	2	1	0	2	0	2	0	2	1	0	0	2	7	5	1.6	0.0	0.0	19.5	0	0	0

Cumulative Summary of all runs, either direction through artery

14 Neither-type runs, collected Wednesday 1/15/2025 to Wednesday 1/15/2025, over day(s) Wed, with starting times during 9:24:57 AM to 10:15:16 AM

	CTT	CTL	CDL	CD	CRT	CPLSD	CPLRT	CMxSD	CMinRT	CStopD	CBS1T	CAS1T	CBS2T	CAS2T	CAS	CStops	CGST	CGCT	CQDL	CLN	TV
to End of Artery																					
Average Neither (n=14)	41	1671	1650	1	40	-4	45	8	32	4	5	36	14	27	28.7	0.5	19.9	39.6	29	1	0
Std Dev Neither (n=14)	7	36	0	7	0	7	0	8	1	5	6	2	12	5	4.5	0.5	32.6	29.6	44	0	0
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0	0	0
Std Dev Difference	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0	0	0
% Difference	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D

Final Timing Runs

Thursday 1/30/2025 12:47:53 PM

Travel Time & Delay Report for W. 21st St./S.R. 611**Legend:**

CTT:	Summarized Cumulative Travel Time since beginning of Run (seconds)
CTL:	Summarized Cumulative Travel Distance since beginning of Run (feet)
CDL:	Summarized Cumulative User-specified Design Distance since beginning of Run (feet)
CD:	Summarized Cumulative Delay since beginning of Run (seconds) = CTT - CRT
CRT:	Summarized Cumulative Running Time (seconds) = accumulation of DL/DS since beginning of Run
CPLSD:	Summarized Cumulative Posted Speed Limit Delay since beginning of Run (seconds)
CPLRT:	Summarized Cumulative Posted Speed Limit Running Time, or Travel Time since beginning of Run if maintaining Posted Speed Limit (seconds) = accumulation of DL/PLS since beginning of Run
CMxSD:	Summarized Cumulative Maximum-Speed Delay since beginning of Run (seconds)
CMinRT:	Summarized Cumulative Minimum Running Time, or Travel Time since beginning of Run if maintaining Maximum Speed (seconds) = accumulation of DL/MxS since beginning of Run
CStopD:	Summarized Cumulative Stopped Delay since beginning of Run (seconds). The "Stopped Delay" is counted from when the speed drops below 5 mph after exceeding 15 mph until it exceeds 15 mph once again
CBS1T:	Summarized Cumulative Time spent Below Speed #1 (10 mph) since beginning of Run (seconds)
CAS1T:	Summarized Cumulative Free-Flow Travel Time (spent Above Speed #1 (10 mph)) since beginning of Run (seconds) = CTT - CBS1T
CBS2T:	Summarized Cumulative Time spent Below Speed #2 (30 mph) since beginning of Run (seconds)
CAS2T:	Summarized Cumulative Free-Flow Travel Time (spent Above Speed #2 (30 mph)) since beginning of Run (seconds) = CTT - CBS2T
CAS:	Summarized Cumulative Actual Average Speed since beginning of Run (mph) = CTL/CTT
CStops:	Summarized Cumulative number of Stops in Run. A "Stop" is counted when the speed drops below 5 mph after exceeding 15 mph
CGST:	Summarized Cumulative Time Elapsed from presumed Start of Through Green to Vehicle Startup (seconds). A "Stop" is counted when the speed drops below 5 mph after exceeding 15 mph
CGCT:	Summarized Cumulative Time Elapsed from presumed Start of Through Green to this Node Crossing (seconds)
CQDL:	Summarized Cumulative Travel Distance from Vehicle Startup after last Stop to Node Crossing (feet). A "Stop" is counted when the speed drops below 5 mph after exceeding 15 mph
CLN:	Summarized Cumulative Number of Links in Run
TV:	Summarized Through Volume (vph)

Cumulative Summary of runs Westbound from Washington Ave. (#1)

7 Neither-type runs, collected Wednesday 1/29/2025 to Wednesday 1/29/2025, over day(s) Wed, with starting times during 7:39:56 AM to 8:18:41 AM

	CTT	CTL	CDL	CD	CRT	CPLSD	CPLRT	CMxSD	CMinRT	CStopD	CBS1T	CAS1T	CBS2T	CAS2T	CAS	CStops	CGST	CGCT	CQDL	CLN	TV
to Oberlin Ave. (#2)																					
Average Neither (n=7)	37	1651	1650	-3	40	-8	45	6	31	1	3	35	11	26	30.9	0.1	1.8	41.4	4	1	0
Std Dev Neither (n=7)	6	0	0	6	0	6	0	5	1	3	3	3	12	6	4.7	0.4	4.8	15.2	11	0	0

Cumulative Summary of runs Eastbound from Oberlin Ave. (#2)

7 Neither-type runs, collected Wednesday 1/29/2025 to Wednesday 1/29/2025, over day(s) Wed, with starting times during 7:31:57 AM to 8:26:50 AM

	CTT	CTL	CDL	CD	CRT	CPLSD	CPLRT	CMxSD	CMinRT	CStopD	CBS1T	CAS1T	CBS2T	CAS2T	CAS	CStops	CGST	CGCT	CQDL	CLN	TV
to Washington Ave. (#1)																					
Average Neither (n=7)	34	1651	1650	-6	40	-11	45	2	32	0	0	34	5	29	33.2	0.0	0.0	55.4	0	1	0
Std Dev Neither (n=7)	3	0	0	3	0	3	0	2	1	0	0	3	6	3	2.5	0.0	0.0	8.0	0	0	0

Cumulative Summary of all runs, either direction through artery

14 Neither-type runs, collected Wednesday 1/29/2025 to Wednesday 1/29/2025, over day(s) Wed, with starting times during 7:31:57 AM to 8:26:50 AM

