APPENDIX B

Eastern Corridor Segments II and III
Red Bank Corridor to I-275/SR 32 Interchange (PID 86462)
Traffic Analyses

APPENDIX B

B.1 HCS ANALYSIS RESULTS

Eastern Corridor Segments II & III (PID 86462) HCS Analysis

Summary of Results

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The purpose of this memorandum is to present the results of HCS analysis for the key intersections which were studied in connection with the Eastern Corridor Segment II/III project. The analyses were performed for:

- 2022 AM peak hour
- 2022 PM peak hour
- 2042 AM peak hour
- 2042 PM peak hour

The analysis was performed using McTrans HCS Version 7.3 for various improvement alternatives, in 5 sub-regions:

1) ANCOR/SR 32
    a. 1A - ANCOR/SR 32 Hill Focus Area Intersection Improvements
    b. 1B –32-18 Limited Access Highway
    c. 1C –32-18 Connector
    d. 1C –32-18 Connector (with Development)
2) Village of Newtown Focus Area
3) SR 125/SR 32 Focus Area
4) Combined Linwood/Eastern Interchange and US 50/Red Bank Interchange Focus Area
5) US 50 Corridor Focus Area

Traffic volumes used in this analysis were based on the Certified Traffic Plates. In some instances, traffic volumes were manually reassigned for alternatives which involved new alignments or alternative configurations. In other instances, additional regional model runs were made to assess revised travel patterns in connection with new connectors or additional interchange ramps. The basis for the traffic volumes used to asses the various alternatives are described in each subsection of this memorandum.

The HCS summary worksheets are attached for each sub-region in Appendix A.

1A – ANCOR/SR 32 Hill Focus Area

This alternative focused on spot improvements to the key intersections:

- I-3 - Eight Mile Rd at SR 32 (6 Alternatives, including sub-alternatives)
  - I-3b – Green Tee Intersection
  - I-3c – Roundabout
  - I-3d – Convert to Interchange on new alignment
    - I-3d-1 - Diamond Interchange, improving grade for truck traffic on SR 32
    - I-3d-2 – Interchange with jug handle ramps
  - I-3e - New alignment and grade separation of eastbound SR 32 over Eight Mile; unsignalized tee intersection at Eight Mile and westbound SR 32
    - I-3e-1 - 2-way stop
    - I-3e-2 – All-way stop
  - I-3h – Roundabout at relocated intersection
- I-4 - SR 32 at Little Dry Run (2 Alternatives)
  - I-4b - Add EB right lane on SR 32 at Little Dry Run
  - I-4c - Install a signalized continuous green tee intersection at Little Dry Run

The ANCOR intersections were analyzed in HCS for the AM and PM peak hours. Traffic volumes for these analyses were taking directly from the Certified Traffic Plates. The results of the analyses are summarized in the Table below.

1A – ANCOR/SR 32 Hill Focus Area		2022				2042			
Identifier	Description	AM		PM		AM		PM	
I-3	Existing Geometry (See Note 2.)	D	41.4	C	32.4	D	41.0	E	65.8
I-3b	Green Tee (See Note 3.)	A	7.2	B	17.3	A	8.8	D	30.6
I-3c	Roundabout	A	9.0	B	12.8	A	9.8	C	16.6
I-3d-1	Diamond Interchange								
	North Ramp	A	9.6	B	11.0	A	9.9	B	11.6
	South Ramp	B	10.0	B	12.5	B	10.3	B	13.1
I-3d-2	Jug Handle Interchange								
	Ramp at 8-Mile Road	B	10.0	B	12.5	B	10.3	B	13.1
	To/From SR 32 EB	B	11.6	C	24.2	B	12.1	D	32.0
	To/From SR 32 WB	C	16.8	B	10.7	C	18.6	B	10.9
I-3e-1	Grade Separation with 2-Way Stop	B	11.9	B	14.5	B	12.6	C	15.7
I-3e-2	Grade Separation with All-Way Stop	A	9.5	B	11.7	A	9.9	B	12.6
I-3h	Roundabout (Relocated)	A	8.9	B	11.7	A	9.7	B	14.4
I-4	Existing Geometry	D	39.5	D	51.1	D	47.0	E	60.3
I-4b	Add EB right-turn lane	D	39.4	C	28.1	D	47.2	C	33.0
I-4c	Green Tee (See Note 3.)	A	4.3	C	26.3	A	4.3	D	31.6

Notes:

1) Results reflect overall average delay (signalized intersection or roundabout location), unless otherwise noted.
2) Stop Sign controlled intersection. The overall delay shown is aggregate. The delay calculated includes the effects of the free-flow movements.
3) Green Tee intersection. The overall delay shown is aggregate. The delay calculated includes the effects of the free-flow movements.
4) Results reflect highest stop-sign controlled approach delay for the stop sign intersection.

1B –32-18

The 32-18 alternative would convert SR 32 to a limited access facility from Eight Mile Road to Beechwood Road. This alternative includes three options to provided full interchange configurations at Eight Mile Road/SR 32 and Beechwood Road:

- 32-18-1 - Grade separated interchanges at 8 Mile and Beechwood, with C/D Roads
- 32-18-2 - Grade separated interchanges at 8 Mile and Beechwood, with two jug handles and roundabouts
- 32-18-3 - Grade separated interchanges at 8 Mile and Beechwood - one Jug Handle and roundabouts

The design year traffic volumes from the certified traffic plates were manually assigned to the interchange configurations as part of this analysis. The results of the analyses are summarized in the Table below.

1B - 32-18		2022				2042			
ID	Description	AM		PM		AM		PM	
32-18-1	C/D Roads								
INT-1	8-mile North Ramp (See Note 2.)	E	35.8	D	26.2	E	47.0	D	29.6
INT-2	8-mile South Ramp (See Note 2.)	B	10.0	B	12.5	B	10.3	B	13.1
INT-3	Beechwood North Ramp	B	13.6	B	13.6	B	13.5	B	14.1
INT-4	Beechwood South Ramp	B	13.7	B	17.8	B	14.2	B	20.0
32-18-2	2 Jug Handles and roundabouts								
INT-1	WB C/D Road at 8-Mile (See Note 2.)	B	11.5	A	9.0	B	10.7	A	9.0
INT-2	EB SR 32 Ramp at 8-Mile (See Note 2.)	B	10.0	B	12.5	B	10.3	B	13.1
INT-3	Beechwood North Loop Roundabout	A	6.3	A	6.3	A	6.7	A	6.5
INT-4	Beechwood South Loop Roundabout	A	5.4	A	7.2	A	5.6	A	7.6
INT-5	WB SR 32 at Jug Handle (See Note 2.)	D	26.8	B	10.3	E	35.6	B	10.4
INT-6	EB SR 32 at Jug Handle (See Note 2.)	B	11.6	C	24.4	B	12.2	D	32.4
32-18-3	1 Jug Handle and roundabouts								
INT-1	EB SR 32 Ramp at 8-Mile (See Note 2.)	B	10.0	B	12.5	B	10.3	B	13.1
INT-2	Beechwood @ WB C/D Road (See Note 2.)	A	5.0	A	5.0	A	5.0	A	5.0
INT-3	Beechwood North Loop Roundabout	A	4.8	A	5.8	A	4.9	A	6.1
INT-4	Beechwood South Loop	Same as Alt 32-18-2							
INT-5	EB SR 32 at Jug Handle	Same as Alt 32-18-2							
INT-6	WB SR 32 RI/RO (See Note 2.)	D	26.8	B	10.3	E	35.6	B	14.8
INT-7	WB 32 ramp to C/D Road (See Note 2.)	B	10.3	A	9.1	B	10.4	A	9.1

Notes:
1) Results reflect overall average delay (signalized intersection or roundabout location), unless otherwise noted.
2) Stop sign controlled intersection. Results reflect highest calculated approach delay.

1C –Connector

The Connector option included five alternative alignment options. In addition, the analysis was completed for two sub alternatives (with and without development traffic associated with the Martin-Marietta Materials, Inc. development). Traffic volumes for each scenario were developed by adding the new connectors into the Ohio-Kentucky-Indiana Regional Council of Governments (OKI) and Miami Valley Regional Planning Commission (MVRPC) 2040 Existing plus Committed Travel Demand Model. In addition, the Streelight Origin-Destination data for the area was also

reviewed and factored into the projected traffic estimates. The results of the analyses are summarized in the Tables below.

1C - Connector (No Development)		2022				2042			
ID	Description	AM		PM		AM		PM	
A-1	Alignment 1								
INT-1	Broadwell Rd at Connector (See Note 2.)	A	9.1	A	9.1	A	9.1	A	9.1
INT-2	SR 32 at Connector	C	22.3	B	16.6	C	25.9	B	18.6
A-2	Alignment 2								
INT-1	Broadwell Rd at Connector (See Note 2.)	A	9.1	A	9.4	A	9.1	A	9.4
INT-2	SR 32 at Connector	Same as A-1							
A-3	Alignment 3								
INT-1	Broadwell Rd at Connector (See Note 2.)	A	9.2	A	9.6	A	9.2	A	9.6
INT-2	SR 32 at Connector (See Note 2.)	Same as A-1							
A-4	Alignment 4								
INT-1	Round Bottom at Connector (See Note 2.)	C	17.3	B	13.7	C	19.5	B	14.6
INT-2	SR 32 at Little Dry Run/Connector	C	30.2	C	24.7	D	49.6	C	27.7
A-5	Alignment 5								
INT-1	Round Bottom at Connector (See Note 2.)	C	17.7	B	12.7	C	18.0	B	13.6
INT-2	SR 32 at Connector	C	33.8	B	19.6	D	41.1	C	22.5

1C - Connector (With Development)		2022				2042			
ID	Description	AM		PM		AM		PM	
A-1	Alignment 1								
INT-1	Broadwell Rd at Connector (See Note 2.)	B	10.3	B	10.9	B	10.3	B	10.9
INT-2	SR 32 at Connector	D	47.3	C	20.7	D	53.4	C	23.8
A-2	Alignment 2								
INT-1	Broadwell Rd at Connector (See Note 2.)	B	10.9	B	12.0	B	10.9	B	12.0
INT-2	SR 32 at Connector (See Note 2.)	Same as A-1							
A-3	Alignment 3								
INT-1	Broadwell Rd at Connector (See Note 2.)	B	11.1	B	13.0	B	11.1	B	13.0
INT-2	SR 32 at Connector (See Note 2.)	Same as A-1							
A-4	Alignment 4								
INT-1	Round Bottom at Connector (See Note 2.)	C	24.1	C	16.4	E	43.2	C	17.4
INT-2	SR 32 at Little Dry Run/Connector	E	63.2	C	26.5	E	71.3	D	36.7
A-5	Alignment 5								
INT-1	Round Bottom at Connector (See Note 2.)	C	22.3	C	15.3	C	22.8	C	16.2
INT-2	SR 32 at Connector	E	66.7	C	21.8	E	76.7	C	25.0

Notes:
1) Results reflect overall average delay (signalized intersection or roundabout location), unless otherwise noted.
2) Stop sign controlled intersection. Results reflect highest calculated approach delay.

2 - Village of Newtown Focus Area Alternatives

This analysis group involved spot improvements at four intersections in Newton:

- I-5 - Round Bottom Road at SR 32 (4 alternatives, including sub-alternatives)
  - I-5a - With 2 EB thru lanes lane and dual SB lanes
  - I-5b – Roundabout
    - I-5b-1 –Roundabout option 1
    - I-5b-2 – Roundabout option 2, with SB RT Bypass
  - I-5c - With right-turn-on-red restriction for NB right-turn lane
- I-6 - Church Street at SR 32 (2 Alternatives)
  - I-6a – With 2 WB thru lanes
  - I-6b - Roundabout
- I-8 - Valley Avenue at Round Bottom Road (Roundabout alternative)
- I-10 - Valley Avenue at Church Street (3 alternatives)
  - I-10a - Add WB right-turn overlap phase
  - I-10c - Install roundabout
  - I-10d - Install Continuous Flow Interchange. (This alternative was analyzed in Synchro. Aggregate delays shown below are approximate.)

The design year traffic volumes from the certified traffic plates were manually assigned to the interchange configurations as part of this analysis. The results of the analyses are summarized in the Table below.

Village of Newtown Focus Area		2022				2042			
ID	Description	AM		PM		AM		PM	
I-5	Existing Geometry	C	28.6	E	76.2	C	29.7	F	99.6
I-5a	Dual SB left turn lanes	C	28.1	C	28.7	C	30.1	C	31.2
I-5b-1	Roundabout	B	12.8	B	13.7	B	14.8	C	17.9
I-5b-2	Roundabout with SB RT bypass	B	12.9	B	14.5	B	14.8	C	19.2
I-5c	No RTOR, NB	C	30.0	E	76.1	C	29.9	F	92.0
I-6	Existing Geometry	E	79.5	D	49.2	F	101.5	D	54.3
I-6a	2 WB thru lanes	E	79.2	C	32.6	F	101.2	C	32.4
I-6b	Roundabout	C	18.3	D	31.0	C	21.1	E	35.9
I-8	Existing Geometry	D	52.4	C	33.4	E	60.4	D	39.8
I-8b	Roundabout	C	20.9	B	11.1	C	24.0	B	12.6
I-10	Existing Geometry	D	43.8	D	42.0	D	45.3	D	43.2
I-10a	WB right-turn Overlap	C	34.4	D	36.0	D	35.1	D	36.2
I-10c	Roundabout	D	30.4	B	11.2	D	33.8	B	11.5
I-10d	Continuous Flow Intersection*	A	5.3	A	8.6	A	8.0	A	9.9

Asterix (*) denotes intersection was analyzed in Synchro.

3 - SR 125/SR 32 Focus Area Alternatives

This analysis group focused on improvements to the interchange of SR 32 at SR 125, and the intersections immediately adjacent to the interchange, as summarized below.

- I-7 - SR 32 at Clough Pike (4 alternatives)
  - I-7a - Install dual left turn lanes from Clough Pike onto SR 32 in conjunction with a 2nd receiving lane on SR 32.
  - I-7b - Remove signal at Clough, add a flyover from Clough to SR 32 westbound. Analyzed WB Rt opposed by NB thru traffic, as a stop condition, for WB delay.
  - I-7c – Roundabout
  - I-7d – Green Tee
- I-22b – SR 125 at Elstun Rd – Extend NB LT lane and add WB RT lane

- X-1 – Interchange of SR 32 at SR 125.
    - X-1D (Ramps to/from the west – two sub-alternatives)
        - X1D-c - Extend merge length on ramp from westbound SR 32 to westbound SR 125.
        - X1D-d - Add 3rd westbound through lane extending from SR 125 to Wooster Road (analysis of freeway segment, only).
    - X-1 East (2 scenarios)
        - 125-4 - Modify ramp connections to stop sign controll. Allow for bike/ped connection on exiting Clough Creek bridge.
        - X1f - Modify ramp connections to align with shopping center driveway.
        - X1g - Modify ramp connections to roundabout.
    - X-1 (Ramps to/from the east – flood scenarios)
        - X-1f(flood) - Event Scenario - Loop Ramp Closed, with U-turns at Roundabout, with emergency signal control.
        - X-1g(flood) - Event Scenario - Loop Ramp Closed, with U-turns at Roundabout.

SR 125/SR 32 Focus Area		2022				2042			
ID	Description	AM		PM		AM		PM	
I-7	Existing Geometry	E	60.2	C	27.0	E	60.3	C	27.6
I-7a	Dual SB left turn lanes	C	34.1	C	26.5	C	34.2	C	27.5
I-7b	Add a flyover from Clough Pike to SR 32 westbound (See Note 2.)	B	10.5	B	14.6	B	10.5	B	14.9
I-7c	Roundabout	B	10.4	A	8.9	B	10.6	A	9.1
I-7d	Green Tee (See Note 3.)	A	5.3	B	12.2	A	5.2	B	13.5
I-22	Existing Geometry	C	33.1	C	28.1	C	31.3	C	28.0
I-22b	Add WB RT lane	C	30.6	C	28.0	C	30.6	C	27.9
X-1	Existing Geometry – Basic Freeway	E	41.7	B	16.4	E	41.7	B	16.4
X-1	Existing Geometry – WB Merge	D	40.9	B	14.6	D	40.9	B	14.6
X1D-c	Extend merge length on-ramp from WB SR 32 to WB SR 125- WB Merge	D	40.4	B	14.4	D	40.4	B	14.4
X1D-d	Add 3rd WB lane – Basic Freeway	D	30.8	A	10.9	D	30.8	A	10.9
125-4	SR 32/SR 125 east - stop sign controlled (See Note 4.)	B	11.0	E	42.3	B	11.1	E	42.3
X-1f	SR 32/SR 125 east - realigned (See Note 4.)	F	901.2	F	319.3	F	901.2	F	326.8
X-1g	SR 32/SR 125 east - roundabout	D	30.6	C	17.0	D	32.7	C	17.0
X-1f (flood)	Event Scenario - Loop Ramp Closed, with U-turns at Roundabout. Emergency signal control.	F	104.0	F	119.1	F	107.6	F	121.7
X-1g (flood)	Event Scenario - Loop Ramp Closed, with U-turns at Roundabout	F	236.5	F	231.2	F	208.1	F	236.5

Notes:
1) Results reflect overall average delay (signalized intersection or roundabout location), unless otherwise noted.
2) Stop Sign controlled intersection. The overall delay shown is aggregate. The delay calculated includes the effects of the free-flow movements.
3) Green Tee intersection. The overall delay shown is aggregate. The delay calculated includes the effects of the free-flow movements.
4) Stop sign controlled intersection. Results reflect highest calculated approach delay.

