

# Brown Street Traffic Redistribution Traffic Impact Study



Prepared for:  
City of Rochester, NY

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This study has been conducted for the City of Rochester, as a supplement to the Bull's Head Traffic Impact Study (BH TIS) dated February 2020, to assess whether diverting / dispersing Brown Street traffic at Essex Street or any point east of the targeted development site for the purpose of having a larger / "uninterrupted" development site to the north of West Main Street, is viable.

The following steps were taken to conduct this assessment:

- Base Conditions volumes were developed using the volumes created for the BH TIS. The Base Conditions are the Conceptual Redevelopment Frame – Without Trips from Redevelopment Conditions from the BH TIS.
- Brown Street redistribution Conditions volumes were developed utilizing the GTC Regional Travel Demand Model.
- The operational impacts of the Brown Street redistribution to the study roadway network were assessed utilizing Synchro modeling.
- The impacts of the Brown Street redistribution to/from Future Redevelopment & Corridor Projects were explored.

The results of this study have determined that redistributing traffic at Brown Street east of the development site would exacerbate conditions due to projected operational deficiencies at a number of study area intersections along with the potential impacts to/from future redevelopment and roadway design options in the study area.

The following pages contain a detailed summary of our findings.



## **Background**

The Bull's Head Traffic Impact Study (BH TIS) was completed in February 2020 to assess the potential traffic impacts within portions of the Bull's Head Urban Renewal Area (BHURA) and Brownfield Opportunity Area (BHBOA) study areas based on one of several conceptual redevelopment scenarios developed as part of the Bull's Head Urban Renewal Plan effort. This study supplements the BH TIS assessing the redistribution of traffic at Brown Street and Essex Street to assess the potential for creation of a larger, uninterrupted development site to the north of West Main Street.

The study area for this study includes portions of the public right-of-way within the BHURA, as adopted by the City Council in July 2018 and the Bull's Head Brownfield Opportunity Area study area in the City of Rochester, New York.

**Figure 1** depicts the Study Area Map.

The map shows the study area in relation to the area transportation network.

The following signalized intersections are within the study area and were evaluated as part of this study:

1. West Avenue/Appleton Street/Ames Street
2. Child Street/Maple Street
3. West Main Street/Chili Avenue/West Avenue/York Street
4. West Main Street/Brown Street/Genesee Street
5. West Main Street/Henion Street
6. West Main Street/Jefferson Avenue

**Figure 1**  
**Study Area Map**



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### **Base Conditions**

The Base Conditions for this study are the Conceptual Redevelopment Frame – Without Trips from Redevelopment Conditions from the BH TIS. This condition includes the transportation system modifications and improvements within the BH TIS conceptual redevelopment plan but does not include trips from redevelopment as they would change with the redistribution of Brown Street traffic and its associated redevelopment plan.

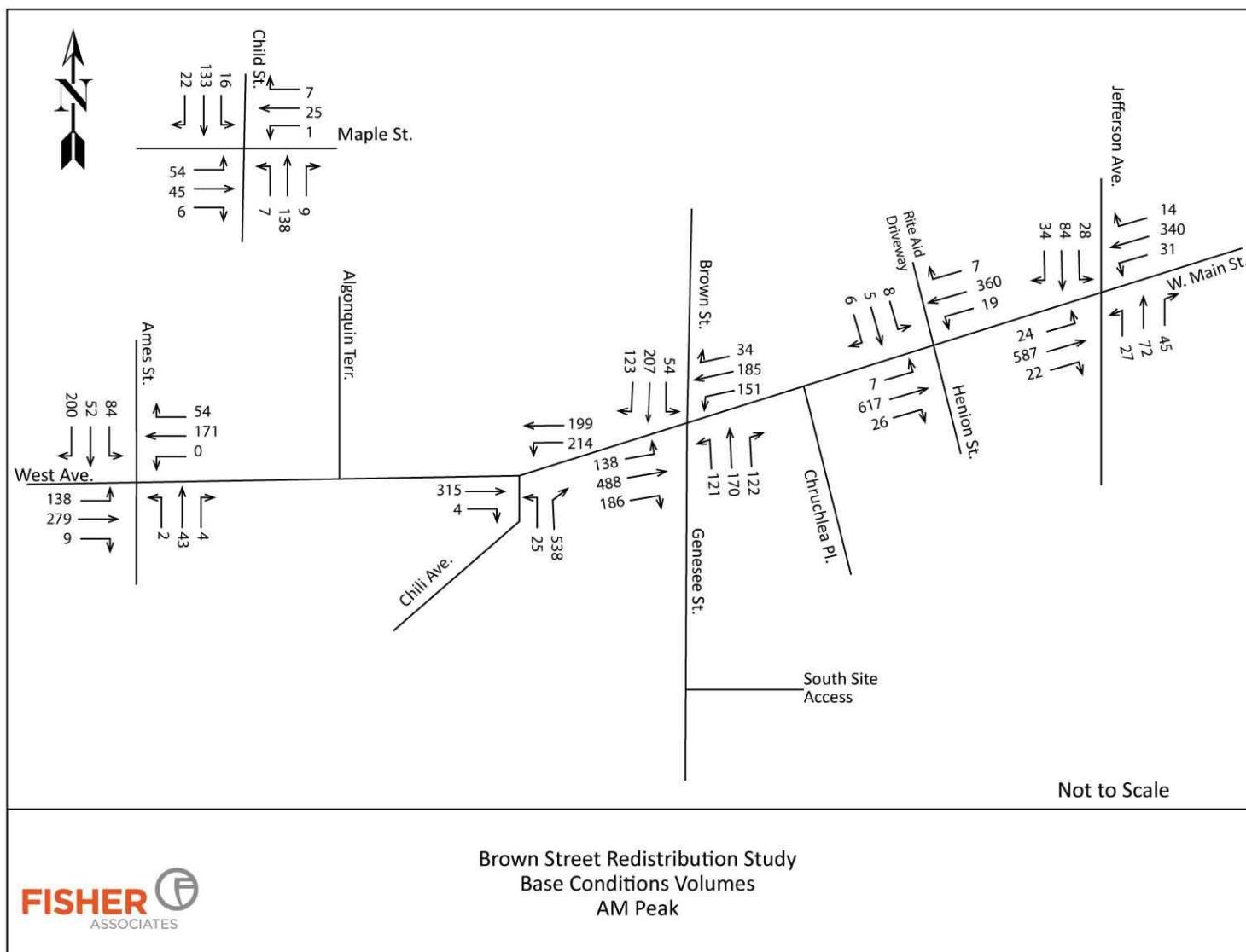
**Figure 2** depicts the BH TIS conceptual redevelopment plan illustrating the transportation system modifications and improvements within.

**Figure 3** and **Figure 4** depict the Base Conditions traffic volumes for the morning and evening peak hours, respectively.

**Figure 2**  
**BH TIS Conceptual Transportation Network (based on Conceptual Redevelopment Plan)**

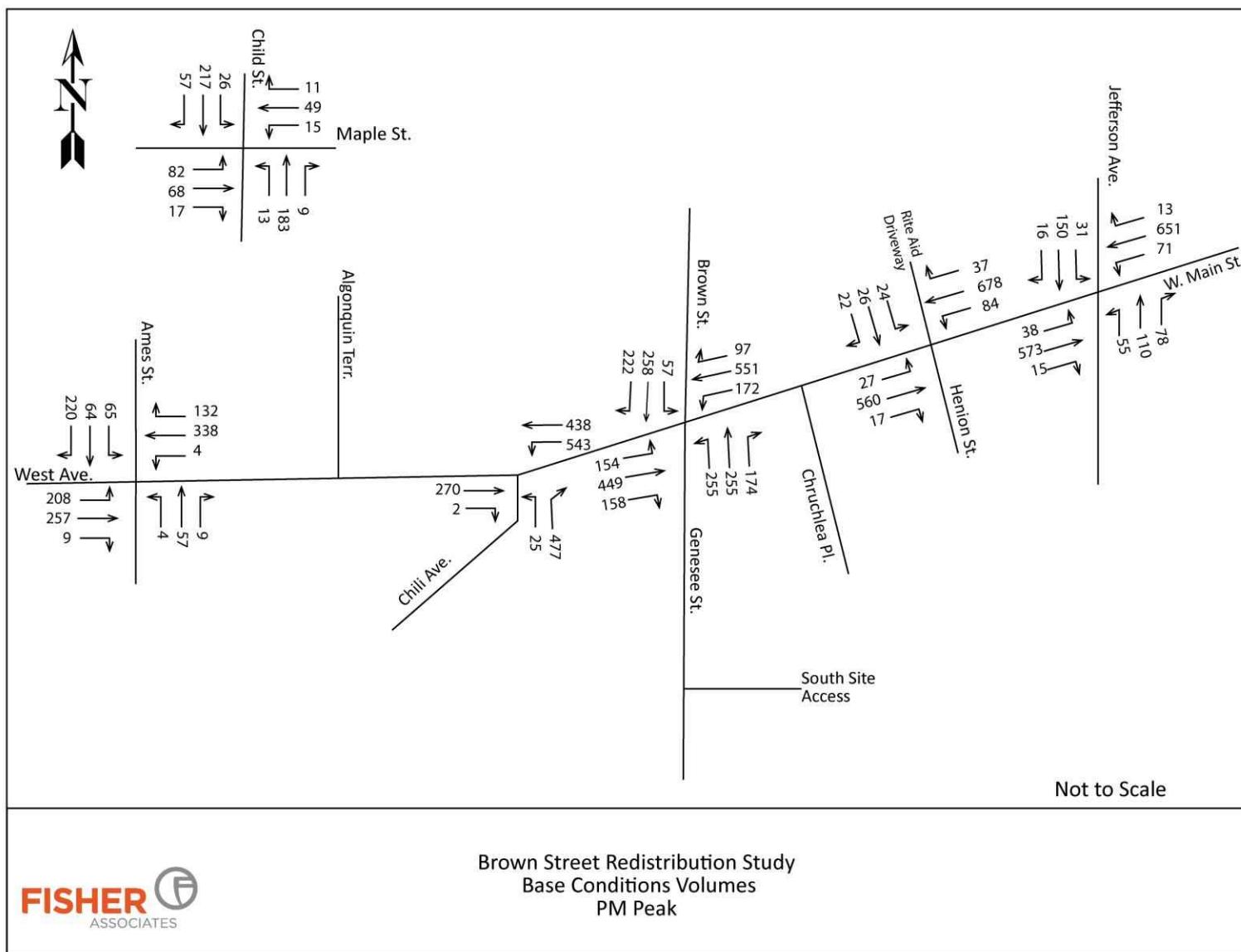


**Figure 3**



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**Figure 4**



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### **Brown Street Diversion Conditions Volume Development**

The GTC Regional Travel Demand Model was utilized to model the impacts of diverting traffic at Brown Street and Essex Street to the adjacent transportation network. The results were summarized as percent changes to the study roadway segment traffic volumes.

**Figure 5 and Figure 6** depict the approximate percent changes to the study roadway segment traffic volumes for the morning and evening peak hours, respectively.

The results of the Travel Demand Modeling indicate that a significant percentage of the Brown Street traffic is redistributed to Jefferson Avenue and Ames Street. Traffic on West Main Street increases to the east of the Genesee Street intersection and decreases to the west of the Genesee Street intersection. These increases/decreases are dependent on the ratio of Brown Street traffic from the old West Main Street/Brown Street/Genesee Street intersection that is removed from the segments to the volume that is re-routed to the segments. This is further clarified in the redistributed Brown Street traffic volume discussion below and its corresponding figures.

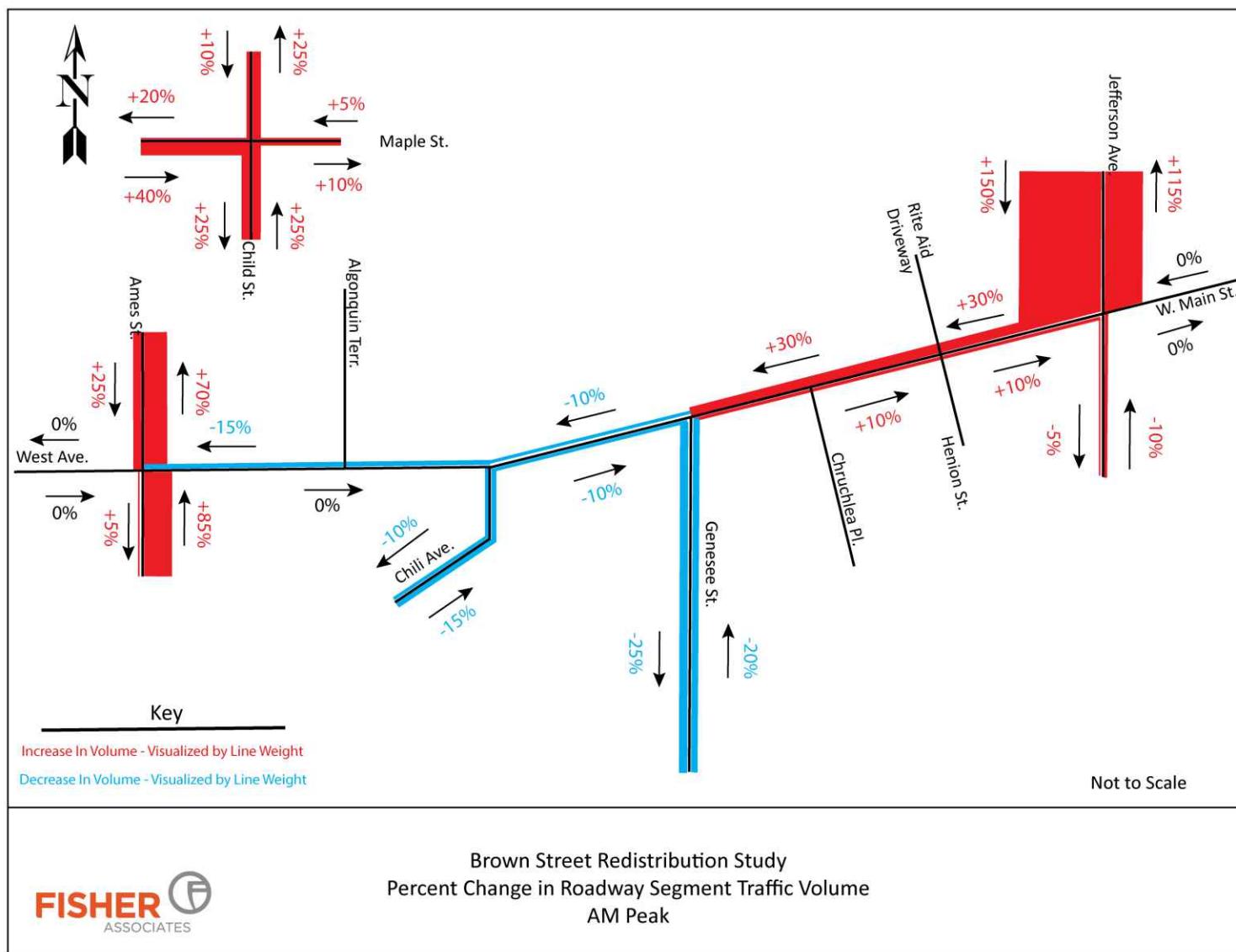
To develop the Brown Street Redistribution Conditions traffic volumes, the Base Conditions traffic volumes accessing Brown Street at the West Main Street/Brown Street/Genesee Street intersection were removed from the study roadway network utilizing the patterns identified from the Travel Demand Modeling. The redistributed Brown Street trips added to the study roadway network were then determined by synchronizing the removed Brown Street volumes with the GTC roadway segment percent changes.

**Figure 7 and Figure 8** depict the redistributed Brown Street traffic volumes for the morning and evening peak hours, respectively.

The redistributed Brown Street traffic volumes were then added to the Base Conditions traffic volumes to create the Brown Street redistribution Conditions traffic volumes.

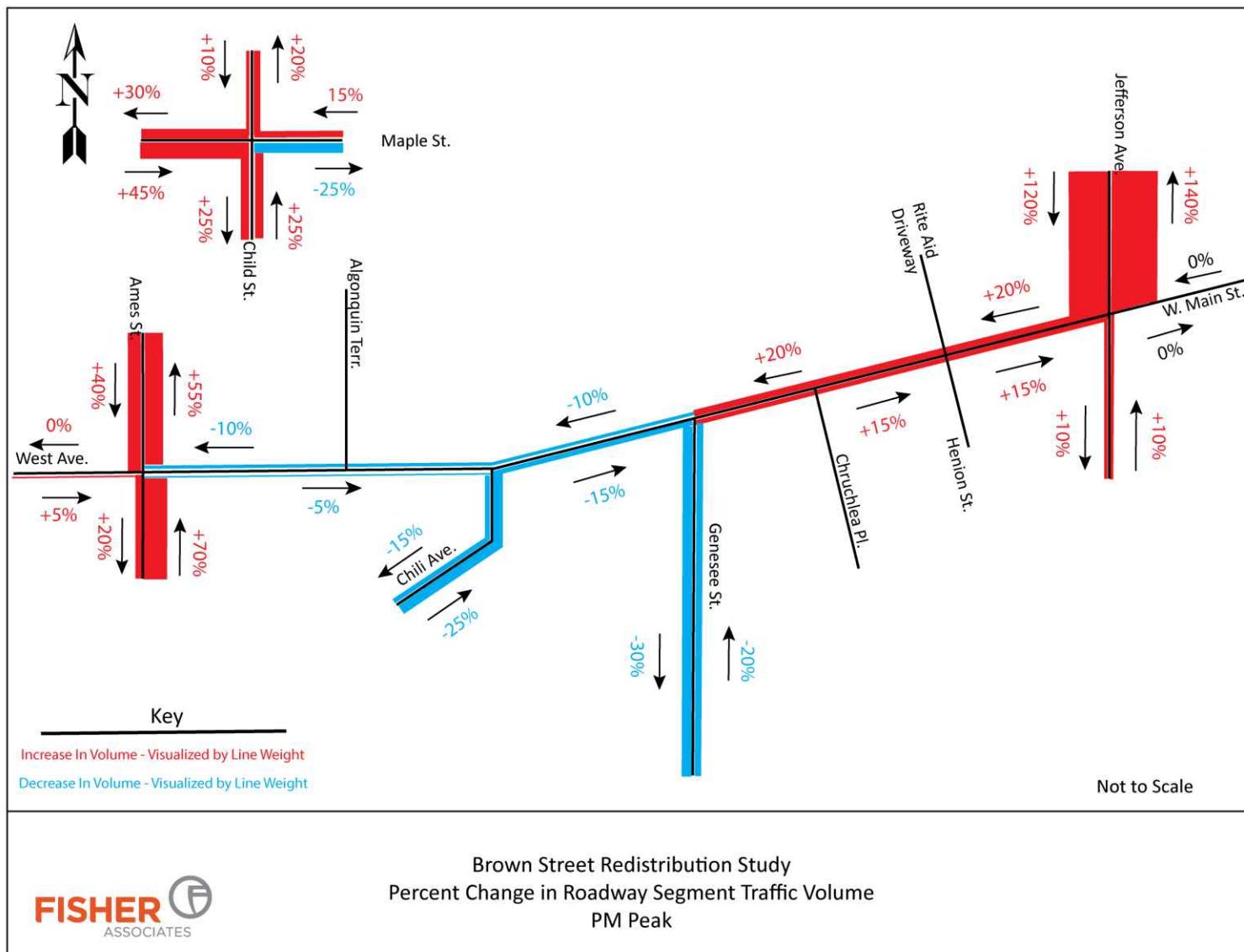
**Figure 9 and Figure 10** depict the Brown Street Redistribution Conditions traffic volumes for the morning and evening peak hours, respectively.

**Figure 5**



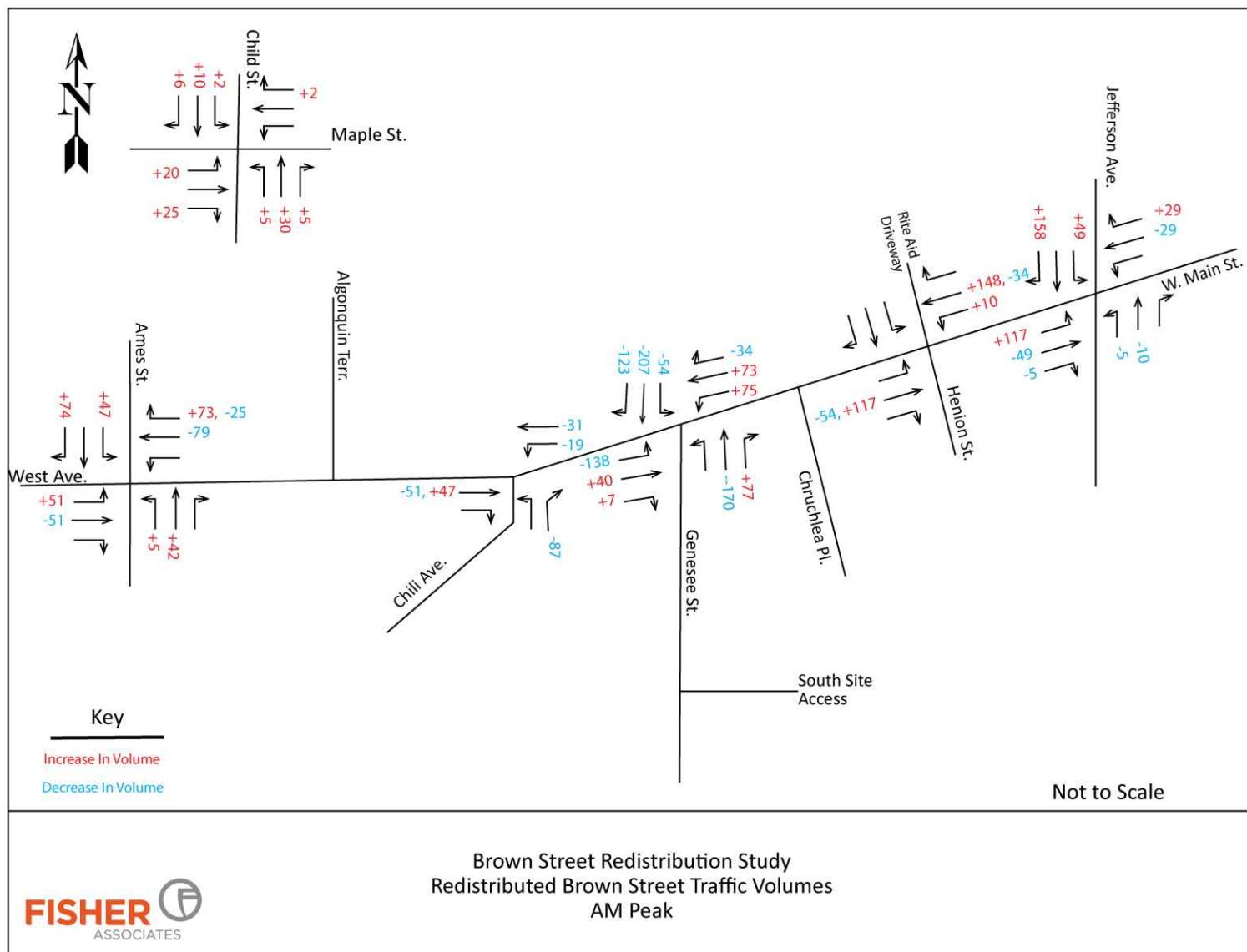
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**Figure 6**