	CTT	CTL	CDL	CD	CRT	CPLSD	CPLRT	CMxSD	CMinRT	CStopD	CBS1T	CAS1T	CBS2T	CAS2T	CAS	CStops	CGST	CGCT	CQDL	CLN	TV
to End of Artery																					
Average Neither (n=14)	36	1651	1650	-5	40	-9	45	4	32	1	1	34	8	28	32.1	0.1	0.9	48.4	2	1	0
Std Dev Neither (n=14)	5	0	0	5	0	5	0	4	1	2	3	3	10	5	3.8	0.3	3.4	13.7	8	0	0
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0	0	0
Std Dev Difference	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0	0	0
% Difference	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D

Thursday 1/30/2025 12:54:13 PM

Travel Time & Delay Report for W. 21st St./S.R. 611**Legend:**

CTT:	Summarized Cumulative Travel Time since beginning of Run (seconds)
CTL:	Summarized Cumulative Travel Distance since beginning of Run (feet)
CDL:	Summarized Cumulative User-specified Design Distance since beginning of Run (feet)
CD:	Summarized Cumulative Delay since beginning of Run (seconds) = CTT - CRT
CRT:	Summarized Cumulative Running Time (seconds) = accumulation of DL/DS since beginning of Run
CPLSD:	Summarized Cumulative Posted Speed Limit Delay since beginning of Run (seconds)
CPLRT:	Summarized Cumulative Posted Speed Limit Running Time, or Travel Time since beginning of Run if maintaining Posted Speed Limit (seconds) = accumulation of DL/PLS since beginning of Run
CMxSD:	Summarized Cumulative Maximum-Speed Delay since beginning of Run (seconds)
CMinRT:	Summarized Cumulative Minimum Running Time, or Travel Time since beginning of Run if maintaining Maximum Speed (seconds) = accumulation of DL/MxS since beginning of Run
CStopD:	Summarized Cumulative Stopped Delay since beginning of Run (seconds). The "Stopped Delay" is counted from when the speed drops below 5 mph after exceeding 15 mph until it exceeds 15 mph once again
CBS1T:	Summarized Cumulative Time spent Below Speed #1 (10 mph) since beginning of Run (seconds)
CAS1T:	Summarized Cumulative Free-Flow Travel Time (spent Above Speed #1 (10 mph)) since beginning of Run (seconds) = CTT - CBS1T
CBS2T:	Summarized Cumulative Time spent Below Speed #2 (30 mph) since beginning of Run (seconds)
CAS2T:	Summarized Cumulative Free-Flow Travel Time (spent Above Speed #2 (30 mph)) since beginning of Run (seconds) = CTT - CBS2T
CAS:	Summarized Cumulative Actual Average Speed since beginning of Run (mph) = CTL/CTT
CStops:	Summarized Cumulative number of Stops in Run. A "Stop" is counted when the speed drops below 5 mph after exceeding 15 mph
CGST:	Summarized Cumulative Time Elapsed from presumed Start of Through Green to Vehicle Startup (seconds). A "Stop" is counted when the speed drops below 5 mph after exceeding 15 mph
CGCT:	Summarized Cumulative Time Elapsed from presumed Start of Through Green to this Node Crossing (seconds)
CQDL:	Summarized Cumulative Travel Distance from Vehicle Startup after last Stop to Node Crossing (feet). A "Stop" is counted when the speed drops below 5 mph after exceeding 15 mph
CLN:	Summarized Cumulative Number of Links in Run
TV:	Summarized Through Volume (vph)

Cumulative Summary of runs Westbound from Washington Ave. (#1)

7 Neither-type runs, collected Wednesday 1/29/2025 to Wednesday 1/29/2025, over day(s) Wed, with starting times during 11:41:28 AM to 12:27:27 PM

	CTT	CTL	CDL	CD	CRT	CPLSD	CPLRT	CMxSD	CMinRT	CStopD	CBS1T	CAS1T	CBS2T	CAS2T	CAS	CStops	CGST	CGCT	CQDL	CLN	TV
to Oberlin Ave. (#2)																					
Average Neither (n=7)	41	1651	1650	1	40	-4	45	9	32	3	4	37	17	24	27.9	0.4	23.0	51.9	35	1	0
Std Dev Neither (n=7)	6	0	0	6	0	6	0	5	1	4	5	3	9	4	4.1	0.5	28.8	6.5	53	0	0

Cumulative Summary of runs Eastbound from Oberlin Ave. (#2)

7 Neither-type runs, collected Wednesday 1/29/2025 to Wednesday 1/29/2025, over day(s) Wed, with starting times during 11:43:53 AM to 12:19:04 PM

	CTT	CTL	CDL	CD	CRT	CPLSD	CPLRT	CMxSD	CMinRT	CStopD	CBS1T	CAS1T	CBS2T	CAS2T	CAS	CStops	CGST	CGCT	CQDL	CLN	TV
to Washington Ave. (#1)																					
Average Neither (n=7)	33	1651	1650	-8	40	-12	45	1	31	0	0	33	1	31	34.5	0.0	0.0	39.7	0	1	0
Std Dev Neither (n=7)	1	0	0	1	0	1	0	1	1	0	0	1	2	1	0.8	0.0	0.0	16.8	0	0	0

Cumulative Summary of all runs, either direction through artery

14 Neither-type runs, collected Wednesday 1/29/2025 to Wednesday 1/29/2025, over day(s) Wed, with starting times during 11:41:28 AM to 12:27:27 PM

	CTT	CTL	CDL	CD	CRT	CPLSD	CPLRT	CMxSD	CMinRT	CStopD	CBS1T	CAS1T	CBS2T	CAS2T	CAS	CStops	CGST	CGCT	CQDL	CLN	TV
to End of Artery																					
Average Neither (n=14)	37	1651	1650	-3	40	-8	45	5	32	2	2	35	9	27	31.2	0.2	11.5	45.8	18	1	0
Std Dev Neither (n=14)	6	0	0	6	0	6	0	5	1	3	4	3	10	5	4.4	0.4	22.9	13.8	40	0	0
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0	0	0
Std Dev Difference	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0	0	0
% Difference	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D