4 – Combined Linwood-Eastern Interchange and US 50/Red Bank Interchange Focus Area Alternatives

This analysis group focused on improvements to various intersections in the Linwood-Eastern sub-region, as well as improvements to the area interchanges. The analysis was broken into two parts: Part 4a – Intersections; Part 4b – Interchange. The OKI and MVRPC 2040 Existing plus Committed Travel Demand Model was used to develop peak-hour traffic volumes where new connections were made. The results of this analysis is summarized below.

Part 4a – Intersections

This analysis group focused on six intersections in Linwood.

- I-16b - Meadowlark at US 50, with roundabout
- I-20 - Wooster Road at Wooster Pike (2 sub-alternatives)
  - I-20a – Continuous right turn from Wooster Road to Wooster Pike
  - I20b - roundabout
- I-25 - Redbank/Colbank intersection
  - I-25b – improve signal timing, lengthen storage lanes, add dual WB right turn lanes and dual NB thru lanes at Red Bank/Colbank intersection
  - I-25c – Eliminate Red Bank/Colbank intersection so that traffic to/from US 50 is the through movement. Realign south leg of Red Bank to ramp terminal intersection. Certified traffic volumes were assigned to the revised roadway system, as part of this analysis.
- I-26a - Beechmont Circle at Wooster Avenue - Roundabout
- I-27a - Beechmont Circle at Wilmer Road - Roundabout
- I-29 - Beechmont at Linwood
  - I-29a - Roundabout
  - I-29b - Signalized traffic operation

4a - Linwood-Eastern & US 50/Red Bank		2022				2042			
ID	Description	AM		PM		AM		PM	
I-16	Existing Geometry	C	23.0	C	24.4	C	23.4	C	24.8
I-16b	Roundabout	A	7.8	A	8.3	A	8.0	A	8.5
I-20	Existing Geometry	C	22.4	B	14.9	C	22.3	B	14.9
I-20a	Continuous right turn lane from Wooster Road	C	22.8	B	14.2	C	22.7	B	14.3
I-20b	Roundabout	C	23.8	C	17.5	C	23.7	C	18.1
I-25	Existing Geometry	F	125.8	C	32.3	F	131.6	C	32.7
I-25b	Add dual WB right turn lanes	B	19.4	B	18.7	B	19.5	B	18.8
I-25c	Realign south leg of Red Bank to ramp terminal intersection (See Note 2.)	B	24.3	B	16.8	C	25.0	B	17.2
I-26	Existing Geometry (See Note 3.)	F	236.1	F	69.5	F	247.7	F	89.3
I-26a	Roundabout	A	8.8	E	44.1	A	8.9	E	44.8
I-27	Existing Geometry	B	18.0	C	26.3	B	18.5	C	28.7
I-27a	Roundabout	A	7.7	B	11.4	A	7.9	B	12.0
I-29	Existing Geometry (See Note 3.)	F	69.7	F	165.7	F	114.2	F	394.3
I-29a	Roundabout	A	9.5	B	13.5	A	9.5	B	13.7
I-29b	Signalized	B	14.9	C	32.4	B	14.9	C	33.7

Notes:
1) Results reflect overall average delay (signalized intersection or roundabout location), unless otherwise noted.
2) Signal controlled intersection with EB free-flow RT lane. The overall delay shown is aggregate. The delay calculated includes the effects of the free-flow movement.
3) Stop sign controlled intersection. Results reflect highest calculated approach delay.

Part 4b – Interchanges

This analysis group included assessments of interchange improvement options at the SR 32 at Beechwood Road (X-2), SR 125 at US 50 (X-3), and the US 50 at Colbank Road/Redbank (X-4) interchanges.

- X-2 - SR 125 at Beechmont Circle (5 Alternatives)
  - X-2B-1 - Single-Point Urban Interchange Option
  - X-2B-2 - Jug-Handle Interchange
  - X-2B-2A - Jug-Handle Interchange with extension road to Eastern Avenue
  - X-2B-3 - Half-Clover Interchange
  - X-2B-4 - Full Dumbbell Interchange
  - X-2B-5 - Dumbbell with Jug Handle
- X-3A - SR 125 at US 50 – Add additional ramps to provide a movement from SR 125 to NB US 50 and from SB US 50 to SR 125.
- X-4c - Colbank Road at US 50 – (2 Alternatives)
  - X-4c-1 - roundabout option with one lane from the ramp and one westbound lane on Colbank Road.
  - X-4c-2 - roundabout option with two lanes from the ramp and two westbound lanes on Colbank Road.
- X-4d – Extend Colbank Road at Wooster Pike – (2 Alternatives)
  - X-4d-1 – This configuration would include signal control at the WB Ramps, stop sign control at the EB Ramps, and a roundabout at Wooster Road/Wooster Pike
  - X-4d-2 – Roundabout provided at all 3 intersections.

Traffic volumes were re-assigned to the proposed interchange configuration as part the analysis for each alternative. The results of the analyses are summarized in the next Table (next page).

4b - Linwood-Eastern & US 50/Red Bank Interchanges		2022				2042			
ID	Description	AM		PM		AM		PM	
X-2B-1	Single Point Interchange	F	130.8	F	117.6	F	146.5	F	123.1
X-2B-2	Jug Handle								
	X-2b-2 (North)	B	18.2	D	35.2	B	18.4	D	39.5
	X-2b-2 (South)	B	14.3	C	32.8	B	15.9	C	35.0
X-2B-2a	Half-Diamond and Linwood Extension								
	X-2b-North	B	17.5	C	20.5	B	18.2	C	22.1
	X-2b-South	B	19.0	D	35.6	C	20.1	D	39.6
X-2B-3	Half-Clover								
	X-2b-3 (North)	C	25.5	C	25.5	C	25.7	C	27.1
	X-2b-3 (South)	Same as X-2b-2 (South)							
X-2B-4	Full Dumbbell								
	X2-4-North	A	5.5	B	11.1	A	5.6	B	11.9
	X2-4-South	B	11.1	D	33.0	B	11.1	E	39.1
X-2B-5	Dumbbell / Jug Handle								
	X2-5-North	A	5.6	A	9.2	A	5.6	A	9.7
	X2-5-South	A	8.0	C	15.6	A	7.9	C	15.3
X-3a-1	Add additional ramps	B	13.6	F	154.7	B	13.7	F	163.8
	Weave Section between Ramps	D	28.1	C	26.2	D	28.1	C	26.2
X-4	Existing Geometry (See Note 3.)	A	5.8	B	8.1	A	5.8	B	8.1
X-4c-1	Roundabout (1-lane)	A	6.1	A	6.3	A	6.4	A	6.5
X-4c-2	Roundabout (2-lane)	A	5.2	A	6.2	A	5.3	A	6.3
X-4d-1	Extend Colbank to Wooster Pike								
	WB US 50 Ramps	B	15.3	B	16.4	B	15.3	B	16.8
	EB US 50 Ramps (See Note 2.)	A	0.7	A	1.1	A	0.7	A	1.1
	Wooster Pike/Wooster Road	C	21.2	C	17.7	C	21.1	C	18.3
X-4d-2	Extend Colbank to Wooster Pike								
	WB US 50 Ramps	B	13.6	B	12.9	B	13.6	B	13.2
	EB US 50 Ramps	A	9.3	B	12.4	A	9.2	B	12.7
	Wooster Pike/Wooster Road	Same as X-4d-1							

Notes:
1) Results reflect overall average delay (signalized intersection or roundabout location), unless otherwise noted.
2) Stop sign controlled intersection. The overall delay shown is aggregate. The delay calculated includes the effects of the free-flow movement.
3) Stop sign controlled intersection. Results reflect highest calculated approach delay.

5 - US 50 Corridor Focus Area Alternatives

This analysis group includes three surface intersections on US 50:

- I-11c – US 50 at Newtown Road - Roundabout
- I-12b – US 50 at Walton Creek Road – (2 Alternatives)
  - I-12b - Add protected/permissive SB left turn phase at Walton Creek/US 50 intersection.
  - I-12-c - Lengthen storage capacity for SB left turn. Add a double left turn by changing right lane to left, straight, and right.
- I-14a - US 50 at Plainville: – (3 Alternatives)
  - I-14a - Restrict left turns from southbound Plainville in peak hour.
  - I-14b - Signalization at Plainville/US 50 intersection.
  - I-14c - Add southbound left turn lane.

The results of the analyses are summarized in the Table below.

US 50 Corridor Focus Area		2022				2042			
ID	Description	AM		PM		AM		PM	
I-11	Existing Geometry	F	83.1	C	34.8	F	87.2	D	36.3
I-11c	Roundabout	C	17.3	C	17.9	C	18.6	C	19.3
I-12	Existing Geometry	C	28.5	D	47.2	C	29.2	D	48.9
I-12b	Protected/permissive SB left turn	C	32.0	D	42.6	C	32.1	D	43.5
I-12c	Dual SB left turn lanes	D	38.8	D	46.6	D	39.8	D	47.5
I-14	Existing Geometry (See Note 2.)	A	8.7	E	55.1	A	8.8	F	76.9
I-14a	Prohibit SB left turns (See Note 2.)	A	2.8	A	2.1	A	2.7	A	2.0
I-14b	Signalization	D	43.0	F	132.0	D	48.8	F	134.0
I-14c	Add SB left turn lane (See Note 2.)	A	4.0	B	13.3	A	4.1	B	13.1

Notes:

1) Results reflect overall average delay (signalized intersection or roundabout location), unless otherwise noted.

2) Stop Sign controlled intersection. The overall delay shown is aggregate. The delay calculated includes the effects of the free-flow movements.

CAPACITY ANLYSIS

1A – ANCOR/SR 32 Hill Focus Area

HCS7 Two-Way Stop-Control Report

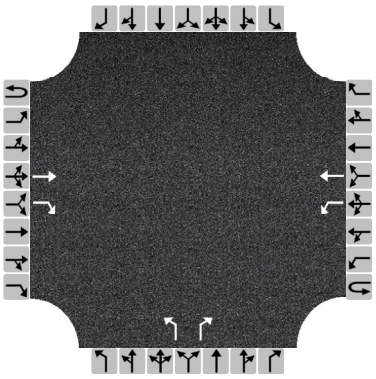
General Information

Analyst	MJH
Agency/Co.	
Date Performed	7/12/2016
Analysis Year	2022
Time Analyzed	AM PEAK HOUR
Intersection Orientation	East-West
Project Description	Intersection 3 - No Build

Site Information

Intersection	SR 32 @ 8 Mile Rd
Jurisdiction	Anderson Township
East/West Street	SR 32
North/South Street	8 Mile Road
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	1	0	1	1	0		1	0	1		0	0	0
Configuration			T	R		L	T			L		R				
Volume, V (veh/h)			440	40		250	1070			130		190				
Percent Heavy Vehicles (%)						3				2		2				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized		No				No				No				No		
Median Type/Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						278				144		211				
Capacity, c (veh/h)						1029				92		579				
v/c Ratio						0.27				1.56		0.36				
95% Queue Length, Q_{95} (veh)						1.1				11.3		1.7				
Control Delay (s/veh)						9.8				378.0		14.7				
Level of Service, LOS						A				F		B				
Approach Delay (s/veh)						1.9				162.1						
Approach LOS										F						

(41.4 Sec - Overall Delay)

HCS7 Two-Way Stop-Control Report

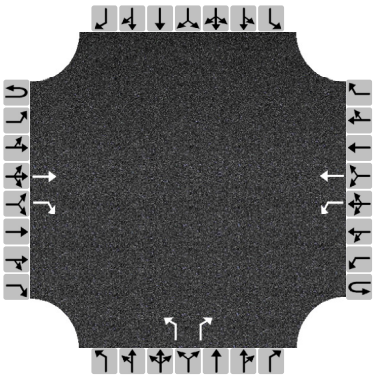
General Information

Analyst	MJH
Agency/Co.	
Date Performed	7/12/2016
Analysis Year	2022
Time Analyzed	NO-BUILD - PM PEAK HOUR
Intersection Orientation	East-West
Project Description	Intersection 3

Site Information

Intersection	SR 32 @ 8 Mile Rd
Jurisdiction	Anderson Township
East/West Street	SR 32
North/South Street	8 Mile Road
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	1	0	1	1	0		1	0	1		0	0	0
Configuration			T	R		L	T			L		R				
Volume, V (veh/h)			960	140		370	580			40		280				
Percent Heavy Vehicles (%)						3				2		2				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized			No				No				No				No	
Median Type/Storage							Undivided									

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						411				44		311				
Capacity, c (veh/h)						566				26		270				
v/c Ratio						0.73				1.72		1.15				
95% Queue Length, Q_{95} (veh)						6.1				5.4		13.7				
Control Delay (s/veh)						26.4				677.9		142.8				
Level of Service, LOS						D				F		F				
Approach Delay (s/veh)						10.3				209.1						
Approach LOS										F						

(32.4 Sec - Overall Delay)

HCS7 Two-Way Stop-Control Report

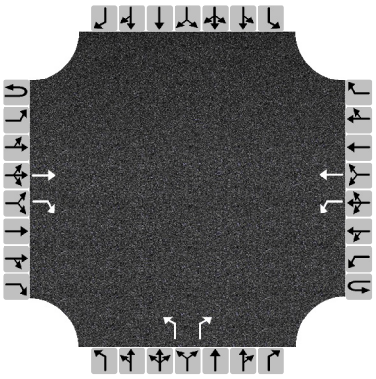
General Information

Analyst	CJK
Agency/Co.	
Date Performed	4/26/2018
Analysis Year	2042
Time Analyzed	AM PEAK HOUR
Intersection Orientation	East-West
Project Description	Intersection 3 - No Build

Site Information

Intersection	SR 32 @ 8 Mile Rd
Jurisdiction	Anderson Township
East/West Street	SR 32
North/South Street	8 Mile Road
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	1	0	1	1	0		1	0	1		0	0	0
Configuration			T	R		L	T			L		R				
Volume, V (veh/h)			470	50		270	1150			140		210				
Percent Heavy Vehicles (%)						3				2		2				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized			No				No				No				No	
Median Type/Storage				Undivided												

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						300				156		233				
Capacity, c (veh/h)						990				74		554				
v/c Ratio						0.30				2.10		0.42				
95% Queue Length, Q_{95} (veh)						1.3				14.3		2.1				
Control Delay (s/veh)						10.2				626.3		16.1				
Level of Service, LOS						B				F		C				
Approach Delay (s/veh)						1.9				260.8			(41.0 Sec - Overall Delay)			
Approach LOS										F						

HCS7 Two-Way Stop-Control Report

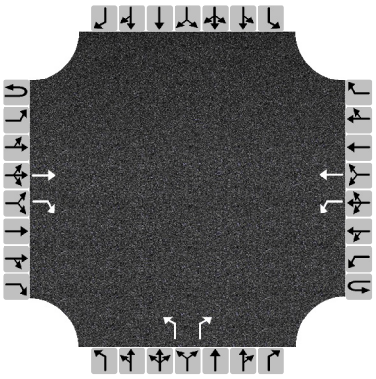
General Information

Analyst	CJK
Agency/Co.	
Date Performed	4/26/2018
Analysis Year	2042
Time Analyzed	PM PEAK HOUR
Intersection Orientation	East-West
Project Description	Intersection 3 - No Build

Site Information

Intersection	SR 32 @ 8 Mile Rd
Jurisdiction	Anderson Township
East/West Street	SR 32
North/South Street	8 Mile Road
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	1	0	1	1	0		1	0	1		0	0	0
Configuration			T	R		L	T			L		R				
Volume, V (veh/h)			1030	150		400	620			40		310				
Percent Heavy Vehicles (%)						3				2		2				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized		No				No				No				No		
Median Type/Storage			Undivided													

Critical and Follow-up Headways

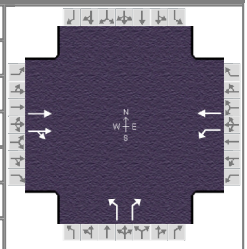
Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						444				44		344				
Capacity, c (veh/h)						524				12		243				
v/c Ratio						0.85				3.76		1.41				
95% Queue Length, Q_{95} (veh)						8.8				6.6		19.3				
Control Delay (s/veh)						39.1				1885.6		247.6				
Level of Service, LOS						E				F		F				
Approach Delay (s/veh)						15.3				433.4			(65.8 Sec - Overall Delay)			
Approach LOS										F						

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.25
Analyst	MJH	Analysis Date	Apr 23, 2018	Area Type	Other
Jurisdiction	Anderson Twp (ODOT)	Time Period		PHF	0.90
Urban Street	SR 32	Analysis Year	2022	Analysis Period	1> 7:00
Intersection	SR 32 at 8 Mile Rd	File Name	AM-03b.xus		
Project Description	Build 3b - 2022 AM Peak Hour				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h		440	40	250	0		130		190			

Signal Information			
Cycle, s	70.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

							1	2	3	4
Green	10.0	27.0	18.0	0.0	0.0	0.0	5	6	7	8
Yellow	4.0	4.0	4.0	0.0	0.0	0.0				
Red	1.0	1.0	1.0	0.0	0.0	0.0				