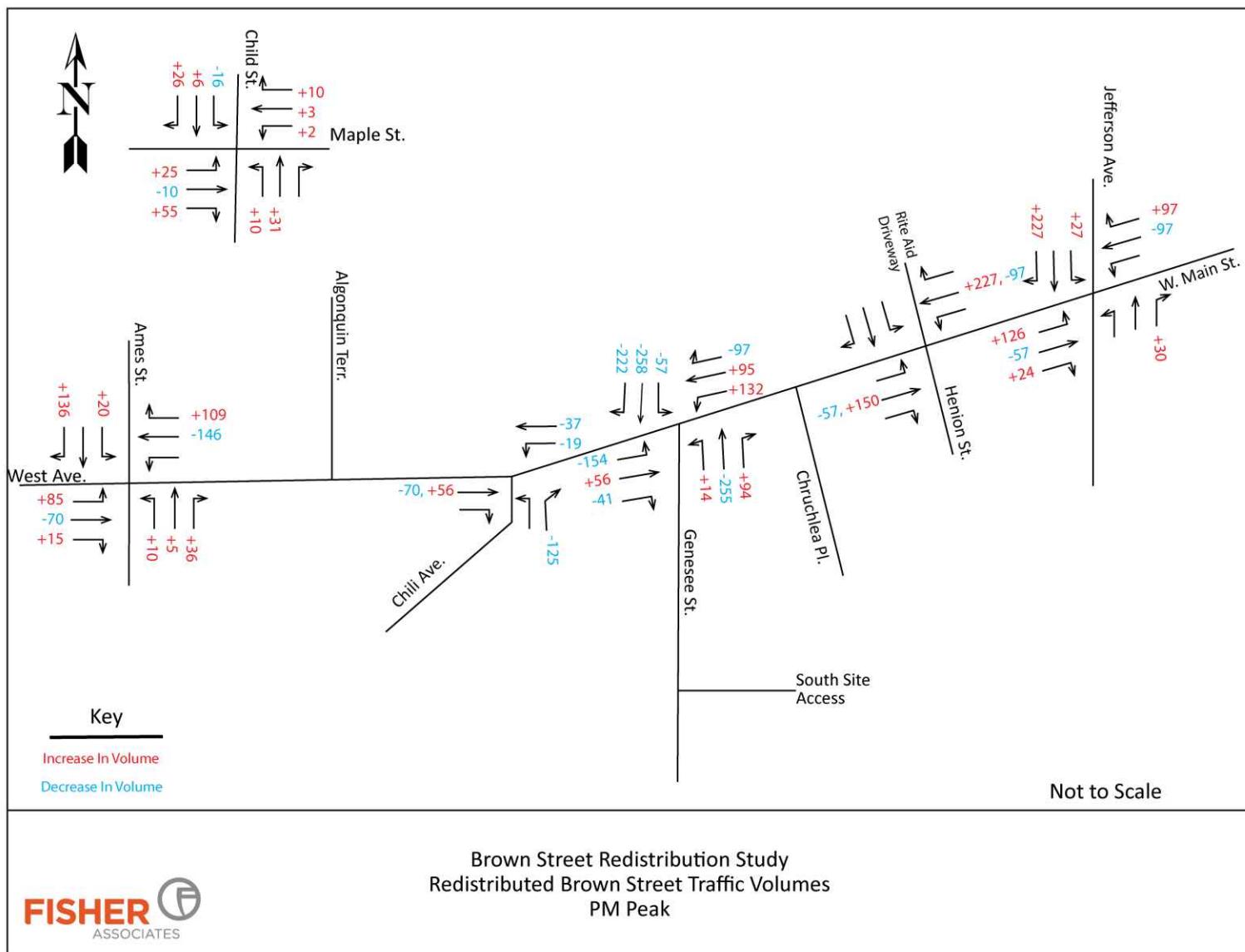


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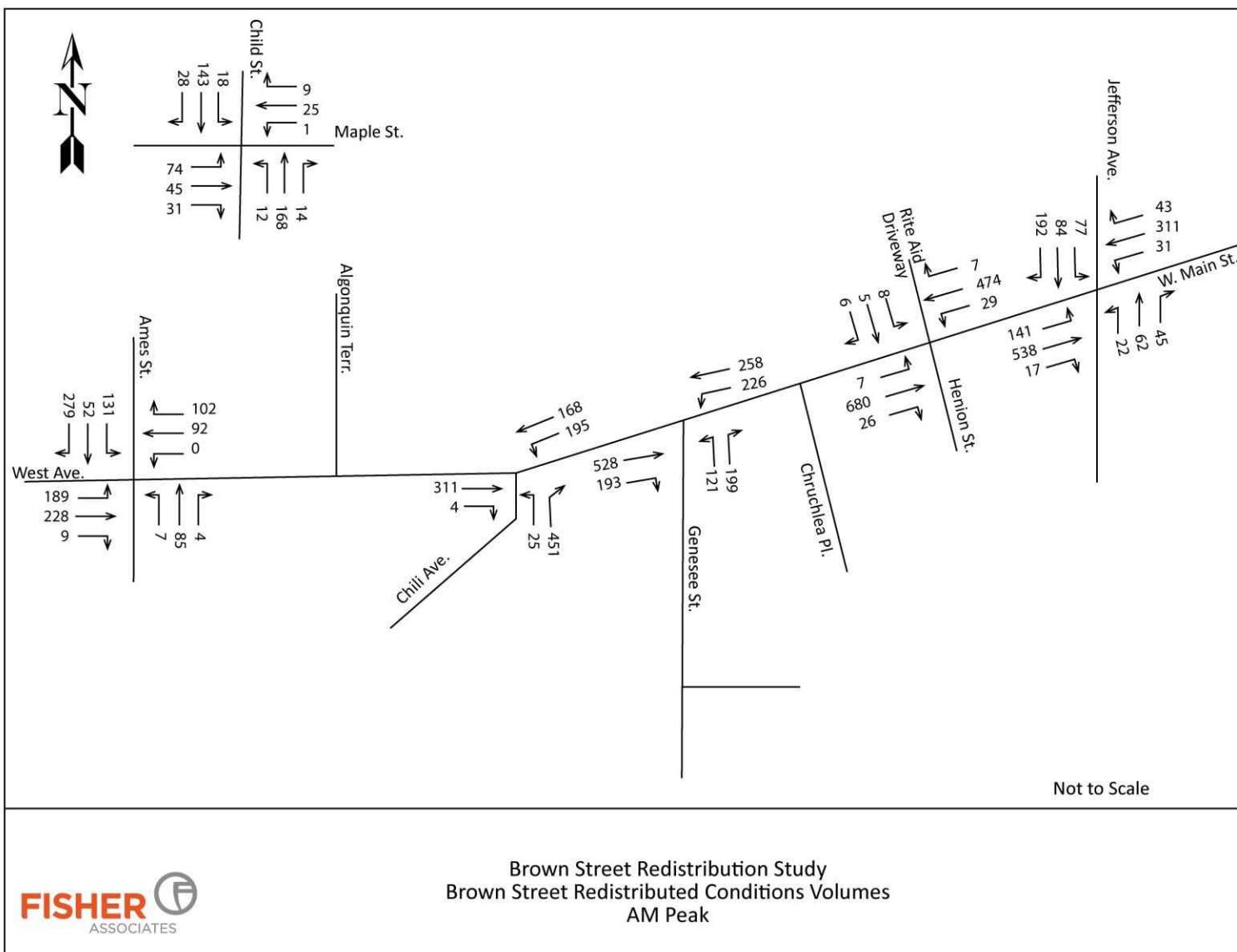
**Figure 7**



**Figure 8**

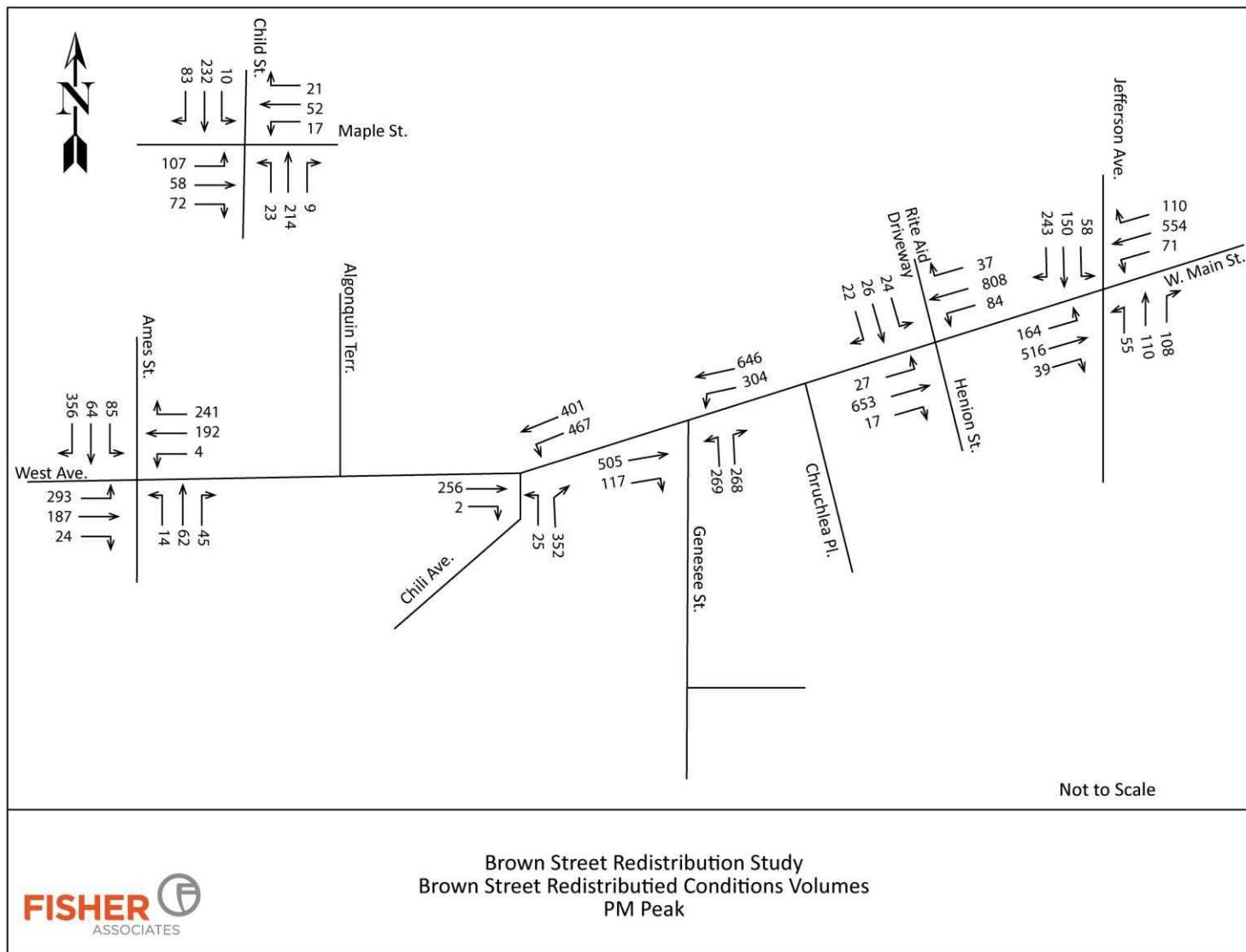


**Figure 9**



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**Figure 10**



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## **Intersection Operations & Capacity Analysis**

Capacity analysis was conducted for the study intersections to determine the operational impacts of redistributing traffic at Brown Street and Essex Street.

### **Capacity Analysis Methodology**

Intersection capacity analysis was conducted using Synchro 10 software. This software is based on methods presented in the Highway Capacity Manual 6<sup>th</sup> Edition that describe the levels of operation for intersections controlled by signals or regulated by stop signs. Using an analytical approach, a Level of Service (LOS) is determined for traffic travelling through an intersection. The Level of Service is defined or quantified in terms of average delay experienced by motorists, which is equated to the letters 'A' to 'F' for signal controlled intersections. Delay descriptions for each level of service are as follows:

#### *Traffic Signal Controlled Intersections*

- A less than 10 seconds
- B 10 to 20 seconds
- C 20 to 35 seconds
- D 35 to 55 seconds
- E 55 to 80 seconds
- F 80 seconds or Greater

An overall intersection LOS 'D' and intersection turning movement LOS 'E' generally represent the threshold of acceptable operations for a signal controlled intersection in an urban/suburban environment.

Additionally, Simtraffic simulations were utilized to supplement the results Synchro analysis to qualitatively determine the impacts of the projected queuing.

### **Capacity Analysis Results**

**Table 1** and **Table 2** summarize the results of the capacity analysis for the morning and evening peak hours, respectively.

In addition to the Base Conditions and Brown Street redistribution Conditions results, the results of the Existing Conditions analysis conducted for the BH TIS are also included for comparative purposes.

**Table 1**  
**Intersection LOS Summary - Morning Peak**

Study Intersection	Approach	Movement	Existing Conditions			Base Conditions			Brown St. Redistribution Conditions		
			Delay (Sec)	LOS	95 <sup>th</sup> % Queue (ft)	Delay (Sec)	LOS	95 <sup>th</sup> % Queue (ft)	Delay (Sec)	LOS	95 <sup>th</sup> % Queue (ft)
West Main Street & Jefferson Avenue (Signalized)	Eastbound	L (L)	1.0	A	1	1.0	A	m1	4.0	A	13
		T-TR (T-TR)	2.0	A	4	2.0	A	3	3.4	A	2
	Westbound	L (L)	3.9	A	10	3.9	A	10	3.9	A	10
		T-TR (T-TR)	3.5	A	30	3.5	A	31	3.5	A	28
	Northbound	LTR (LTR)	18.6	B	67	18.8	B	69	28.6	C	#79
	Southbound	L (L)	17.2	B	23	17.3	B	24	22.0	C	52
		TR (TR)	15.1	B	55	15.2	B	56	13.9	B	76
	<b>Overall</b>		<b>6.1</b>	<b>A</b>		<b>6.2</b>	<b>A</b>		<b>8.8</b>	<b>A</b>	
West Main Street & Henion Street / Rite Aid (Signalized)	Eastbound	(L)	-	-	-	2.1	A	m2	3.3	A	m2
		LT-TR (TR)	1.1	A	43	3.9	A	167	6.0	A	223
	Westbound	(L)	-	-	-	3.3	A	m9	3.4	A	m12
		LT-TR (TR)	2.6	A	75	3.5	A	163	4.0	A	229
	Southbound	LTR (LTR)	30.7	C	25	30.7	C	25	30.7	C	25
	<b>Overall</b>		<b>2.3</b>	<b>A</b>		<b>4.4</b>	<b>A</b>		<b>5.6</b>	<b>A</b>	
West Main Street & Genesee Street / Brown Street (Signalized)	Eastbound	L (L) [-]	21.2	C	116	11.5	B	m81	-	-	-
		T-T (T-TR) [T-TR]	25.4	C	222	22.2	C	263	22.0	C	276
		R (-) [-]	26.0	C	189	-	-	-	-	-	-
	Westbound	L (L) [L]	17.2	B	70	18.4	B	61	17.4	B	132
		T-TR (T-TR) [T-T]	21.1	C	44	18.8	B	80	6.7	A	42
		L (L) [L]	24.8	C	92	30.5	C	96	35.1	D	114
	Northbound	T (TR) [-]	20.9	C	125	36.3	D	237	-	-	-
		R (-) [R]	20.7	C	95	-	-	-	51.8	D	189
		LTR (L) [-]	40.5	D	275	42.1	D	69	-	-	-
	Southbound	- (T) [-]	-	-	-	51.0	D	200	-	-	-
		- (R) [-]	-	-	-	27.0	C	102	-	-	-
		<b>Overall</b>		<b>25.7</b>	<b>C</b>		<b>27.1</b>	<b>C</b>		<b>23.9</b>	<b>C</b>
West Main Street & West Avenue Chili Avenue & York Street (Signalized)	Eastbound	LT-TR (TR)	42.9	D	138	50.8	D	266	50.7	D	262
	Westbound	L (L)	16.3	B	216	7.5	A	101	4.0	A	30
		TR (T)	4.1	A	49	1.4	A	54	2.1	A	67
	Northbound	(L)	-	-	-	41.7	D	39	41.7	D	39
		R-R (R)	0.6	A	0	12.3	B	273	8.7	A	179
	Southbound	LR (-)	45.6	D	81	-	-	-	-	-	-
<b>Overall</b>		<b>16.8</b>	<b>B</b>			<b>20.8</b>	<b>C</b>		<b>20.2</b>	<b>C</b>	
West Avenue & Appleton Street / Ames Street (Signalized)	Eastbound	L (L)	6.0	A	56	6.2	A	59	9.5	A	102
		TR (TR)	5.6	A	101	5.8	A	106	7.5	A	105
	Westbound	L (L)	0.0	A	0	0.0	A	0	0.0	A	0
		TR (TR)	4.9	A	71	5.1	A	74	4.7	A	56
	Northbound	LTR (LTR)	22.8	C	44	22.5	C	44	21.5	C	68
	Southbound	LT (LT)	32.6	C	106	32.5	C	108	35.0	C	134
		R (R)	7.5	A	42	7.4	A	42	6.1	A	42
	<b>Overall</b>		<b>10.2</b>	<b>B</b>		<b>10.2</b>	<b>B</b>		<b>12.4</b>	<b>B</b>	
Child Street & Maple Street (Signalized)	Eastbound	LTR (LTR)	8.6	A	39	8.6	A	40	8.6	A	51
	Westbound	LTR (LTR)	6.3	A	12	6.3	A	12	6.1	A	12
	Northbound	LTR (LTR)	7.5	A	56	7.5	A	57	8.2	A	71
	Southbound	LTR (LTR)	7.5	A	64	7.6	A	65	8.1	A	72
	<b>Overall</b>		<b>7.6</b>	<b>A</b>		<b>7.7</b>	<b>A</b>		<b>8.1</b>	<b>A</b>	

**Note\***

- Levels of Service (LOS) were obtained from Synchro 10

  = Acceptable Operations

- Delay is vehicle delay measured in seconds.

  = LOS E, and/or Queues that don't always clear

- 95th % = 95th percentile queue length (feet)

  = LOS F, and/or Significant Queues

- m = Volume for 95th percentile queue is metered by upstream signal.

- # = 95th percentile volume exceeds capacity, queue may be longer.

Scenarios: L (LT) [LT] = Existing (Base & Brown St. Redistribution Conditions) [Brown St. Redistribution Conditions - Main/Genesee intersection only]

**Table 2**  
**Intersection LOS Summary - Evening Peak**

Study Intersection	Approach	Movement	Existing Conditions			Base Conditions			Brown St. Redistribution Conditions			Brown St. Redistribution with Timing Improvements		
			Delay (Sec)	LOS	95 <sup>th</sup> % Queue (ft)	Delay (Sec)	LOS	95 <sup>th</sup> % Queue (ft)	Delay (Sec)	LOS	95 <sup>th</sup> % Queue (ft)	Delay (Sec)	LOS	95 <sup>th</sup> % Queue (ft)
West Main Street & Jefferson Avenue (Signalized)	Eastbound	L (L)	4.1	A	14	7.7	A	22	16.9	B	189	29.6	C	189
		T-TR (T-TR)	4.4	A	73	6.8	A	100	6.4	A	119	13.5	B	165
	Westbound	L (L)	8.5	A	38	8.8	A	39	8.8	A	39	13.8	B	51
		T-TR (T-TR)	8.6	A	130	8.9	A	134	8.8	A	128	13.9	B	168
	Northbound	LTR (LTR)	77.8	E	#289	78.9	E	#301	1074.2	F	#455	107.9	F	#361
	Southbound	L (L)	35.6	D	46	35.5	D	46	43.6	D	79	28.7	C	67
		TR (TR)	37.3	D	160	37.1	D	165	85.5	F	#451	35.3	D	#340
	<b>Overall</b>		<b>19.3</b>	<b>B</b>		<b>20.4</b>	<b>C</b>		<b>154.7</b>	<b>F</b>		<b>30.7</b>	<b>C</b>	
West Main Street & Henion Street / Rite Aid (Signalized)	Eastbound	(L)	-	-	-	3.7	A	m8	5.7	A	m10	11.6	B	m22
		LT-TR (TR)	1.9	A	m52	4.7	A	167	9.5	A	255	16.9	B	523
	Westbound	(L)	-	-	-	2.0	A	m11	5.9	A	m29	7.1	A	m55
		LT-TR (TR)	11.3	B	m291	6.3	A	m457	12.4	B	m574	13.7	B	m667
	Southbound	LTR (LTR)	28.8	C	66	29.3	C	68	29.3	C	68	29.3	C	68
	<b>Overall</b>		<b>8.4</b>	<b>A</b>		<b>6.5</b>	<b>A</b>		<b>11.6</b>	<b>B</b>		<b>15.2</b>	<b>B</b>	
West Main Street & Genesee Street / Brown Street (Signalized)	Eastbound	L (L) [-]	60.8	E	#154	21.0	C	m116	-	-	-	-	-	-
		T-T (T-TR) [T-TR]	37.4	D	218	36.5	D	288	47.8	D	297	34.7	C	272
		R (-) [-]	38.1	D	175	-	-	-	-	-	-	-	-	-
	Westbound	L (L) [L]	30.5	C	77	21.5	C	93	24.6	C	#270	16.3	B	#186
		T-TR (T-TR) [T-T]	22.4	C	176	25.2	C	265	8.2	A	121	4.5	A	84
		L (L) [L]	42.4	D	#227	45.4	D	#202	41.5	D	218	43.7	D	225
	Northbound	T (TR) [-]	18.6	B	163	35.4	D	327	-	-	-	-	-	-
		R (-) [R]	18.0	B	116	-	-	-	47.4	D	226	52.6	D	233
		LTR (L) [-]	64.6	E	#506	41.1	D	70	-	-	-	-	-	-
	Southbound	- (T) [-]	-	-	-	51.0	D	238	-	-	-	-	-	-
		- (R) [-]	-	-	-	28.3	C	168	-	-	-	-	-	-
		<b>Overall</b>		<b>36.8</b>	<b>D</b>		<b>33.3</b>	<b>C</b>		<b>31.2</b>	<b>C</b>		<b>25.8</b>	<b>C</b>
West Main Street & West Avenue Chili Avenue & York Street (Signalized)	Eastbound	LT-TR (TR)	41.2	D	101	50.6	D	177	46.4	D	197	46.4	D	197
		L (L)	5.9	A	m189	7.3	A	m158	7.5	A	256	5.1	A	149
	Westbound	TR (T)	3.5	A	m111	3.2	A	m91	2.5	A	147	2.8	A	103
		(L)	-	-	-	41.9	D	39	41.9	D	39	41.9	D	39
	Northbound	R-R (R)	0.4	A	0	6.6	A	166	4.1	A	84	4.0	A	84
	Southbound	LR (-)	52.1	D	87	-	-	-	-	-	-	-	-	-
	<b>Overall</b>		<b>10.9</b>	<b>B</b>		<b>13.1</b>	<b>B</b>		<b>12.5</b>	<b>B</b>		<b>11.8</b>	<b>B</b>	
West Avenue & Appleton Street / Ames Street (Signalized)	Eastbound	L (L)	8.6	A	113	9.3	A	121	15.3	B	239	15.3	B	239
		TR (TR)	5.3	A	99	5.5	A	104	6.3	A	91	6.3	A	91
	Westbound	L (L)	3.8	A	m2	3.8	A	m3	5.2	A	m3	5.2	A	m3
		TR (TR)	3.8	A	103	5.4	A	115	6.2	A	84	4.9	A	101
	Northbound	LTR (LTR)	40.0	D	76	36.4	D	73	33.5	C	98	33.5	C	98
	Southbound	LT (LT)	52.3	D	133	52.4	D	138	63.5	E	158	63.5	E	158
		R (R)	9.8	A	61	9.5	A	61	8.8	A	72	8.8	A	72
	<b>Overall</b>		<b>12.2</b>	<b>B</b>		<b>12.8</b>	<b>B</b>		<b>16.2</b>	<b>B</b>		<b>15.8</b>	<b>B</b>	
Child Street & Maple Street (Signalized)	Eastbound	LTR (LTR)	11.6	B	70	11.8	B	73	12.9	B	108	12.9	B	108
	Westbound	LTR (LTR)	8.1	A	33	8.6	A	35	8.5	A	42	8.5	A	42
	Northbound	LTR (LTR)	8.0	A	73	8.0	A	74	10.4	B	110	10.4	B	110
	Southbound	LTR (LTR)	9.0	A	108	9.1	A	110	11.3	B	146	11.3	B	146
	<b>Overall</b>		<b>9.3</b>	<b>A</b>		<b>9.4</b>	<b>A</b>		<b>11.2</b>	<b>B</b>		<b>11.2</b>	<b>B</b>	

**Note\***

- Levels of Service (LOS) were obtained from Synchro 10

  = Acceptable Operations

- Delay is vehicle delay measured in seconds.