Thursday 1/30/2025 1:00:47 PM

Travel Time & Delay Report for W. 21st St./S.R. 611**Legend:**

CTT:	Summarized Cumulative Travel Time since beginning of Run (seconds)
CTL:	Summarized Cumulative Travel Distance since beginning of Run (feet)
CDL:	Summarized Cumulative User-specified Design Distance since beginning of Run (feet)
CD:	Summarized Cumulative Delay since beginning of Run (seconds) = CTT - CRT
CRT:	Summarized Cumulative Running Time (seconds) = accumulation of DL/DS since beginning of Run
CPLSD:	Summarized Cumulative Posted Speed Limit Delay since beginning of Run (seconds)
CPLRT:	Summarized Cumulative Posted Speed Limit Running Time, or Travel Time since beginning of Run if maintaining Posted Speed Limit (seconds) = accumulation of DL/PLS since beginning of Run
CMxSD:	Summarized Cumulative Maximum-Speed Delay since beginning of Run (seconds)
CMinRT:	Summarized Cumulative Minimum Running Time, or Travel Time since beginning of Run if maintaining Maximum Speed (seconds) = accumulation of DL/MxS since beginning of Run
CStopD:	Summarized Cumulative Stopped Delay since beginning of Run (seconds). The "Stopped Delay" is counted from when the speed drops below 5 mph after exceeding 15 mph until it exceeds 15 mph once again
CBS1T:	Summarized Cumulative Time spent Below Speed #1 (10 mph) since beginning of Run (seconds)
CAS1T:	Summarized Cumulative Free-Flow Travel Time (spent Above Speed #1 (10 mph)) since beginning of Run (seconds) = CTT - CBS1T
CBS2T:	Summarized Cumulative Time spent Below Speed #2 (30 mph) since beginning of Run (seconds)
CAS2T:	Summarized Cumulative Free-Flow Travel Time (spent Above Speed #2 (30 mph)) since beginning of Run (seconds) = CTT - CBS2T
CAS:	Summarized Cumulative Actual Average Speed since beginning of Run (mph) = CTL/CTT
CStops:	Summarized Cumulative number of Stops in Run. A "Stop" is counted when the speed drops below 5 mph after exceeding 15 mph
CGST:	Summarized Cumulative Time Elapsed from presumed Start of Through Green to Vehicle Startup (seconds). A "Stop" is counted when the speed drops below 5 mph after exceeding 15 mph
CGCT:	Summarized Cumulative Time Elapsed from presumed Start of Through Green to this Node Crossing (seconds)
CQDL:	Summarized Cumulative Travel Distance from Vehicle Startup after last Stop to Node Crossing (feet). A "Stop" is counted when the speed drops below 5 mph after exceeding 15 mph
CLN:	Summarized Cumulative Number of Links in Run
TV:	Summarized Through Volume (vph)

Cumulative Summary of runs Westbound from Washington Ave. (#1)

7 Neither-type runs, collected Wednesday 1/29/2025 to Wednesday 1/29/2025, over day(s) Wed, with starting times during 4:01:37 PM to 5:02:05 PM

	CTT	CTL	CDL	CD	CRT	CPLSD	CPLRT	CMxSD	CMinRT	CStopD	CBS1T	CAS1T	CBS2T	CAS2T	CAS	CStops	CGST	CGCT	CQDL	CLN	TV
to Oberlin Ave. (#2)																					
Average Neither (n=7)	37	1652	1650	-3	40	-8	45	7	31	4	4	33	9	29	31.2	0.3	16.7	55.3	4	1	0
Std Dev Neither (n=7)	9	3	0	9	0	9	0	8	1	7	7	2	12	3	6.1	0.5	28.6	7.6	7	0	0

Cumulative Summary of runs Eastbound from Oberlin Ave. (#2)

7 Neither-type runs, collected Wednesday 1/29/2025 to Wednesday 1/29/2025, over day(s) Wed, with starting times during 4:03:48 PM to 4:59:30 PM

	CTT	CTL	CDL	CD	CRT	CPLSD	CPLRT	CMxSD	CMinRT	CStopD	CBS1T	CAS1T	CBS2T	CAS2T	CAS	CStops	CGST	CGCT	CQDL	CLN	TV
to Washington Ave. (#1)																					
Average Neither (n=7)	41	1651	1650	1	40	-4	45	10	31	3	4	38	18	23	27.7	0.4	22.6	51.7	40	1	0
Std Dev Neither (n=7)	6	0	0	6	0	6	0	6	1	5	5	3	8	3	3.8	0.5	28.7	7.3	71	0	0

Cumulative Summary of all runs, either direction through artery

14 Neither-type runs, collected Wednesday 1/29/2025 to Wednesday 1/29/2025, over day(s) Wed, with starting times during 4:01:37 PM to 5:02:05 PM

	CTT	CTL	CDL	CD	CRT	CPLSD	CPLRT	CMxSD	CMinRT	CStopD	CBS1T	CAS1T	CBS2T	CAS2T	CAS	CStops	CGST	CGCT	CQDL	CLN	TV
to End of Artery																					
Average Neither (n=14)	39	1651	1650	-1	40	-6	45	8	31	4	4	36	13	26	29.5	0.4	19.7	53.5	22	1	0
Std Dev Neither (n=14)	7	2	0	7	0	7	0	7	1	6	6	3	11	4	5.2	0.5	27.7	7.4	52	0	0
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0	0	0
Std Dev Difference	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0	0	0
% Difference	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D