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		8		
Case Number		8.3	1.0	4.0		9.0		
Phase Duration, s		32.0	15.0	47.0		23.0		
Change Period, ($Y+R_c$), s		5.0	5.0	5.0		5.0		
Max Allow Headway (*MAH*), s		3.1	3.1	0.0		3.3		
Queue Clearance Time (g_s), s		9.4	7.8			8.5		
Green Extension Time (g_e), s		0.9	0.1	0.0		0.6		
Phase Call Probability		1.00	1.00			1.00		
Max Out Probability		0.00	1.00			0.01		

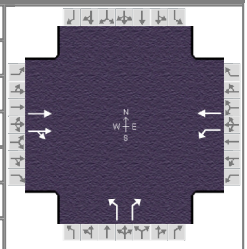
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2	12	1	6		3		18			
Adjusted Flow Rate (*v*), veh/h		270	263	278	0		144		211			
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1856	1801	1767	1856		1781		1585			
Queue Service Time (g_s), s		7.3	7.4	5.8	0.0		4.6		6.5			
Cycle Queue Clearance Time (g_c), s		7.3	7.4	5.8	0.0		4.6		6.5			
Green Ratio (*g/C*)		0.39	0.39	0.56	0.60		0.26		0.40			
Capacity (*c*), veh/h		716	695	598	1113		458		634			
Volume-to-Capacity Ratio (*X*)		0.377	0.379	0.465	0.000		0.315		0.333			
Back of Queue (*Q*), ft/ln (95 th percentile)		129.6	123.6	84.4	0		82.3		96.1			
Back of Queue (*Q*), veh/ln (95 th percentile)		5.1	4.9	3.3	0.0		3.2		3.8			
Queue Storage Ratio (*RQ*) (95 th percentile)		0.00	0.00	0.00	0.00		0.00		0.00			
Uniform Delay (d_1), s/veh		15.5	15.5	9.1	0.0		21.0		14.5			
Incremental Delay (d_2), s/veh		0.1	0.1	0.2	0.0		0.1		0.1			
Initial Queue Delay (d_3), s/veh		0.0	0.0	0.0	0.0		0.0		0.0			
Control Delay (*d*), s/veh		15.6	15.6	9.3	0.0		21.2		14.6			
Level of Service (LOS)		B	B	A			C		B			
Approach Delay, s/veh / LOS	15.6	B		9.3	A		17.3	B		0.0		
Intersection Delay, s/veh / LOS	14.6						B					

7.2 SEC
Aggregate Delay

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	0.7	A	2.7	C	2.3	B
Bicycle LOS Score / LOS	0.9	A	0.9	A		F		

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.25
Analyst	MJH	Analysis Date	Apr 23, 2018	Area Type	Other
Jurisdiction	Anderson Twp (ODOT)	Time Period		PHF	0.90
Urban Street	SR 32	Analysis Year	2022	Analysis Period	1> 7:00
Intersection	SR 32 at 8 Mile Rd	File Name	PM-03b.xus		
Project Description	Build 3b - 2022 PM Peak Hour				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h		960	140	370	0		40		280			

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

							1	2	3	4
Green	20.0	41.0	14.0	0.0	0.0	0.0	5	6	7	8
Yellow	4.0	4.0	4.0	0.0	0.0	0.0				
Red	1.0	1.0	1.0	0.0	0.0	0.0				

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		8		
Case Number		8.3	1.0	4.0		9.0		
Phase Duration, s		46.0	25.0	71.0		19.0		
Change Period, (*Y+R c*), s		5.0	5.0	5.0		5.0		
Max Allow Headway (*MAH*), s		3.1	3.1	0.0		3.3		
Queue Clearance Time (*g s*), s		26.9	12.6			15.7		
Green Extension Time (*g e*), s		2.4	0.6	0.0		0.0		
Phase Call Probability		1.00	1.00			1.00		
Max Out Probability		0.05	0.05			1.00		

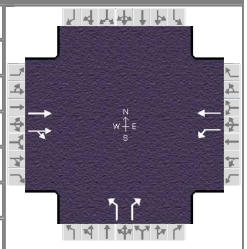
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2	12	1	6		3		18			
Adjusted Flow Rate (*v*), veh/h		624	598	411	0		44		311			
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1856	1773	1767	1856		1781		1585			
Queue Service Time (*g s*), s		24.8	24.9	10.6	0.0		1.9		13.7			
Cycle Queue Clearance Time (*g c*), s		24.8	24.9	10.6	0.0		1.9		13.7			
Green Ratio (*g/C*)		0.46	0.46	0.70	0.73		0.16		0.38			
Capacity (*c*), veh/h		845	808	553	1361		277		599			
Volume-to-Capacity Ratio (*X*)		0.738	0.741	0.743	0.000		0.160		0.520			
Back of Queue (*Q*), ft/ln (95 th percentile)		407.4	385.8	199.4	0		37.8		215.8			
Back of Queue (*Q*), veh/ln (95 th percentile)		15.9	15.4	7.8	0.0		1.5		8.5			
Queue Storage Ratio (*RQ*) (95 th percentile)		0.00	0.00	0.00	0.00		0.00		0.00			
Uniform Delay (*d 1*), s/veh		20.1	20.1	17.1	0.0		32.9		21.7			
Incremental Delay (*d 2*), s/veh		3.0	3.2	4.8	0.0		0.1		0.4			
Initial Queue Delay (*d 3*), s/veh		0.0	0.0	0.0	0.0		0.0		0.0			
Control Delay (*d*), s/veh		23.1	23.4	21.9	0.0		33.0		22.1			
Level of Service (LOS)		C	C	C			C		C			
Approach Delay, s/veh / LOS	23.3	C		21.9	C		23.4	C		0.0		
Intersection Delay, s/veh / LOS	23.0						C					

17.3 SEC
Aggregate Delay

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	2.6	A	2.7	C	2.3	B
Bicycle LOS Score / LOS	1.5	A	1.2	A		F		

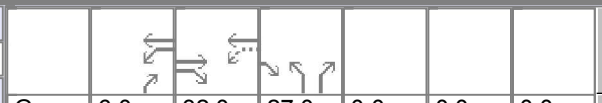
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.25
Analyst	CJK	Analysis Date	Apr 26, 2018	Area Type	Other
Jurisdiction	Anderson Twp (ODOT)	Time Period		PHF	0.90
Urban Street	SR 32	Analysis Year	2042	Analysis Period	1> 7:00
Intersection	SR 32 at 8 Mile Rd	File Name	AM-03b.xus		
Project Description	Build 3b - AM Peak Hour				

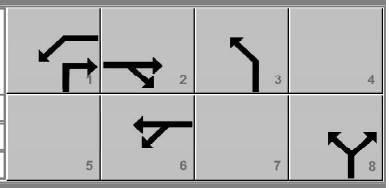


Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h		470	50	270	0		140		210			

Signal Information			
Cycle, s	80.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On



Green	6.0	32.0	27.0	0.0	0.0	0.0
Yellow	4.0	4.0	4.0	0.0	0.0	0.0
Red	1.0	1.0	1.0	0.0	0.0	0.0



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		8		
Case Number		8.3	1.0	4.0		9.0		
Phase Duration, s		37.0	11.0	48.0		32.0		
Change Period, (*Y+R c*), s		5.0	5.0	5.0		5.0		
Max Allow Headway (*MAH*), s		3.1	3.1	0.0		3.3		
Queue Clearance Time (*g s*), s		11.1	8.0			10.1		
Green Extension Time (*g e*), s		1.0	0.0	0.0		0.7		
Phase Call Probability		1.00	1.00			1.00		
Max Out Probability		0.00	1.00			0.00		

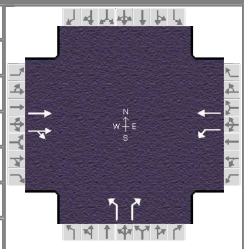
Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2	12	1	6		3		18			
Adjusted Flow Rate (*v*), veh/h		293	285	300	0		156		233			
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1856	1793	1767	1856		1781		1585			
Queue Service Time (*g s*), s		9.0	9.1	6.0	0.0		5.1		8.1			
Cycle Queue Clearance Time (*g c*), s		9.0	9.1	6.0	0.0		5.1		8.1			
Green Ratio (*g/C*)		0.40	0.40	0.50	0.54		0.34		0.41			
Capacity (*c*), veh/h		742	717	460	997		601		654			
Volume-to-Capacity Ratio (*X*)		0.395	0.397	0.652	0.000		0.259		0.357			
Back of Queue (*Q*), ft/ln (95 th percentile)		165.1	156.7	147.7	0		90.9		125.2			
Back of Queue (*Q*), veh/ln (95 th percentile)		6.5	6.3	5.8	0.0		3.6		4.9			
Queue Storage Ratio (*RQ*) (95 th percentile)		0.00	0.00	0.00	0.00		0.00		0.00			
Uniform Delay (*d 1*), s/veh		17.1	17.1	15.8	0.0		19.2		16.2			
Incremental Delay (*d 2*), s/veh		0.1	0.1	2.6	0.0		0.1		0.1			
Initial Queue Delay (*d 3*), s/veh		0.0	0.0	0.0	0.0		0.0		0.0			
Control Delay (*d*), s/veh		17.2	17.3	18.4	0.0		19.3		16.3			
Level of Service (LOS)		B	B	B			B		B			
Approach Delay, s/veh / LOS	17.2	B		18.4	B		17.5	B		0.0		
Intersection Delay, s/veh / LOS	17.6						B					

8.8 SEC
Aggregate Delay

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	0.7	A	2.7	C	2.3	B
Bicycle LOS Score / LOS	1.0	A	1.0	A		F		

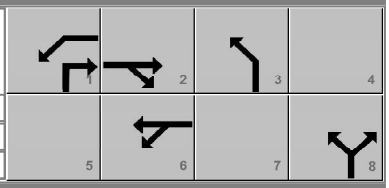
HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.25
Analyst	CJK	Analysis Date	Apr 26, 2018	Area Type	Other
Jurisdiction	Anderson Twp (ODOT)	Time Period		PHF	0.90
Urban Street	SR 32	Analysis Year	2042	Analysis Period	1> 7:00
Intersection	SR 32 at 8 Mile Rd	File Name	PM-03b.xus		
Project Description	Build 3b - PM Peak Hour				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h		1030	150	400	0		40		310			

Signal Information					EB			WB			NB			SB		
Cycle, s	90.0	Reference Phase	2		L	T	R	L	T	R	L	T	R	L	T	R
Offset, s	0	Reference Point	End	Green	22.0	41.0		12.0	0.0		0.0			0.0		
Uncoordinated	Yes	Simult. Gap E/W	On	Yellow	4.0	4.0		4.0	0.0		0.0			0.0		
Force Mode	Fixed	Simult. Gap N/S	On	Red	1.0	1.0		1.0	0.0		0.0			0.0		



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		8		
Case Number		8.3	1.0	4.0		9.0		
Phase Duration, s		46.0	27.0	73.0		17.0		
Change Period, ($Y+R_c$), s		5.0	5.0	5.0		5.0		
Max Allow Headway (*MAH*), s		3.1	3.1	0.0		3.3		
Queue Clearance Time (g_s), s		29.8	15.3			14.0		
Green Extension Time (g_e), s		2.5	0.6	0.0		0.0		
Phase Call Probability		1.00	1.00			1.00		
Max Out Probability		0.14	0.10			1.00		

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2	12	1	6		3		18			
Adjusted Flow Rate (*v*), veh/h		669	642	444	0		44		344			
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1856	1773	1767	1856		1781		1585			
Queue Service Time (g_s), s		27.6	27.8	13.3	0.0		2.0		12.0			
Cycle Queue Clearance Time (g_c), s		27.6	27.8	13.3	0.0		2.0		12.0			
Green Ratio (*g/C*)		0.46	0.46	0.72	0.76		0.13		0.38			
Capacity (*c*), veh/h		845	808	573	1402		238		599			
Volume-to-Capacity Ratio (*X*)		0.791	0.795	0.776	0.000		0.187		0.575			
Back of Queue (*Q*), ft/ln (95 th percentile)		455.5	433.1	361.1	0		39.1		241.5			
Back of Queue (*Q*), veh/ln (95 th percentile)		17.8	17.3	14.1	0.0		1.5		9.5			
Queue Storage Ratio (*RQ*) (95 th percentile)		0.00	0.00	0.00	0.00		0.00		0.00			
Uniform Delay (d_1), s/veh		20.9	20.9	19.8	0.0		34.7		22.3			
Incremental Delay (d_2), s/veh		4.7	5.1	6.0	0.0		0.1		0.9			
Initial Queue Delay (d_3), s/veh		0.0	0.0	0.0	0.0		0.0		0.0			
Control Delay (*d*), s/veh		25.6	26.0	25.8	0.0		34.8		23.1			
Level of Service (LOS)		C	C	C			C		C			
Approach Delay, s/veh / LOS	25.8	C		25.8	C		24.5	C		0.0		
Intersection Delay, s/veh / LOS	25.6						C					

30.6 SEC
Aggregate Delay

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.3	B	0.6	A	2.7	C	2.3	B
Bicycle LOS Score / LOS	1.6	B	1.2	A		F		

HCS7 Roundabouts Report

General Information

Analyst	MJH
Agency or Co.	
Date Performed	4/23/2018
Analysis Year	2022
Time Analyzed	AM PEAK HOUR
Project Description	Build 3c

Site Information

Intersection	SR 32 @ 8 Mile Rd
E/W Street Name	SR 32
N/S Street Name	8 Mile Rd
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.90
Jurisdiction	Anderson Township

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	2	0	0	0	2	0	0	1	0	0	0	0	0	0
Lane Assignment	T		TR		LT		T				L					
Volume (V), veh/h	0		440	40	0	250	1070		0	130		190				
Percent Heavy Vehicles, %	0		3	3	0	3	3		0	2		2				
Flow Rate (v_{PCE}), pc/h	0		504	46	0	286	1225		0	147		215				
Right-Turn Bypass	None				None				Yielding				None			
Conflicting Lanes	1				1				1							
Pedestrians Crossing, p/h	0				0				0							

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)	4.5436	4.5436		4.5436	4.5436			4.9763	4.9763			
Follow-Up Headway (s)	2.5352	2.5352		2.5352	2.5352			2.6087	2.6087			

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h	258.50	291.50		710.17	800.83			147.00	215.00			
Entry Volume veh/h	250.97	283.01		689.49	777.50			144.12	210.78			
Circulating Flow (v_c), pc/h	286			147			504			1658		
Exiting Flow (v_{ex}), pc/h	504			1372			0			332		
Capacity (c_{pce}), pc/h	1094.61	1094.61		1242.21	1242.21			825.31	825.31			
Capacity (c), veh/h	1062.73	1062.73		1206.03	1206.03			809.13	809.13			
v/c Ratio (x)	0.24	0.27		0.57	0.64			0.18	0.26			

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh	5.6	5.9		9.7	11.5			6.3	7.3			
Lane LOS	A	A		A	B			A	A			
95% Queue, veh	0.9	1.1		3.8	5.0			0.6	1.0			
Approach Delay, s/veh	5.8			10.7			6.9					
Approach LOS	A			B			A					
Intersection Delay, s/veh | LOS	9.0						A					

HCS7 Roundabouts Report

General Information

Analyst	MJH
Agency or Co.	
Date Performed	4/23/2018
Analysis Year	2022
Time Analyzed	PM PEAK HOUR
Project Description	Build 3c

Site Information

Intersection	SR 32 @ 8 Mile Rd
E/W Street Name	SR 32
N/S Street Name	8 Mile Rd
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.90
Jurisdiction	Anderson Township

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	2	0	0	0	2	0	0	1	0	0	0	0	0	0
Lane Assignment	T		TR		LT		T				L					
Volume (V), veh/h	0		960	140	0	370	580		0	40		280				
Percent Heavy Vehicles, %	3		3	3	3	3	3		3	2		2				
Flow Rate (v_{PCE}), pc/h	0		1099	160	0	423	664		0	45		317				
Right-Turn Bypass	None				None				Yielding				None			
Conflicting Lanes	1				1				1							
Pedestrians Crossing, p/h	0				0				0							

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)	4.5436	4.5436		4.5436	4.5436			4.9763	4.9763			
Follow-Up Headway (s)	2.5352	2.5352		2.5352	2.5352			2.6087	2.6087			

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h	591.73	667.27		510.89	576.11			45.00	317.00			
Entry Volume veh/h	574.50	647.83		496.01	559.33			44.12	310.78			
Circulating Flow (v_c), pc/h	423			45			1099			1132		
Exiting Flow (v_{ex}), pc/h	1099			709			0			583		
Capacity (c_{pce}), pc/h	966.31	966.31		1363.03	1363.03			449.83	449.83			
Capacity (c), veh/h	938.17	938.17		1323.33	1323.33			441.01	441.01			
v/c Ratio (x)	0.61	0.69		0.37	0.42			0.10	0.70			

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh	12.8	15.4		6.2	6.8			9.6	28.9			
Lane LOS	B	C		A	A			A	D			
95% Queue, veh	4.3	5.8		1.8	2.1			0.3	5.4			
Approach Delay, s/veh	14.2			6.5			26.5					
Approach LOS	B			A			D					
Intersection Delay, s/veh | LOS	12.8						B					

HCS7 Roundabouts Report

General Information

Analyst	MJH
Agency or Co.	
Date Performed	4/23/2018
Analysis Year	2042
Time Analyzed	AM PEAK HOUR
Project Description	Build 3c