  = LOS E, and/or Queues that don't always clear

- 95th % = 95th percentile queue length (feet)

  = LOS F, and/or Significant Queues

- m = Volume for 95th percentile queue is metered by upstream signal.

- # = 95th percentile volume exceeds capacity, queue may be longer.

Scenarios: L (LT) [LT] = Existing (Base & Brown St. Redistribution Conditions) [Brown St. Redistribution Conditions - Main/Genesee intersection only]



### Base Conditions Operations & Capacity Analysis

The results of the Base Conditions capacity analysis noted steady but manageable traffic flow and the traffic signals were able to service all arriving traffic during both peak hours.

Base Conditions capacity analysis indicates an overall LOS C with LOS D or better for all turning movements during the morning peak and evening peak hours except for the Northbound Left/Thru/Right movement at the West Main Street/Jefferson Avenue intersection which operates at LOS E during the evening peak. This is an existing issue at the West Main Street/Jefferson Avenue intersection. Long queues that do not always clear within each cycle were observed in the field. Northbound vehicles were also observed running on red due to congestion and insufficient green time.

Additionally, the NB Left turn lane at the West Main Street/Brown Street/Genesee Street intersection is projected to occasionally have queues that do not clear within each cycle during the evening peak.

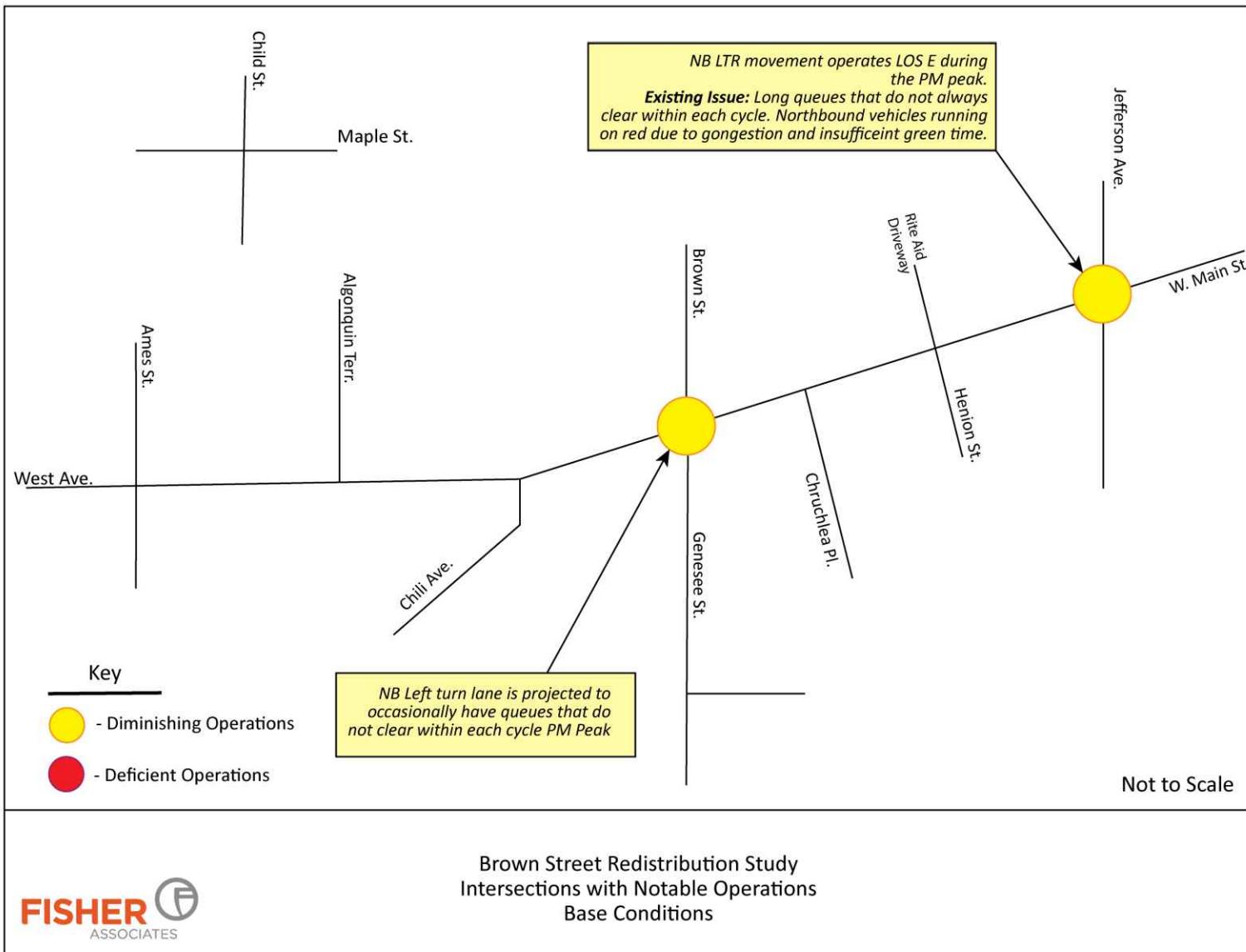
The noted movements at these two intersections still generally fall within the threshold of acceptable operations but are approaching unacceptable operations if conditions continue to degrade.

All other locations LOS values generally fall within the threshold of acceptable operations with no excessive queues projected.

**Figure 11** depicts the Base Conditions intersections with notable operations.

Base Conditions capacity analysis summary reports are included in the **Appendix**.

**Figure 11**





## Brown Street Redistribution Conditions Operations & Capacity Analysis

The results of Brown Street Redistribution Conditions capacity analysis project that the increase in traffic volumes at the West Avenue/Ames Street intersection and the West Main Street/Jefferson Avenue intersection will degrade the operations at these intersections and create conditions that fall outside the threshold of acceptable operations with either high delays and or excessive queues.

Signal timing improvements were implemented to attempt to mitigate these issues. These improvements helped reduce delay and queues but were unable to mitigate operations to be within the threshold of acceptable operations. The results discussed below are the conditions with the signal timing improvements.

The EB left turn volume at the West Avenue/Ames Street intersection is projected to increase to almost 300 vehicles and there is no protected left turn signal at this intersection. Therefore, the queues for the EB Left turn movement are projected to regularly extend beyond the available storage creating excessive queuing on the EB approach and long delays due to the queues. The delay in the Synchro analysis does not reflect the potential delay as it does not fully reflect the impact of the projected queues. The 50<sup>th</sup> percentile queue is projected to be 91 feet and the 95<sup>th</sup> percentile queue is projected to be 239 feet. Both queue lengths are approximately double the length of left turn lane for this approach (50 feet) or longer. Observations of the Simtraffic simulations verified extensive queuing and delays on the eastbound approach with queues that regularly do not clear within each cycle during the evening peak.

The SB Through movement at this intersection is projected to operate at LOS E. However, this movement will still generally fall within the threshold of acceptable operations with no excessive queues or delays projected.

The northbound approach to the West Main Street/Jefferson Avenue intersection is projected to degrade to LOS F with oversaturated conditions (v/c 1.08), high delays, and extensive queues.

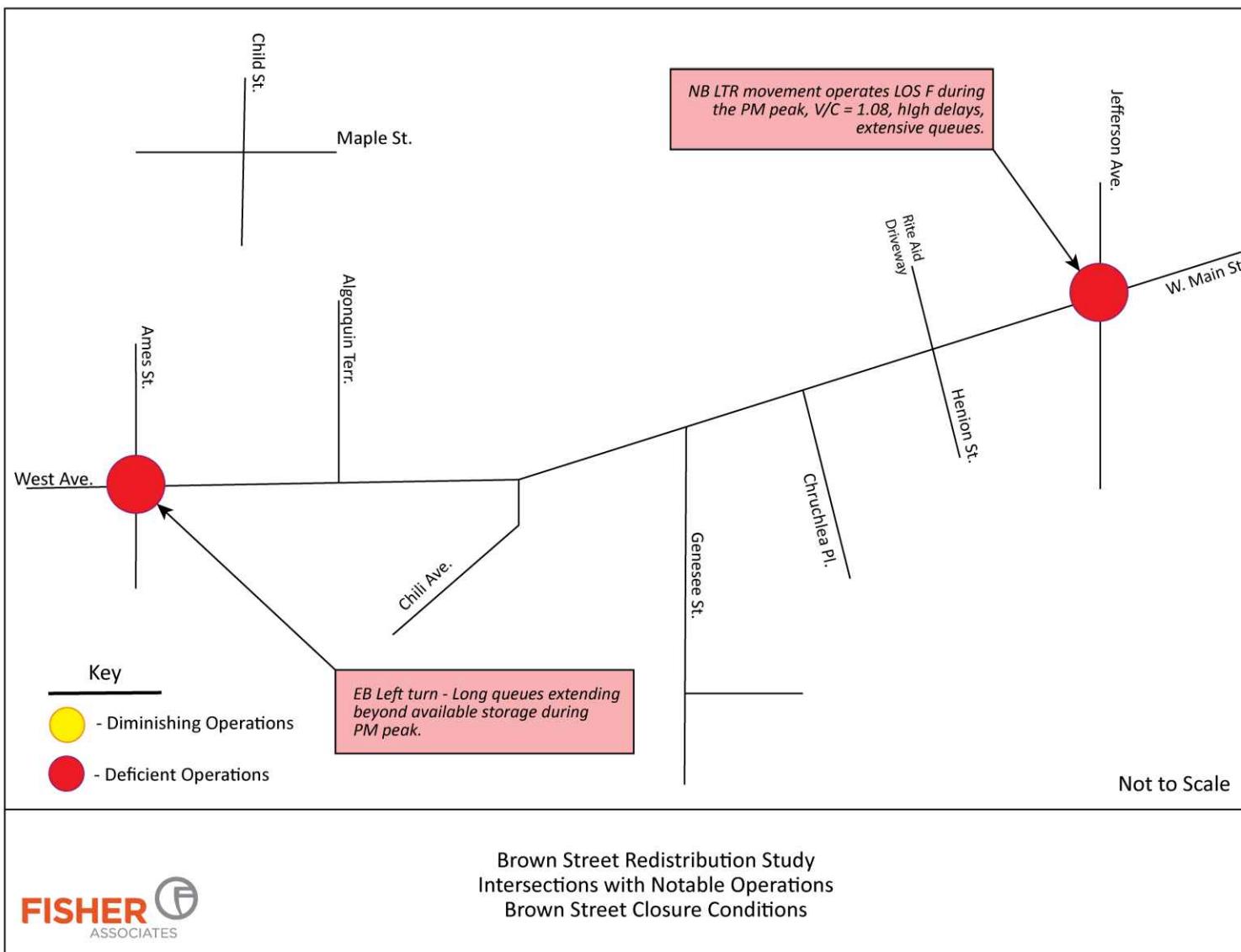
All other intersections are projected to operate at an overall LOS C with LOS D or better for all turning movements during the morning peak and evening peak hours. These values generally fall within the threshold of acceptable operations with no excessive queues projected.

Additionally, the removal of the Brown Street leg at the West Main Street/Brown Street/Genesee Street intersection is projected to reduce the queues for the NB Left turn that were projected for Base Conditions by removing opposing traffic for this movement.

**Figure 12** depicts the Brown Street Redistribution Conditions intersections with notable operations.

Brown Street Redistribution Conditions capacity analysis summary reports are included in the **Appendix**.

**Figure 12**





## Future Redevelopment & Corridor Projects

A conceptual redevelopment vision that will generate higher volumes of new traffic was completed as part of the Bull's Head Urban Renewal Plan effort. This study did not include the trips generated from future redevelopment. Additional traffic due to redevelopment in the area would further degrade the operations at the identified intersections with projected operational deficiencies. Or the impacts of the Brown Street redistribution would limit the intensity of future redevelopment.

Additionally, the ongoing West Main Street Multimodal Transportation & Placemaking Study is being conducted to explore design alternatives of West Main Street including a four-to-three lane conversion. This study builds off the Bull's Head Revitalization Study and incorporates most of its transportation system modifications and improvements. The draft recommendations in the multimodal study include reducing the number of through lanes on West Main Street at the West Main Street/Jefferson Avenue intersection from two in each direction to one in each direction. This would significantly further degrade the poor operations at the West Main Street/Jefferson Avenue intersection if the Brown Street redistribution changes were implemented. Or the impacts of the Brown Street redistribution would limit future design options at this intersection.

## Conclusion

This study has been conducted for the City of Rochester, as a supplement to the [Bull's Head Traffic Impact Study](#) (BH TIS) dated February 2020, to assess whether diverting / dispersing Brown Street traffic at Essex Street or any point east of the targeted development site for the purpose of having a larger / "uninterrupted" development site to the north of West Main Street, is viable.

The results of this study have determined that redistributing traffic at Brown Street and Essex Street would significantly adversely impact already existing poor/failing traffic conditions due to the corresponding operational impacts on West Main Street between Jefferson Avenue and Ames Street along with the anticipated impacts to/from future redevelopment and roadway design options in the study area, and therefore is found to be not viable.

An Appendix containing the supporting data used in this assessment is attached.

# **APPENDIX**

## **Brown Street Traffic Redistribution Study**

### **Table of Contents**

INTERSECTION CAPACITY ANALYSIS SUMMARY REPORTS

## CAPACITY ANALYSIS SUMMARY REPORTS

Base Conditions  
Redistribution Conditions

**BASE CONDITIONS**

**Morning Peak Hour**

Lanes, Volumes, Timings  
1: Jefferson & Main

Bull's Head - Brown St. Closure Analysis  
AM 2024 Base Conditions

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↓		↑	↑↓		↔	↔		↑	↑↓	
Traffic Volume (vph)	24	587	22	31	340	14	27	72	45	28	84	34
Future Volume (vph)	24	587	22	31	340	14	27	72	45	28	84	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10	10	10	10	10	10	10
Storage Length (ft)	75		0	100		0	50		0	100		0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1546	3164	0	1636	3090	0	0	1516	0	1574	1584	0
Flt Permitted	0.506			0.406				0.907		0.564		
Satd. Flow (perm)	819	3164	0	698	3090	0	0	1387	0	934	1584	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			17			43			38	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		325			653			1957			388	
Travel Time (s)		7.4			14.8			44.5			8.8	
Confl. Peds. (#/hr)	11		3	3		11	2		1	1		2
Peak Hour Factor	0.97	0.97	0.97	0.84	0.84	0.84	0.80	0.80	0.80	0.83	0.83	0.83
Heavy Vehicles (%)	9%	5%	29%	3%	8%	14%	11%	14%	5%	7%	7%	6%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	25	628	0	37	422	0	0	180	0	34	142	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		10			10			10			10	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA										
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Detector Phase	1	1		1	1		2	2		2	2	
Switch Phase												
Minimum Initial (s)	21.0	21.0		21.0	21.0		6.0	6.0		6.0	6.0	
Minimum Split (s)	34.0	34.0		34.0	34.0		17.5	17.5		17.5	17.5	
Total Split (s)	35.0	35.0		35.0	35.0		15.0	15.0		15.0	15.0	
Total Split (%)	70.0%	70.0%		70.0%	70.0%		30.0%	30.0%		30.0%	30.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0		-3.5		-3.5	-3.5	-3.5	
Total Lost Time (s)	3.0	3.0		3.0	3.0		3.0		3.0	3.0	3.0	
Lead/Lag	Lead	Lead		Lead	Lead		Lag	Lag		Lag	Lag	
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)	35.8	35.8		35.8	35.8			11.3		11.3	11.3	
Actuated g/C Ratio	0.72	0.72		0.72	0.72			0.23		0.23	0.23	
v/c Ratio	0.04	0.28		0.07	0.19		0.52		0.16	0.37		
Control Delay	1.0	2.0		3.9	3.5		18.8		17.3	15.2		

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HCM 6 Report

Lanes, Volumes, Timings  
1: Jefferson & Main

Bull's Head - Brown St. Closure Analysis  
AM 2024 Base Conditions



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Total Delay	1.0	2.0		3.9	3.5			18.8		17.3	15.2	
LOS	A	A		A	A			B		B	B	
Approach Delay		2.0			3.5			18.8			15.6	
Approach LOS		A			A			B			B	
Queue Length 50th (ft)	2	52		3	20			34		8	25	
Queue Length 95th (ft)	m1	3		10	31			69		24	56	
Internal Link Dist (ft)		245			573			1877			308	
Turn Bay Length (ft)	75			100						100		
Base Capacity (vph)	587	2271		500	2218			365		224	409	
Starvation Cap Reductn	0	0		0	0			0		0	0	
Spillback Cap Reductn	0	0		0	0			0		0	0	
Storage Cap Reductn	0	0		0	0			0		0	0	
Reduced v/c Ratio	0.04	0.28		0.07	0.19			0.49		0.15	0.35	

Intersection Summary

Area Type: Other

Cycle Length: 50

Actuated Cycle Length: 50

Offset: 22 (44%), Referenced to phase 1:EBWB, Start of Green

Natural Cycle: 55

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.52

Intersection Signal Delay: 6.2

Intersection LOS: A

Intersection Capacity Utilization 47.2%

ICU Level of Service A

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Jefferson & Main



Lanes, Volumes, Timings  
2: Henion/Rite Aid & Main

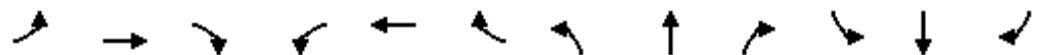
Bull's Head - Brown St. Closure Analysis  
AM 2024 Base Conditons

	→	→	→	←	←	↑	↑	↑	↓	↓	↙	
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑		↑	↑					↔		
Traffic Volume (vph)	7	617	26	19	360	7	0	0	0	8	5	6
Future Volume (vph)	7	617	26	19	360	7	0	0	0	8	5	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	50		0	50		0	0	0	0	0	0	0
Storage Lanes	1		0	1		0	0	0	0	0	0	0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1805	1783	0	1805	1689	0	0	0	0	0	1672	0
Flt Permitted	0.527			0.379							0.979	
Satd. Flow (perm)	994	1783	0	718	1689	0	0	0	0	0	1663	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			2						8	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		177			1167			322			169	
Travel Time (s)		4.0			26.5			7.3			3.8	
Confl. Peds. (#/hr)	5		6	6		5	10		6	6		10
Peak Hour Factor	0.95	0.95	0.95	0.92	0.92	0.92	0.90	0.90	0.90	0.75	0.75	0.75
Heavy Vehicles (%)	0%	6%	0%	0%	10%	0%	2%	2%	2%	0%	0%	17%
Bus Blockages (#/hr)	0	0	0	0	5	5	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	7	676	0	21	399	0	0	0	0	0	26	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.03	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA					Perm	NA	
Protected Phases		2			6						4	
Permitted Phases	2			6						4		
Detector Phase	2	2		6	6					4	4	
Switch Phase												
Minimum Initial (s)	25.0	25.0		25.0	25.0					6.0	6.0	
Minimum Split (s)	31.0	31.0		31.0	31.0					33.0	33.0	
Total Split (s)	65.0	65.0		65.0	65.0					35.0	35.0	
Total Split (%)	65.0%	65.0%		65.0%	65.0%					35.0%	35.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0					3.5	3.5	
All-Red Time (s)	2.0	2.0		2.0	2.0					2.5	2.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0					0.0		
Total Lost Time (s)	6.0	6.0		6.0	6.0					6.0		
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max					None	None	
Act Effct Green (s)	85.4	85.4		85.4	85.4						9.8	
Actuated g/C Ratio	0.85	0.85		0.85	0.85						0.10	
v/c Ratio	0.01	0.44		0.03	0.28						0.15	
Control Delay	2.1	3.9		3.3	3.5						30.7	

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HCM 6 Report

Lanes, Volumes, Timings  
2: Henion/Rite Aid & Main

Bull's Head - Brown St. Closure Analysis  
AM 2024 Base Condition



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.1		0.0	0.0						0.0	
Total Delay	2.1	3.9		3.3	3.5						30.7	
LOS	A	A		A	A						C	
Approach Delay		3.9			3.5						30.7	
Approach LOS		A			A						C	
Queue Length 50th (ft)	0	41		2	39						11	
Queue Length 95th (ft)	m2	167		m9	163						25	
Internal Link Dist (ft)		97			1087			242			89	
Turn Bay Length (ft)	50		50									
Base Capacity (vph)	849	1523		613	1442						487	
Starvation Cap Reductn	0	94		0	0						0	
Spillback Cap Reductn	0	0		0	0						0	
Storage Cap Reductn	0	0		0	0						0	
Reduced v/c Ratio	0.01	0.47		0.03	0.28						0.05	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 19 (19%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.44

Intersection Signal Delay: 4.4

Intersection LOS: A

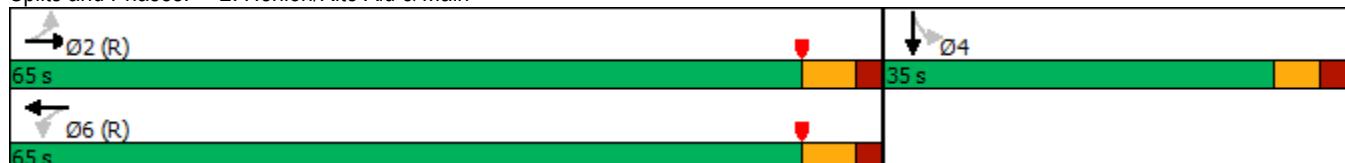
Intersection Capacity Utilization 55.3%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Henion/Rite Aid & Main