Thursday 1/30/2025 1:06:46 PM

Travel Time & Delay Report for W. 21st St./S.R. 611**Legend:**

CTT:	Summarized Cumulative Travel Time since beginning of Run (seconds)
CTL:	Summarized Cumulative Travel Distance since beginning of Run (feet)
CDL:	Summarized Cumulative User-specified Design Distance since beginning of Run (feet)
CD:	Summarized Cumulative Delay since beginning of Run (seconds) = CTT - CRT
CRT:	Summarized Cumulative Running Time (seconds) = accumulation of DL/DS since beginning of Run
CPLSD:	Summarized Cumulative Posted Speed Limit Delay since beginning of Run (seconds)
CPLRT:	Summarized Cumulative Posted Speed Limit Running Time, or Travel Time since beginning of Run if maintaining Posted Speed Limit (seconds) = accumulation of DL/PLS since beginning of Run
CMxSD:	Summarized Cumulative Maximum-Speed Delay since beginning of Run (seconds)
CMinRT:	Summarized Cumulative Minimum Running Time, or Travel Time since beginning of Run if maintaining Maximum Speed (seconds) = accumulation of DL/MxS since beginning of Run
CStopD:	Summarized Cumulative Stopped Delay since beginning of Run (seconds). The "Stopped Delay" is counted from when the speed drops below 5 mph after exceeding 15 mph until it exceeds 15 mph once again
CBS1T:	Summarized Cumulative Time spent Below Speed #1 (10 mph) since beginning of Run (seconds)
CAS1T:	Summarized Cumulative Free-Flow Travel Time (spent Above Speed #1 (10 mph)) since beginning of Run (seconds) = CTT - CBS1T
CBS2T:	Summarized Cumulative Time spent Below Speed #2 (30 mph) since beginning of Run (seconds)
CAS2T:	Summarized Cumulative Free-Flow Travel Time (spent Above Speed #2 (30 mph)) since beginning of Run (seconds) = CTT - CBS2T
CAS:	Summarized Cumulative Actual Average Speed since beginning of Run (mph) = CTL/CTT
CStops:	Summarized Cumulative number of Stops in Run. A "Stop" is counted when the speed drops below 5 mph after exceeding 15 mph
CGST:	Summarized Cumulative Time Elapsed from presumed Start of Through Green to Vehicle Startup (seconds). A "Stop" is counted when the speed drops below 5 mph after exceeding 15 mph
CGCT:	Summarized Cumulative Time Elapsed from presumed Start of Through Green to this Node Crossing (seconds)
CQDL:	Summarized Cumulative Travel Distance from Vehicle Startup after last Stop to Node Crossing (feet). A "Stop" is counted when the speed drops below 5 mph after exceeding 15 mph
CLN:	Summarized Cumulative Number of Links in Run
TV:	Summarized Through Volume (vph)

Cumulative Summary of runs Westbound from Washington Ave. (#1)

7 Neither-type runs, collected Wednesday 1/29/2025 to Wednesday 1/29/2025, over day(s) Wed, with starting times during 9:07:47 AM to 9:54:49 AM

	CTT	CTL	CDL	CD	CRT	CPLSD	CPLRT	CMxSD	CMinRT	CStopD	CBS1T	CAS1T	CBS2T	CAS2T	CAS	CStops	CGST	CGCT	CQDL	CLN	TV
to Oberlin Ave. (#2)																					
Average Neither (n=7)	38	1651	1650	-2	40	-7	45	7	31	3	3	35	12	26	30.7	0.3	17.1	49.1	17	1	0
Std Dev Neither (n=7)	10	1	0	10	0	10	0	9	2	6	6	4	18	8	6.3	0.5	29.2	10.7	34	0	0

Cumulative Summary of runs Eastbound from Oberlin Ave. (#2)

7 Neither-type runs, collected Wednesday 1/29/2025 to Wednesday 1/29/2025, over day(s) Wed, with starting times during 9:09:57 AM to 10:04:48 AM

	CTT	CTL	CDL	CD	CRT	CPLSD	CPLRT	CMxSD	CMinRT	CStopD	CBS1T	CAS1T	CBS2T	CAS2T	CAS	CStops	CGST	CGCT	CQDL	CLN	TV
to Washington Ave. (#1)																					
Average Neither (n=7)	33	1651	1650	-7	40	-12	45	3	30	0	0	33	6	27	34.1	0.0	0.0	45.2	0	1	0
Std Dev Neither (n=7)	2	0	0	2	0	2	0	3	1	0	0	2	9	7	2.3	0.0	0.0	23.4	0	0	0

Cumulative Summary of all runs, either direction through artery

14 Neither-type runs, collected Wednesday 1/29/2025 to Wednesday 1/29/2025, over day(s) Wed, with starting times during 9:07:47 AM to 10:04:48 AM

	CTT	CTL	CDL	CD	CRT	CPLSD	CPLRT	CMxSD	CMinRT	CStopD	CBS1T	CAS1T	CBS2T	CAS2T	CAS	CStops	CGST	CGCT	CQDL	CLN	TV
to End of Artery																					
Average Neither (n=14)	36	1651	1650	-4	40	-9	45	5	31	2	2	34	9	27	32.4	0.1	8.5	47.1	8	1	0
Std Dev Neither (n=14)	7	1	0	7	0	7	0	6	1	4	4	3	14	7	4.9	0.4	21.7	17.6	25	0	0
Difference	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0	0	0
Std Dev Difference	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0	0	0
% Difference	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D