Site Information

Intersection	SR 32 @ 8 Mile Rd
E/W Street Name	SR 32
N/S Street Name	8 Mile Rd
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.90
Jurisdiction	Anderson Township

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	2	0	0	0	2	0	0	1	0	0	0	0	0	0
Lane Assignment	T		TR		LT		T				L					
Volume (V), veh/h	0		440	40	0	250	1150		0	140		210				
Percent Heavy Vehicles, %	0		3	3	0	3	3		0	2		2				
Flow Rate (v_{PCE}), pc/h	0		504	46	0	286	1316		0	159		238				
Right-Turn Bypass	None				None				Yielding				None			
Conflicting Lanes	1				1				1							
Pedestrians Crossing, p/h	0				0				0							

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)	4.5436	4.5436		4.5436	4.5436			4.9763	4.9763			
Follow-Up Headway (s)	2.5352	2.5352		2.5352	2.5352			2.6087	2.6087			

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h	258.50	291.50		752.94	849.06			159.00	238.00			
Entry Volume veh/h	250.97	283.01		731.01	824.33			155.88	233.33			
Circulating Flow (v_c), pc/h	286			159			504			1761		
Exiting Flow (v_{ex}), pc/h	504			1475			0			332		
Capacity (c_{pce}), pc/h	1094.61	1094.61		1228.72	1228.72			825.31	825.31			
Capacity (c), veh/h	1062.73	1062.73		1192.93	1192.93			809.13	809.13			
v/c Ratio (x)	0.24	0.27		0.61	0.69			0.19	0.29			

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh	5.6	5.9		10.7	12.9			6.5	7.7			
Lane LOS	A	A		B	B			A	A			
95% Queue, veh	0.9	1.1		4.4	5.9			0.7	1.2			
Approach Delay, s/veh	5.8			11.9			7.2					
Approach LOS	A			B			A					
Intersection Delay, s/veh | LOS	9.8						A					

HCS7 Roundabouts Report

General Information

Analyst	CJK
Agency or Co.	
Date Performed	4/26/2018
Analysis Year	2042
Time Analyzed	PM PEAK HOUR
Project Description	Build 3c

Site Information

Intersection	SR 32 @ 8 Mile Rd
E/W Street Name	SR 32
N/S Street Name	8 Mile Rd
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.90
Jurisdiction	Anderson Township

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	2	0	0	0	2	0	0	1	0	0	0	0	0	0
Lane Assignment	T		TR		LT		T				L					
Volume (V), veh/h	0		1030	150	0	400	620		0	40		310				
Percent Heavy Vehicles, %	3		3	3	3	3	3		3	2		2				
Flow Rate (v_{PCE}), pc/h	0		1179	172	0	458	710		0	45		351				
Right-Turn Bypass	None				None				Yielding				None			
Conflicting Lanes	1				1				1							
Pedestrians Crossing, p/h	0				0				0							

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)	4.5436	4.5436		4.5436	4.5436			4.9763	4.9763			
Follow-Up Headway (s)	2.5352	2.5352		2.5352	2.5352			2.6087	2.6087			

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h	634.97	716.03		548.96	619.04			45.00	351.00			
Entry Volume veh/h	616.48	695.17		532.97	601.01			44.12	344.12			
Circulating Flow (v_c), pc/h	458			45			1179			1213		
Exiting Flow (v_{ex}), pc/h	1179			755			0			630		
Capacity (c_{pce}), pc/h	936.02	936.02		1363.03	1363.03			414.58	414.58			
Capacity (c), veh/h	908.76	908.76		1323.33	1323.33			406.45	406.45			
v/c Ratio (x)	0.68	0.76		0.40	0.45			0.11	0.85			

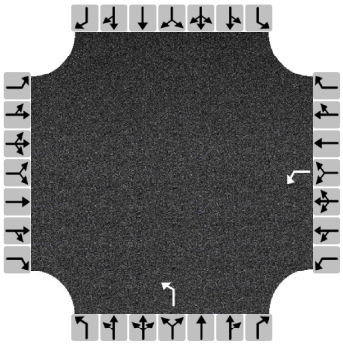
Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh	15.3	19.4		6.6	7.2			10.5	46.1			
Lane LOS	C	C		A	A			B	E			
95% Queue, veh	5.5	7.6		2.0	2.4			0.4	8.1			
Approach Delay, s/veh	17.5			6.9			42.1					
Approach LOS	C			A			E					
Intersection Delay, s/veh | LOS	16.6						C					

HCS7 All-Way Stop Control Report

General Information		Site Information	
Analyst	MJH	Intersection	North- SR 32 @ Eight Mile
Agency/Co.		Jurisdiction	Anderson Township
Date Performed	5/4/2018	East/West Street	SR 32 - Westbound Ramps
Analysis Year	2022	North/South Street	8 Mile Road
Analysis Time Period (hrs)	0.25	Peak Hour Factor	0.90
Time Analyzed	AM PEAK HOUR		
Project Description	Build 3d-1		

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume				250			130					
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration				L			L					
Flow Rate, v (veh/h)				278			144					
Percent Heavy Vehicles				2			3					

Departure Headway and Service Time

Initial Departure Headway, hd (s)				3.20			3.20					
Initial Degree of Utilization, x				0.247			0.128					
Final Departure Headway, hd (s)				4.51			4.83					
Final Degree of Utilization, x				0.348			0.194					
Move-Up Time, m (s)				2.0			2.0					
Service Time, ts (s)				2.51			2.83					

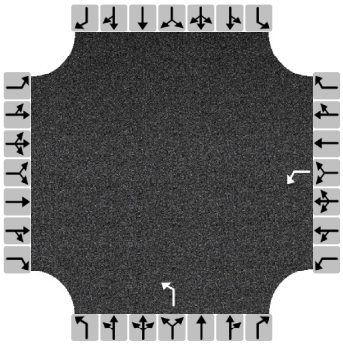
Capacity, Delay and Level of Service

Flow Rate, v (veh/h)				278			144					
Capacity				798			746					
95% Queue Length, Q_{95} (veh)				1.6			0.7					
Control Delay (s/veh)				9.9			9.0					
Level of Service, LOS				A			A					
Approach Delay (s/veh)				9.9			9.0					
Approach LOS				A			A					
Intersection Delay, s/veh | LOS	9.6						A					

HCS7 All-Way Stop Control Report

General Information		Site Information	
Analyst	MJH	Intersection	North- SR 32 @ Eight Mile
Agency/Co.		Jurisdiction	Anderson Township
Date Performed	5/4/2018	East/West Street	SR 32 - Westbound Ramps
Analysis Year	2022	North/South Street	8 Mile Road
Analysis Time Period (hrs)	0.25	Peak Hour Factor	0.90
Time Analyzed	PM PEAK HOUR		
Project Description	Build 3d-1		

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume				370			40					
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration				L			L					
Flow Rate, v (veh/h)				411			44					
Percent Heavy Vehicles				3			2					

Departure Headway and Service Time

Initial Departure Headway, hd (s)				3.20			3.20					
Initial Degree of Utilization, x				0.365			0.040					
Final Departure Headway, hd (s)				4.27			5.08					
Final Degree of Utilization, x				0.488			0.063					
Move-Up Time, m (s)				2.0			2.0					
Service Time, ts (s)				2.27			3.08					

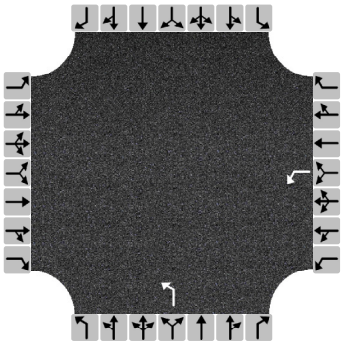
Capacity, Delay and Level of Service

Flow Rate, v (veh/h)				411			44					
Capacity				842			709					
95% Queue Length, Q_{95} (veh)				2.7			0.2					
Control Delay (s/veh)				11.3			8.4					
Level of Service, LOS				B			A					
Approach Delay (s/veh)				11.3			8.4					
Approach LOS				B			A					
Intersection Delay, s/veh | LOS	11.0						B					

HCS7 All-Way Stop Control Report

General Information		Site Information	
Analyst	MJH	Intersection	North- SR 32 @ Eight Mile
Agency/Co.		Jurisdiction	Anderson Township
Date Performed	5/4/2018	East/West Street	SR 32 - Westbound Ramps
Analysis Year	2042	North/South Street	8 Mile Road
Analysis Time Period (hrs)	0.25	Peak Hour Factor	0.90
Time Analyzed	AM PEAK HOUR		
Project Description	Build Alternative 3d-1		

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume				270			140					
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration				L			L					
Flow Rate, v (veh/h)				300			156					
Percent Heavy Vehicles				3			2					

Departure Headway and Service Time

Initial Departure Headway, hd (s)				3.20			3.20					
Initial Degree of Utilization, x				0.267			0.138					
Final Departure Headway, hd (s)				4.56			4.87					
Final Degree of Utilization, x				0.380			0.211					
Move-Up Time, m (s)				2.0			2.0					
Service Time, ts (s)				2.56			2.87					

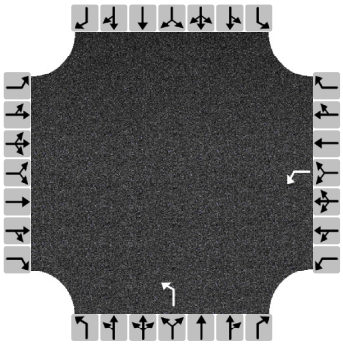
Capacity, Delay and Level of Service

Flow Rate, v (veh/h)				300			156					
Capacity				789			739					
95% Queue Length, Q_{95} (veh)				1.8			0.8					
Control Delay (s/veh)				10.3			9.2					
Level of Service, LOS				B			A					
Approach Delay (s/veh)				10.3			9.2					
Approach LOS				B			A					
Intersection Delay, s/veh | LOS	9.9						A					

HCS7 All-Way Stop Control Report

General Information		Site Information	
Analyst	MJH	Intersection	North- SR 32 @ Eight Mile
Agency/Co.		Jurisdiction	Anderson Township
Date Performed	5/4/2018	East/West Street	SR 32 - Westbound Ramps
Analysis Year	2042	North/South Street	8 Mile Road
Analysis Time Period (hrs)	0.25	Peak Hour Factor	0.90
Time Analyzed	PM PEAK HOUR		
Project Description	Build 3d-1		

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume				400			40					
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration				L			L					
Flow Rate, v (veh/h)				444			44					
Percent Heavy Vehicles				3			2					

Departure Headway and Service Time

Initial Departure Headway, hd (s)				3.20			3.20					
Initial Degree of Utilization, x				0.395			0.040					
Final Departure Headway, hd (s)				4.28			5.15					
Final Degree of Utilization, x				0.528			0.064					
Move-Up Time, m (s)				2.0			2.0					
Service Time, ts (s)				2.28			3.15					

Capacity, Delay and Level of Service

Flow Rate, v (veh/h)				444			44					
Capacity				842			699					
95% Queue Length, Q_{95} (veh)				3.2			0.2					
Control Delay (s/veh)				12.0			8.5					
Level of Service, LOS				B			A					
Approach Delay (s/veh)				12.0			8.5					
Approach LOS				B			A					
Intersection Delay, s/veh | LOS	11.6						B					

HCS7 Two-Way Stop-Control Report

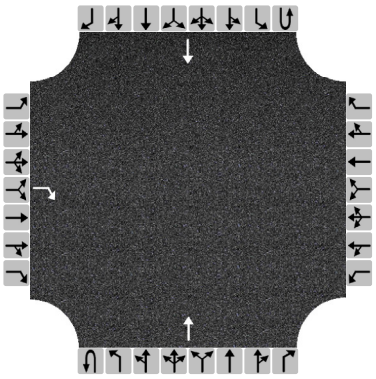
General Information

Analyst	MJH
Agency/Co.	
Date Performed	4/22/2018
Analysis Year	2022
Time Analyzed	2022 AM PEAK HOUR
Intersection Orientation	North-South
Project Description	Intersection 3 - Build Alternative 3d1

Site Information

Intersection	South - SR 32 @ 8 Mile Rd
Jurisdiction	Anderson Township
East/West Street	SR 32 - Eastbound Ramps
North/South Street	8 Mile Road
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	1		0	0	0	0	0	1	0	0	0	1	0
Configuration				R							T				T	
Volume, V (veh/h)				40							130				250	
Percent Heavy Vehicles (%)				3												
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)				44												
Capacity, c (veh/h)				758												
v/c Ratio				0.06												
95% Queue Length, Q_{95} (veh)				0.2												
Control Delay (s/veh)				10.0												
Level of Service, LOS				B												
Approach Delay (s/veh)		10.0														
Approach LOS		B														

HCS7 Two-Way Stop-Control Report

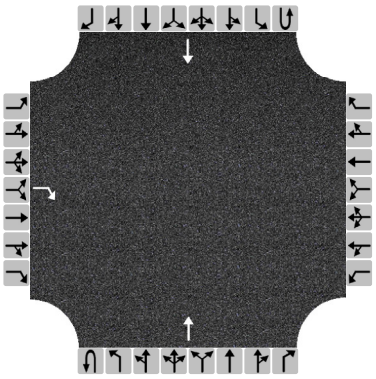
General Information

Analyst	MJH
Agency/Co.	
Date Performed	4/22/2018
Analysis Year	2022
Time Analyzed	PM PEAK HOUR
Intersection Orientation	North-South
Project Description	Build 3d-1

Site Information

Intersection	South - SR 32 @ 8 Mile Rd
Jurisdiction	Anderson Township
East/West Street	SR 32 - Eastbound Ramps
North/South Street	8 Mile Road
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	1		0	0	0	0	0	1	0	0	0	1	0
Configuration				R							T				T	
Volume, V (veh/h)				140							40				370	
Percent Heavy Vehicles (%)				3												
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)				156												
Capacity, c (veh/h)				638												
v/c Ratio				0.24												
95% Queue Length, Q_{95} (veh)				1.0												
Control Delay (s/veh)				12.5												
Level of Service, LOS				B												
Approach Delay (s/veh)		12.5														
Approach LOS		B														

HCS7 Two-Way Stop-Control Report

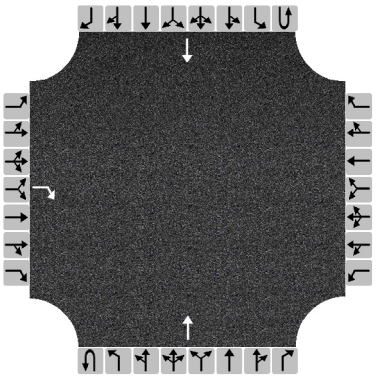
General Information

Analyst	CJK
Agency/Co.	
Date Performed	4/26/2018
Analysis Year	2042
Time Analyzed	AM PEAK HOUR
Intersection Orientation	North-South
Project Description	Build Alternative 3d-1

Site Information

Intersection	South - SR 32 @ 8 Mile Rd
Jurisdiction	Anderson Township
East/West Street	SR 32 - Eastbound Ramps
North/South Street	8 Mile Road
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	1		0	0	0	0	0	1	0	0	0	1	0
Configuration				R							T				T	
Volume, V (veh/h)				50							140				270	
Percent Heavy Vehicles (%)				3												
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)				56												
Capacity, c (veh/h)				737												
v/c Ratio				0.08												
95% Queue Length, Q_{95} (veh)				0.2												
Control Delay (s/veh)				10.3												
Level of Service, LOS				B												
Approach Delay (s/veh)		10.3														
Approach LOS		B														

HCS7 Two-Way Stop-Control Report

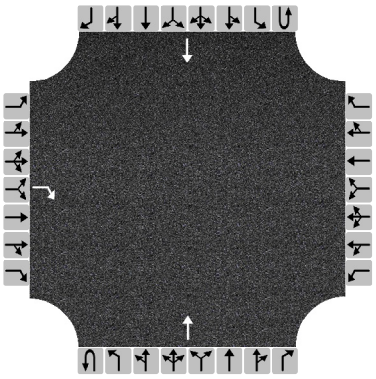
General Information

Analyst	CJK
Agency/Co.	
Date Performed	4/26/2018
Analysis Year	2042
Time Analyzed	PM PEAK HOUR
Intersection Orientation	North-South
Project Description	Build 3d-1

Site Information

Intersection	South - SR 32 @ 8 Mile Rd
Jurisdiction	Anderson Township
East/West Street	SR 32 - Eastbound Ramps
North/South Street	8 Mile Road
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	1		0	0	0	0	0	1	0	0	0	1	0
Configuration				R							T				T	
Volume, V (veh/h)				150							40				400	
Percent Heavy Vehicles (%)				3												
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)				167												
Capacity, c (veh/h)				611												
v/c Ratio				0.27												
95% Queue Length, Q_{95} (veh)				1.1												
Control Delay (s/veh)				13.1												
Level of Service, LOS				B												
Approach Delay (s/veh)	13.1															
Approach LOS	B															

HCS7 Two-Way Stop-Control Report

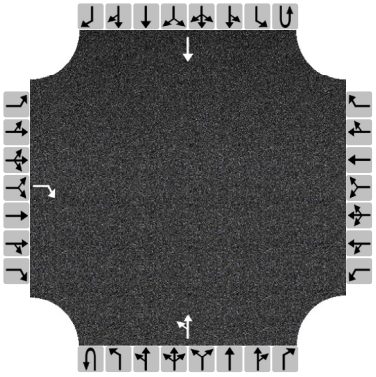
General Information

Analyst	MJH
Agency/Co.	
Date Performed	4/22/2018
Analysis Year	2022
Time Analyzed	AM PEAK HOUR
Intersection Orientation	North-South
Project Description	Build 3d-2