Lanes, Volumes, Timings  
3: Genesee/Brown & Main

Bull's Head - Brown St. Closure Analysis  
AM 2024 Base Conditons

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↓		↑	↑↓		↑	↑↓		↑	↑	↑
Traffic Volume (vph)	138	488	186	151	185	34	121	170	122	54	207	123
Future Volume (vph)	138	488	186	151	185	34	121	170	122	54	207	123
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10	10	10	10	10	15	10
Storage Length (ft)	150		225	200		200	0		0	100		200
Storage Lanes	1		1	1		1	1		0	1		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1504	3073	0	1546	3024	0	1518	1501	0	1685	1972	1334
Flt Permitted	0.608			0.247			0.284			0.560		
Satd. Flow (perm)	960	3073	0	400	3024	0	454	1501	0	992	1972	1334
Right Turn on Red			No			No			No		No	
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		378			313			355			307	
Travel Time (s)		8.6			7.1			8.1			7.0	
Confl. Peds. (#/hr)	2		8	8		2			1	1		
Peak Hour Factor	0.85	0.85	0.85	0.95	0.95	0.95	0.88	0.88	0.88	0.92	0.92	0.92
Heavy Vehicles (%)	12%	3%	7%	9%	10%	0%	11%	8%	13%	0%	6%	13%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	162	793	0	159	231	0	138	332	0	59	225	134
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		10			10			10			10	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	*0.90	*0.90	*0.90	*0.90	*0.90	*0.90	*0.90	*0.90	*0.90	*0.90	*0.90	*0.90
Turning Speed (mph)	15		9	15		9	15		9	15		25
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		Perm	NA	pm+ov
Protected Phases	5	2		1	6		3	8			4	5
Permitted Phases	2			6			8			4		4
Detector Phase	5	2		1	6		3	8		4	4	5
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	11.0	29.0		11.0	29.0		11.0	28.5		28.5	28.5	11.0
Total Split (s)	12.0	38.0		12.0	38.0		18.0	50.0		32.0	32.0	12.0
Total Split (%)	12.0%	38.0%		12.0%	38.0%		18.0%	50.0%		32.0%	32.0%	12.0%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.5		1.5	1.5	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.5		5.5	5.5	5.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead			Lag	Lag	Lead
Lead-Lag Optimize?												
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	None
Act Effct Green (s)	51.7	42.4		52.8	43.0		32.7	32.2		16.2	16.2	31.0
Actuated g/C Ratio	0.52	0.42		0.53	0.43		0.33	0.32		0.16	0.16	0.31
v/c Ratio	0.30	0.61		0.49	0.18		0.52	0.69		0.37	0.70	0.32
Control Delay	11.5	21.6		18.4	18.8		30.5	36.3		42.1	51.0	27.0

Lanes, Volumes, Timings  
3: Genesee/Brown & Main

Bull's Head - Brown St. Closure Analysis  
AM 2024 Base Conditions

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.6		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	11.5	22.2		18.4	18.8		30.5	36.3		42.1	51.0	27.0
LOS	B	C		B	B		C	D		D	D	C
Approach Delay		20.4			18.6			34.6			42.1	
Approach LOS		C			B			C			D	
Queue Length 50th (ft)	41	150		33	43		64	182		34	138	65
Queue Length 95th (ft)	m81	263		61	80		96	237		69	200	102
Internal Link Dist (ft)		298			233			275			227	
Turn Bay Length (ft)	150		200						100		200	
Base Capacity (vph)	549	1303		324	1299		286	667		262	522	416
Starvation Cap Reductn	0	206		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.30	0.72		0.49	0.18		0.48	0.50		0.23	0.43	0.32

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 8 (8%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 27.1

Intersection LOS: C

Intersection Capacity Utilization 67.4%

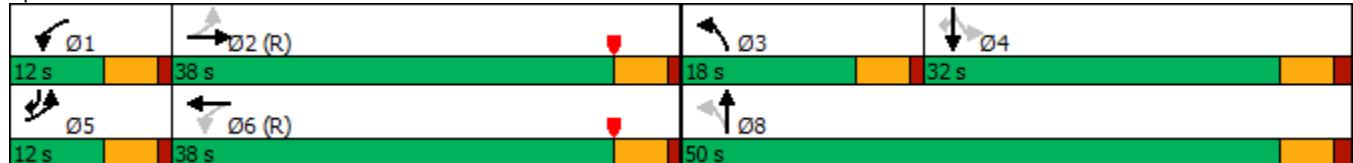
ICU Level of Service C

Analysis Period (min) 15

\* User Entered Value

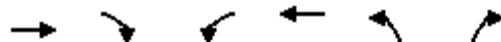
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Genesee/Brown & Main

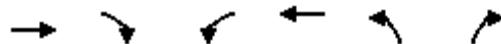


Lanes, Volumes, Timings  
4: Chili & West /Main

Bull's Head - Brown St. Closure Analysis  
AM 2024 Base Conditons



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø6
Lane Configurations	↑	↓	↑	↑	↑	↑	
Traffic Volume (vph)	315	4	214	199	25	538	
Future Volume (vph)	315	4	214	199	25	538	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	10	10	11	12	10	
Storage Length (ft)		200	0		0	0	
Storage Lanes		0	1		1	1	
Taper Length (ft)			25		25		
Satd. Flow (prot)	1625	0	1546	1655	1805	1449	
Flt Permitted				0.210		0.950	
Satd. Flow (perm)	1625	0	340	1655	1767	1417	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	1				258		
Link Speed (mph)	30			30	30		
Link Distance (ft)	1754			378	136		
Travel Time (s)	39.9			8.6	3.1		
Confl. Peds. (#/hr)		5	5		8	1	
Peak Hour Factor	0.79	0.79	0.89	0.89	0.89	0.89	
Heavy Vehicles (%)	9%	0%	9%	11%	0%	4%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	404	0	240	224	28	604	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(ft)	0			20	12		
Link Offset(ft)	0			0	0		
Crosswalk Width(ft)	16			16	16		
Two way Left Turn Lane							
Headway Factor	1.09	1.09	*0.90	*0.90	*0.90	*0.90	
Turning Speed (mph)		9	15		15	9	
Turn Type	NA		custom	NA	Perm	pm+ov	
Protected Phases	2		1	1 6		1	6
Permitted Phases			6		8	8	
Detector Phase	2		1	6	8	1	
Switch Phase							
Minimum Initial (s)	6.0		10.0		6.0	10.0	10.0
Minimum Split (s)	24.0		15.0		24.0	15.0	24.0
Total Split (s)	42.0		34.0		24.0	34.0	76.0
Total Split (%)	42.0%		34.0%		24.0%	34.0%	76%
Yellow Time (s)	4.0		4.0		4.0	4.0	4.0
All-Red Time (s)	1.0		1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0	
Total Lost Time (s)	5.0		5.0		5.0	5.0	
Lead/Lag	Lag		Lead			Lead	
Lead-Lag Optimize?							
Recall Mode	None		C-Max		None	C-Max	None
Act Effct Green (s)	29.2		85.2	87.2	9.2	57.8	
Actuated g/C Ratio	0.29		0.85	0.87	0.09	0.58	
v/c Ratio	0.85		0.27	0.16	0.17	0.64	
Control Delay	50.0		7.5	1.4	41.7	12.3	



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø6
Queue Delay	0.8		0.0	0.0	0.0	0.0	
Total Delay	50.8		7.5	1.4	41.7	12.3	
LOS	D		A	A	D	B	
Approach Delay	50.8			4.5	13.6		
Approach LOS	D			A	B		
Queue Length 50th (ft)	240		8	6	17	121	
Queue Length 95th (ft)	266		101	54	39	273	
Internal Link Dist (ft)	1674			298	56		
Turn Bay Length (ft)							
Base Capacity (vph)	601		905	1443	335	944	
Starvation Cap Reductn	0		0	0	0	0	
Spillback Cap Reductn	47		0	0	0	7	
Storage Cap Reductn	0		0	0	0	0	
Reduced v/c Ratio	0.73		0.27	0.16	0.08	0.64	

#### Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 65 (65%), Referenced to phase 1:WBTL, Start of Yellow

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.85

Intersection Signal Delay: 20.8

Intersection LOS: C

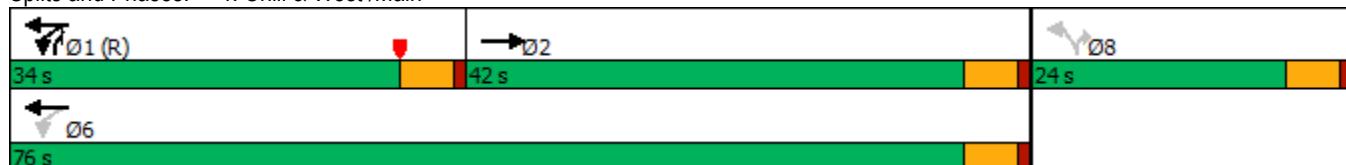
Intersection Capacity Utilization 58.6%

ICU Level of Service B

Analysis Period (min) 15

\* User Entered Value

#### Splits and Phases: 4: Chili & West /Main



Lanes, Volumes, Timings  
5: Appleton/Ames & West

Bull's Head - Brown St. Closure Analysis  
AM 2024 Base Conditons

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↓		↑	↓		↑	↓		↑	↓	↑
Traffic Volume (vph)	138	279	9	0	171	54	2	43	4	84	52	200
Future Volume (vph)	138	279	9	0	171	54	2	43	4	84	52	200
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10	12	12	12	12	12	12
Storage Length (ft)	50		0	50		0	0		0	125		125
Storage Lanes	1		0	1		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1532	1622	0	1773	1498	0	0	1762	0	0	1729	1495
Flt Permitted	0.576							0.991			0.824	
Satd. Flow (perm)	922	1622	0	1773	1498	0	0	1749	0	0	1467	1462
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			30			5				235
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1910			1754			679				962
Travel Time (s)		43.4			39.9			15.4				21.9
Confl. Peds. (#/hr)	10		1	1		10	1		1	1		1
Peak Hour Factor	0.85	0.85	0.85	0.81	0.81	0.81	0.88	0.88	0.88	0.85	0.85	0.85
Heavy Vehicles (%)	10%	9%	0%	0%	14%	11%	0%	7%	0%	7%	6%	8%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	162	339	0	0	278	0	0	56	0	0	160	235
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		10			10			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		2
Detector Phase	1	1		1	1		2	2		2	2	2
Switch Phase												
Minimum Initial (s)	18.0	18.0		18.0	18.0		6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	43.0	43.0		43.0	43.0		26.0	26.0		26.0	26.0	26.0
Total Split (s)	45.0	45.0		45.0	45.0		35.0	35.0		35.0	35.0	35.0
Total Split (%)	56.3%	56.3%		56.3%	56.3%		43.8%	43.8%		43.8%	43.8%	43.8%
Yellow Time (s)	4.0	4.0		4.0	4.0		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0		-2.5			-2.5		-1.0
Total Lost Time (s)	3.0	3.0		3.0	3.0		3.0			3.0		4.5
Lead/Lag	Lead	Lead		Lead	Lead		Lag	Lag		Lag	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	None
Act Effct Green (s)	56.9	56.9			56.9			17.1			17.1	15.6
Actuated g/C Ratio	0.71	0.71			0.71			0.21			0.21	0.20
v/c Ratio	0.25	0.29			0.26			0.15			0.51	0.50
Control Delay	6.2	5.8			5.1			22.5			32.5	7.4

Lanes, Volumes, Timings  
5: Appleton/Ames & West

Bull's Head - Brown St. Closure Analysis  
AM 2024 Base Condition



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0						0.0			0.0	0.0
Total Delay	6.2	5.8			5.1			22.5			32.5	7.4
LOS	A	A			A			C			C	A
Approach Delay		5.9			5.1			22.5			17.6	
Approach LOS		A			A			C			B	
Queue Length 50th (ft)	23	50			35			21			71	0
Queue Length 95th (ft)	59	106			74			44			108	42
Internal Link Dist (ft)		1830			1674			599			882	
Turn Bay Length (ft)		50										125
Base Capacity (vph)	655	1153			1073			702			586	702
Starvation Cap Reductn	0	0			0			0			0	0
Spillback Cap Reductn	0	0			0			0			0	0
Storage Cap Reductn	0	0			0			0			0	0
Reduced v/c Ratio	0.25	0.29			0.26			0.08			0.27	0.33

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 0 (0%), Referenced to phase 1:EBWB, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.51

Intersection Signal Delay: 10.2

Intersection LOS: B

Intersection Capacity Utilization 69.9%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 5: Appleton/Ames & West



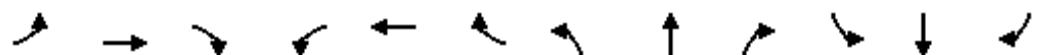
Lanes, Volumes, Timings  
6: Child & Maple

Bull's Head - Brown St. Closure Analysis  
AM 2024 Base Conditions

	↙	→	↘	↗	←	↖	↑	↗	↘	↓	↗	
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	54	45	6	1	25	7	7	138	9	16	133	22
Future Volume (vph)	54	45	6	1	25	7	7	138	9	16	133	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	14	14	14	14	14	15	15	15	12	12	12
Satd. Flow (prot)	0	1669	0	0	1684	0	0	1889	0	0	1688	0
Flt Permitted		0.831			0.989			0.986			0.966	
Satd. Flow (perm)	0	1420	0	0	1669	0	0	1867	0	0	1638	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			13			6			14	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		677			1774			247			405	
Travel Time (s)		15.4			40.3			5.6			9.2	
Confl. Peds. (#/hr)	2		1	1		2			3	3		
Peak Hour Factor	0.81	0.81	0.81	0.55	0.55	0.55	0.76	0.76	0.76	0.86	0.86	0.86
Heavy Vehicles (%)	17%	18%	17%	0%	13%	29%	14%	9%	11%	0%	8%	29%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	130	0	0	60	0	0	203	0	0	200	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.88	0.88	0.88	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA										
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Detector Phase	4	4		4	4		2	2		2	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	26.0	26.0		26.0	26.0		24.0	24.0		24.0	24.0	
Total Split (s)	36.0	36.0		36.0	36.0		36.0	36.0		36.0	36.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-3.0			-3.0			-3.0			-3.0		
Total Lost Time (s)		3.0			3.0			3.0			3.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)		13.6			13.6			19.9			19.9	
Actuated g/C Ratio		0.38			0.38			0.55			0.55	
v/c Ratio		0.24			0.09			0.20			0.22	
Control Delay		8.6			6.3			7.5			7.6	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		8.6			6.3			7.5			7.6	
LOS		A			A			A			A	

Lanes, Volumes, Timings  
6: Child & Maple

Bull's Head - Brown St. Closure Analysis  
AM 2024 Base Condition



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		8.6			6.3			7.5			7.6	
Approach LOS			A			A			A			A
Queue Length 50th (ft)		12			4			18			18	
Queue Length 95th (ft)		40			12			57			65	
Internal Link Dist (ft)		597			1694			167			325	
Turn Bay Length (ft)												
Base Capacity (vph)		1305			1535			1716			1506	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.10			0.04			0.12			0.13	

Intersection Summary

Area Type: Other

Cycle Length: 72

Actuated Cycle Length: 36

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.24

Intersection Signal Delay: 7.7

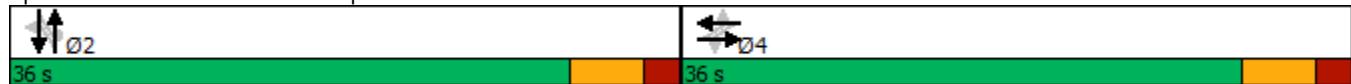
Intersection LOS: A

Intersection Capacity Utilization 33.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: Child & Maple



Lanes, Volumes, Timings  
7: Brown

Bull's Head - Brown St. Closure Analysis  
AM 2024 Base Conditions

	↙	→	↘	↗	←	↖	↑	↗	↘	↓	↖	
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	10	70	304	10	10	29	10	303	10	10	10
Future Volume (vph)	10	10	70	304	10	10	29	10	303	10	10	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1659	0	0	1772	0	0	1633	0	0	1750	0
Flt Permitted		0.995			0.955			0.996			0.984	
Satd. Flow (perm)	0	1659	0	0	1772	0	0	1633	0	0	1750	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		871			187			307			740	
Travel Time (s)		19.8			4.3			7.0			16.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	100	0	0	360	0	0	380	0	0	33	0
Enter Blocked Intersection	No	No	No									
Lane Alignment	Left	Left	Right									
Median Width(ft)		0			0			10			10	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary

Area Type: Other

Control Type: Roundabout

Intersection Capacity Utilization 53.1%

ICU Level of Service A

Analysis Period (min) 15



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↓		↑	↑	↑↓	
Traffic Volume (vph)	653	11	20	365	5	9
Future Volume (vph)	653	11	20	365	5	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	50		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			25		25	
Satd. Flow (prot)	3532	0	1770	1863	1676	0
Flt Permitted			0.950		0.982	
Satd. Flow (perm)	3532	0	1770	1863	1676	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	313			177	272	
Travel Time (s)	7.1			4.0	6.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)						
Lane Group Flow (vph)	738	0	22	406	16	0
Enter Blocked Intersection	Yes	No	No	Yes	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	*0.90	*0.90	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

#### Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 29.2% ICU Level of Service A

Analysis Period (min) 15

\* User Entered Value

Lanes, Volumes, Timings  
9: Genesee

Bull's Head - Brown St. Closure Analysis  
AM 2024 Base Conditons



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Volume (vph)	0	0	413	0	0	544
Future Volume (vph)	0	0	413	0	0	544
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	1863	0	1863	0	0	1863
Flt Permitted						
Satd. Flow (perm)	1863	0	1863	0	0	1863
Link Speed (mph)	30		30			30
Link Distance (ft)	287		350			355
Travel Time (s)	6.5		8.0			8.1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	459	0	0	604
Enter Blocked Intersection	No	No	Yes	No	No	Yes
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 32.0%

ICU Level of Service A

Analysis Period (min) 15

BASE CONDITIONS

Evening Peak Hour

Lanes, Volumes, Timings  
1: Jefferson & Main

Bull's Head - Brown St. Closure Analysis  
PM 2024 Base Conditions

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↓		↑	↑↓			↔		↑	↑↓	
Traffic Volume (vph)	38	573	15	71	651	13	55	110	78	31	150	16
Future Volume (vph)	38	573	15	71	651	13	55	110	78	31	150	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10	10	10	10	10	10	10
Storage Length (ft)	75		0	100		0	50		0	100		0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1685	3287	0	1668	3260	0	0	1583	0	1491	1727	0
Flt Permitted	0.320			0.383				0.773		0.436		
Satd. Flow (perm)	563	3287	0	670	3260	0	0	1233	0	681	1727	0
Right Turn on Red			Yes				Yes			Yes		Yes
Satd. Flow (RTOR)		5			4			22			5	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		325			653			1957			388	
Travel Time (s)		7.4			14.8			44.5			8.8	
Confl. Peds. (#/hr)	18		7	7		18	15		6	6		15
Peak Hour Factor	0.88	0.88	0.88	0.82	0.82	0.82	0.87	0.87	0.87	0.89	0.89	0.89
Heavy Vehicles (%)	0%	2%	3%	1%	3%	0%	7%	3%	7%	13%	1%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	43	668	0	87	810	0	0	279	0	35	187	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		10			10			10			10	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA										
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Detector Phase	1	1		1	1		2	2		2	2	
Switch Phase												
Minimum Initial (s)	21.0	21.0		21.0	21.0		6.0	6.0		6.0	6.0	
Minimum Split (s)	40.0	40.0		40.0	40.0		30.0	30.0		30.0	30.0	
Total Split (s)	70.0	70.0		70.0	70.0		30.0	30.0		30.0	30.0	
Total Split (%)	70.0%	70.0%		70.0%	70.0%		30.0%	30.0%		30.0%	30.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.5		6.5	6.5		
Lead/Lag	Lead	Lead		Lead	Lead		Lag	Lag		Lag	Lag	
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)	65.2	65.2		65.2	65.2			22.3		22.3	22.3	
Actuated g/C Ratio	0.65	0.65		0.65	0.65			0.22		0.22	0.22	
v/c Ratio	0.12	0.31		0.20	0.38		0.96		0.23	0.48		
Control Delay	7.7	6.8		8.8	8.9		78.9		35.5	37.1		

Lanes, Volumes, Timings  
1: Jefferson & Main

Bull's Head - Brown St. Closure Analysis  
PM 2024 Base Conditions



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Total Delay	7.7	6.8		8.8	8.9			78.9		35.5	37.1	
LOS	A	A		A	A			E		D	D	
Approach Delay		6.8			8.9			78.9			36.8	
Approach LOS		A			A			E			D	
Queue Length 50th (ft)	2	18		21	117			162		18	100	
Queue Length 95th (ft)	22	100		39	134			#301		46	165	
Internal Link Dist (ft)		245			573			1877			308	
Turn Bay Length (ft)	75			100						100		
Base Capacity (vph)	366	2143		436	2125			306		160	409	
Starvation Cap Reductn	0	0		0	0			0		0	0	
Spillback Cap Reductn	0	0		0	0			0		0	0	
Storage Cap Reductn	0	0		0	0			0		0	0	
Reduced v/c Ratio	0.12	0.31		0.20	0.38			0.91		0.22	0.46	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 34 (34%), Referenced to phase 1:EBWB, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.96

Intersection Signal Delay: 20.4

Intersection LOS: C

Intersection Capacity Utilization 92.7%

ICU Level of Service F

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: Jefferson & Main



Lanes, Volumes, Timings  
2: Henion/Rite Aid & Main

Bull's Head - Brown St. Closure Analysis  
PM 2024 Base Conditions

	→	→	→	←	←	↑	↑	↑	↓	↓	↙	
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑		↑	↑					↔		
Traffic Volume (vph)	27	560	17	84	678	37	0	0	0	24	26	22
Future Volume (vph)	27	560	17	84	678	37	0	0	0	24	26	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	50		0	50		0	0	0	0	0	0	0
Storage Lanes	1		0	1		0	0	0	0	0	0	0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1805	1836	0	1736	1790	0	0	0	0	0	1768	0
Flt Permitted	0.296			0.391							0.984	
Satd. Flow (perm)	562	1836	0	706	1790	0	0	0	0	0	1744	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			5						23	
Link Speed (mph)	30			30			30			30		
Link Distance (ft)	177			1167			322			169		
Travel Time (s)	4.0			26.5			7.3			3.8		
Confl. Peds. (#/hr)	20		19	19		20	10		19	19		10
Peak Hour Factor	0.93	0.93	0.93	0.89	0.89	0.89	0.72	0.72	0.72	0.89	0.89	0.89
Heavy Vehicles (%)	0%	3%	0%	4%	3%	0%	2%	2%	2%	0%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	5	5	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	29	620	0	94	804	0	0	0	0	0	81	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.03	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA					Perm	NA	
Protected Phases		2			6						4	
Permitted Phases	2			6						4		
Detector Phase	2	2		6	6					4	4	
Switch Phase												
Minimum Initial (s)	25.0	25.0		25.0	25.0					6.0	6.0	
Minimum Split (s)	31.0	31.0		31.0	31.0					33.0	33.0	
Total Split (s)	65.0	65.0		65.0	65.0					35.0	35.0	
Total Split (%)	65.0%	65.0%		65.0%	65.0%					35.0%	35.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0					3.5	3.5	
All-Red Time (s)	2.0	2.0		2.0	2.0					2.5	2.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0					0.0		
Total Lost Time (s)	6.0	6.0		6.0	6.0					6.0		
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max					None	None	
Act Effct Green (s)	78.0	78.0		78.0	78.0						13.6	
Actuated g/C Ratio	0.78	0.78		0.78	0.78						0.14	
v/c Ratio	0.07	0.43		0.17	0.58						0.32	
Control Delay	3.7	4.5		2.0	6.3						29.3	