Appendix J - Travel Run Comparison Charts

SR 611

Pre-Study vs Optimized Timings

Peak Hour Analysis

Timing	Direction	Travel Time (sec)	Vehicle Delay (sec)	Stopped Delay (sec)	Stops	Average Speed (mph)
CUMULATIVE						
Pre-Study		45	7	7	0.5	26.1
Optimized		37	1	2	0.2	31.3
% Change		-18%	-86%	-71%	-60%	20%
AM Peak						
Pre-Study	EB	46	6	3	0.1	27.6
Optimized	EB	34	1	1	0.1	33.2
EB % Change		-26%	-83%	-67%	0%	20%
Pre-Study	WB	52	12	14	0.7	22.2
Optimized	WB	37	1	1	0.1	30.9
WB % Change		-29%	-92%	-93%	-86%	39%
MIDDAY Peak						
Pre-Study	EB	40	1	1	0.1	28.1
Optimized	EB	33	1	1	0.1	34.5
EB % Change		-18%	0%	0%	0%	23%
Pre-Study	WB	55	15	15	1	20.4
Optimized	WB	41	1	3	0.4	27.9
WB % Change		-25%	-93%	-80%	-60%	37%
PM Peak						
Pre-Study	EB	39	1	1	0.1	29.4
Optimized	EB	41	1	3	0.4	27.7
EB % Change		5%	0%	200%	300%	-6%
Pre-Study	WB	49	9	11	0.7	24.0
Optimized	WB	37	1	4	0.3	31.2
WB % Change		-24%	-89%	-64%	-57%	30%
OFF Peak						
Pre-Study	EB	34	1	1	0.1	32.8
Optimized	EB	33	1	1	0.1	34.1
EB % Change		-3%	0%	0%	0%	4%
Pre-Study	WB	47	7	9	1	24.6
Optimized	WB	38	1	3	0.3	30.7
WB % Change		-19%	-86%	-67%	-70%	25%

Reduction

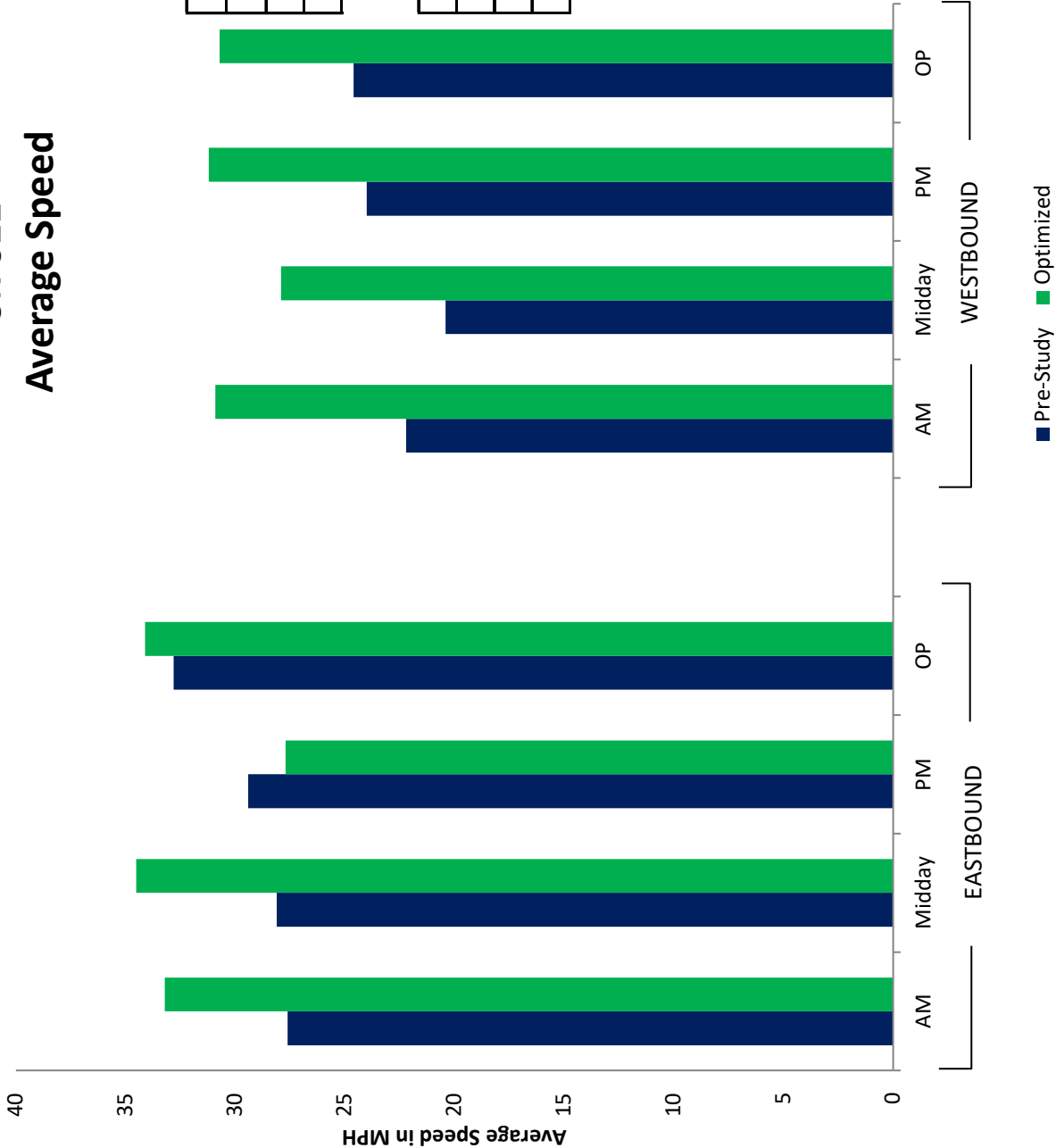
No Change

Increase

(Note: in the case of average speed, green means an increase in overall travel speed, whereas red means a reduction in overall travel speed)