Site Information

Intersection	Ramp @ 8 Mile Rd
Jurisdiction	Anderson Township
East/West Street	Ramp
North/South Street	8 Mile Road
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	1		0	0	0	0	0	1	0	0	0	1	0
Configuration				R						LT					T	
Volume, V (veh/h)				40						190	130				250	
Percent Heavy Vehicles (%)				3						3						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)				44						211						
Capacity, c (veh/h)				758						1278						
v/c Ratio				0.06						0.17						
95% Queue Length, Q_{95} (veh)				0.2						0.6						
Control Delay (s/veh)				10.0						8.4						
Level of Service, LOS				B						A						
Approach Delay (s/veh)		10.0								5.6						
Approach LOS		B														

HCS7 Two-Way Stop-Control Report

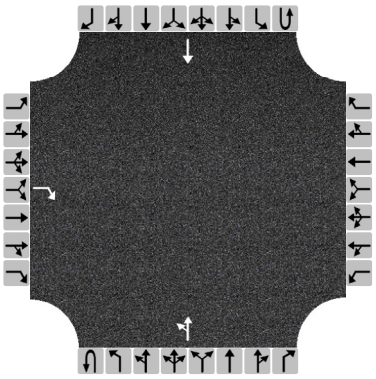
General Information

Analyst	MJH
Agency/Co.	
Date Performed	4/22/2018
Analysis Year	2022
Time Analyzed	PM PEAK HOUR
Intersection Orientation	North-South
Project Description	Build 3d-2

Site Information

Intersection	Ramp @ 8 Mile Rd
Jurisdiction	Anderson Township
East/West Street	Ramp
North/South Street	8 Mile Road
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	1		0	0	0	0	0	1	0	0	0	1	0
Configuration				R						LT					T	
Volume, V (veh/h)				140						280	40				370	
Percent Heavy Vehicles (%)				3						3						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)				156						311						
Capacity, c (veh/h)				638						1141						
v/c Ratio				0.24						0.27						
95% Queue Length, Q_{95} (veh)				1.0						1.1						
Control Delay (s/veh)				12.5						9.3						
Level of Service, LOS				B						A						
Approach Delay (s/veh)		12.5								8.5						
Approach LOS		B														

HCS7 Two-Way Stop-Control Report

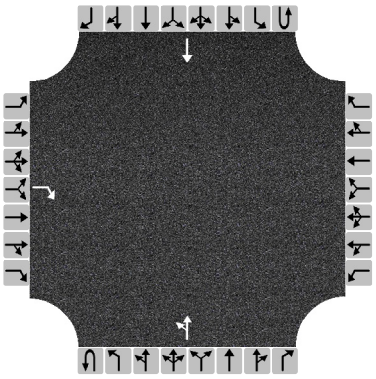
General Information

Analyst	CJK
Agency/Co.	
Date Performed	4/26/2018
Analysis Year	2042
Time Analyzed	AM PEAK HOUR
Intersection Orientation	North-South
Project Description	Build Alternative 3d-2

Site Information

Intersection	Ramp @ 8 Mile Rd
Jurisdiction	Anderson Township
East/West Street	Ramp
North/South Street	8 Mile Road
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	1		0	0	0	0	0	1	0	0	0	1	0
Configuration				R						LT					T	
Volume, V (veh/h)				50						210	140				270	
Percent Heavy Vehicles (%)				3						2						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)				56						233						
Capacity, c (veh/h)				737						1260						
v/c Ratio				0.08						0.18						
95% Queue Length, Q_{95} (veh)				0.2						0.7						
Control Delay (s/veh)				10.3						8.5						
Level of Service, LOS				B						A						
Approach Delay (s/veh)		10.3								5.8						
Approach LOS		B														

HCS7 Two-Way Stop-Control Report

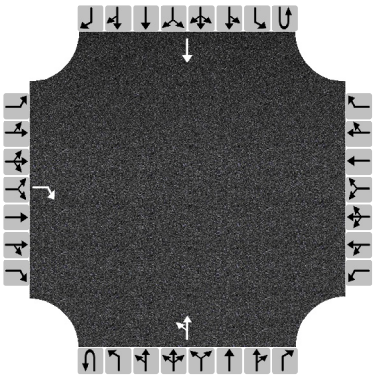
General Information

Analyst	CJK
Agency/Co.	
Date Performed	4/26/2018
Analysis Year	2042
Time Analyzed	PM PEAK HOUR
Intersection Orientation	North-South
Project Description	Build 3d-2

Site Information

Intersection	Ramp @ 8 Mile Rd
Jurisdiction	Anderson Township
East/West Street	Ramp
North/South Street	8 Mile Road
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	1		0	0	0	0	0	1	0	0	0	1	0
Configuration				R						LT					T	
Volume, V (veh/h)				150						310	40				400	
Percent Heavy Vehicles (%)				3						2						
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)				167						344						
Capacity, c (veh/h)				611						1115						
v/c Ratio				0.27						0.31						
95% Queue Length, Q_{95} (veh)				1.1						1.3						
Control Delay (s/veh)				13.1						9.7						
Level of Service, LOS				B						A						
Approach Delay (s/veh)	13.1								8.9							
Approach LOS	B															

HCS7 Two-Way Stop-Control Report

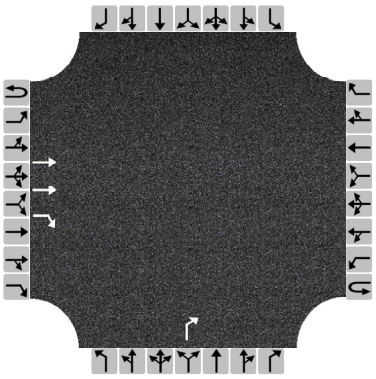
General Information

Analyst	MJH
Agency/Co.	
Date Performed	4/22/2018
Analysis Year	2022
Time Analyzed	AM PEAK HOUR
Intersection Orientation	East-West
Project Description	Build 3d-2

Site Information

Intersection	EB SR 32 @ Ramp to 8 Mile
Jurisdiction	Anderson Township
East/West Street	EB SR 32 Ramp
North/South Street	8 Mile Road
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	2	1	0	0	0	0		0	0	1		0	0	0
Configuration			T	R								R				
Volume, V (veh/h)			440	40								190				
Percent Heavy Vehicles (%)												3				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized		No				No				No				No		
Median Type/Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)												211				
Capacity, c (veh/h)												754				
v/c Ratio												0.28				
95% Queue Length, Q_{95} (veh)												1.1				
Control Delay (s/veh)												11.6				
Level of Service, LOS												B				
Approach Delay (s/veh)										11.6						
Approach LOS										B						

HCS7 Two-Way Stop-Control Report

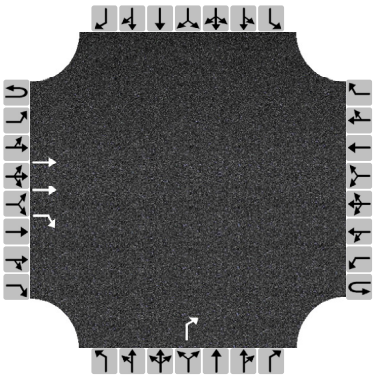
General Information

Analyst	MJH
Agency/Co.	
Date Performed	4/22/2018
Analysis Year	2022
Time Analyzed	PM PEAK HOUR
Intersection Orientation	East-West
Project Description	Build 3d-2

Site Information

Intersection	EB SR 32 @ Ramp to 8 Mile
Jurisdiction	Anderson Township
East/West Street	EB SR 32 Ramp
North/South Street	8 Mile Road
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	2	1	0	0	0	0		0	0	1		0	0	0
Configuration			T	R								R				
Volume, V (veh/h)			960	140								280				
Percent Heavy Vehicles (%)												2				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized		No				No				No				No		
Median Type/Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)												311				
Capacity, c (veh/h)												491				
v/c Ratio												0.63				
95% Queue Length, Q_{95} (veh)												4.4				
Control Delay (s/veh)												24.2				
Level of Service, LOS												C				
Approach Delay (s/veh)										24.2						
Approach LOS										C						

HCS7 Two-Way Stop-Control Report

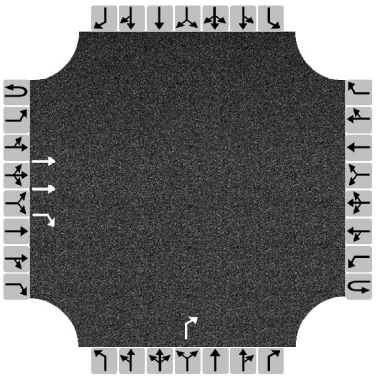
General Information

Analyst	CJK
Agency/Co.	
Date Performed	4/26/2018
Analysis Year	2042
Time Analyzed	AM PEAK HOUR
Intersection Orientation	East-West
Project Description	Build Alternative 3d-2

Site Information

Intersection	EB SR 32 @ Ramp to 8 Mile
Jurisdiction	Anderson Township
East/West Street	EB SR 32 Ramp
North/South Street	8 Mile Road
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	2	1	0	0	0	0		0	0	1		0	0	0
Configuration			T	R								R				
Volume, V (veh/h)			470	50								210				
Percent Heavy Vehicles (%)												2				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized		No				No				No				No		
Median Type/Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)												233				
Capacity, c (veh/h)												738				
v/c Ratio												0.32				
95% Queue Length, Q_{95} (veh)												1.4				
Control Delay (s/veh)												12.1				
Level of Service, LOS												B				
Approach Delay (s/veh)										12.1						
Approach LOS										B						

HCS7 Two-Way Stop-Control Report

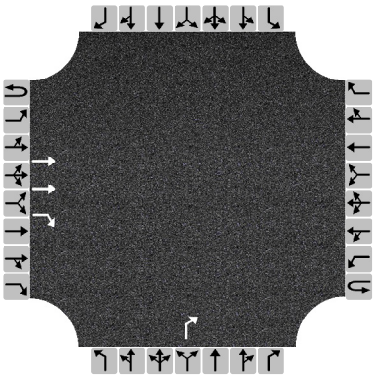
General Information

Analyst	CJK
Agency/Co.	
Date Performed	4/26/2018
Analysis Year	2042
Time Analyzed	PM PEAK HOUR
Intersection Orientation	East-West
Project Description	Build 3d-2

Site Information

Intersection	EB SR 32 @ Ramp to 8 Mile
Jurisdiction	Anderson Township
East/West Street	EB SR 32 Ramp
North/South Street	8 Mile Road
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	2	1	0	0	0	0		0	0	1		0	0	0
Configuration			T	R								R				
Volume, V (veh/h)			1030	150								310				
Percent Heavy Vehicles (%)												2				
Proportion Time Blocked																
Percent Grade (%)										0						
Right Turn Channelized		No				No				No				No		
Median Type/Storage			Undivided													

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)												344				
Capacity, c (veh/h)												463				
v/c Ratio												0.74				
95% Queue Length, Q_{95} (veh)												6.1				
Control Delay (s/veh)												32.0				
Level of Service, LOS												D				
Approach Delay (s/veh)										32.0						
Approach LOS										D						

HCS7 Two-Way Stop-Control Report

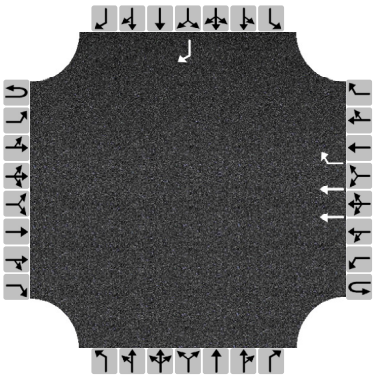
General Information

Analyst	MJH
Agency/Co.	
Date Performed	4/22/2018
Analysis Year	2022
Time Analyzed	AM PEAK HOUR
Intersection Orientation	East-West
Project Description	Build 3d-2

Site Information

Intersection	WB SR 32 @ Ramp to 8 Mile
Jurisdiction	Anderson Township
East/West Street	WB SR 32 Ramp
North/South Street	8 Mile Road
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	0	0	0	0	2	1		0	0	0		0	0	1
Configuration							T	R								R
Volume, V (veh/h)							1070	250								130
Percent Heavy Vehicles (%)																2
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)																144
Capacity, c (veh/h)																448
v/c Ratio																0.32
95% Queue Length, Q_{95} (veh)																1.4
Control Delay (s/veh)																16.8
Level of Service, LOS																C
Approach Delay (s/veh)													16.8			
Approach LOS													C			

HCS7 Two-Way Stop-Control Report

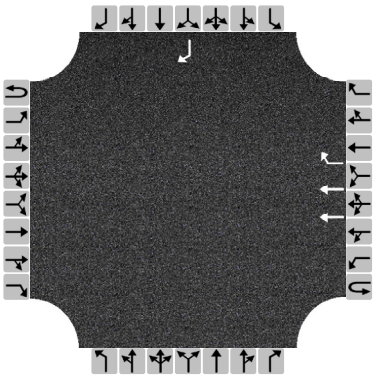
General Information

Analyst	MJH
Agency/Co.	
Date Performed	4/22/2018
Analysis Year	2022
Time Analyzed	PM PEAK HOUR
Intersection Orientation	East-West
Project Description	Build 3d-2

Site Information

Intersection	WB SR 32 @ Ramp to 8 Mile
Jurisdiction	Anderson Township
East/West Street	WB SR 32 Ramp
North/South Street	8 Mile Road
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	0	0	0	0	2	1		0	0	0		0	0	1
Configuration							T	R								R
Volume, V (veh/h)							580	370								40
Percent Heavy Vehicles (%)																2
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)																44
Capacity, c (veh/h)																674
v/c Ratio																0.07
95% Queue Length, Q_{95} (veh)																0.2
Control Delay (s/veh)																10.7
Level of Service, LOS																B
Approach Delay (s/veh)													10.7			
Approach LOS													B			

HCS7 Two-Way Stop-Control Report

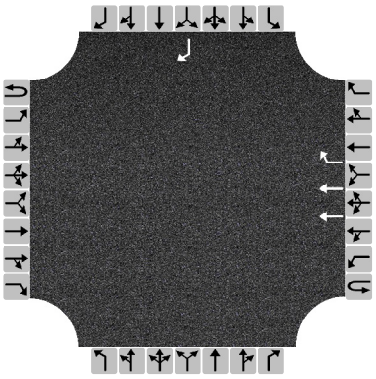
General Information

Analyst	CJK
Agency/Co.	
Date Performed	4/26/2018
Analysis Year	2042
Time Analyzed	AM PEAK HOUR
Intersection Orientation	East-West
Project Description	Build Alternative 3d-2

Site Information

Intersection	WB SR 32 @ Ramp to 8 Mile
Jurisdiction	Anderson Township
East/West Street	WB SR 32 Ramp
North/South Street	8 Mile Road
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	0	0	0	0	2	1		0	0	0		0	0	1
Configuration							T	R								R
Volume, V (veh/h)							1150	270								140
Percent Heavy Vehicles (%)																2
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)																156
Capacity, c (veh/h)																419
v/c Ratio																0.37
95% Queue Length, Q_{95} (veh)																1.7
Control Delay (s/veh)																18.6
Level of Service, LOS																C
Approach Delay (s/veh)													18.6			
Approach LOS													C			

HCS7 Two-Way Stop-Control Report

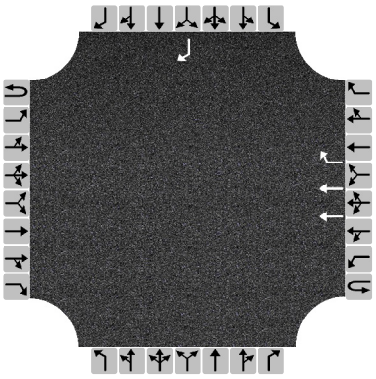
General Information

Analyst	CJK
Agency/Co.	
Date Performed	4/26/2018
Analysis Year	2042
Time Analyzed	PM PEAK HOUR
Intersection Orientation	East-West
Project Description	Build 3d-2

Site Information

Intersection	WB SR 32 @ Ramp to 8 Mile
Jurisdiction	Anderson Township
East/West Street	WB SR 32 Ramp
North/South Street	8 Mile Road
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	0	0	0	0	2	1		0	0	0		0	0	1
Configuration							T	R								R
Volume, V (veh/h)							620	400								40
Percent Heavy Vehicles (%)																2
Proportion Time Blocked																
Percent Grade (%)													0			
Right Turn Channelized	No				No				No				No			
Median Type/Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)																44
Capacity, c (veh/h)																652
v/c Ratio																0.07
95% Queue Length, Q_{95} (veh)																0.2
Control Delay (s/veh)																10.9
Level of Service, LOS																B
Approach Delay (s/veh)													10.9			
Approach LOS													B			

HCS7 Two-Way Stop-Control Report

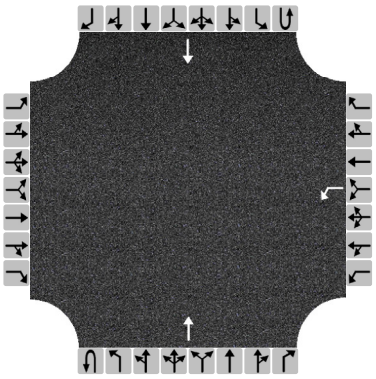
General Information

Analyst	MJH
Agency/Co.	
Date Performed	4/24/2018
Analysis Year	2022
Time Analyzed	AM PEAK HOUR
Intersection Orientation	North-South
Project Description	Build 3e-1