Lanes, Volumes, Timings  
2: Henion/Rite Aid & Main

Bull's Head - Brown St. Closure Analysis  
PM 2024 Base Conditions



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.2		0.0	0.0						0.0	
Total Delay	3.7	4.7		2.0	6.3						29.3	
LOS	A	A		A	A						C	
Approach Delay		4.6			5.9						29.3	
Approach LOS		A			A						C	
Queue Length 50th (ft)	2	56		3	102						36	
Queue Length 95th (ft)	m8	167		m11	m457						68	
Internal Link Dist (ft)		97			1087			242			89	
Turn Bay Length (ft)	50		50									
Base Capacity (vph)	438	1433		550	1398						522	
Starvation Cap Reductn	0	229		0	0						0	
Spillback Cap Reductn	0	0		0	0						0	
Storage Cap Reductn	0	0		0	0						0	
Reduced v/c Ratio	0.07	0.51		0.17	0.58						0.16	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 32 (32%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.58

Intersection Signal Delay: 6.5

Intersection LOS: A

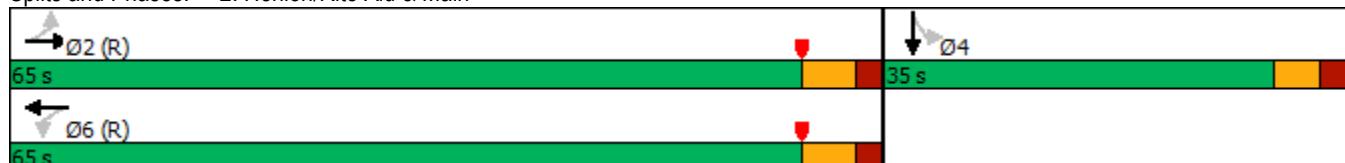
Intersection Capacity Utilization 87.2%

ICU Level of Service E

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Henion/Rite Aid & Main



Lanes, Volumes, Timings  
3: Genesee/Brown & Main

Bull's Head - Brown St. Closure Analysis  
PM 2024 Base Conditons

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑↓		↑	↑↓		↑	↑↓		↑	↑	↑
Traffic Volume (vph)	154	449	158	172	551	97	255	255	174	57	258	222
Future Volume (vph)	154	449	158	172	551	97	255	255	174	57	258	222
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10	10	10	10	10	15	10
Storage Length (ft)	150		225	200		200	0		0	100		200
Storage Lanes	1		1	1		1	1		0	1		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1560	3089	0	1589	3199	0	1604	1586	0	1685	2029	1463
Flt Permitted	0.239			0.252			0.224			0.502		
Satd. Flow (perm)	391	3089	0	417	3199	0	378	1586	0	890	2029	1442
Right Turn on Red			No			No			No		No	
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		378			313			355			307	
Travel Time (s)		8.6			7.1			8.1			7.0	
Confl. Peds. (#/hr)	5		18	18		5	2		1	1		2
Peak Hour Factor	0.89	0.89	0.89	0.88	0.88	0.88	0.95	0.95	0.95	0.93	0.93	0.93
Heavy Vehicles (%)	8%	3%	4%	6%	3%	0%	5%	4%	5%	0%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	173	682	0	195	736	0	268	451	0	61	277	239
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		10			10			10			10	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	*0.90	*0.90	*0.90	*0.90	*0.90	*0.90	*0.90	*0.90	*0.90	*0.90	*0.90	*0.90
Turning Speed (mph)	15		9	15		9	15		9	15		25
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		Perm	NA	pm+ov
Protected Phases	5	2		1	6		3	8			4	5
Permitted Phases	2			6			8			4		4
Detector Phase	5	2		1	6		3	8		4	4	5
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0		6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	11.0	29.0		11.0	29.0		11.0	28.5		28.5	28.5	11.0
Total Split (s)	12.0	33.0		12.0	33.0		20.0	55.0		35.0	35.0	12.0
Total Split (%)	12.0%	33.0%		12.0%	33.0%		20.0%	55.0%		35.0%	35.0%	12.0%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.5		1.5	1.5	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.5		5.5	5.5	5.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead			Lag	Lag	Lead
Lead-Lag Optimize?												
Recall Mode	None	C-Max		None	C-Max		None	None		None	None	None
Act Effct Green (s)	46.0	33.6		47.7	34.5		38.1	37.6		18.2	18.2	31.1
Actuated g/C Ratio	0.46	0.34		0.48	0.34		0.38	0.38		0.18	0.18	0.31
v/c Ratio	0.54	0.66		0.55	0.67		0.84	0.76		0.38	0.75	0.53
Control Delay	21.0	36.1		21.5	25.2		45.4	35.4		41.1	51.0	28.3

Lanes, Volumes, Timings  
3: Genesee/Brown & Main

Bull's Head - Brown St. Closure Analysis  
PM 2024 Base Conditions



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.5		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	21.0	36.5		21.5	25.2		45.4	35.4		41.1	51.0	28.3
LOS	C	D		C	C		D	D		D	D	C
Approach Delay		33.4			24.4			39.1			40.6	
Approach LOS		C			C			D			D	
Queue Length 50th (ft)	67	218		44	204		123	244		35	169	113
Queue Length 95th (ft)	m116	288		93	265		#202	327		70	238	168
Internal Link Dist (ft)		298			233			275			227	
Turn Bay Length (ft)	150			200						100		200
Base Capacity (vph)	323	1039		354	1104		328	785		262	598	450
Starvation Cap Reductn	0	93		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.54	0.72		0.55	0.67		0.82	0.57		0.23	0.46	0.53

#### Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

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

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 33.3

Intersection LOS: C

Intersection Capacity Utilization 76.1%

ICU Level of Service D

Analysis Period (min) 15

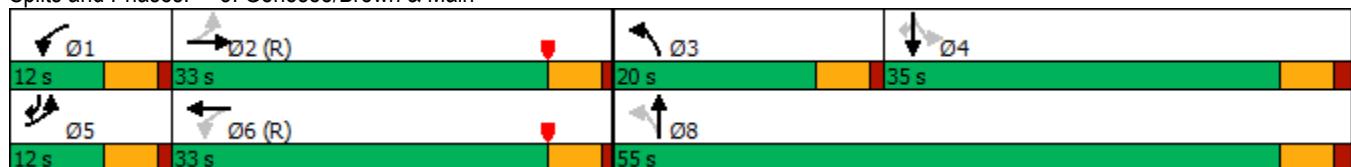
\* User Entered Value

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

#### Splits and Phases: 3: Genesee/Brown & Main

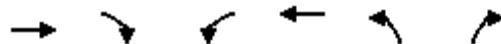


Lanes, Volumes, Timings  
4: Chili & West /Main

Bull's Head - Brown St. Closure Analysis  
PM 2024 Base Conditons



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø6
Lane Configurations	↑	↓	↖	↑	↖	↑	
Traffic Volume (vph)	270	2	543	438	25	477	
Future Volume (vph)	270	2	543	438	25	477	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	10	10	11	12	10	
Storage Length (ft)		200	0		0	0	
Storage Lanes		0	1		1	1	
Taper Length (ft)			25		25		
Satd. Flow (prot)	1720	0	1636	1717	1770	1422	
Flt Permitted			0.234		0.950		
Satd. Flow (perm)	1720	0	395	1717	1681	1422	
Right Turn on Red		Yes			Yes		
Satd. Flow (RTOR)					195		
Link Speed (mph)	30			30	30		
Link Distance (ft)	1754			378	136		
Travel Time (s)	39.9			8.6	3.1		
Confl. Peds. (#/hr)		17	17		19		
Peak Hour Factor	0.96	0.96	0.95	0.95	0.89	0.89	
Heavy Vehicles (%)	3%	0%	3%	7%	2%	6%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	283	0	572	461	28	536	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(ft)	0			20	12		
Link Offset(ft)	0			0	0		
Crosswalk Width(ft)	16			16	16		
Two way Left Turn Lane							
Headway Factor	1.09	1.09	*0.90	*0.90	*0.90	*0.90	
Turning Speed (mph)		9	15		15	9	
Turn Type	NA		custom	NA	Perm	pm+ov	
Protected Phases	2		1	1 6		1	6
Permitted Phases			6		8	8	
Detector Phase	2		1	6	8	1	
Switch Phase							
Minimum Initial (s)	6.0		10.0		6.0	10.0	10.0
Minimum Split (s)	24.0		15.0		24.0	15.0	24.0
Total Split (s)	29.0		47.0		24.0	47.0	76.0
Total Split (%)	29.0%		47.0%		24.0%	47.0%	76%
Yellow Time (s)	4.0		4.0		4.0	4.0	4.0
All-Red Time (s)	1.0		1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0	
Total Lost Time (s)	5.0		5.0		5.0	5.0	
Lead/Lag	Lag		Lead		Lead		
Lead-Lag Optimize?							
Recall Mode	None		C-Max		None	C-Max	None
Act Effct Green (s)	19.9		85.2	87.2	9.3	70.1	
Actuated g/C Ratio	0.20		0.85	0.87	0.09	0.70	
v/c Ratio	0.83		0.53	0.31	0.18	0.51	
Control Delay	50.6		7.1	2.8	41.9	6.5	



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø6
Queue Delay	0.0		0.2	0.3	0.0	0.1	
Total Delay	50.6		7.3	3.2	41.9	6.6	
LOS	D		A	A	D	A	
Approach Delay	50.6			5.5	8.4		
Approach LOS	D			A	A		
Queue Length 50th (ft)	180		108	66	17	81	
Queue Length 95th (ft)	177		m158	m91	39	166	
Internal Link Dist (ft)	1674			298	56		
Turn Bay Length (ft)							
Base Capacity (vph)	412		1084	1496	319	1055	
Starvation Cap Reductn	0		108	530	0	0	
Spillback Cap Reductn	0		0	0	0	61	
Storage Cap Reductn	0		0	0	0	0	
Reduced v/c Ratio	0.69		0.59	0.48	0.09	0.54	

#### Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 28 (28%), Referenced to phase 1:WBTL, Start of Yellow

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.83

Intersection Signal Delay: 13.1

Intersection LOS: B

Intersection Capacity Utilization 62.6%

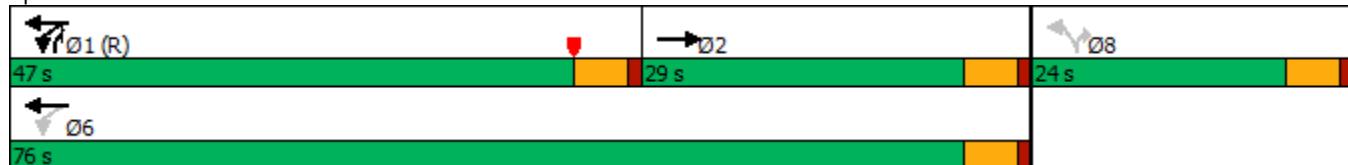
ICU Level of Service B

Analysis Period (min) 15

\* User Entered Value

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Chili & West /Main



Lanes, Volumes, Timings  
5: Appleton/Ames & West

Bull's Head - Brown St. Closure Analysis  
PM 2024 Base Conditions

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↓		↑	↓		↑	↓		↑	↓	↑
Traffic Volume (vph)	208	257	9	4	338	132	4	57	9	65	64	220
Future Volume (vph)	208	257	9	4	338	132	4	57	9	65	64	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10	12	12	12	12	12	12
Storage Length (ft)	50		0	50		0	0		0	125		125
Storage Lanes	1		0	1		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1636	1697	0	1348	1593	0	0	1706	0	0	1756	1599
Flt Permitted	0.424			0.583			0.982			0.797		
Satd. Flow (perm)	727	1697	0	822	1593	0	0	1680	0	0	1425	1554
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			30			8				242
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1910			1754			679				962
Travel Time (s)		43.4			39.9			15.4				21.9
Confl. Peds. (#/hr)	8		7	7		8	3		6	6		3
Peak Hour Factor	0.92	0.92	0.92	0.86	0.86	0.86	0.76	0.76	0.76	0.91	0.91	0.91
Heavy Vehicles (%)	3%	4%	0%	25%	6%	5%	22%	9%	0%	5%	6%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	226	289	0	5	546	0	0	92	0	0	141	242
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		10			10			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		2
Detector Phase	1	1		1	1		2	2		2	2	2
Switch Phase												
Minimum Initial (s)	18.0	18.0		18.0	18.0		6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	43.0	43.0		43.0	43.0		26.0	26.0		26.0	26.0	26.0
Total Split (s)	60.0	60.0		60.0	60.0		40.0	40.0		40.0	40.0	40.0
Total Split (%)	60.0%	60.0%		60.0%	60.0%		40.0%	40.0%		40.0%	40.0%	40.0%
Yellow Time (s)	4.0	4.0		4.0	4.0		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0			0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0		5.5			5.5	5.5	5.5
Lead/Lag	Lead	Lead		Lead	Lead		Lag	Lag		Lag	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	None
Act Effct Green (s)	73.1	73.1		73.1	73.1			15.4			15.4	15.4
Actuated g/C Ratio	0.73	0.73		0.73	0.73			0.15			0.15	0.15
v/c Ratio	0.43	0.23		0.01	0.47			0.35			0.64	0.55
Control Delay	9.3	5.5		3.8	5.4			36.4			52.4	9.5



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Delay	9.3	5.5		3.8	5.4			36.4			52.4	9.5
LOS	A	A		A	A			D			D	A
Approach Delay		7.2			5.3			36.4			25.3	
Approach LOS		A			A			D			C	
Queue Length 50th (ft)	47	50		1	67			48			86	0
Queue Length 95th (ft)	121	104		m3	115			73			138	61
Internal Link Dist (ft)		1830			1674			599			882	
Turn Bay Length (ft)	50			50								125
Base Capacity (vph)	531	1241		601	1172			584			491	694
Starvation Cap Reductn	0	0		0	0			0			0	0
Spillback Cap Reductn	0	0		0	0			0			0	0
Storage Cap Reductn	0	0		0	0			0			0	0
Reduced v/c Ratio	0.43	0.23		0.01	0.47			0.16			0.29	0.35

#### Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 15 (15%), Referenced to phase 1:EBWB, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 12.8

Intersection LOS: B

Intersection Capacity Utilization 74.2%

ICU Level of Service D

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Appleton/Ames & West



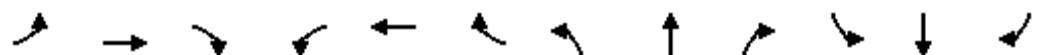
Lanes, Volumes, Timings  
6: Child & Maple

Bull's Head - Brown St. Closure Analysis  
PM 2024 Base Conditions

	→	→	→	←	←	↑	↑	↑	↓	↓	↙	
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	68	17	15	49	11	13	183	9	26	217	57
Future Volume (vph)	82	68	17	15	49	11	13	183	9	26	217	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	14	14	14	14	14	15	15	15	12	12	12
Satd. Flow (prot)	0	1763	0	0	1859	0	0	1954	0	0	1760	0
Flt Permitted		0.822			0.926			0.972			0.963	
Satd. Flow (perm)	0	1483	0	0	1737	0	0	1905	0	0	1701	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			13			4			22	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		677			1774			247			405	
Travel Time (s)		15.4			40.3			5.6			9.2	
Confl. Peds. (#/hr)	2		4	4		2	2		5	5		2
Peak Hour Factor	0.78	0.78	0.78	0.86	0.86	0.86	0.84	0.84	0.84	0.86	0.86	0.86
Heavy Vehicles (%)	11%	9%	12%	9%	4%	7%	8%	6%	0%	0%	4%	7%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	214	0	0	87	0	0	244	0	0	348	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.88	0.88	0.88	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA										
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Detector Phase	4	4		4	4		2	2		2	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	26.0	26.0		26.0	26.0		24.0	24.0		24.0	24.0	
Total Split (s)	36.0	36.0		36.0	36.0		36.0	36.0		36.0	36.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-3.0			-3.0			-3.0			-3.0		
Total Lost Time (s)		3.0			3.0			3.0			3.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)		15.7			15.7			20.8			20.8	
Actuated g/C Ratio		0.37			0.37			0.49			0.49	
v/c Ratio		0.39			0.13			0.26			0.41	
Control Delay		11.8			8.6			8.0			9.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		11.8			8.6			8.0			9.1	
LOS		B			A			A			A	

Lanes, Volumes, Timings  
6: Child & Maple

Bull's Head - Brown St. Closure Analysis  
PM 2024 Base Condition



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		11.8			8.6			8.0			9.1	
Approach LOS			B			A			A			A
Queue Length 50th (ft)		28			9			28			41	
Queue Length 95th (ft)		73			35			74			110	
Internal Link Dist (ft)		597			1694			167			325	
Turn Bay Length (ft)												
Base Capacity (vph)		1182			1385			1516			1358	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.18			0.06			0.16			0.26	

Intersection Summary

Area Type: Other

Cycle Length: 72

Actuated Cycle Length: 42.7

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.41

Intersection Signal Delay: 9.4

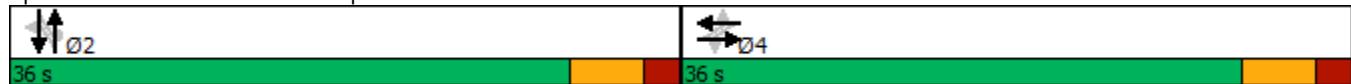
Intersection LOS: A

Intersection Capacity Utilization 45.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: Child & Maple



Lanes, Volumes, Timings  
7: Brown

Bull's Head - Brown St. Closure Analysis  
PM 2024 Base Conditions

	↙	→	↘	↗	←	↖	↑	↗	↘	↓	↖	
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	10	72	455	10	10	69	10	427	10	10	10
Future Volume (vph)	10	10	72	455	10	10	69	10	427	10	10	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1657	0	0	1772	0	0	1639	0	0	1750	0
Flt Permitted		0.995			0.954			0.993			0.984	
Satd. Flow (perm)	0	1657	0	0	1772	0	0	1639	0	0	1750	0
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		871			187			307			740	
Travel Time (s)		19.8			4.3			7.0			16.8	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	102	0	0	528	0	0	562	0	0	33	0
Enter Blocked Intersection	No	No	No									
Lane Alignment	Left	Left	Right									
Median Width(ft)		0			0			10			10	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary

Area Type: Other

Control Type: Roundabout

Intersection Capacity Utilization 73.0%

ICU Level of Service C

Analysis Period (min) 15

Lanes, Volumes, Timings  
8: Churchlea Pl & Main

Bull's Head - Brown St. Closure Analysis  
PM 2024 Base Conditons



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↓		↑	↑	↑↓	
Traffic Volume (vph)	676	4	7	810	10	18
Future Volume (vph)	676	4	7	810	10	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	50		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			25		25	
Satd. Flow (prot)	3536	0	1770	1863	1672	0
Flt Permitted			0.950		0.983	
Satd. Flow (perm)	3536	0	1770	1863	1672	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	313			177	272	
Travel Time (s)	7.1			4.0	6.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)						
Lane Group Flow (vph)	755	0	8	900	31	0
Enter Blocked Intersection	Yes	No	No	Yes	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	*0.90	*0.90	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 52.6% ICU Level of Service A

Analysis Period (min) 15

\* User Entered Value

Lanes, Volumes, Timings  
9: Genesee

Bull's Head - Brown St. Closure Analysis  
PM 2024 Base Conditons



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↑	↗	↙	↓
Traffic Volume (vph)	0	0	684	0	0	588
Future Volume (vph)	0	0	684	0	0	588
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	1863	0	1863	0	0	1863
Flt Permitted						
Satd. Flow (perm)	1863	0	1863	0	0	1863
Link Speed (mph)	30		30			30
Link Distance (ft)	287		350			355
Travel Time (s)	6.5		8.0			8.1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	760	0	0	653
Enter Blocked Intersection	No	No	Yes	No	No	Yes
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 39.3%

ICU Level of Service A

Analysis Period (min) 15

## REDISTRIBUTION CONDITIONS

Morning Peak Hour

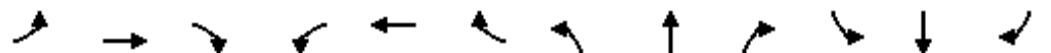
Lanes, Volumes, Timings  
1: Jefferson & Main

Bull's Head - Brown St. Closure Analysis  
AM 2024 Brown Street Closure

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Configurations	1	2	3	4	5	6	7	8	9	10	11	12
Traffic Volume (vph)	141	538	17	31	311	43	22	62	45	77	84	192
Future Volume (vph)	141	538	17	31	311	43	22	62	45	77	84	192
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10	10	10	10	10	10	10
Storage Length (ft)	75		0	100		0	50		0	100		0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1546	3168	0	1636	3032	0	0	1511	0	1574	1481	0
Flt Permitted	0.506			0.430				0.596		0.618		
Satd. Flow (perm)	819	3168	0	739	3032	0	0	908	0	1024	1481	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13			51			50			217	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		325			653			1957			388	
Travel Time (s)		7.4			14.8			44.5			8.8	
Confl. Peds. (#/hr)	11		3	3		11	2		1	1		2
Peak Hour Factor	0.97	0.97	0.97	0.84	0.84	0.84	0.80	0.80	0.80	0.83	0.83	0.83
Heavy Vehicles (%)	9%	5%	29%	3%	8%	14%	11%	14%	5%	7%	7%	6%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	145	573	0	37	421	0	0	162	0	93	332	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		10			10			10			10	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA										
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Detector Phase	1	1		1	1		2	2		2	2	
Switch Phase												
Minimum Initial (s)	21.0	21.0		21.0	21.0		6.0	6.0		6.0	6.0	
Minimum Split (s)	34.0	34.0		34.0	34.0		17.5	17.5		17.5	17.5	
Total Split (s)	35.0	35.0		35.0	35.0		15.0	15.0		15.0	15.0	
Total Split (%)	70.0%	70.0%		70.0%	70.0%		30.0%	30.0%		30.0%	30.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0		-3.5	-3.5		-3.5	-3.5	
Total Lost Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lead/Lag	Lead	Lead		Lead	Lead		Lag	Lag		Lag	Lag	
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)	32.6	32.6		32.6	32.6			11.4		11.4	11.4	
Actuated g/C Ratio	0.65	0.65		0.65	0.65			0.23		0.23	0.23	
v/c Ratio	0.27	0.28		0.08	0.21			0.66		0.40	0.66	
Control Delay	4.0	3.4		3.9	3.5			28.6		22.0	13.9	