SR 611

Average Speed



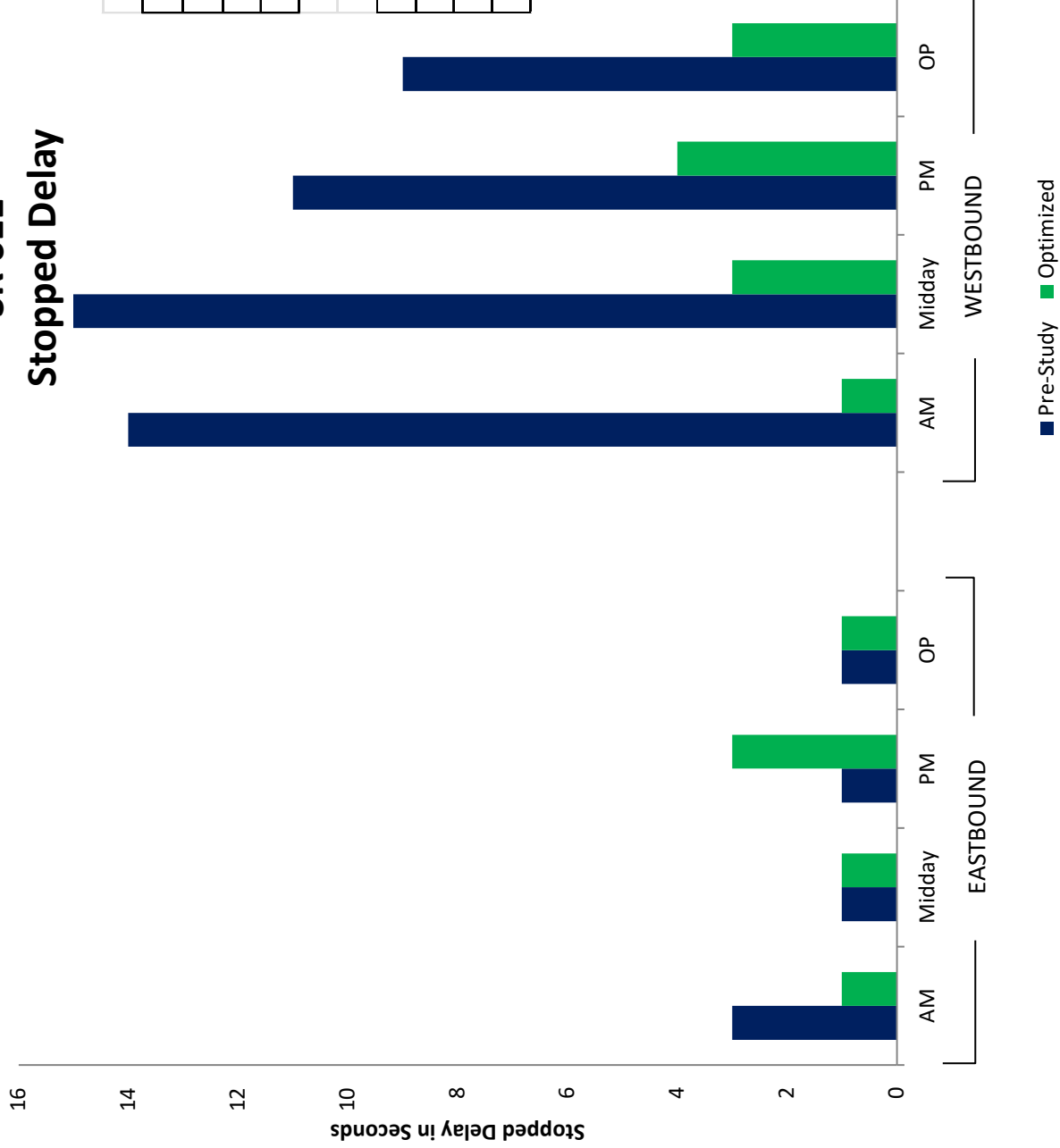
EASTBOUND

AM Peak	+5.6 MPH	20% increase
Midday Peak	+6.4 MPH	23% increase
PM Peak	-1.7 MPH	6% reduction
OFF Peak	+1.3 MPH	4% increase

WESTBOUND

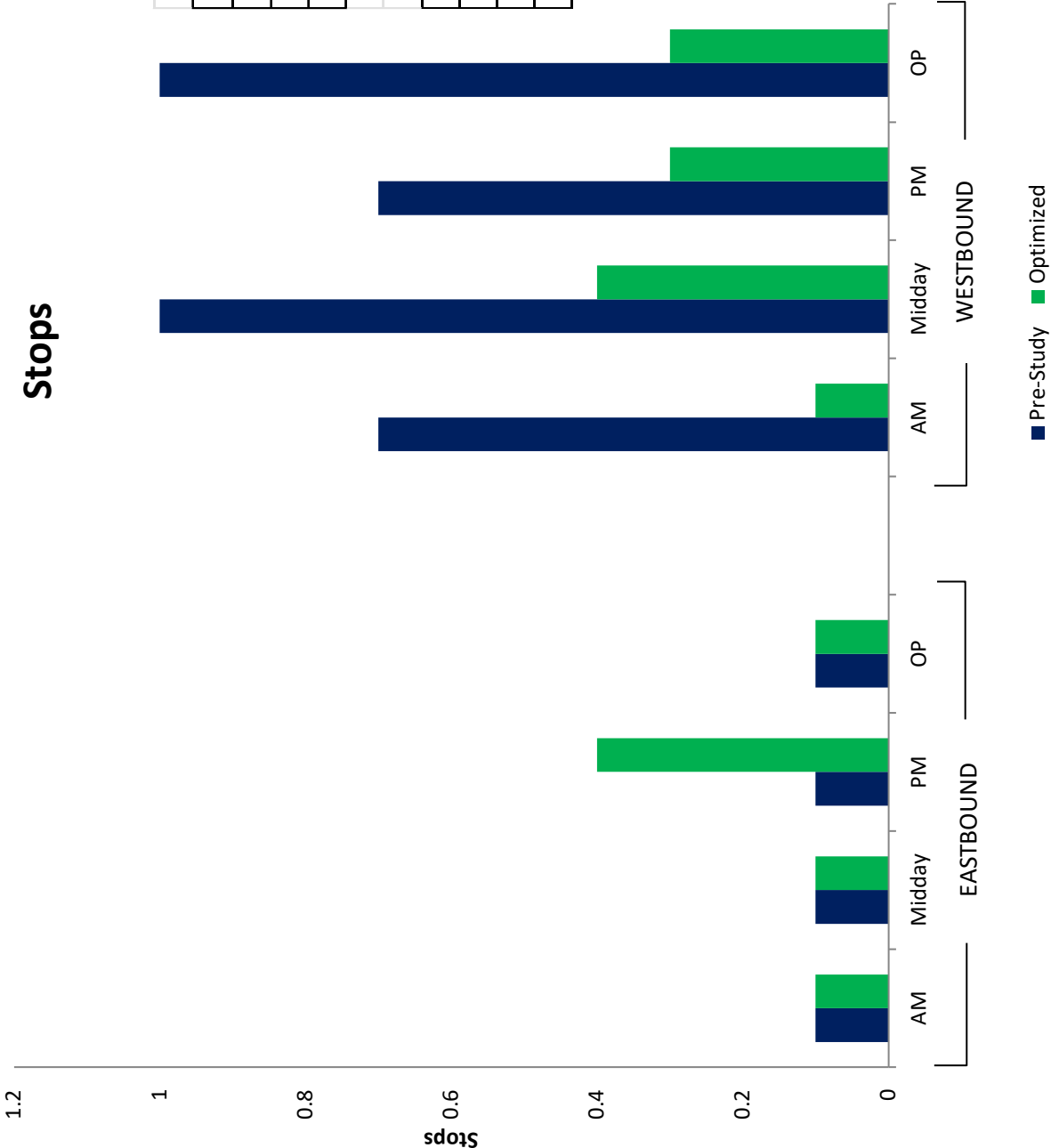
AM Peak	+8.7 MPH	39% increase
Midday Peak	+7.5 MPH	37% increase
PM Peak	+7.2 MPH	30% increase
OFF Peak	+6.1 MPH	25% increase