Site Information

Intersection	SR 32 @ 8 Mile Rd
Jurisdiction	Anderson Township
East/West Street	SR 32 WB LT
North/South Street	RAMP TO/FROM WB SR 32
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	0	0	0	1	0	0	0	1	0
Configuration						L					T				T	
Volume, V (veh/h)						250					130				40	
Percent Heavy Vehicles (%)						3										
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						278										
Capacity, c (veh/h)						798										
v/c Ratio						0.35										
95% Queue Length, Q_{95} (veh)						1.6										
Control Delay (s/veh)						11.9										
Level of Service, LOS						B										
Approach Delay (s/veh)						11.9										
Approach LOS						B										

HCS7 Two-Way Stop-Control Report

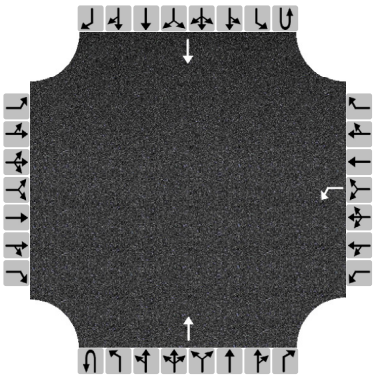
General Information

Analyst	MJH
Agency/Co.	
Date Performed	4/24/2018
Analysis Year	2022
Time Analyzed	PM PEAK HOUR
Intersection Orientation	North-South
Project Description	Build 3e-1

Site Information

Intersection	SR 32 @ 8 Mile Rd
Jurisdiction	Andrson Township
East/West Street	SR 32 WB LT
North/South Street	RAMP TO/FROM WB SR 32
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	0	0	0	1	0	0	0	1	0
Configuration						L					T				T	
Volume, V (veh/h)						370					40				140	
Percent Heavy Vehicles (%)						3										
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						411										
Capacity, c (veh/h)						786										
v/c Ratio						0.52										
95% Queue Length, Q_{95} (veh)						3.1										
Control Delay (s/veh)						14.5										
Level of Service, LOS						B										
Approach Delay (s/veh)						14.5										
Approach LOS						B										

HCS7 Two-Way Stop-Control Report

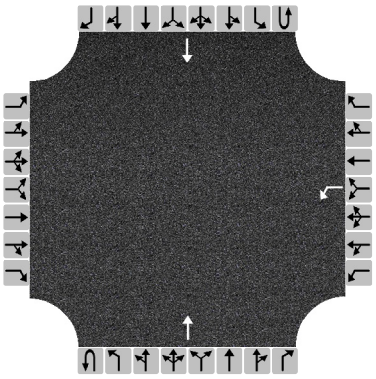
General Information

Analyst	CJK
Agency/Co.	
Date Performed	4/26/2018
Analysis Year	2042
Time Analyzed	AM PEAK HOUR
Intersection Orientation	North-South
Project Description	Build Alternative 3e-1

Site Information

Intersection	SR 32 @ 8 Mile Rd
Jurisdiction	Anderson Township
East/West Street	SR 32 WB LT
North/South Street	RAMP TO/FROM WB SR 32
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	0	0	0	1	0	0	0	1	0
Configuration						L					T				T	
Volume, V (veh/h)						270					140				50	
Percent Heavy Vehicles (%)						3										
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						300										
Capacity, c (veh/h)						774										
v/c Ratio						0.39										
95% Queue Length, Q_{95} (veh)						1.8										
Control Delay (s/veh)						12.6										
Level of Service, LOS						B										
Approach Delay (s/veh)						12.6										
Approach LOS						B										

HCS7 Two-Way Stop-Control Report

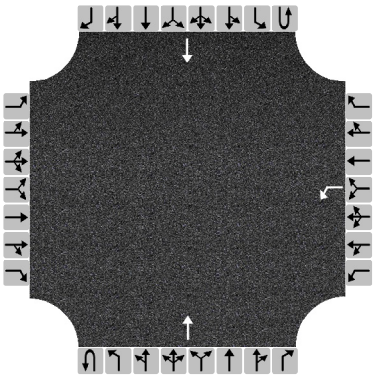
General Information

Analyst	CJK
Agency/Co.	
Date Performed	4/26/2018
Analysis Year	2042
Time Analyzed	PM PEAK HOUR
Intersection Orientation	North-South
Project Description	Build 3e-1

Site Information

Intersection	SR 32 @ 8 Mile Rd
Jurisdiction	Anderson Township
East/West Street	SR 32 WB LT
North/South Street	RAMP TO/FROM WB SR 32
Peak Hour Factor	0.90
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	0	0	0	1	0	0	0	1	0
Configuration						L					T				T	
Volume, V (veh/h)						400					40				150	
Percent Heavy Vehicles (%)						3										
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized		No				No				No				No		
Median Type/Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)																
Critical Headway (sec)																
Base Follow-Up Headway (sec)																
Follow-Up Headway (sec)																

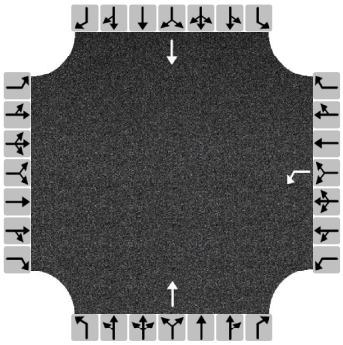
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						444										
Capacity, c (veh/h)						775										
v/c Ratio						0.57										
95% Queue Length, Q_{95} (veh)						3.7										
Control Delay (s/veh)						15.7										
Level of Service, LOS						C										
Approach Delay (s/veh)						15.7										
Approach LOS						C										

HCS7 All-Way Stop Control Report

General Information		Site Information	
Analyst	MJH	Intersection	SR 32 @ 8 Mile Rd
Agency/Co.		Jurisdiction	Anderson Township
Date Performed	4/24/2018	East/West Street	SR 32 WB LT
Analysis Year	2022	North/South Street	RAMP TO/FROM WB SR 32
Analysis Time Period (hrs)	0.25	Peak Hour Factor	0.90
Time Analyzed	AM PEAK HOUR		
Project Description	Build 3e-2		

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume				250				130			40	
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration				L			T			T		
Flow Rate, v (veh/h)				278			144			44		
Percent Heavy Vehicles				3			2			3		

Departure Headway and Service Time

Initial Departure Headway, hd (s)				3.20			3.20			3.20		
Initial Degree of Utilization, x				0.247			0.128			0.040		
Final Departure Headway, hd (s)				4.62			4.69			4.83		
Final Degree of Utilization, x				0.356			0.188			0.060		
Move-Up Time, m (s)				2.0			2.0			2.0		
Service Time, ts (s)				2.62			2.69			2.83		

Capacity, Delay and Level of Service

Flow Rate, v (veh/h)				278			144			44		
Capacity				780			768			745		
95% Queue Length, Q_{95} (veh)				1.6			0.7			0.2		
Control Delay (s/veh)				10.2			8.8			8.1		
Level of Service, LOS				B			A			A		
Approach Delay (s/veh)				10.2			8.8			8.1		
Approach LOS				B			A			A		
Intersection Delay, s/veh | LOS	9.5						A					

HCS7 All-Way Stop Control Report

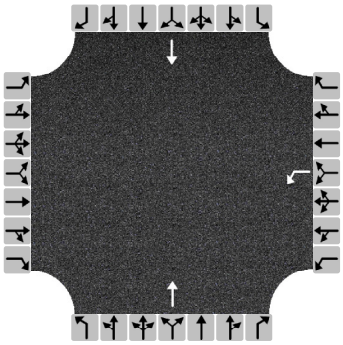
General Information

Analyst	MJH
Agency/Co.	
Date Performed	4/24/2018
Analysis Year	2022
Analysis Time Period (hrs)	0.25
Time Analyzed	PM PEAK HOUR
Project Description	Build 3e-2

Site Information

Intersection	SR 32 @ 8 Mile Rd
Jurisdiction	Anderson Township
East/West Street	SR 32 WB LT
North/South Street	RAMP TO/FROM WB SR 32
Peak Hour Factor	0.90

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume				370				40			140	
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration				L			T			T		
Flow Rate, v (veh/h)				411			44			156		
Percent Heavy Vehicles				3			2			3		

Departure Headway and Service Time

Initial Departure Headway, hd (s)				3.20			3.20			3.20		
Initial Degree of Utilization, x				0.365			0.040			0.138		
Final Departure Headway, hd (s)				4.68			5.21			5.06		
Final Degree of Utilization, x				0.535			0.064			0.219		
Move-Up Time, m (s)				2.0			2.0			2.0		
Service Time, ts (s)				2.68			3.21			3.06		

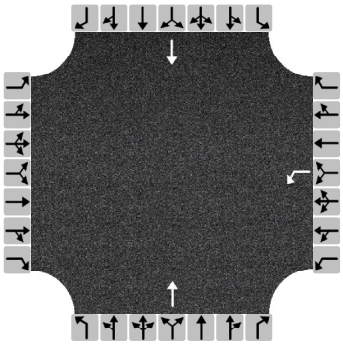
Capacity, Delay and Level of Service

Flow Rate, v (veh/h)				411			44			156		
Capacity				769			691			711		
95% Queue Length, Q_{95} (veh)				3.2			0.2			0.8		
Control Delay (s/veh)				12.9			8.6			9.5		
Level of Service, LOS				B			A			A		
Approach Delay (s/veh)				12.9			8.6			9.5		
Approach LOS				B			A			A		
Intersection Delay, s/veh | LOS	11.7						B					

HCS7 All-Way Stop Control Report

General Information		Site Information	
Analyst	CJK	Intersection	SR 32 @ 8 Mile Rd
Agency/Co.		Jurisdiction	Anderson Township
Date Performed	4/26/2018	East/West Street	SR 32 WB LT
Analysis Year	2042	North/South Street	RAMP TO/FROM WB SR 32
Analysis Time Period (hrs)	0.25	Peak Hour Factor	0.90
Time Analyzed	AM PEAK HOUR		
Project Description	Intersection 3 - Build Alternative 3e2		

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume				270				140			50	
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration				L			T			T		
Flow Rate, v (veh/h)				300			156			56		
Percent Heavy Vehicles				3			2			3		

Departure Headway and Service Time

Initial Departure Headway, hd (s)				3.20			3.20			3.20		
Initial Degree of Utilization, x				0.267			0.138			0.049		
Final Departure Headway, hd (s)				4.68			4.77			4.92		
Final Degree of Utilization, x				0.390			0.206			0.076		
Move-Up Time, m (s)				2.0			2.0			2.0		
Service Time, ts (s)				2.68			2.77			2.92		

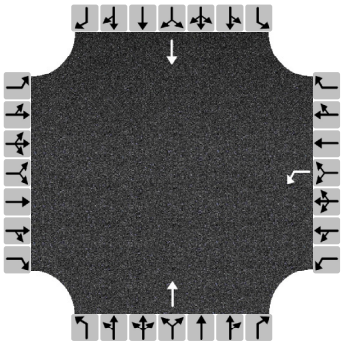
Capacity, Delay and Level of Service

Flow Rate, v (veh/h)				300			156			56		
Capacity				769			754			732		
95% Queue Length, Q_{95} (veh)				1.9			0.8			0.2		
Control Delay (s/veh)				10.6			9.0			8.3		
Level of Service, LOS				B			A			A		
Approach Delay (s/veh)				10.6			9.0			8.3		
Approach LOS				B			A			A		
Intersection Delay, s/veh | LOS	9.9						A					

HCS7 All-Way Stop Control Report

General Information		Site Information	
Analyst	CJK	Intersection	SR 32 @ 8 Mile Rd
Agency/Co.		Jurisdiction	Anderson Township
Date Performed	4/26/2018	East/West Street	SR 32 WB LT
Analysis Year	2042	North/South Street	RAMP TO/FROM WB SR 32
Analysis Time Period (hrs)	0.25	Peak Hour Factor	0.90
Time Analyzed	PM PEAK HOUR		
Project Description	Build 3e-2		

Lanes



Vehicle Volume and Adjustments

Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Volume				400				40			150	
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration				L			T			T		
Flow Rate, v (veh/h)				444			44			167		
Percent Heavy Vehicles				3			2			3		

Departure Headway and Service Time

Initial Departure Headway, hd (s)				3.20			3.20			3.20		
Initial Degree of Utilization, x				0.395			0.040			0.148		
Final Departure Headway, hd (s)				4.72			5.33			5.16		
Final Degree of Utilization, x				0.583			0.066			0.239		
Move-Up Time, m (s)				2.0			2.0			2.0		
Service Time, ts (s)				2.72			3.33			3.16		

Capacity, Delay and Level of Service

Flow Rate, v (veh/h)				444			44			167		
Capacity				763			676			698		
95% Queue Length, Q_{95} (veh)				3.8			0.2			0.9		
Control Delay (s/veh)				14.1			8.7			9.8		
Level of Service, LOS				B			A			A		
Approach Delay (s/veh)				14.1			8.7			9.8		
Approach LOS				B			A			A		
Intersection Delay, s/veh | LOS	12.6						B					

HCS7 Roundabouts Report

General Information

Analyst	MJH
Agency or Co.	
Date Performed	4/23/2018
Analysis Year	2022
Time Analyzed	AM PEAK HOUR
Project Description	Build 3h

Site Information

Intersection	SR 32 @ 8 Mile Rd
E/W Street Name	SR 32
N/S Street Name	8 Mile Rd
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.90
Jurisdiction	Anderson Township

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	2	0	0	0	2	0	0	1	0	1	0	0	0	0
Lane Assignment	T		TR		LT		T		L		R					
Volume (V), veh/h	0		440	40	0	250	1070		0	130		190				
Percent Heavy Vehicles, %	0		3	3	0	3	3		0	2		2				
Flow Rate (v_{PCE}), pc/h	0		504	46	0	286	1225		0	147		215				
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1							
Pedestrians Crossing, p/h	0				0				0							

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)	4.5436	4.5436		4.5436	4.5436		4.5436	4.5436				
Follow-Up Headway (s)	2.5352	2.5352		2.5352	2.5352		2.5352	2.5352				

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h	258.50	291.50		710.17	800.83		147.00	215.00				
Entry Volume veh/h	250.97	283.01		689.49	777.50		144.12	210.78				
Circulating Flow (v_c), pc/h	286			147			504			1658		
Exiting Flow (v_{ex}), pc/h	719			1372			0			332		
Capacity (c_{pce}), pc/h	1094.61	1094.61		1242.21	1242.21		897.65	897.65				
Capacity (c), veh/h	1062.73	1062.73		1206.03	1206.03		880.05	880.05				
v/c Ratio (x)	0.24	0.27		0.57	0.64		0.16	0.24				

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh	5.6	5.9		9.7	11.5		5.7	6.6				
Lane LOS	A	A		A	B		A	A				
95% Queue, veh	0.9	1.1		3.8	5.0		0.6	0.9				
Approach Delay, s/veh	5.8			10.7			6.2					
Approach LOS	A			B			A					
Intersection Delay, s/veh | LOS	8.9						A					

HCS7 Roundabouts Report

General Information

Analyst	MJH
Agency or Co.	
Date Performed	4/23/2018
Analysis Year	2022
Time Analyzed	PM PEAK HOUR
Project Description	Build 3h

Site Information

Intersection	SR 32 @ 8 Mile Rd
E/W Street Name	SR 32
N/S Street Name	8 Mile Rd
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.90
Jurisdiction	Anderson Township

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	2	0	0	0	2	0	0	1	0	1	0	0	0	0
Lane Assignment	T		TR		LT		T		L		R					
Volume (V), veh/h	0		960	140	0	370	580		0	40		280				
Percent Heavy Vehicles, %	3		3	3	3	3	3		3	2		2				
Flow Rate (v_{PCE}), pc/h	0		1099	160	0	423	664		0	45		317				
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1							
Pedestrians Crossing, p/h	0				0				0							

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)	4.5436	4.5436		4.5436	4.5436		4.5436	4.5436				
Follow-Up Headway (s)	2.5352	2.5352		2.5352	2.5352		2.5352	2.5352				

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h	591.73	667.27		510.89	576.11		45.00	317.00				
Entry Volume veh/h	574.50	647.83		496.01	559.33		44.12	310.78				
Circulating Flow (v_c), pc/h	423			45			1099			1132		
Exiting Flow (v_{ex}), pc/h	1416			709			0			583		
Capacity (c_{pce}), pc/h	966.31	966.31		1363.03	1363.03		522.34	522.34				
Capacity (c), veh/h	938.17	938.17		1323.33	1323.33		512.10	512.10				
v/c Ratio (x)	0.61	0.69		0.37	0.42		0.09	0.61				

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh	12.8	15.4		6.2	6.8		8.1	20.3				
Lane LOS	B	C		A	A		A	C				
95% Queue, veh	4.3	5.8		1.8	2.1		0.3	4.0				
Approach Delay, s/veh	14.2			6.5			18.8					
Approach LOS	B			A			C					
Intersection Delay, s/veh | LOS	11.7						B					

