

# Bull's Head Traffic Impact Study

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Bull's Head Urban Renewal Area & Brownfield Opportunity Area  
City of Rochester, New York

February 2020

*Prepared for:*



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Department of Neighborhood and Business  
Development

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Executive Summary ..... 1

1.0 Introduction..... 4

    1.1 Purpose and Objectives..... 4

    1.2 Background..... 4

    1.3 Study Area ..... 4

2.0 Existing Conditions Summary & Analysis ..... 6

    2.1 Overview..... 6

    2.2 Study Area Roadway Descriptions..... 6

    2.3 Roadway Functional Classification ..... 8

    2.4 Roadway Average Annual Daily Traffic (AADT) ..... 10

    2.5 Study Area Intersection Descriptions ..... 11

    2.6 Turning Movement Traffic Counts ..... 15

    2.7 Pedestrian Counts ..... 18

    2.8 Existing Operations and Capacity Analysis ..... 19

        Capacity Analysis Methodology..... 19

        Capacity Analysis Results..... 19

    2.9 Safety Considerations, Accident History and Analysis..... 22

        Accident Severity ..... 22

        Accident Rates ..... 23

        Accident Type ..... 23

        Accident Patterns, Causes, and Mitigation..... 24

3.0 Future No Build Conditions..... 28

    3.1 Background Growth..... 28

    3.2 Future No Build Operations & Capacity Analysis..... 31

4.0 Future Build Conditions ..... 33

    4.1 Description of Conceptual Redevelopment Frame ..... 33

    4.2 Trip Generation ..... 37

    4.3 Trip Distribution ..... 38

    4.4 Future Build Operations & Capacity Analysis ..... 44

5.0 Conclusion, Recommendations, and Next Steps ..... 47

6.0 References ..... 48

List of Figures

Figure 1: Bull’s Head Traffic Impact Study Area Map .....5

Figure 2: Functional Classification .....9

Figure 3: Average Annual Daily Traffic Volumes (AADT).....10

Figure 4: Existing Intersection Lane Designations, Turn Lane Lengths & Traffic Controls .....14

Figure 5: Morning Peak Existing Traffic Volumes .....16

Figure 6: Evening Peak Existing Traffic Volumes.....17

Figure 7: Morning Peak Traffic Volumes - Future No-Build 2024 .....29

Figure 8: Evening Peak Traffic Volumes - Future No-Build 2024 .....30

Figure 9: Conceptual Redevelopment Frame .....34

Figure 10: Morning Peak Traffic Volumes – Conceptual Redevelopment Frame without Trips from Redevelopment 2024 ...35

Figure 11: Evening Peak Traffic Volumes – Conceptual Redevelopment Frame without Trips from Redevelopment 2024.....36

Figure 12: Trip Distribution .....39

Figure 13: New Trips – Morning Peak.....40

Figure 14: New Trips – Evening Peak .....41

Figure 15: Morning Peak Traffic Volumes - Future Build 2024 .....42

Figure 16: Evening Peak Traffic Volumes - Future Build 2024 .....43

List of Tables

Table 1: Pedestrian Crossing Data .....18

Table 2: Existing Intersection Level of Service .....21

Table 3: Intersection Accident Severity .....22

Table 4: Intersection Accident Rates .....23

Table 5: Intersection Accident Type .....23

Table 6: Existing and Future No-Build Level of Service .....32

Table 7: Trip Generation Zones .....37

Table 8: Trip Generation Summary – New Trips.....38

Table 9: Level of Service Summary – Morning Peak .....45

Table 10: Level of Service Summary – Evening Peak .....46

## Executive Summary

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This Traffic Impact Study (TIS) was conducted 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 frames developed as part of the Bull's Head Urban Renewal Plan effort. This conceptual redevelopment frame represents the most intensive development compared to the other frames and was chosen as the highest level of potential development for a conventional traffic impact assessment. The objectives of this TIS include:

1. Document existing roadway network
2. Assess the Existing/Future No Build Conditions traffic operations
3. Identify safety deficiencies
4. Develop and assess the Future Build Conditions traffic operations
5. Evaluate the traffic impacts, if any, of the proposed redevelopment concept on the study area transportation network
6. Identify potential mitigation measures needed to address safety and/or capacity issues that arise from the analysis of the proposed redevelopment concept.