SR 611 Stopped Delay



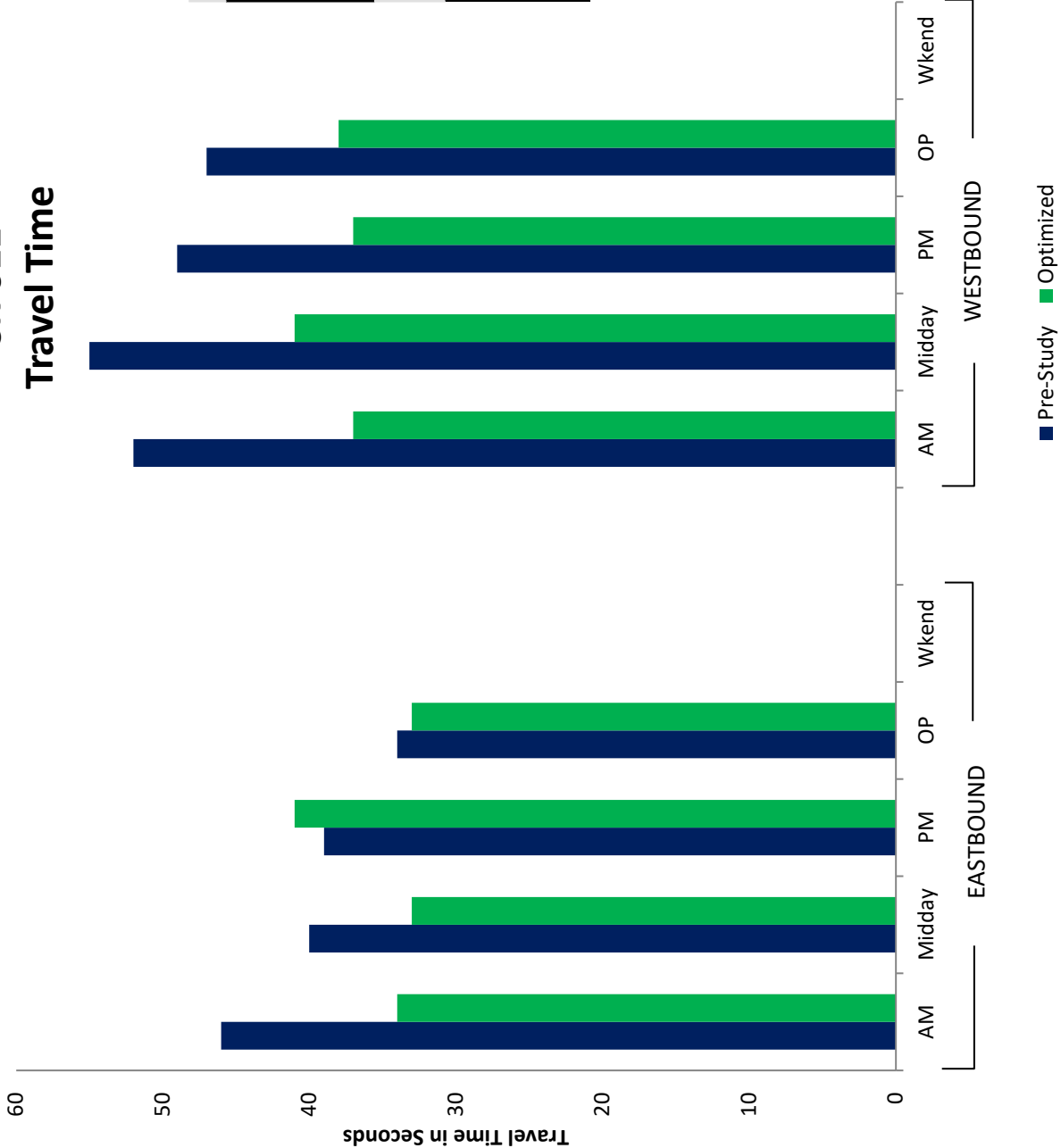
EASTBOUND			
AM Peak	-2 secs		67% reduction
Midday Peak	-0 secs		0% increase
PM Peak	+2 secs		200% increase
OFF Peak	-0 secs		0% increase
WESTBOUND			
AM Peak	-13 secs		93% reduction
Midday Peak	-12 secs		80% reduction
PM Peak	-7 secs		64% reduction
OFF Peak	-6 secs		67% reduction