HCS7 Roundabouts Report

General Information

Analyst	MJH
Agency or Co.	
Date Performed	4/23/2018
Analysis Year	2042
Time Analyzed	AM PEAK HOUR
Project Description	Build 3h

Site Information

Intersection	SR 32 @ 8 Mile Rd
E/W Street Name	SR 32
N/S Street Name	8 Mile Rd
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.90
Jurisdiction	Anderson Township

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	2	0	0	0	2	0	0	1	0	1	0	0	0	0
Lane Assignment	T		TR		LT		T		L		R					
Volume (V), veh/h	0		440	40	0	250	1150		0	140		210				
Percent Heavy Vehicles, %	0		3	3	0	3	3		0	2		2				
Flow Rate (v_{PCE}), pc/h	0		504	46	0	286	1316		0	159		238				
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1							
Pedestrians Crossing, p/h	0				0				0							

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)	4.5436	4.5436		4.5436	4.5436		4.5436	4.5436				
Follow-Up Headway (s)	2.5352	2.5352		2.5352	2.5352		2.5352	2.5352				

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h	258.50	291.50		752.94	849.06		159.00	238.00				
Entry Volume veh/h	250.97	283.01		731.01	824.33		155.88	233.33				
Circulating Flow (v_c), pc/h	286			159			504			1761		
Exiting Flow (v_{ex}), pc/h	742			1475			0			332		
Capacity (c_{pce}), pc/h	1094.61	1094.61		1228.72	1228.72		897.65	897.65				
Capacity (c), veh/h	1062.73	1062.73		1192.93	1192.93		880.05	880.05				
v/c Ratio (x)	0.24	0.27		0.61	0.69		0.18	0.27				

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh	5.6	5.9		10.7	12.9		5.9	6.9				
Lane LOS	A	A		B	B		A	A				
95% Queue, veh	0.9	1.1		4.4	5.9		0.6	1.1				
Approach Delay, s/veh	5.8			11.9			6.5					
Approach LOS	A			B			A					
Intersection Delay, s/veh | LOS	9.7						A					

HCS7 Roundabouts Report

General Information

Analyst	CJK
Agency or Co.	
Date Performed	4/26/2018
Analysis Year	2042
Time Analyzed	PM PEAK HOUR
Project Description	Build 3h

Site Information

Intersection	SR 32 @ 8 Mile Rd
E/W Street Name	SR 32
N/S Street Name	8 Mile Rd
Analysis Time Period (hrs)	0.25
Peak Hour Factor	0.90
Jurisdiction	Anderson Township

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	2	0	0	0	2	0	0	1	0	1	0	0	0	0
Lane Assignment	T		TR		LT		T		L		R					
Volume (V), veh/h	0		1030	150	0	400	620		0	40		310				
Percent Heavy Vehicles, %	3		3	3	3	3	3		3	2		2				
Flow Rate (v_{PCE}), pc/h	0		1179	172	0	458	710		0	45		351				
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1							
Pedestrians Crossing, p/h	0				0				0							

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)	4.5436	4.5436		4.5436	4.5436		4.5436	4.5436				
Follow-Up Headway (s)	2.5352	2.5352		2.5352	2.5352		2.5352	2.5352				

Flow Computations, Capacity and v/c Ratios

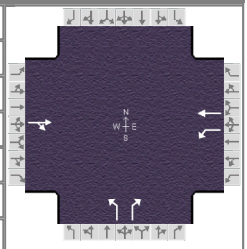
Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h	634.97	716.03		548.96	619.04		45.00	351.00				
Entry Volume veh/h	616.48	695.17		532.97	601.01		44.12	344.12				
Circulating Flow (v_c), pc/h	458			45			1179			1213		
Exiting Flow (v_{ex}), pc/h	1530			755			0			630		
Capacity (c_{pce}), pc/h	936.02	936.02		1363.03	1363.03		485.67	485.67				
Capacity (c), veh/h	908.76	908.76		1323.33	1323.33		476.15	476.15				
v/c Ratio (x)	0.68	0.76		0.40	0.45		0.09	0.72				

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh	15.3	19.4		6.6	7.2		8.8	28.5				
Lane LOS	C	C		A	A		A	D				
95% Queue, veh	5.5	7.6		2.0	2.4		0.3	5.8				
Approach Delay, s/veh	17.5			6.9			26.2					
Approach LOS	C			A			D					
Intersection Delay, s/veh | LOS	14.4						B					

HCS7 Signalized Intersection Results Summary

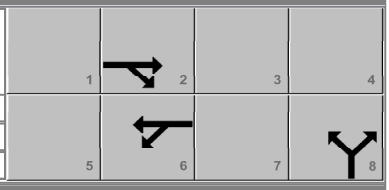
General Information				Intersection Information	
Agency				Duration, h	0.25
Analyst	MJH	Analysis Date	Apr 23, 2018	Area Type	Other
Jurisdiction	Newtown	Time Period		PHF	0.90
Urban Street	SR 32	Analysis Year	2022	Analysis Period	1> 7:00
Intersection	SR 32 at Little Dry Run…	File Name	04%-22-am.xus		
Project Description	NO-BUILD 4 - 2022 AM Peak Hour				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h		490	40	20	1240		200		20			

Signal Information			
Cycle, s	70.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	49.8	10.2	0.0	0.0	0.0	0.0	
Yellow	4.0	4.0	0.0	0.0	0.0	0.0	
Red	1.0	1.0	0.0	0.0	0.0	0.0	



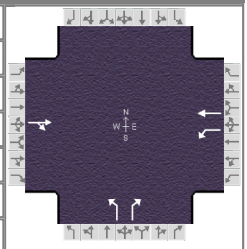
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		
Case Number		8.0		6.0		9.0		
Phase Duration, s		54.8		54.8		15.2		
Change Period, ($Y+R_c$), s		5.0		5.0		5.0		
Max Allow Headway (*MAH*), s		3.0		3.0		3.1		
Queue Clearance Time (g_s), s		11.8		51.8		10.7		
Green Extension Time (g_e), s		7.3		0.0		0.0		
Phase Call Probability		1.00		1.00		1.00		
Max Out Probability		0.03		1.00		1.00		

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2	12	1	6		3		18			
Adjusted Flow Rate (*v*), veh/h		589		22	1378		222		22			
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1801		808	1826		1753		1560			
Queue Service Time (g_s), s		9.8		0.8	49.8		8.7		0.9			
Cycle Queue Clearance Time (g_c), s		9.8		10.7	49.8		8.7		0.9			
Green Ratio (*g/C*)		0.71		0.71	0.71		0.15		0.15			
Capacity (*c*), veh/h		1282		564	1299		255		227			
Volume-to-Capacity Ratio (*X*)		0.459		0.039	1.061		0.870		0.098			
Back of Queue (*Q*), ft/ln (95 th percentile)		103.4		5.7	960.8		231.3		14.4			
Back of Queue (*Q*), veh/ln (95 th percentile)		4.0		0.2	37.0		9.0		0.6			
Queue Storage Ratio (*RQ*) (95 th percentile)		0.00		0.00	0.00		0.00		0.00			
Uniform Delay (d_1), s/veh		4.3		6.6	10.1		29.3		25.9			
Incremental Delay (d_2), s/veh		0.1		0.0	42.8		25.1		0.1			
Initial Queue Delay (d_3), s/veh		0.0		0.0	0.0		0.0		0.0			
Control Delay (*d*), s/veh		4.4		6.6	52.9		54.3		26.0			
Level of Service (LOS)		A		A	F		D		C			
Approach Delay, s/veh / LOS	4.4	A		52.1	D		51.8	D		0.0		
Intersection Delay, s/veh / LOS	39.5						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.2	B	0.6	A	2.3	B	2.1	B
Bicycle LOS Score / LOS	1.5	A	2.8	C		F		

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.25
Analyst	MJH	Analysis Date	Apr 23, 2018	Area Type	Other
Jurisdiction	Newtown	Time Period		PHF	0.90
Urban Street	SR 32	Analysis Year	2022	Analysis Period	1> 7:00
Intersection	SR 32 at Little Dry Run…	File Name	04%-22-pm.xus		
Project Description	2022 NO-BUILD - PM Peak Hour				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h		1090	170	50	610		120		40			

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

							1	2	3	4
Green	5.0	62.5	7.5	0.0	0.0	0.0	5	6	7	8
Yellow	4.0	4.0	4.0	0.0	0.0	0.0				
Red	1.0	1.0	1.0	0.0	0.0	0.0				

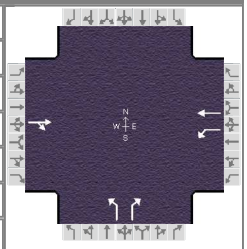
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		8		
Case Number		8.3	1.0	4.0		9.0		
Phase Duration, s		67.5	10.0	77.5		12.5		
Change Period, ($Y+R_c$), s		5.0	5.0	5.0		5.0		
Max Allow Headway (*MAH*), s		3.1	3.1	3.1		3.2		
Queue Clearance Time (g_s), s		64.5	2.7	11.9		8.7		
Green Extension Time (g_e), s		0.0	0.0	8.2		0.0		
Phase Call Probability		1.00	1.00	1.00		1.00		
Max Out Probability		1.00	1.00	0.01		1.00		

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2	12	1	6		3		18			
Adjusted Flow Rate (*v*), veh/h		1400		56	678		133		44			
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1826		1781	1870		1781		1585			
Queue Service Time (g_s), s		62.5		0.7	9.9		6.7		2.4			
Cycle Queue Clearance Time (g_c), s		62.5		0.7	9.9		6.7		2.4			
Green Ratio (*g/C*)		0.69		0.77	0.81		0.08		0.08			
Capacity (*c*), veh/h		1268		179	1507		148		132			
Volume-to-Capacity Ratio (*X*)		1.104		0.310	0.450		0.898		0.336			
Back of Queue (*Q*), ft/ln (95 th percentile)		1377.7		38.4	87.6		208.9		42.3			
Back of Queue (*Q*), veh/ln (95 th percentile)		54.2		1.5	3.4		8.2		1.7			
Queue Storage Ratio (*RQ*) (95 th percentile)		0.00		0.00	0.00		0.00		0.00			
Uniform Delay (d_1), s/veh		13.8		25.5	2.7		40.9		38.9			
Incremental Delay (d_2), s/veh		58.8		0.4	0.1		44.2		0.6			
Initial Queue Delay (d_3), s/veh		0.0		0.0	0.0		0.0		0.0			
Control Delay (*d*), s/veh		72.6		25.9	2.7		85.1		39.5			
Level of Service (LOS)		F		C	A		F		D			
Approach Delay, s/veh / LOS	72.6	E		4.5	A		73.7	E		0.0		
Intersection Delay, s/veh / LOS	51.1						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.2	B	0.6	A	2.3	B	2.1	B
Bicycle LOS Score / LOS	2.8	C	1.7	B		F		

HCS7 Signalized Intersection Results Summary

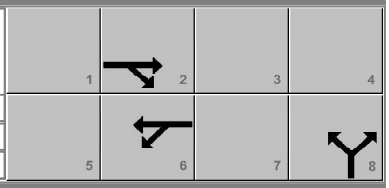
General Information				Intersection Information	
Agency				Duration, h	0.25
Analyst	CJK	Analysis Date	Apr 26, 2018	Area Type	Other
Jurisdiction	Newtown	Time Period		PHF	0.90
Urban Street	SR 32	Analysis Year	2042	Analysis Period	1> 7:00
Intersection	SR 32 at Little Dry Run…	File Name	AM-04.xus		
Project Description	NO-BUILD - AM Peak Hour				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h		510	40	20	1290		200		20			

Signal Information			
Cycle, s	70.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	50.4	9.6	0.0	0.0	0.0	0.0	
Yellow	4.0	4.0	0.0	0.0	0.0	0.0	
Red	1.0	1.0	0.0	0.0	0.0	0.0	



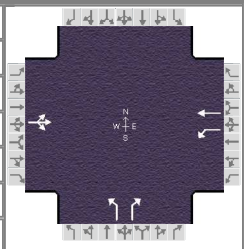
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		
Case Number		8.0		6.0		9.0		
Phase Duration, s		55.4		55.4		14.6		
Change Period, ($Y+R_c$), s		5.0		5.0		5.0		
Max Allow Headway (*MAH*), s		3.0		3.0		3.1		
Queue Clearance Time (g_s), s		12.1		52.4		10.8		
Green Extension Time (g_e), s		8.2		0.0		0.0		
Phase Call Probability		1.00		1.00		1.00		
Max Out Probability		0.04		1.00		1.00		

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2	12	1	6		3		18			
Adjusted Flow Rate (*v*), veh/h		611		22	1433		222		22			
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1802		791	1826		1753		1560			
Queue Service Time (g_s), s		10.1		0.9	50.4		8.8		0.9			
Cycle Queue Clearance Time (g_c), s		10.1		10.9	50.4		8.8		0.9			
Green Ratio (*g/C*)		0.72		0.72	0.72		0.14		0.14			
Capacity (*c*), veh/h		1298		559	1315		240		214			
Volume-to-Capacity Ratio (*X*)		0.471		0.040	1.090		0.924		0.104			
Back of Queue (*Q*), ft/ln (95 th percentile)		102.6		5.6	1104.6		257.7		14.5			
Back of Queue (*Q*), veh/ln (95 th percentile)		3.9		0.2	42.5		10.0		0.6			
Queue Storage Ratio (*RQ*) (95 th percentile)		0.00		0.00	0.00		0.00		0.00			
Uniform Delay (d_1), s/veh		4.2		6.5	9.8		29.8		26.4			
Incremental Delay (d_2), s/veh		0.1		0.0	53.2		37.5		0.1			
Initial Queue Delay (d_3), s/veh		0.0		0.0	0.0		0.0		0.0			
Control Delay (*d*), s/veh		4.3		6.5	63.0		67.3		26.5			
Level of Service (LOS)		A		A	F		E		C			
Approach Delay, s/veh / LOS	4.3	A		62.2	E		63.6	E		0.0		
Intersection Delay, s/veh / LOS	47.0						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.2	B	0.6	A	2.3	B	2.1	B
Bicycle LOS Score / LOS	1.5	A	2.9	C		F		

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.25
Analyst	CJK	Analysis Date	Apr 26, 2018	Area Type	Other
Jurisdiction	Newtown	Time Period		PHF	0.90
Urban Street	SR 32	Analysis Year	2042	Analysis Period	1> 7:00
Intersection	SR 32 at Little Dry Run…	File Name	PM-04.xus		
Project Description	NO-BUILD - PM Peak Hour				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h	0	1140	170	50	630		120		40			

Signal Information			
Cycle, s	90.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

							1	2	3	4
Green	5.0	62.9	7.1	0.0	0.0	0.0	5	6	7	8
Yellow	4.0	4.0	4.0	0.0	0.0	0.0				
Red	1.0	1.0	1.0	0.0	0.0	0.0				

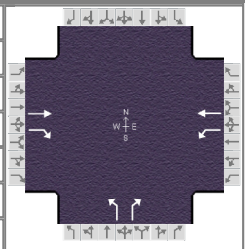
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		8		
Case Number		8.3	1.0	4.0		9.0		
Phase Duration, s		67.9	10.0	77.9		12.1		
Change Period, ($Y+R_c$), s		5.0	5.0	5.0		5.0		
Max Allow Headway (*MAH*), s		3.1	3.1	3.1		3.2		
Queue Clearance Time (g_s), s		64.9	2.6	12.2		8.7		
Green Extension Time (g_e), s		0.0	0.0	9.3		0.0		
Phase Call Probability		1.00	1.00	1.00		1.00		
Max Out Probability		1.00	1.00	0.02		1.00		

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6		3		18			
Adjusted Flow Rate (*v*), veh/h		0		56	700		133		44			
Adjusted Saturation Flow Rate (*s*), veh/h/ln		0		1781	1870		1781		1585			
Queue Service Time (g_s), s		0.0		0.6	10.2		6.7		2.4			
Cycle Queue Clearance Time (g_c), s		0.0		0.6	10.2		6.7		2.4			
Green Ratio (*g/C*)				0.78	0.81		0.08		0.08			
Capacity (*c*), veh/h				179	1515		141		125			
Volume-to-Capacity Ratio (*X*)		0.000		0.310	0.462		0.949		0.355			
Back of Queue (*Q*), ft/ln (95 th percentile)		0		38.7	86		227.2		42.6			
Back of Queue (*Q*), veh/ln (95 th percentile)		0.0		1.5	3.4		8.9		1.7			
Queue Storage Ratio (*RQ*) (95 th percentile)		0.00		0.00	0.00		0.00		0.00			
Uniform Delay (d_1), s/veh				25.7	2.6		41.3		39.3			
Incremental Delay (d_2), s/veh		0.0		0.4	0.1		59.8		0.6			
Initial Queue Delay (d_3), s/veh		0.0		0.0	0.0		0.0		0.0			
Control Delay (*d*), s/veh				26.1	2.7		101.1		39.9			
Level of Service (LOS)				C	A		F		D			
Approach Delay, s/veh / LOS	86.3	F		4.4	A		85.8	F		0.0		
Intersection Delay, s/veh / LOS	60.3						E					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.2	B	0.6	A	2.3	B	2.1	B
Bicycle LOS Score / LOS	2.9	C	1.7	B		F		