Lanes, Volumes, Timings  
1: Jefferson & Main

Bull's Head - Brown St. Closure Analysis  
AM 2024 Brown Street Closure



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Total Delay	4.0	3.4		3.9	3.5			28.6		22.0	13.9	
LOS	A	A		A	A			C		C	B	
Approach Delay		3.6			3.5			28.6			15.7	
Approach LOS		A			A			C			B	
Queue Length 50th (ft)	29	60		3	18			28		23	28	
Queue Length 95th (ft)	13	2		10	28			#79		52	76	
Internal Link Dist (ft)		245			573			1877			308	
Turn Bay Length (ft)	75			100						100		
Base Capacity (vph)	534	2072		482	1996			255		245	520	
Starvation Cap Reductn	0	0		0	0			0		0	0	
Spillback Cap Reductn	0	0		0	0			0		0	0	
Storage Cap Reductn	0	0		0	0			0		0	0	
Reduced v/c Ratio	0.27	0.28		0.08	0.21			0.64		0.38	0.64	

Intersection Summary

Area Type: Other

Cycle Length: 50

Actuated Cycle Length: 50

Offset: 22 (44%), Referenced to phase 1:EBWB, Start of Green

Natural Cycle: 55

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 8.8

Intersection LOS: A

Intersection Capacity Utilization 76.7%

ICU Level of Service D

Analysis Period (min) 15

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: Jefferson & Main



Lanes, Volumes, Timings  
2: Henion/Rite Aid & Main

Bull's Head - Brown St. Closure Analysis  
AM 2024 Brown Street Closure

	→	→	→	←	←	↑	↑	↑	↓	↓	←	
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (vph)	7	680	26	29	474	7	0	0	0	8	5	6
Future Volume (vph)	7	680	26	29	474	7	0	0	0	8	5	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	50		0	50		0	0	0	0	0	0	0
Storage Lanes	1		0	1		0	0	0	0	0	0	0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1805	1785	0	1805	1691	0	0	0	0	0	1672	0
Flt Permitted	0.459			0.347							0.979	
Satd. Flow (perm)	868	1785	0	658	1691	0	0	0	0	0	1663	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			1						8	
Link Speed (mph)	30			30			30			30		
Link Distance (ft)	177			1167			322			169		
Travel Time (s)	4.0			26.5			7.3			3.8		
Confl. Peds. (#/hr)	5		6	6		5	10		6	6		10
Peak Hour Factor	0.95	0.95	0.95	0.92	0.92	0.92	0.90	0.90	0.90	0.75	0.75	0.75
Heavy Vehicles (%)	0%	6%	0%	0%	10%	0%	2%	2%	2%	0%	0%	17%
Bus Blockages (#/hr)	0	0	0	0	5	5	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	7	743	0	32	523	0	0	0	0	0	26	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.03	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA					Perm	NA	
Protected Phases		2			6						4	
Permitted Phases	2			6						4		
Detector Phase	2	2		6	6					4	4	
Switch Phase												
Minimum Initial (s)	25.0	25.0		25.0	25.0				6.0	6.0		
Minimum Split (s)	31.0	31.0		31.0	31.0				33.0	33.0		
Total Split (s)	65.0	65.0		65.0	65.0				35.0	35.0		
Total Split (%)	65.0%	65.0%		65.0%	65.0%				35.0%	35.0%		
Yellow Time (s)	4.0	4.0		4.0	4.0				3.5	3.5		
All-Red Time (s)	2.0	2.0		2.0	2.0				2.5	2.5		
Lost Time Adjust (s)	0.0	0.0		0.0	0.0				0.0			
Total Lost Time (s)	6.0	6.0		6.0	6.0				6.0			
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max				None	None		
Act Effct Green (s)	85.4	85.4		85.4	85.4					9.8		
Actuated g/C Ratio	0.85	0.85		0.85	0.85					0.10		
v/c Ratio	0.01	0.49		0.06	0.36					0.15		
Control Delay	3.3	5.9		3.4	4.0					30.7		

Lanes, Volumes, Timings  
2: Henion/Rite Aid & Main

Bull's Head - Brown St. Closure Analysis  
AM 2024 Brown Street Closure



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0							0.0
Total Delay	3.3	6.0		3.4	4.0							30.7
LOS	A	A		A	A							C
Approach Delay		5.9			4.0							30.7
Approach LOS		A			A							C
Queue Length 50th (ft)	0	132		2	52							11
Queue Length 95th (ft)	m2	223		m12	229							25
Internal Link Dist (ft)		97			1087			242				89
Turn Bay Length (ft)	50		50									
Base Capacity (vph)	741	1525		562	1444							487
Starvation Cap Reductn	0	62		0	0							0
Spillback Cap Reductn	0	0		0	0							0
Storage Cap Reductn	0	0		0	0							0
Reduced v/c Ratio	0.01	0.51		0.06	0.36							0.05

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 19 (19%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.49

Intersection Signal Delay: 5.6

Intersection LOS: A

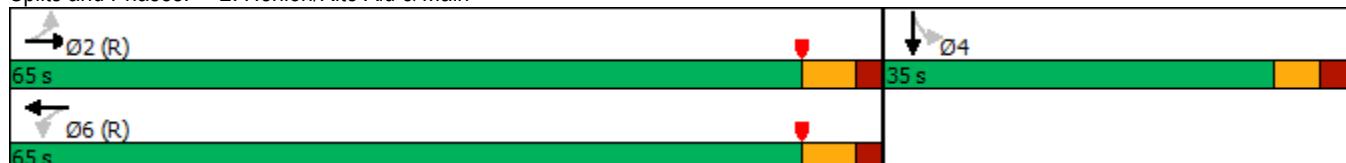
Intersection Capacity Utilization 58.6%

ICU Level of Service B

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Henion/Rite Aid & Main



Lanes, Volumes, Timings  
3: Genesee & Main

Bull's Head - Brown St. Closure Analysis  
AM 2024 Brown Street Closure



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↓		↑	↑↓	↑	↑
Traffic Volume (vph)	528	193	226	258	121	199
Future Volume (vph)	528	193	226	258	121	199
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10
Storage Length (ft)		225	200		0	0
Storage Lanes		1	1		1	1
Taper Length (ft)			25		25	
Satd. Flow (prot)	3078	0	1546	3063	1518	1334
Flt Permitted				0.195		0.950
Satd. Flow (perm)	3078	0	316	3063	1518	1334
Right Turn on Red		No			No	
Satd. Flow (RTOR)						
Link Speed (mph)	30			30	30	
Link Distance (ft)	378			313	355	
Travel Time (s)	8.6			7.1	8.1	
Confl. Peds. (#/hr)		8	8			1
Peak Hour Factor	0.85	0.85	0.95	0.95	0.88	0.88
Heavy Vehicles (%)	3%	7%	9%	10%	11%	13%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	848	0	238	272	138	226
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	10			10	10	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	*0.90	*0.90	*0.90	*0.90	*0.90	*0.90
Turning Speed (mph)		9	15		15	9
Turn Type	NA		pm+pt	NA	Prot	Prot
Protected Phases	2		1	6	8	8
Permitted Phases			6			
Detector Phase	2		1	6	8	8
Switch Phase						
Minimum Initial (s)	10.0		6.0	10.0	6.0	6.0
Minimum Split (s)	29.0		11.0	29.0	28.5	28.5
Total Split (s)	38.0		12.0	50.0	50.0	50.0
Total Split (%)	38.0%		12.0%	50.0%	50.0%	50.0%
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	1.0		1.0	1.0	1.5	1.5
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0		5.0	5.0	5.5	5.5
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?						
Recall Mode	C-Max		None	C-Max	None	None
Act Effct Green (s)	41.5		67.2	67.2	22.3	22.3
Actuated g/C Ratio	0.42		0.67	0.67	0.22	0.22
v/c Ratio	0.66		0.51	0.13	0.41	0.76
Control Delay	21.1		17.4	6.7	35.1	51.8



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Queue Delay	1.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.0		17.4	6.7	35.1	51.8
LOS	C		B	A	D	D
Approach Delay	22.0			11.7	45.5	
Approach LOS	C			B	D	
Queue Length 50th (ft)	137		43	24	76	136
Queue Length 95th (ft)	276		132	42	114	189
Internal Link Dist (ft)	298			233	275	
Turn Bay Length (ft)			200			
Base Capacity (vph)	1277		466	2057	675	593
Starvation Cap Reductn	197		0	0	0	0
Spillback Cap Reductn	0		0	0	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.79		0.51	0.13	0.20	0.38

#### Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 8 (8%), Referenced to phase 2:EBT and 6:WBTL, Start of Yellow

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.76

Intersection Signal Delay: 23.9

Intersection LOS: C

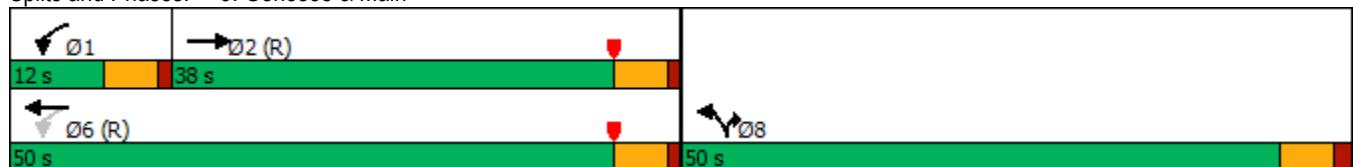
Intersection Capacity Utilization 53.5%

ICU Level of Service A

Analysis Period (min) 15

\* User Entered Value

Splits and Phases: 3: Genesee & Main

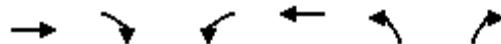


Lanes, Volumes, Timings  
4: Chili & West /Main

Bull's Head - Brown St. Closure Analysis  
AM 2024 Brown Street Closure



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø6
Lane Configurations	↑	↓	↑	↑	↑	↑	
Traffic Volume (vph)	311	4	195	168	25	451	
Future Volume (vph)	311	4	195	168	25	451	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	10	10	11	12	10	
Storage Length (ft)		200	0		0	0	
Storage Lanes		0	1		1	1	
Taper Length (ft)			25		25		
Satd. Flow (prot)	1625	0	1546	1655	1805	1449	
Flt Permitted				0.212		0.950	
Satd. Flow (perm)	1625	0	344	1655	1767	1417	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	1				263		
Link Speed (mph)	30			30	30		
Link Distance (ft)	1754			378	136		
Travel Time (s)	39.9			8.6	3.1		
Confl. Peds. (#/hr)		5	5		8	1	
Peak Hour Factor	0.79	0.79	0.89	0.89	0.89	0.89	
Heavy Vehicles (%)	9%	0%	9%	11%	0%	4%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	399	0	219	189	28	507	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(ft)	0			10	12		
Link Offset(ft)	0			0	0		
Crosswalk Width(ft)	16			16	16		
Two way Left Turn Lane							
Headway Factor	1.09	1.09	*0.90	*0.90	*0.90	*0.90	
Turning Speed (mph)		9	15		15	9	
Turn Type	NA		custom	NA	Perm	pm+ov	
Protected Phases	2		1	1 6		1	6
Permitted Phases			6		8	8	
Detector Phase	2		1	6	8	1	
Switch Phase							
Minimum Initial (s)	6.0		10.0		6.0	10.0	10.0
Minimum Split (s)	24.0		15.0		24.0	15.0	24.0
Total Split (s)	42.0		34.0		24.0	34.0	76.0
Total Split (%)	42.0%		34.0%		24.0%	34.0%	76%
Yellow Time (s)	4.0		4.0		4.0	4.0	4.0
All-Red Time (s)	1.0		1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0	
Total Lost Time (s)	5.0		5.0		5.0	5.0	
Lead/Lag	Lag		Lead			Lead	
Lead-Lag Optimize?							
Recall Mode	None		C-Max		None	C-Max	None
Act Effct Green (s)	28.9		85.2	87.2	9.2	58.1	
Actuated g/C Ratio	0.29		0.85	0.87	0.09	0.58	
v/c Ratio	0.85		0.24	0.13	0.17	0.53	
Control Delay	49.8		4.0	2.1	41.7	8.7	



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø6
Queue Delay	0.9		0.0	0.0	0.0	0.0	
Total Delay	50.7		4.0	2.1	41.7	8.7	
LOS	D		A	A	D	A	
Approach Delay	50.7			3.1	10.4		
Approach LOS	D			A	B		
Queue Length 50th (ft)	237		9	8	17	71	
Queue Length 95th (ft)	262		90	67	39	179	
Internal Link Dist (ft)	1674			298	56		
Turn Bay Length (ft)							
Base Capacity (vph)	601		909	1443	335	949	
Starvation Cap Reductn	0		0	0	0	0	
Spillback Cap Reductn	54		0	0	0	8	
Storage Cap Reductn	0		0	0	0	0	
Reduced v/c Ratio	0.73		0.24	0.13	0.08	0.54	

#### Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 65 (65%), Referenced to phase 1:WBTL, Start of Yellow

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.85

Intersection Signal Delay: 20.2

Intersection LOS: C

Intersection Capacity Utilization 55.8%

ICU Level of Service B

Analysis Period (min) 15

\* User Entered Value

#### Splits and Phases: 4: Chili & West /Main



Lanes, Volumes, Timings  
5: Appleton/Ames & West

Bull's Head - Brown St. Closure Analysis  
AM 2024 Brown Street Closure

	→	→	→	←	←	↑	↑	↑	↓	↓	←	
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	2	3	4	5	6	7	8	9	10	11	12
Traffic Volume (vph)	189	228	9	0	92	102	7	85	4	131	52	279
Future Volume (vph)	189	228	9	0	92	102	7	85	4	131	52	279
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10	12	12	12	12	12	12
Storage Length (ft)	50		0	50		0	0		0	125		125
Storage Lanes	1		0	1		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1532	1621	0	1773	1429	0	0	1770	0	0	1718	1495
Flt Permitted	0.596							0.976			0.695	
Satd. Flow (perm)	954	1621	0	1773	1429	0	0	1734	0	0	1236	1462
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			105			4				328
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1910			1754			679				962
Travel Time (s)		43.4			39.9			15.4				21.9
Confl. Peds. (#/hr)	10		1	1		10	1		1	1		1
Peak Hour Factor	0.85	0.85	0.85	0.81	0.81	0.81	0.88	0.88	0.88	0.85	0.85	0.85
Heavy Vehicles (%)	10%	9%	0%	0%	14%	11%	0%	7%	0%	7%	6%	8%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	222	279	0	0	240	0	0	110	0	0	215	328
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		10			10			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		2
Detector Phase	1	1		1	1		2	2		2	2	2
Switch Phase												
Minimum Initial (s)	18.0	18.0		18.0	18.0		6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	43.0	43.0		43.0	43.0		26.0	26.0		26.0	26.0	26.0
Total Split (s)	45.0	45.0		45.0	45.0		35.0	35.0		35.0	35.0	35.0
Total Split (%)	56.3%	56.3%		56.3%	56.3%		43.8%	43.8%		43.8%	43.8%	43.8%
Yellow Time (s)	4.0	4.0		4.0	4.0		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-3.0		-3.0	-3.0		-2.5			-2.5		-1.0
Total Lost Time (s)	3.0	3.0		3.0	3.0		3.0			3.0		4.5
Lead/Lag	Lead	Lead		Lead	Lead		Lag	Lag		Lag	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	None
Act Effct Green (s)	52.8	52.8			52.8			21.2			21.2	19.7
Actuated g/C Ratio	0.66	0.66			0.66			0.26			0.26	0.25
v/c Ratio	0.35	0.26			0.25			0.24			0.66	0.54
Control Delay	9.5	7.5			4.7			21.5			35.0	6.1

Lanes, Volumes, Timings  
5: Appleton/Ames & West

Bull's Head - Brown St. Closure Analysis  
AM 2024 Brown Street Closure



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0						0.0			0.0	0.0
Total Delay	9.5	7.5			4.7			21.5			35.0	6.1
LOS	A	A			A			C			D	A
Approach Delay		8.4			4.7			21.5			17.6	
Approach LOS		A			A			C			B	
Queue Length 50th (ft)	42	48			22			42			96	0
Queue Length 95th (ft)	102	105			56			68			134	42
Internal Link Dist (ft)		1830			1674			599			882	
Turn Bay Length (ft)		50										125
Base Capacity (vph)	629	1071			979			696			494	760
Starvation Cap Reductn	0	0			0			0			0	0
Spillback Cap Reductn	0	0			0			0			0	0
Storage Cap Reductn	0	0			0			0			0	0
Reduced v/c Ratio	0.35	0.26			0.25			0.16			0.44	0.43

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 0 (0%), Referenced to phase 1:EBWB, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 12.4

Intersection LOS: B

Intersection Capacity Utilization 72.5%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 5: Appleton/Ames & West



Lanes, Volumes, Timings  
6: Child & Maple

Bull's Head - Brown St. Closure Analysis  
AM 2024 Brown Street Closure

	↙	→	↘	↗	←	↖	↑	↗	↘	↓	↗	
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	74	45	31	1	25	9	12	168	14	18	143	28
Future Volume (vph)	74	45	31	1	25	9	12	168	14	18	143	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	14	14	14	14	14	15	15	15	12	12	12
Satd. Flow (prot)	0	1632	0	0	1665	0	0	1881	0	0	1678	0
Flt Permitted		0.830			0.989			0.977			0.961	
Satd. Flow (perm)	0	1385	0	0	1650	0	0	1844	0	0	1620	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		24			16			7			16	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		677			1774			247			405	
Travel Time (s)		15.4			40.3			5.6			9.2	
Confl. Peds. (#/hr)	2		1	1		2			3	3		
Peak Hour Factor	0.81	0.81	0.81	0.55	0.55	0.55	0.76	0.76	0.76	0.86	0.86	0.86
Heavy Vehicles (%)	17%	18%	17%	0%	13%	29%	14%	9%	11%	0%	8%	29%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	185	0	0	63	0	0	255	0	0	220	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.88	0.88	0.88	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA										
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Detector Phase	4	4		4	4		2	2		2	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	26.0	26.0		26.0	26.0		24.0	24.0		24.0	24.0	
Total Split (s)	36.0	36.0		36.0	36.0		36.0	36.0		36.0	36.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-3.0			-3.0			-3.0			-3.0		
Total Lost Time (s)		3.0			3.0			3.0			3.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)		14.4			14.4			19.6			19.6	
Actuated g/C Ratio		0.40			0.40			0.54			0.54	
v/c Ratio		0.33			0.09			0.26			0.25	
Control Delay		8.6			6.1			8.2			8.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		8.6			6.1			8.2			8.1	
LOS		A			A			A			A	

Lanes, Volumes, Timings  
6: Child & Maple

Bull's Head - Brown St. Closure Analysis  
AM 2024 Brown Street Closure



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		8.6			6.1			8.2			8.1	
Approach LOS			A			A			A			A
Queue Length 50th (ft)		17			5			26			21	
Queue Length 95th (ft)		51			12			71			72	
Internal Link Dist (ft)		597			1694			167			325	
Turn Bay Length (ft)												
Base Capacity (vph)		1262			1502			1677			1474	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.15			0.04			0.15			0.15	

Intersection Summary

Area Type: Other

Cycle Length: 72

Actuated Cycle Length: 36.3

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.33

Intersection Signal Delay: 8.1

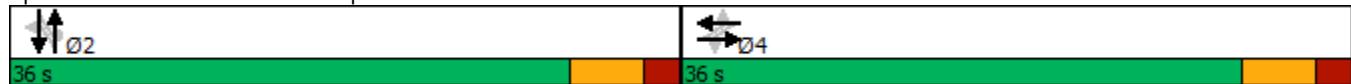
Intersection LOS: A

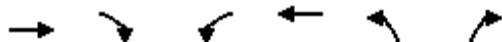
Intersection Capacity Utilization 36.7%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: Child & Maple





Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↓		↑	↑	↑↓	
Traffic Volume (vph)	716	11	20	479	5	9
Future Volume (vph)	716	11	20	479	5	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	50		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			25		25	
Satd. Flow (prot)	3532	0	1770	1863	1676	0
Flt Permitted			0.950		0.982	
Satd. Flow (perm)	3532	0	1770	1863	1676	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	313			177	272	
Travel Time (s)	7.1			4.0	6.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)						
Lane Group Flow (vph)	808	0	22	532	16	0
Enter Blocked Intersection	Yes	No	No	Yes	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	*0.90	*0.90	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

#### Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 35.2% ICU Level of Service A

Analysis Period (min) 15

\* User Entered Value

Lanes, Volumes, Timings  
9: Genesee

Bull's Head - Brown St. Closure Analysis  
AM 2024 Brown Street Closure



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↑	↗	↙	↓
Traffic Volume (vph)	0	0	320	0	0	419
Future Volume (vph)	0	0	320	0	0	419
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	1863	0	1863	0	0	1863
Flt Permitted						
Satd. Flow (perm)	1863	0	1863	0	0	1863
Link Speed (mph)	30		30			30
Link Distance (ft)	287		350			355
Travel Time (s)	6.5		8.0			8.1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	356	0	0	466
Enter Blocked Intersection	No	No	Yes	No	No	Yes
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	25.4%					ICU Level of Service A
Analysis Period (min)	15					

## REDISTRIBUTION CONDITIONS

Evening Peak Hour

Lanes, Volumes, Timings  
1: Jefferson & Main

Bull's Head - Brown St. Closure Analysis  
PM 2024 Brown Street Closure

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	164	516	39	71	554	110	55	110	108	58	150	243
Future Volume (vph)	164	516	39	71	554	110	55	110	108	58	150	243
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10	10	10	10	10	10	10
Storage Length (ft)	75		0	100		0	50		0	100		0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1685	3261	0	1668	3180	0	0	1565	0	1491	1570	0
Flt Permitted	0.318			0.399			0.193		0.403			
Satd. Flow (perm)	559	3261	0	698	3180	0	0	305	0	630	1570	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			46			31			76	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		325			653			1957			989	
Travel Time (s)		7.4			14.8			44.5			22.5	
Confl. Peds. (#/hr)	18		7	7		18	15		6	6		15
Peak Hour Factor	0.88	0.88	0.88	0.82	0.82	0.82	0.87	0.87	0.87	0.89	0.89	0.89
Heavy Vehicles (%)	0%	2%	3%	1%	3%	0%	7%	3%	7%	13%	1%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	186	630	0	87	810	0	0	313	0	65	442	0
Enter Blocked Intersection	No	No	No	No	No							
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		10			10			10			10	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Detector Phase	1	1		1	1		2	2		2	2	
Switch Phase												
Minimum Initial (s)	21.0	21.0		21.0	21.0		6.0	6.0		6.0	6.0	
Minimum Split (s)	40.0	40.0		40.0	40.0		30.0	30.0		30.0	30.0	
Total Split (s)	70.0	70.0		70.0	70.0		30.0	30.0		30.0	30.0	
Total Split (%)	70.0%	70.0%		70.0%	70.0%		30.0%	30.0%		30.0%	30.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.5		6.5	6.5		
Lead/Lag	Lead	Lead		Lead	Lead		Lag	Lag		Lag	Lag	
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)	64.0	64.0		64.0	64.0			23.5		23.5	23.5	
Actuated g/C Ratio	0.64	0.64		0.64	0.64			0.24		0.24	0.24	
v/c Ratio	0.52	0.30		0.20	0.39			3.29		0.44	1.04	
Control Delay	16.9	6.4		8.8	8.8			1074.2		43.6	85.5	