SR 611 Stops



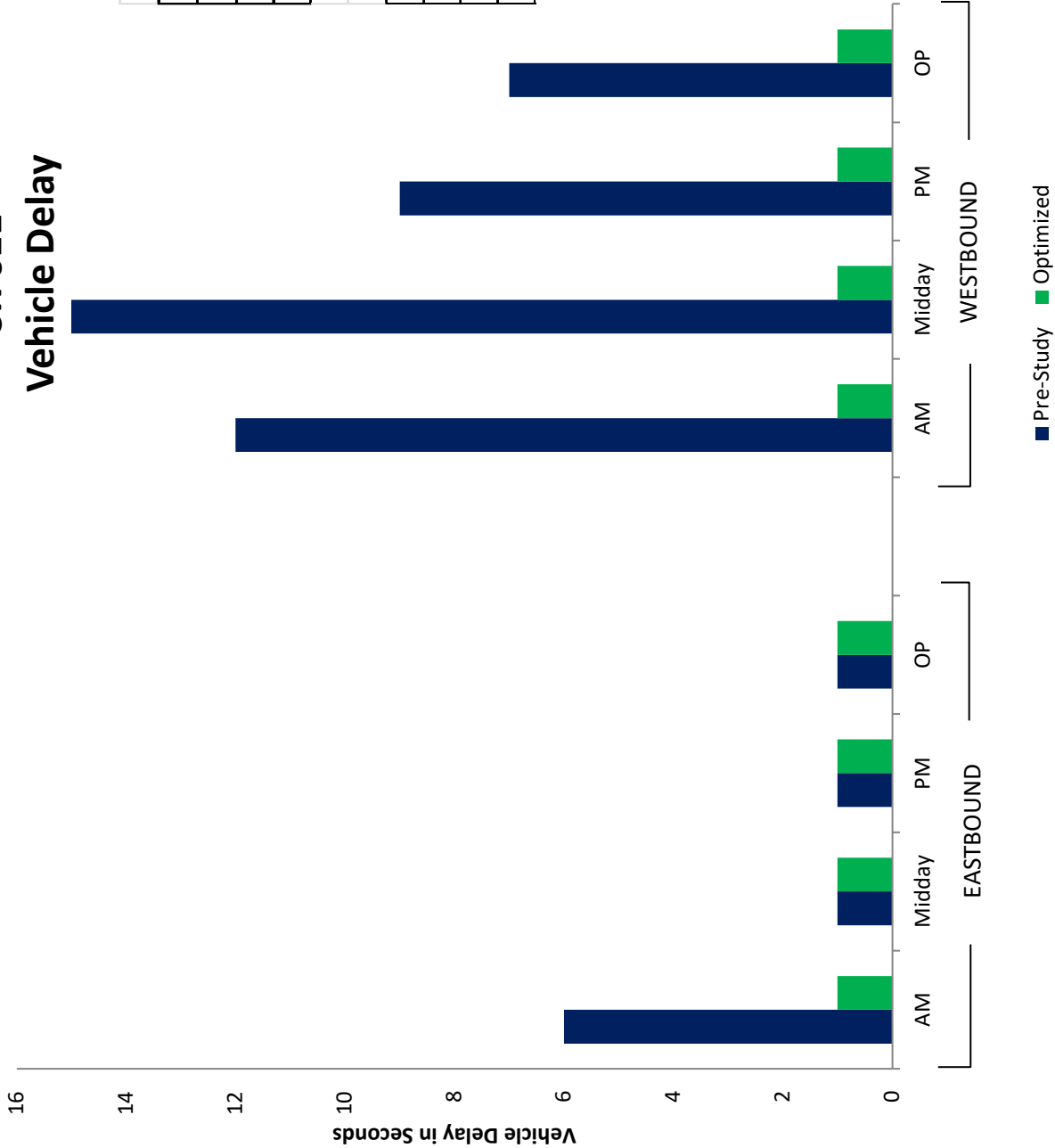
EASTBOUND			
AM Peak	-0 stops		0% increase
Midday Peak	-0 stops		0% increase
PM Peak	+0.1 stops		300% increase
OFF Peak	-0 stops		0% increase
WESTBOUND			
AM Peak	-1 stops		86% reduction
Midday Peak	-1 stops		60% reduction
PM Peak	-0 stops		57% reduction
OFF Peak	-1 stops		70% reduction

SR 611 Travel Time



EASTBOUND			
AM Peak	-12 secs		26% reduction
Midday Peak	-7 secs		18% reduction
PM Peak	+2 secs		5% increase
OFF Peak	-1 secs		3% reduction
WESTBOUND			
AM Peak	-15 secs		29% reduction
Midday Peak	-14 secs		25% reduction
PM Peak	-12 secs		24% reduction
OFF Peak	-9 secs		19% reduction

SR 611 Vehicle Delay



EASTBOUND			
AM Peak	-5 secs	83% reduction	
Midday Peak	-0 secs	0% increase	
PM Peak	-0 secs	0% increase	
OFF Peak	-0 secs	0% increase	
WESTBOUND			
AM Peak	-11 secs	92% reduction	
Midday Peak	-14 secs	93% reduction	
PM Peak	-8 secs	89% reduction	
OFF Peak	-6 secs	86% reduction	

Appendix K - Estimated Signal Re-Timing Benefits



Estimated Annual Signal Retiming Benefits

Corridor: SR 611