HCS7 Signalized Intersection Results Summary

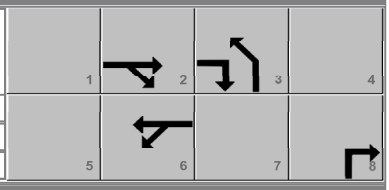
General Information				Intersection Information	
Agency				Duration, h	0.25
Analyst	MJH	Analysis Date	Apr 23, 2018	Area Type	Other
Jurisdiction	Newtown	Time Period		PHF	0.90
Urban Street	SR 32	Analysis Year	2022	Analysis Period	1> 7:00
Intersection	SR 32 at Little Dry Run…	File Name	04b-22-am.xus		
Project Description	Build 4b - 2022 AM Peak Hour				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h		490	40	20	1240		200		20			

Signal Information			
Cycle, s	70.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	49.8	10.2	0.0	0.0	0.0	0.0	
Yellow	4.0	4.0	0.0	0.0	0.0	0.0	
Red	1.0	1.0	0.0	0.0	0.0	0.0	



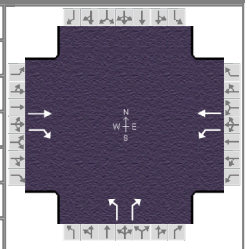
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		
Case Number		7.0		6.0		9.0		
Phase Duration, s		54.8		54.8		15.2		
Change Period, (*Y+R c*), s		5.0		5.0		5.0		
Max Allow Headway (*MAH*), s		3.0		3.0		3.1		
Queue Clearance Time (*g s*), s		10.6		51.8		10.7		
Green Extension Time (*g e*), s		7.2		0.0		0.0		
Phase Call Probability		1.00		1.00		1.00		
Max Out Probability		0.03		1.00		1.00		

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2	12	1	6		3		18			
Adjusted Flow Rate (*v*), veh/h		544	44	22	1378		222		22			
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1826	1547	841	1826		1753		1560			
Queue Service Time (*g s*), s		8.6	0.3	0.8	49.8		8.7		0.9			
Cycle Queue Clearance Time (*g c*), s		8.6	0.3	9.4	49.8		8.7		0.9			
Green Ratio (*g/C*)		0.71	0.86	0.71	0.71		0.15		0.15			
Capacity (*c*), veh/h		1299	1326	598	1299		255		227			
Volume-to-Capacity Ratio (*X*)		0.419	0.034	0.037	1.061		0.870		0.098			
Back of Queue (*Q*), ft/ln (95 th percentile)		91.9	0.1	5.3	960.8		231.3		14.4			
Back of Queue (*Q*), veh/ln (95 th percentile)		3.5	0.0	0.2	37.0		9.0		0.6			
Queue Storage Ratio (*RQ*) (95 th percentile)		0.00	0.00	0.00	0.00		0.00		0.00			
Uniform Delay (*d 1*), s/veh		4.2	0.7	6.1	10.1		29.3		25.9			
Incremental Delay (*d 2*), s/veh		0.1	0.0	0.0	42.8		25.1		0.1			
Initial Queue Delay (*d 3*), s/veh		0.0	0.0	0.0	0.0		0.0		0.0			
Control Delay (*d*), s/veh		4.2	0.7	6.1	52.9		54.3		26.0			
Level of Service (LOS)		A	A	A	F		D		C			
Approach Delay, s/veh / LOS	4.0	A		52.1	D		51.8	D		0.0		
Intersection Delay, s/veh / LOS	39.4						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.2	B	0.6	A	2.3	B	2.3	B
Bicycle LOS Score / LOS	1.5	A	2.8	C		F		

HCS7 Signalized Intersection Results Summary

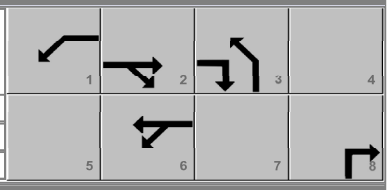
General Information				Intersection Information	
Agency				Duration, h	0.25
Analyst	MJH	Analysis Date	Apr 23, 2018	Area Type	Other
Jurisdiction	Newtown	Time Period		PHF	0.90
Urban Street	SR 32	Analysis Year	2022	Analysis Period	1> 7:00
Intersection	SR 32 at Little Dry Run…	File Name	04b-22-pm.xus		
Project Description	Build 4b - 2022 PM Peak Hour				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h		1090	170	50	610		120		40			

Signal Information			
Cycle, s	80.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	5.0	51.0	9.0	0.0	0.0	0.0						
Yellow	4.0	4.0	4.0	0.0	0.0	0.0						
Red	1.0	1.0	1.0	0.0	0.0	0.0						



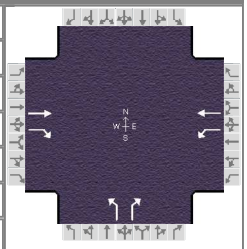
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		8		
Case Number		7.3	1.0	4.0		9.0		
Phase Duration, s		56.0	10.0	66.0		14.0		
Change Period, ($Y+R_c$), s		5.0	5.0	5.0		5.0		
Max Allow Headway (*MAH*), s		3.1	3.1	3.1		3.2		
Queue Clearance Time (g_s), s		53.0	2.7	12.8		7.7		
Green Extension Time (g_e), s		0.0	0.0	6.5		0.0		
Phase Call Probability		1.00	1.00	1.00		1.00		
Max Out Probability		1.00	1.00	0.02		1.00		

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2	12	1	6		3		18			
Adjusted Flow Rate (*v*), veh/h		1211	189	56	678		133		44			
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1870	1585	1781	1870		1781		1585			
Queue Service Time (g_s), s		51.0	2.7	0.7	10.8		5.7		2.0			
Cycle Queue Clearance Time (g_c), s		51.0	2.7	0.7	10.8		5.7		2.0			
Green Ratio (*g/C*)		0.64	0.75	0.72	0.76		0.11		0.11			
Capacity (*c*), veh/h		1192	1189	201	1426		200		178			
Volume-to-Capacity Ratio (*X*)		1.016	0.159	0.276	0.475		0.665		0.249			
Back of Queue (*Q*), ft/ln (95 th percentile)		891.1	24.1	30.2	107.5		126.1		35.3			
Back of Queue (*Q*), veh/ln (95 th percentile)		35.1	0.9	1.2	4.2		5.0		1.4			
Queue Storage Ratio (*RQ*) (95 th percentile)		0.00	0.00	0.00	0.00		0.00		0.00			
Uniform Delay (d_1), s/veh		14.5	2.8	20.7	3.5		34.1		32.4			
Incremental Delay (d_2), s/veh		30.0	0.0	0.3	0.1		6.6		0.3			
Initial Queue Delay (d_3), s/veh		0.0	0.0	0.0	0.0		0.0		0.0			
Control Delay (*d*), s/veh		44.5	2.9	21.0	3.6		40.6		32.7			
Level of Service (LOS)		F	A	C	A		D		C			
Approach Delay, s/veh / LOS	38.9	D		4.9	A		38.6	D		0.0		
Intersection Delay, s/veh / LOS	28.1						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.2	B	0.6	A	2.3	B	2.3	B
Bicycle LOS Score / LOS	2.8	C	1.7	B		F		

HCS7 Signalized Intersection Results Summary

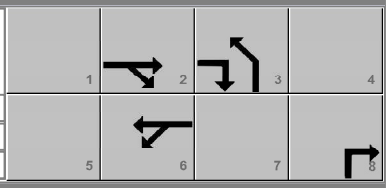
General Information				Intersection Information	
Agency				Duration, h	0.25
Analyst	CJK	Analysis Date	Apr 26, 2018	Area Type	Other
Jurisdiction	Newtown	Time Period		PHF	0.90
Urban Street	SR 32	Analysis Year	2042	Analysis Period	1> 7:00
Intersection	SR 32 at Little Dry Run…	File Name	AM-04b.xus		
Project Description	Build 4b - AM Peak Hour				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h		510	40	20	1290		200		20			

Signal Information			
Cycle, s	70.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	50.3	9.7	0.0	0.0	0.0	0.0	
Yellow	4.0	4.0	0.0	0.0	0.0	0.0	
Red	1.0	1.0	0.0	0.0	0.0	0.0	



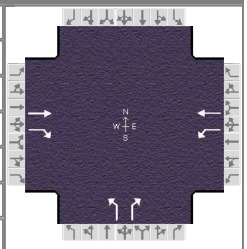
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		
Case Number		7.0		6.0		9.0		
Phase Duration, s		55.3		55.3		14.7		
Change Period, ($Y+R_c$), s		5.0		5.0		5.0		
Max Allow Headway (*MAH*), s		3.0		3.0		3.1		
Queue Clearance Time (g_s), s		10.9		52.3		10.8		
Green Extension Time (g_e), s		8.1		0.0		0.0		
Phase Call Probability		1.00		1.00		1.00		
Max Out Probability		0.04		1.00		1.00		

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2	12	1	6		3		18			
Adjusted Flow Rate (*v*), veh/h		567	44	22	1433		222		22			
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1826	1547	824	1826		1753		1560			
Queue Service Time (g_s), s		8.9	0.3	0.8	50.3		8.8		0.9			
Cycle Queue Clearance Time (g_c), s		8.9	0.3	9.7	50.3		8.8		0.9			
Green Ratio (*g/C*)		0.72	0.86	0.72	0.72		0.14		0.14			
Capacity (*c*), veh/h		1312	1326	591	1312		243		216			
Volume-to-Capacity Ratio (*X*)		0.432	0.034	0.038	1.092		0.915		0.103			
Back of Queue (*Q*), ft/ln (95 th percentile)		92	0.1	5.2	1116.5		252.9		14.5			
Back of Queue (*Q*), veh/ln (95 th percentile)		3.5	0.0	0.2	42.9		9.8		0.6			
Queue Storage Ratio (*RQ*) (95 th percentile)		0.00	0.00	0.00	0.00		0.00		0.00			
Uniform Delay (d_1), s/veh		4.0	0.7	6.0	9.9		29.7		26.3			
Incremental Delay (d_2), s/veh		0.1	0.0	0.0	54.1		35.0		0.1			
Initial Queue Delay (d_3), s/veh		0.0	0.0	0.0	0.0		0.0		0.0			
Control Delay (*d*), s/veh		4.1	0.7	6.0	63.9		64.8		26.4			
Level of Service (LOS)		A	A	A	F		E		C			
Approach Delay, s/veh / LOS	3.9	A		63.0	E		61.3	E		0.0		
Intersection Delay, s/veh / LOS	47.2						D					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.2	B	0.6	A	2.3	B	2.3	B
Bicycle LOS Score / LOS	1.5	A	2.9	C		F		

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information	
Agency				Duration, h	0.25
Analyst	CJK	Analysis Date	Apr 26, 2018	Area Type	Other
Jurisdiction	Newtown	Time Period		PHF	0.90
Urban Street	SR 32	Analysis Year	2042	Analysis Period	1> 7:00
Intersection	SR 32 at Little Dry Run…	File Name	PM-04b.xus		
Project Description	Build 4b - PM Peak Hour				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h		1140	170	50	630		120		40			

Signal Information			
Cycle, s	80.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

							1	2	3	4
Green	5.0	51.8	8.2	0.0	0.0	0.0	5	6	7	8
Yellow	4.0	4.0	4.0	0.0	0.0	0.0				
Red	1.0	1.0	1.0	0.0	0.0	0.0				

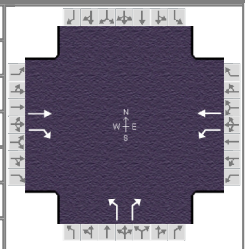
Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2	1	6		8		
Case Number		7.3	1.0	4.0		9.0		
Phase Duration, s		56.8	10.0	66.8		13.2		
Change Period, ($Y+R_c$), s		5.0	5.0	5.0		5.0		
Max Allow Headway (*MAH*), s		3.0	3.1	3.0		3.2		
Queue Clearance Time (g_s), s		53.8	2.7	12.9		7.8		
Green Extension Time (g_e), s		0.0	0.0	7.1		0.0		
Phase Call Probability		1.00	1.00	1.00		1.00		
Max Out Probability		1.00	1.00	0.03		1.00		

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2	12	1	6		3		18			
Adjusted Flow Rate (*v*), veh/h		1267	189	56	700		133		44			
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1870	1585	1781	1870		1781		1585			
Queue Service Time (g_s), s		51.8	2.7	0.7	10.9		5.8		2.1			
Cycle Queue Clearance Time (g_c), s		51.8	2.7	0.7	10.9		5.8		2.1			
Green Ratio (*g/C*)		0.65	0.75	0.73	0.77		0.10		0.10			
Capacity (*c*), veh/h		1211	1189	201	1445		183		162			
Volume-to-Capacity Ratio (*X*)		1.046	0.159	0.276	0.484		0.730		0.274			
Back of Queue (*Q*), ft/ln (95 th percentile)		1006.2	24.1	30.8	102.2		139.2		35.8			
Back of Queue (*Q*), veh/ln (95 th percentile)		39.6	0.9	1.2	4.0		5.5		1.4			
Queue Storage Ratio (*RQ*) (95 th percentile)		0.00	0.00	0.00	0.00		0.00		0.00			
Uniform Delay (d_1), s/veh		14.1	2.8	21.0	3.3		34.8		33.1			
Incremental Delay (d_2), s/veh		38.7	0.0	0.3	0.1		12.2		0.3			
Initial Queue Delay (d_3), s/veh		0.0	0.0	0.0	0.0		0.0		0.0			
Control Delay (*d*), s/veh		52.8	2.9	21.3	3.4		47.0		33.5			
Level of Service (LOS)		F	A	C	A		D		C			
Approach Delay, s/veh / LOS	46.3	D		4.7	A		43.7	D		0.0		
Intersection Delay, s/veh / LOS	33.0						C					

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.2	B	0.6	A	2.3	B	2.3	B
Bicycle LOS Score / LOS	2.9	C	1.7	B		F		

HCS7 Signalized Intersection Results Summary

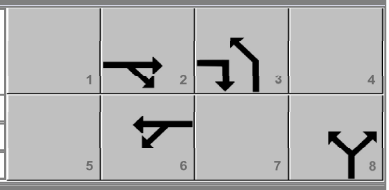
General Information				Intersection Information	
Agency				Duration, h	0.25
Analyst	MJH	Analysis Date	Apr 23, 2018	Area Type	Other
Jurisdiction	Newtown	Time Period		PHF	0.90
Urban Street	SR 32	Analysis Year	2022	Analysis Period	1> 7:00
Intersection	SR 32 at Little Dry Run…	File Name	04c-22-am.xus		
Project Description	Build 4c - 2022 AM Peak Hour				



Demand Information	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Demand (*v*), veh/h		490	40	20	0		200		20			

Signal Information			
Cycle, s	50.0	Reference Phase	2
Offset, s	0	Reference Point	End
Uncoordinated	Yes	Simult. Gap E/W	On
Force Mode	Fixed	Simult. Gap N/S	On

Green	23.5	16.5	0.0	0.0	0.0	0.0	
Yellow	4.0	4.0	0.0	0.0	0.0	0.0	
Red	1.0	1.0	0.0	0.0	0.0	0.0	



Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		
Case Number		7.0		6.0		9.0		
Phase Duration, s		28.5		28.5		21.5		
Change Period, (*Y+R c*), s		5.0		5.0		5.0		
Max Allow Headway (*MAH*), s		3.1		3.1		3.1		
Queue Clearance Time (*g s*), s		13.3		14.3		6.9		
Green Extension Time (*g e*), s		1.0		1.0		0.3		
Phase Call Probability		1.00		1.00		1.00		
Max Out Probability		0.03		0.04		0.00		

Movement Group Results	EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement		2	12	1	6		3		18			
Adjusted Flow Rate (*v*), veh/h		544	44	22	0		222		22			
Adjusted Saturation Flow Rate (*s*), veh/h/ln		1826	1547	841	1826		1753		1560			
Queue Service Time (*g s*), s		11.3	0.3	1.0	0.0		4.9		0.5			
Cycle Queue Clearance Time (*g c*), s		11.3	0.3	12.3	0.0		4.9		0.5			
Green Ratio (*g/C*)		0.47	0.80	0.47	0.47		0.33		0.33			
Capacity (*c*), veh/h		858	1238	350	858		579		515			
Volume-to-Capacity Ratio (*X*)		0.634	0.036	0.063	0.000		0.384		0.043			
Back of Queue (*Q*), ft/ln (95 th percentile)		167.5	0.1	8	0		74.3		6.6			
Back of Queue (*Q*), veh/ln (95 th percentile)		6.4	0.0	0.3	0.0		2.9		0.3			
Queue Storage Ratio (*RQ*) (95 th percentile)		0.00	0.00	0.00	0.00		0.00		0.00			
Uniform Delay (*d 1*), s/veh		10.0	1.0	14.6	0.0		12.9		11.4			
Incremental Delay (*d 2*), s/veh		1.2	0.0	0.0	0.0		0.2		0.0			
Initial Queue Delay (*d 3*), s/veh		0.0	0.0	0.0	0.0		0.0		0.0			
Control Delay (*d*), s/veh		11.2	1.0	14.7	0.0		13.0		11.4			
Level of Service (LOS)		B	A	B			B		B			
Approach Delay, s/veh / LOS	10.4	B		14.7	B		12.9	B		0.0		
Intersection Delay, s/veh / LOS	11.2 (4.3 Sec - Aggregate) B											

Multimodal Results	EB		WB		NB		SB	
Pedestrian LOS Score / LOS	2.2	B	0.7	A	2.3	B	2.3	B
Bicycle LOS Score / LOS	1.5	A	0.5	A		F		