Lanes, Volumes, Timings  
1: Jefferson & Main

Bull's Head - Brown St. Closure Analysis  
PM 2024 Brown Street Closure



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Total Delay	16.9	6.4		8.8	8.8			1074.2		43.6	85.5	
LOS	B	A		A	A			F		D	F	
Approach Delay		8.8			8.8			1074.2			80.1	
Approach LOS		A			A			F			F	
Queue Length 50th (ft)	11	16		21	111			~302		36	~265	
Queue Length 95th (ft)	189	119		39	128			#455		79	#451	
Internal Link Dist (ft)		245			573			1877			909	
Turn Bay Length (ft)	75			100						100		
Base Capacity (vph)	357	2092		446	2051			95		148	427	
Starvation Cap Reductn	0	0		0	0			0		0	0	
Spillback Cap Reductn	0	0		0	0			0		0	0	
Storage Cap Reductn	0	0		0	0			0		0	0	
Reduced v/c Ratio	0.52	0.30		0.20	0.39			3.29		0.44	1.04	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 34 (34%), Referenced to phase 1:EBWB, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 3.29

Intersection Signal Delay: 154.7

Intersection LOS: F

Intersection Capacity Utilization 105.6%

ICU Level of Service G

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: Jefferson & Main



Lanes, Volumes, Timings  
2: Henion/Rite Aid & Main

Bull's Head - Brown St. Closure Analysis  
PM 2024 Brown Street Closure

	→	→	→	←	←	↑	↑	↑	↓	↓	←	
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑		↑	↑					↔		
Traffic Volume (vph)	27	653	17	84	808	37	0	0	0	24	26	22
Future Volume (vph)	27	653	17	84	808	37	0	0	0	24	26	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	50		0	50		0	0	0	0	0	0	0
Storage Lanes	1		0	1		0	0	0	0	0	0	0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1805	1836	0	1736	1793	0	0	0	0	0	1768	0
Flt Permitted	0.227			0.338							0.984	
Satd. Flow (perm)	431	1836	0	613	1793	0	0	0	0	0	1744	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			4						23	
Link Speed (mph)	30			30			30			30		
Link Distance (ft)	177			1167			322			169		
Travel Time (s)	4.0			26.5			7.3			3.8		
Confl. Peds. (#/hr)	20		19	19		20	10		19	19		10
Peak Hour Factor	0.93	0.93	0.93	0.89	0.89	0.89	0.72	0.72	0.72	0.89	0.89	0.89
Heavy Vehicles (%)	0%	3%	0%	4%	3%	0%	2%	2%	2%	0%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	5	5	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	29	720	0	94	950	0	0	0	0	0	81	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.03	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA					Perm	NA	
Protected Phases		2			6						4	
Permitted Phases	2			6						4		
Detector Phase	2	2		6	6					4	4	
Switch Phase												
Minimum Initial (s)	25.0	25.0		25.0	25.0					6.0	6.0	
Minimum Split (s)	31.0	31.0		31.0	31.0					33.0	33.0	
Total Split (s)	65.0	65.0		65.0	65.0					35.0	35.0	
Total Split (%)	65.0%	65.0%		65.0%	65.0%					35.0%	35.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0					3.5	3.5	
All-Red Time (s)	2.0	2.0		2.0	2.0					2.5	2.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0					0.0		
Total Lost Time (s)	6.0	6.0		6.0	6.0					6.0		
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max					None	None	
Act Effct Green (s)	78.0	78.0		78.0	78.0						13.6	
Actuated g/C Ratio	0.78	0.78		0.78	0.78						0.14	
v/c Ratio	0.09	0.50		0.20	0.68						0.32	
Control Delay	5.7	9.1		5.9	12.4						29.3	

Lanes, Volumes, Timings  
2: Henion/Rite Aid & Main

Bull's Head - Brown St. Closure Analysis  
PM 2024 Brown Street Closure



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.3		0.0	0.0							0.0
Total Delay	5.7	9.5		5.9	12.4							29.3
LOS	A	A		A	B							C
Approach Delay		9.3			11.8							29.3
Approach LOS		A			B							C
Queue Length 50th (ft)	4	160		9	196							36
Queue Length 95th (ft)	m10	255		m29	m574							68
Internal Link Dist (ft)		97			1087			242				89
Turn Bay Length (ft)	50		50									
Base Capacity (vph)	336	1433		478	1400							522
Starvation Cap Reductn	0	253		0	0							0
Spillback Cap Reductn	0	0		0	0							0
Storage Cap Reductn	0	0		0	0							0
Reduced v/c Ratio	0.09	0.61		0.20	0.68							0.16

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 32 (32%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 11.6

Intersection LOS: B

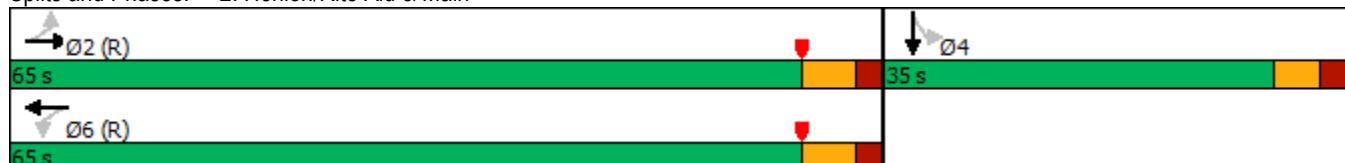
Intersection Capacity Utilization 93.1%

ICU Level of Service F

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Henion/Rite Aid & Main



Lanes, Volumes, Timings  
3: Genesee & Main

Bull's Head - Brown St. Closure Analysis  
PM 2024 Brown Street Closure



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↓		↑	↑↓	↑	↑
Traffic Volume (vph)	505	117	304	646	269	268
Future Volume (vph)	505	117	304	646	269	268
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10
Storage Length (ft)		225	200		0	0
Storage Lanes		1	1		1	1
Taper Length (ft)			25		25	
Satd. Flow (prot)	3140	0	1589	3271	1604	1436
Flt Permitted				0.174		0.950
Satd. Flow (perm)	3140	0	289	3271	1600	1436
Right Turn on Red		No			No	
Satd. Flow (RTOR)						
Link Speed (mph)	30			30	30	
Link Distance (ft)	378			313	355	
Travel Time (s)	8.6			7.1	8.1	
Confl. Peds. (#/hr)		18	18		2	1
Peak Hour Factor	0.89	0.89	0.88	0.88	0.95	0.95
Heavy Vehicles (%)	3%	4%	6%	3%	5%	5%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	698	0	345	734	283	282
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	10			10	10	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	*0.90	*0.90	*0.90	*0.90	*0.90	*0.90
Turning Speed (mph)		9	15		15	9
Turn Type	NA		pm+pt	NA	Prot	Prot
Protected Phases	2		1	6	8	8
Permitted Phases			6			
Detector Phase	2		1	6	8	8
Switch Phase						
Minimum Initial (s)	10.0		6.0	10.0	6.0	6.0
Minimum Split (s)	29.0		11.0	29.0	28.5	28.5
Total Split (s)	33.0		12.0	45.0	55.0	55.0
Total Split (%)	33.0%		12.0%	45.0%	55.0%	55.0%
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	1.0		1.0	1.0	1.5	1.5
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0		5.0	5.0	5.5	5.5
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?						
Recall Mode	C-Max		None	C-Max	None	None
Act Effct Green (s)	28.4		63.9	63.9	25.6	25.6
Actuated g/C Ratio	0.28		0.64	0.64	0.26	0.26
v/c Ratio	0.78		0.59	0.35	0.69	0.77
Control Delay	46.0		24.6	8.2	41.5	47.4



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Queue Delay	1.8	0.0	0.0	0.0	0.0	0.0
Total Delay	47.8		24.6	8.2	41.5	47.4
LOS	D		C	A	D	D
Approach Delay	47.8			13.5	44.4	
Approach LOS	D			B	D	
Queue Length 50th (ft)	230		75	54	163	167
Queue Length 95th (ft)	297		#270	121	218	226
Internal Link Dist (ft)	298			233	275	
Turn Bay Length (ft)			200			
Base Capacity (vph)	890		581	2089	793	710
Starvation Cap Reductn	81		0	0	0	0
Spillback Cap Reductn	0		0	32	0	0
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.86		0.59	0.36	0.36	0.40

#### Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 21 (21%), Referenced to phase 2:EBT and 6:WBTL, Start of Yellow

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.78

Intersection Signal Delay: 31.2

Intersection LOS: C

Intersection Capacity Utilization 64.8%

ICU Level of Service C

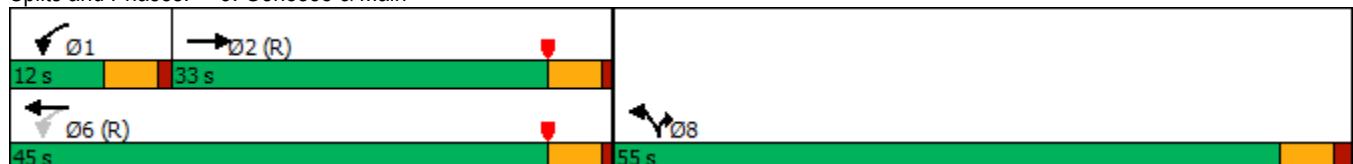
Analysis Period (min) 15

\* User Entered Value

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Genesee & Main

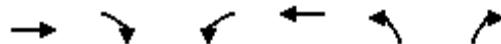


Lanes, Volumes, Timings  
4: Chili & West /Main

Bull's Head - Brown St. Closure Analysis  
PM 2024 Brown Street Closure



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø6
Lane Configurations	↑	↓	↖	↗	↖	↗	
Traffic Volume (vph)	256	2	467	401	25	352	
Future Volume (vph)	256	2	467	401	25	352	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	10	10	11	12	10	
Storage Length (ft)		200	0		0	0	
Storage Lanes		0	1		1	1	
Taper Length (ft)			25		25		
Satd. Flow (prot)	1720	0	1636	1717	1770	1422	
Flt Permitted			0.247		0.950		
Satd. Flow (perm)	1720	0	417	1717	1681	1422	
Right Turn on Red		Yes			Yes		
Satd. Flow (RTOR)					211		
Link Speed (mph)	30			30	30		
Link Distance (ft)	1754			378	136		
Travel Time (s)	39.9			8.6	3.1		
Confl. Peds. (#/hr)		17	17		19		
Peak Hour Factor	0.96	0.96	0.95	0.95	0.89	0.89	
Heavy Vehicles (%)	3%	0%	3%	7%	2%	6%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	269	0	492	422	28	396	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(ft)	0			10	12		
Link Offset(ft)	0			0	0		
Crosswalk Width(ft)	16			16	16		
Two way Left Turn Lane							
Headway Factor	1.09	1.09	*0.90	*0.90	*0.90	*0.90	
Turning Speed (mph)		9	15		15	9	
Turn Type	NA		custom	NA	Perm	pm+ov	
Protected Phases	2		1	1 6		1	6
Permitted Phases			6		8	8	
Detector Phase	2		1	6	8	1	
Switch Phase							
Minimum Initial (s)	6.0		10.0		6.0	10.0	10.0
Minimum Split (s)	24.0		15.0		24.0	15.0	24.0
Total Split (s)	29.0		47.0		24.0	47.0	76.0
Total Split (%)	29.0%		47.0%		24.0%	47.0%	76%
Yellow Time (s)	4.0		4.0		4.0	4.0	4.0
All-Red Time (s)	1.0		1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0	
Total Lost Time (s)	5.0		5.0		5.0	5.0	
Lead/Lag	Lag		Lead		Lead		
Lead-Lag Optimize?							
Recall Mode	None		C-Max		None	C-Max	None
Act Effct Green (s)	19.3		85.2	87.2	9.3	70.7	
Actuated g/C Ratio	0.19		0.85	0.87	0.09	0.71	
v/c Ratio	0.81		0.45	0.28	0.18	0.37	
Control Delay	46.4		7.3	2.2	41.9	4.0	



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø6
Queue Delay	0.0		0.2	0.3	0.0	0.1	
Total Delay	46.4		7.5	2.5	41.9	4.1	
LOS	D		A	A	D	A	
Approach Delay	46.4			5.2	6.6		
Approach LOS	D			A	A		
Queue Length 50th (ft)	141		96	6	17	35	
Queue Length 95th (ft)	197		256	147	39	84	
Internal Link Dist (ft)	1674			298	56		
Turn Bay Length (ft)							
Base Capacity (vph)	412		1097	1496	319	1067	
Starvation Cap Reductn	0		153	516	0	0	
Spillback Cap Reductn	0		0	0	0	80	
Storage Cap Reductn	0		0	0	0	0	
Reduced v/c Ratio	0.65		0.52	0.43	0.09	0.40	

#### Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 28 (28%), Referenced to phase 1:WBTL, Start of Yellow

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 12.5

Intersection LOS: B

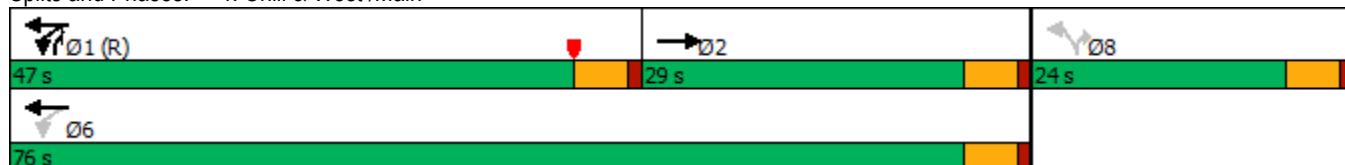
Intersection Capacity Utilization 57.9%

ICU Level of Service B

Analysis Period (min) 15

\* User Entered Value

Splits and Phases: 4: Chili & West /Main



Lanes, Volumes, Timings  
5: Appleton/Ames & West

Bull's Head - Brown St. Closure Analysis  
PM 2024 Brown Street Closure

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↓		↑	↓		↑	↓		↑	↓	↑
Traffic Volume (vph)	293	187	24	4	192	241	14	62	45	85	64	356
Future Volume (vph)	293	187	24	4	192	241	14	62	45	85	64	356
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10	12	12	12	12	12	12
Storage Length (ft)	50		0	50		0	0		0	125		125
Storage Lanes	1		0	1		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1636	1678	0	1348	1516	0	0	1652	0	0	1752	1599
Flt Permitted	0.441			0.616			0.951			0.635		
Satd. Flow (perm)	756	1678	0	868	1516	0	0	1580	0	0	1137	1554
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			98			32				391
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1910			1754			679				962
Travel Time (s)		43.4			39.9			15.4				21.9
Confl. Peds. (#/hr)	8		7	7		8	3		6	6		3
Peak Hour Factor	0.92	0.92	0.92	0.86	0.86	0.86	0.76	0.76	0.76	0.91	0.91	0.91
Heavy Vehicles (%)	3%	4%	0%	25%	6%	5%	22%	9%	0%	5%	6%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	318	229	0	5	503	0	0	159	0	0	163	391
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		10			10			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		2
Detector Phase	1	1		1	1		2	2		2	2	2
Switch Phase												
Minimum Initial (s)	18.0	18.0		18.0	18.0		6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	43.0	43.0		43.0	43.0		26.0	26.0		26.0	26.0	26.0
Total Split (s)	60.0	60.0		60.0	60.0		40.0	40.0		40.0	40.0	40.0
Total Split (%)	60.0%	60.0%		60.0%	60.0%		40.0%	40.0%		40.0%	40.0%	40.0%
Yellow Time (s)	4.0	4.0		4.0	4.0		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0			0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		5.5			5.5	5.5	
Lead/Lag	Lead	Lead		Lead	Lead		Lag	Lag		Lag	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	None
Act Effct Green (s)	70.3	70.3		70.3	70.3			18.2		18.2	18.2	
Actuated g/C Ratio	0.70	0.70		0.70	0.70			0.18		0.18	0.18	
v/c Ratio	0.60	0.19		0.01	0.46			0.51		0.79	0.65	
Control Delay	15.3	6.3		5.2	6.2			33.5		63.5	8.8	

Lanes, Volumes, Timings  
5: Appleton/Ames & West

Bull's Head - Brown St. Closure Analysis  
PM 2024 Brown Street Closure



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Delay	15.3	6.3		5.2	6.2			33.5			63.5	8.8
LOS	B	A		A	A			C			E	A
Approach Delay		11.5			6.1			33.5			24.9	
Approach LOS		B			A			C			C	
Queue Length 50th (ft)	91	42		1	70			73			100	0
Queue Length 95th (ft)	239	91		m3	84			98			158	72
Internal Link Dist (ft)		1830			1674			599			882	
Turn Bay Length (ft)	50			50								125
Base Capacity (vph)	531	1182		610	1094			566			392	792
Starvation Cap Reductn	0	0		0	0			0			0	0
Spillback Cap Reductn	0	0		0	0			0			0	0
Storage Cap Reductn	0	0		0	0			0			0	0
Reduced v/c Ratio	0.60	0.19		0.01	0.46			0.28			0.42	0.49

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 15 (15%), Referenced to phase 1:EBWB, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 16.2

Intersection LOS: B

Intersection Capacity Utilization 76.4%

ICU Level of Service D

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Appleton/Ames & West



Lanes, Volumes, Timings  
6: Child & Maple

Bull's Head - Brown St. Closure Analysis  
PM 2024 Brown Street Closure

	↙	→	↘	↗	←	↖	↑	↗	↘	↓	↗	
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	107	58	72	17	52	21	23	214	9	10	232	83
Future Volume (vph)	107	58	72	17	52	21	23	214	9	10	232	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	14	14	14	14	14	15	15	15	12	12	12
Satd. Flow (prot)	0	1701	0	0	1830	0	0	1951	0	0	1738	0
Flt Permitted		0.822			0.916			0.948			0.987	
Satd. Flow (perm)	0	1428	0	0	1692	0	0	1858	0	0	1719	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		40			24			4			32	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		677			1774			247			405	
Travel Time (s)		15.4			40.3			5.6			9.2	
Confl. Peds. (#/hr)	2		4	4		2	2		5	5		2
Peak Hour Factor	0.78	0.78	0.78	0.86	0.86	0.86	0.84	0.84	0.84	0.86	0.86	0.86
Heavy Vehicles (%)	11%	9%	12%	9%	4%	7%	8%	6%	0%	0%	4%	7%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	303	0	0	104	0	0	293	0	0	379	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.88	0.88	0.88	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA										
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Detector Phase	4	4		4	4		2	2		2	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	26.0	26.0		26.0	26.0		24.0	24.0		24.0	24.0	
Total Split (s)	36.0	36.0		36.0	36.0		36.0	36.0		36.0	36.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-3.0			-3.0			-3.0			-3.0		
Total Lost Time (s)		3.0			3.0			3.0			3.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)		18.9			18.9			20.7			20.7	
Actuated g/C Ratio		0.41			0.41			0.45			0.45	
v/c Ratio		0.50			0.15			0.35			0.48	
Control Delay		12.9			8.5			10.4			11.3	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		12.9			8.5			10.4			11.3	
LOS		B			A			B			B	

Lanes, Volumes, Timings  
6: Child & Maple

Bull's Head - Brown St. Closure Analysis  
PM 2024 Brown Street Closure



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		12.9			8.5			10.4			11.3	
Approach LOS			B			A			B			B
Queue Length 50th (ft)			44			11			42			53
Queue Length 95th (ft)			108			42			110			146
Internal Link Dist (ft)			597			1694			167			325
Turn Bay Length (ft)												
Base Capacity (vph)		1090				1286			1407			1308
Starvation Cap Reductn		0				0			0			0
Spillback Cap Reductn		0				0			0			0
Storage Cap Reductn		0				0			0			0
Reduced v/c Ratio		0.28				0.08			0.21			0.29

Intersection Summary

Area Type: Other

Cycle Length: 72

Actuated Cycle Length: 46.1

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.50

Intersection Signal Delay: 11.2

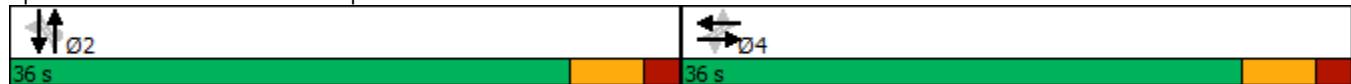
Intersection LOS: B

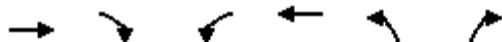
Intersection Capacity Utilization 49.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: Child & Maple





Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↓		↑	↑	↑↓	
Traffic Volume (vph)	769	4	7	940	10	18
Future Volume (vph)	769	4	7	940	10	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	50		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			25		25	
Satd. Flow (prot)	3536	0	1770	1863	1672	0
Flt Permitted			0.950		0.983	
Satd. Flow (perm)	3536	0	1770	1863	1672	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	313			177	272	
Travel Time (s)	7.1			4.0	6.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)						
Lane Group Flow (vph)	858	0	8	1044	31	0
Enter Blocked Intersection	Yes	No	No	Yes	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	*0.90	*0.90	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

#### Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 59.5% ICU Level of Service B

Analysis Period (min) 15

\* User Entered Value

Lanes, Volumes, Timings  
9: Genesee

Bull's Head - Brown St. Closure Analysis  
PM 2024 Brown Street Closure



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Volume (vph)	0	0	537	0	0	421
Future Volume (vph)	0	0	537	0	0	421
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	1863	0	1863	0	0	1863
Flt Permitted						
Satd. Flow (perm)	1863	0	1863	0	0	1863
Link Speed (mph)	30		30			30
Link Distance (ft)	287		350			355
Travel Time (s)	6.5		8.0			8.1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	597	0	0	468
Enter Blocked Intersection	No	No	Yes	No	No	Yes
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	31.6%					
ICU Level of Service	A					
Analysis Period (min)	15					

## REDISTRIBUTION CONDITIONS

Evening Peak Hour  
With Timing Improvements

Lanes, Volumes, Timings  
1: Jefferson & Main

Bull's Head - Brown St. Closure Analysis  
PM 2024 Brown Street Closure - Timing Improvements

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Configurations	1	2	3	4	5	6	7	8	9	10	11	12
Traffic Volume (vph)	164	516	39	71	554	110	55	110	108	58	150	243
Future Volume (vph)	164	516	39	71	554	110	55	110	108	58	150	243
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10	10	10	10	10	10	10
Storage Length (ft)	75		0	100		0	50		0	100		0
Storage Lanes	1		0	1		0	0		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1685	3261	0	1668	3180	0	0	1565	0	1491	1570	0
Flt Permitted	0.296			0.382			0.518			0.481		
Satd. Flow (perm)	521	3261	0	668	3180	0	0	818	0	752	1570	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12			37			35			86	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		325			653			1957			989	
Travel Time (s)		7.4			14.8			44.5			22.5	
Confl. Peds. (#/hr)	18		7	7		18	15		6	6		15
Peak Hour Factor	0.88	0.88	0.88	0.82	0.82	0.82	0.87	0.87	0.87	0.89	0.89	0.89
Heavy Vehicles (%)	0%	2%	3%	1%	3%	0%	7%	3%	7%	13%	1%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	186	630	0	87	810	0	0	313	0	65	442	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		10			10			10			10	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA										
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		
Detector Phase	1	1		1	1		2	2		2	2	
Switch Phase												
Minimum Initial (s)	21.0	21.0		21.0	21.0		6.0	6.0		6.0	6.0	
Minimum Split (s)	40.0	40.0		40.0	40.0		30.0	30.0		30.0	30.0	
Total Split (s)	61.0	61.0		61.0	61.0		39.0	39.0		39.0	39.0	
Total Split (%)	61.0%	61.0%		61.0%	61.0%		39.0%	39.0%		39.0%	39.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.5	2.5		2.5	2.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0		0.0	0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		6.5		6.5	6.5		
Lead/Lag	Lead	Lead		Lead	Lead		Lag	Lag		Lag	Lag	
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	
Act Effct Green (s)	55.0	55.0		55.0	55.0			32.5		32.5	32.5	
Actuated g/C Ratio	0.55	0.55		0.55	0.55			0.32		0.32	0.32	
v/c Ratio	0.65	0.35		0.24	0.46			1.08		0.27	0.78	
Control Delay	29.6	13.5		13.8	13.9			107.9		28.7	35.3	

Lanes, Volumes, Timings  
1: Jefferson & Main

Bull's Head - Brown St. Closure Analysis  
PM 2024 Brown Street Closure - Timing Improvements



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Total Delay	29.6	13.5		13.8	13.9			107.9		28.7	35.3	
LOS	C	B		B	B			F		C	D	
Approach Delay		17.2			13.9			107.9			34.5	
Approach LOS		B			B			F			C	
Queue Length 50th (ft)	76	130		27	146			~209		30	207	
Queue Length 95th (ft)	189	165		51	168			#361		67	#340	
Internal Link Dist (ft)		245			573			1877			909	
Turn Bay Length (ft)	75			100						100		
Base Capacity (vph)	286	1798		367	1765			289		244	568	
Starvation Cap Reductn	0	0		0	0			0		0	0	
Spillback Cap Reductn	0	0		0	0			0		0	0	
Storage Cap Reductn	0	0		0	0			0		0	0	
Reduced v/c Ratio	0.65	0.35		0.24	0.46			1.08		0.27	0.78	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 24 (24%), Referenced to phase 1:EBWB, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.08

Intersection Signal Delay: 30.7

Intersection LOS: C

Intersection Capacity Utilization 105.6%

ICU Level of Service G

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 1: Jefferson & Main



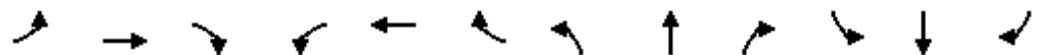
Lanes, Volumes, Timings  
2: Henion/Rite Aid & Main

Bull's Head - Brown St. Closure Analysis  
PM 2024 Brown Street Closure - Timing Improvements

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↓		↑	↓						↔	
Traffic Volume (vph)	27	653	17	84	808	37	0	0	0	24	26	22
Future Volume (vph)	27	653	17	84	808	37	0	0	0	24	26	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	50		0	50		0	0	0	0	0	0	0
Storage Lanes	1		0	1		0	0	0	0	0	0	0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1805	1836	0	1736	1793	0	0	0	0	0	1768	0
Flt Permitted	0.227			0.338							0.984	
Satd. Flow (perm)	431	1836	0	613	1793	0	0	0	0	0	1744	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			4						23	
Link Speed (mph)	30			30			30			30		
Link Distance (ft)	177			1167			322			169		
Travel Time (s)	4.0			26.5			7.3			3.8		
Confl. Peds. (#/hr)	20		19	19		20	10		19	19		10
Peak Hour Factor	0.93	0.93	0.93	0.89	0.89	0.89	0.72	0.72	0.72	0.89	0.89	0.89
Heavy Vehicles (%)	0%	3%	0%	4%	3%	0%	2%	2%	2%	0%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	5	5	0	0	0	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	29	720	0	94	950	0	0	0	0	0	81	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.03	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA					Perm	NA	
Protected Phases		2			6						4	
Permitted Phases	2			6						4		
Detector Phase	2	2		6	6					4	4	
Switch Phase												
Minimum Initial (s)	25.0	25.0		25.0	25.0					6.0	6.0	
Minimum Split (s)	31.0	31.0		31.0	31.0					33.0	33.0	
Total Split (s)	65.0	65.0		65.0	65.0					35.0	35.0	
Total Split (%)	65.0%	65.0%		65.0%	65.0%					35.0%	35.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0					3.5	3.5	
All-Red Time (s)	2.0	2.0		2.0	2.0					2.5	2.5	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0					0.0		
Total Lost Time (s)	6.0	6.0		6.0	6.0					6.0		
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max					None	None	
Act Effct Green (s)	78.0	78.0		78.0	78.0						13.6	
Actuated g/C Ratio	0.78	0.78		0.78	0.78						0.14	
v/c Ratio	0.09	0.50		0.20	0.68						0.32	
Control Delay	11.6	14.9		7.1	13.7						29.3	

Lanes, Volumes, Timings  
2: Henion/Rite Aid & Main

Bull's Head - Brown St. Closure Analysis  
PM 2024 Brown Street Closure - Timing Improvements



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	1.9		0.0	0.0						0.0	
Total Delay	11.6	16.9		7.1	13.7						29.3	
LOS	B	B		A	B						C	
Approach Delay		16.7			13.1						29.3	
Approach LOS		B			B						C	
Queue Length 50th (ft)	2	133		9	381						36	
Queue Length 95th (ft)	m22	523		m55	m667						68	
Internal Link Dist (ft)		97			1087			242			89	
Turn Bay Length (ft)	50		50									
Base Capacity (vph)	336	1433		478	1400						522	
Starvation Cap Reductn	0	531		0	0						0	
Spillback Cap Reductn	0	0		0	0						0	
Storage Cap Reductn	0	0		0	0						0	
Reduced v/c Ratio	0.09	0.80		0.20	0.68						0.16	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 32 (32%), Referenced to phase 2:EBTL and 6:WBTL, Start of Yellow

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 15.2

Intersection LOS: B

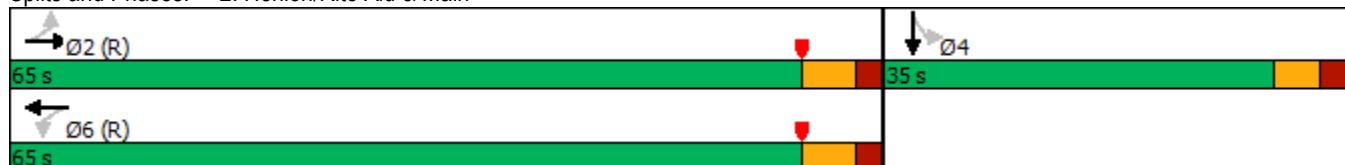
Intersection Capacity Utilization 93.1%

ICU Level of Service F

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Henion/Rite Aid & Main



Lanes, Volumes, Timings  
3: Genesee & Main

Bull's Head - Brown St. Closure Analysis  
PM 2024 Brown Street Closure - Timing Improvements



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↓		↑	↑↓	↑	↑
Traffic Volume (vph)	505	117	304	646	269	268
Future Volume (vph)	505	117	304	646	269	268
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10
Storage Length (ft)		225	200		0	0
Storage Lanes		1	1		1	1
Taper Length (ft)			25		25	
Satd. Flow (prot)	3140	0	1589	3271	1604	1436
Flt Permitted				0.261		0.950
Satd. Flow (perm)	3140	0	433	3271	1600	1436
Right Turn on Red		No			No	
Satd. Flow (RTOR)						
Link Speed (mph)	30			30	30	
Link Distance (ft)	378			313	355	
Travel Time (s)	8.6			7.1	8.1	
Confl. Peds. (#/hr)		18	18		2	1
Peak Hour Factor	0.89	0.89	0.88	0.88	0.95	0.95
Heavy Vehicles (%)	3%	4%	6%	3%	5%	5%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	698	0	345	734	283	282
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	10			10	10	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	*0.90	*0.90	*0.90	*0.90	*0.90	*0.90
Turning Speed (mph)		9	15		15	9
Turn Type	NA		pm+pt	NA	Prot	Prot
Protected Phases	2		1	6	8	8
Permitted Phases			6			
Detector Phase	2		1	6	8	8
Switch Phase						
Minimum Initial (s)	10.0		6.0	10.0	6.0	6.0
Minimum Split (s)	29.0		11.0	29.0	28.5	28.5
Total Split (s)	37.0		20.0	57.0	43.0	43.0
Total Split (%)	37.0%		20.0%	57.0%	43.0%	43.0%
Yellow Time (s)	4.0		4.0	4.0	4.0	4.0
All-Red Time (s)	1.0		1.0	1.0	1.5	1.5
Lost Time Adjust (s)	0.0		0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0		5.0	5.0	5.5	5.5
Lead/Lag	Lag		Lead			
Lead-Lag Optimize?						
Recall Mode	C-Max		None	C-Max	None	None
Act Effct Green (s)	41.4		64.7	64.7	24.8	24.8
Actuated g/C Ratio	0.41		0.65	0.65	0.25	0.25
v/c Ratio	0.54		0.70	0.35	0.71	0.79
Control Delay	34.2		16.3	4.5	43.7	50.7



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Queue Delay	0.6	0.0	0.0	0.0	1.9	
Total Delay	34.7		16.3	4.5	43.7	52.6
LOS	C		B	A	D	D
Approach Delay	34.7			8.3	48.1	
Approach LOS	C			A	D	
Queue Length 50th (ft)	186		93	106	165	169
Queue Length 95th (ft)	272		#186	84	225	233
Internal Link Dist (ft)	298			233	275	
Turn Bay Length (ft)			200			
Base Capacity (vph)	1300		494	2117	601	538
Starvation Cap Reductn	259		0	0	0	0
Spillback Cap Reductn	0		0	4	0	132
Storage Cap Reductn	0		0	0	0	0
Reduced v/c Ratio	0.67		0.70	0.35	0.47	0.69

#### Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 46 (46%), Referenced to phase 2:EBT and 6:WBTL, Start of Yellow

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 25.8

Intersection LOS: C

Intersection Capacity Utilization 64.8%

ICU Level of Service C

Analysis Period (min) 15

\* User Entered Value

# 95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

#### Splits and Phases: 3: Genesee & Main

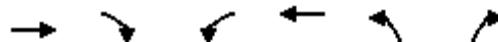


Lanes, Volumes, Timings  
4: Chili & West /Main

Bull's Head - Brown St. Closure Analysis  
PM 2024 Brown Street Closure - Timing Improvements



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø6
Lane Configurations	↑	↓	↑	↑	↑	↑	
Traffic Volume (vph)	256	2	467	401	25	352	
Future Volume (vph)	256	2	467	401	25	352	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	10	10	11	12	10	
Storage Length (ft)		200	0		0	0	
Storage Lanes		0	1		1	1	
Taper Length (ft)			25		25		
Satd. Flow (prot)	1720	0	1636	1717	1770	1422	
Flt Permitted			0.247		0.950		
Satd. Flow (perm)	1720	0	417	1717	1681	1422	
Right Turn on Red		Yes			Yes		
Satd. Flow (RTOR)					211		
Link Speed (mph)	30			30	30		
Link Distance (ft)	1754			378	136		
Travel Time (s)	39.9			8.6	3.1		
Confl. Peds. (#/hr)		17	17		19		
Peak Hour Factor	0.96	0.96	0.95	0.95	0.89	0.89	
Heavy Vehicles (%)	3%	0%	3%	7%	2%	6%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	269	0	492	422	28	396	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(ft)	0			10	12		
Link Offset(ft)	0			0	0		
Crosswalk Width(ft)	16			16	16		
Two way Left Turn Lane							
Headway Factor	1.09	1.09	*0.90	*0.90	*0.90	*0.90	
Turning Speed (mph)		9	15		15	9	
Turn Type	NA		custom	NA	Perm	pm+ov	
Protected Phases	2		1	1 6		1	6
Permitted Phases			6		8	8	
Detector Phase	2		1	6	8	1	
Switch Phase							
Minimum Initial (s)	6.0		10.0		6.0	10.0	10.0
Minimum Split (s)	24.0		15.0		24.0	15.0	24.0
Total Split (s)	29.0		47.0		24.0	47.0	76.0
Total Split (%)	29.0%		47.0%		24.0%	47.0%	76%
Yellow Time (s)	4.0		4.0		4.0	4.0	4.0
All-Red Time (s)	1.0		1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0	
Total Lost Time (s)	5.0		5.0		5.0	5.0	
Lead/Lag	Lag		Lead		Lead		
Lead-Lag Optimize?							
Recall Mode	None		C-Max		None	C-Max	None
Act Effct Green (s)	19.3		85.2	87.2	9.3	70.7	
Actuated g/C Ratio	0.19		0.85	0.87	0.09	0.71	
v/c Ratio	0.81		0.45	0.28	0.18	0.37	
Control Delay	46.4		4.9	2.6	41.9	4.0	



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø6
Queue Delay	0.0		0.2	0.2	0.0	0.0	
Total Delay	46.4		5.1	2.8	41.9	4.0	
LOS	D		A	A	D	A	
Approach Delay	46.4			4.0	6.5		
Approach LOS	D			A	A		
Queue Length 50th (ft)	141		47	35	17	35	
Queue Length 95th (ft)	197		149	103	39	84	
Internal Link Dist (ft)	1674			298	56		
Turn Bay Length (ft)							
Base Capacity (vph)	412		1097	1496	319	1067	
Starvation Cap Reductn	0		142	405	0	0	
Spillback Cap Reductn	0		0	0	0	19	
Storage Cap Reductn	0		0	0	0	0	
Reduced v/c Ratio	0.65		0.52	0.39	0.09	0.38	

#### Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 28 (28%), Referenced to phase 1:WBTL, Start of Yellow

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.81

Intersection Signal Delay: 11.8

Intersection LOS: B

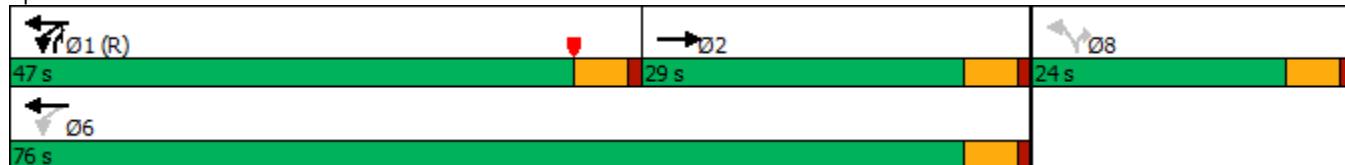
Intersection Capacity Utilization 57.9%

ICU Level of Service B

Analysis Period (min) 15

\* User Entered Value

#### Splits and Phases: 4: Chili & West /Main



Lanes, Volumes, Timings  
5: Appleton/Ames & West

Bull's Head - Brown St. Closure Analysis  
PM 2024 Brown Street Closure - Timing Improvements

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↓		↑	↓		↑	↓		↑	↓	
Traffic Volume (vph)	293	187	24	4	192	241	14	62	45	85	64	356
Future Volume (vph)	293	187	24	4	192	241	14	62	45	85	64	356
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	10	10	12	12	12	12	12	12
Storage Length (ft)	50		0	50		0	0		0	125		125
Storage Lanes	1		0	1		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1636	1678	0	1348	1516	0	0	1652	0	0	1752	1599
Flt Permitted	0.441			0.616			0.951			0.635		
Satd. Flow (perm)	756	1678	0	868	1516	0	0	1580	0	0	1137	1554
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			98			32				391
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1910			1754			679				962
Travel Time (s)		43.4			39.9			15.4				21.9
Confl. Peds. (#/hr)	8		7	7		8	3		6	6		3
Peak Hour Factor	0.92	0.92	0.92	0.86	0.86	0.86	0.76	0.76	0.76	0.91	0.91	0.91
Heavy Vehicles (%)	3%	4%	0%	25%	6%	5%	22%	9%	0%	5%	6%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	318	229	0	5	503	0	0	159	0	0	163	391
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		10			10			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.09	1.09	1.09	1.09	1.09	1.09	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		1			1			2			2	
Permitted Phases	1			1			2			2		2
Detector Phase	1	1		1	1		2	2		2	2	2
Switch Phase												
Minimum Initial (s)	18.0	18.0		18.0	18.0		6.0	6.0		6.0	6.0	6.0
Minimum Split (s)	43.0	43.0		43.0	43.0		26.0	26.0		26.0	26.0	26.0
Total Split (s)	60.0	60.0		60.0	60.0		40.0	40.0		40.0	40.0	40.0
Total Split (%)	60.0%	60.0%		60.0%	60.0%		40.0%	40.0%		40.0%	40.0%	40.0%
Yellow Time (s)	4.0	4.0		4.0	4.0		3.5	3.5		3.5	3.5	3.5
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0			0.0	0.0	
Total Lost Time (s)	6.0	6.0		6.0	6.0		5.5			5.5	5.5	
Lead/Lag	Lead	Lead		Lead	Lead		Lag	Lag		Lag	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	None
Act Effct Green (s)	70.3	70.3		70.3	70.3			18.2		18.2	18.2	
Actuated g/C Ratio	0.70	0.70		0.70	0.70			0.18		0.18	0.18	
v/c Ratio	0.60	0.19		0.01	0.46			0.51		0.79	0.65	
Control Delay	15.3	6.3		5.2	4.9			33.5		63.5	8.8	

Lanes, Volumes, Timings  
5: Appleton/Ames & West

Bull's Head - Brown St. Closure Analysis  
PM 2024 Brown Street Closure - Timing Improvements



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Delay	15.3	6.3		5.2	4.9			33.5			63.5	8.8
LOS	B	A		A	A			C			E	A
Approach Delay		11.5			4.9			33.5			24.9	
Approach LOS		B			A			C			C	
Queue Length 50th (ft)	91	42		1	29			73			100	0
Queue Length 95th (ft)	239	91		m3	101			98			158	72
Internal Link Dist (ft)		1830			1674			599			882	
Turn Bay Length (ft)	50			50								125
Base Capacity (vph)	531	1182		610	1094			566			392	792
Starvation Cap Reductn	0	0		0	0			0			0	0
Spillback Cap Reductn	0	0		0	0			0			0	0
Storage Cap Reductn	0	0		0	0			0			0	0
Reduced v/c Ratio	0.60	0.19		0.01	0.46			0.28			0.42	0.49

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 15 (15%), Referenced to phase 1:EBWB, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 15.8

Intersection LOS: B

Intersection Capacity Utilization 76.4%

ICU Level of Service D

Analysis Period (min) 15

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 5: Appleton/Ames & West



Lanes, Volumes, Timings  
6: Child & Maple

Bull's Head - Brown St. Closure Analysis  
PM 2024 Brown Street Closure - Timing Improvements

	→	→	→	←	←	↑	↑	↑	↓	↓	↙	
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	107	58	72	17	52	21	23	214	9	10	232	83
Future Volume (vph)	107	58	72	17	52	21	23	214	9	10	232	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	14	14	14	14	14	14	15	15	15	12	12	12
Satd. Flow (prot)	0	1701	0	0	1830	0	0	1951	0	0	1738	0
Flt Permitted		0.822			0.916			0.948			0.987	
Satd. Flow (perm)	0	1428	0	0	1692	0	0	1858	0	0	1719	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		40			24			4			32	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		677			1774			247			405	
Travel Time (s)		15.4			40.3			5.6			9.2	
Confl. Peds. (#/hr)	2		4	4		2	2		5	5		2
Peak Hour Factor	0.78	0.78	0.78	0.86	0.86	0.86	0.84	0.84	0.84	0.86	0.86	0.86
Heavy Vehicles (%)	11%	9%	12%	9%	4%	7%	8%	6%	0%	0%	4%	7%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	303	0	0	104	0	0	293	0	0	379	0
Enter Blocked Intersection	No											
Lane Alignment	Left	Left	Right									
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.88	0.88	0.88	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA										
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Detector Phase	4	4		4	4		2	2		2	2	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		10.0	10.0		10.0	10.0	
Minimum Split (s)	26.0	26.0		26.0	26.0		24.0	24.0		24.0	24.0	
Total Split (s)	36.0	36.0		36.0	36.0		36.0	36.0		36.0	36.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		50.0%	50.0%		50.0%	50.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-3.0			-3.0			-3.0			-3.0		
Total Lost Time (s)		3.0			3.0			3.0			3.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)		18.9			18.9			20.7			20.7	
Actuated g/C Ratio		0.41			0.41			0.45			0.45	
v/c Ratio		0.50			0.15			0.35			0.48	
Control Delay		12.9			8.5			10.4			11.3	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		12.9			8.5			10.4			11.3	
LOS		B			A			B			B	

Lanes, Volumes, Timings  
6: Child & Maple

Bull's Head - Brown St. Closure Analysis  
PM 2024 Brown Street Closure - Timing Improvements



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		12.9			8.5			10.4			11.3	
Approach LOS			B			A			B			B
Queue Length 50th (ft)			44			11			42			53
Queue Length 95th (ft)			108			42			110			146
Internal Link Dist (ft)			597			1694			167			325
Turn Bay Length (ft)												
Base Capacity (vph)		1090				1286			1407			1308
Starvation Cap Reductn		0				0			0			0
Spillback Cap Reductn		0				0			0			0
Storage Cap Reductn		0				0			0			0
Reduced v/c Ratio		0.28				0.08			0.21			0.29

Intersection Summary

Area Type: Other

Cycle Length: 72

Actuated Cycle Length: 46.1

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.50

Intersection Signal Delay: 11.2

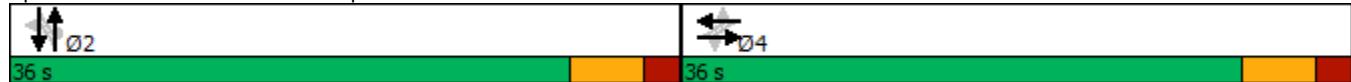
Intersection LOS: B

Intersection Capacity Utilization 49.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: Child & Maple



Lanes, Volumes, Timings  
8: Churchlea Pl & Main

Bull's Head - Brown St. Closure Analysis  
PM 2024 Brown Street Closure - Timing Improvements



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↓		↑	↑	↑↓	
Traffic Volume (vph)	769	4	7	940	10	18
Future Volume (vph)	769	4	7	940	10	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0	50		0	0
Storage Lanes		0	1		1	0
Taper Length (ft)			25		25	
Satd. Flow (prot)	3536	0	1770	1863	1672	0
Flt Permitted			0.950		0.983	
Satd. Flow (perm)	3536	0	1770	1863	1672	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	313			177	272	
Travel Time (s)	7.1			4.0	6.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)						
Lane Group Flow (vph)	858	0	8	1044	31	0
Enter Blocked Intersection	Yes	No	No	Yes	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(ft)	12			12	12	
Link Offset(ft)	0			0	0	
Crosswalk Width(ft)	16			16	16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	*0.90	*0.90	1.00	1.00
Turning Speed (mph)		9	15		15	9
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 59.5% ICU Level of Service B

Analysis Period (min) 15

\* User Entered Value

Lanes, Volumes, Timings  
9: Genesee

Bull's Head - Brown St. Closure Analysis  
PM 2024 Brown Street Closure - Timing Improvements



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↑	↗	↙	↓
Traffic Volume (vph)	0	0	537	0	0	421
Future Volume (vph)	0	0	537	0	0	421
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	1863	0	1863	0	0	1863
Flt Permitted						
Satd. Flow (perm)	1863	0	1863	0	0	1863
Link Speed (mph)	30		30			30
Link Distance (ft)	287		350			355
Travel Time (s)	6.5		8.0			8.1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	597	0	0	468
Enter Blocked Intersection	No	No	Yes	No	No	Yes
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free
Intersection Summary						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	31.6%					
ICU Level of Service	A					
Analysis Period (min)	15					