### Existing Conditions

To establish traffic flow patterns, characteristics, and modes within the study area, intersection turning movement and pedestrian counts were conducted during weekday morning and evening peak periods at the following study intersections:

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

Existing conditions capacity analysis was conducted. Overall, the results of the capacity analysis reflect field observations which noted steady but manageable traffic flow and queues. The traffic signals were generally able to service all arriving traffic during both peak periods with some delay for left turning vehicles at the study intersections. The Results of the existing conditions capacity analysis performed for this study indicate that all project intersections operate at an overall Level of Service (LOS) D or better with all individual movements operating at a LOS D or better during both peak periods except for the following locations:

- W Main Street & Jefferson Avenue:
  - Northbound LTR movement: LOS E (PM Peak)
- W Main Street & Genesee Street/Brown Street:
  - Southbound LTR movement: LOS E (PM Peak)
  - Eastbound L movement: LOS E (PM Peak)

The Safety Analysis indicated that three of the six study area intersections were identified as having correctable accident patterns:

- W Main Street / Jefferson Avenue: Rear end, overtaking, right angle accidents
- W Main Street / Genesee Street / Brown Street: Rear end, overtaking, left-turn accidents
- W Main Street / West Avenue / Chili Avenue / York Street: Pedestrian & parked vehicle

The accidents at all other study area intersections were random in occurrence with no correctable patterns identified.

#### Future No Build Conditions

Future No Build Conditions upon which the intensive conceptual redevelopment frame will be added to produce Future Build Conditions within the study area, were established. Volume projections were made for the year 2024. Capacity analysis conducted for the Future No Build Condition (2024) for each of the study intersections projected similar operations to Existing Conditions with minimal degradation in intersection operations.

All study intersections are projected to continue to operate at an overall Level of Service (LOS) D or better with all individual movements operating at a LOS D or better during both peak periods with the exception of the movements at the West Main Street/Jefferson Avenue intersection (NB LTR) and West Main Street/Genesee Street/Brown Street intersection (EB L, SB LTR) which continue to operate at LOS E as noted under Existing Conditions.

#### Future Build Conditions

The potential number of vehicle trips, trip distribution, and future build operations and capacity within portions of the BHURA and BHBOA study areas were based on one of several conceptual redevelopment frames developed as part of the BHURA Plan effort. As previously indicated, this conceptual redevelopment frame represents the most intensive development frame compared to the other frames and was chosen as the highest level of potential development for a conventional traffic study assessment. The number of vehicle trips estimated for the conceptual redevelopment frame utilized conventional methods for trip generation and distribution.

Trip generation estimates for the conceptual redevelopment frame were produced using the Institute of Transportation Engineer's (ITE) Trip Generation Manual, 10<sup>th</sup> edition<sup>4</sup>. Trip generation estimates were calculated for each of the buildings within the conceptual redevelopment frame and then grouped into zones based on the location of the buildings and their access points to the transportation network.

#### Trip Generation Summary

Zone	Morning Peak Hour			Evening Peak Hour		
	Entering	Exiting	Total	Entering	Exiting	Total
Purple	2	4	6	4	5	9
Red	15	26	40	24	24	48
Yellow	2	6	8	5	3	8
Green	5	6	11	7	9	16
Blue	111	48	159	37	99	136
<b>Total New Trips</b>	<b>135</b>	<b>90</b>	<b>224</b>	<b>77</b>	<b>140</b>	<b>217</b>

The results of the Future Build capacity analysis indicate that all study intersections are projected to operate at an overall Level of Service (LOS) D or better with all individual movements operating at a LOS D or better during both peak periods with the exception of the NB LTR movement at the West Main Street/Jefferson Avenue intersection. This movement is projected to continue to operate at LOS E as noted under Existing and Future No Build Conditions.

The conceptual redevelopment frame's road configuration is projected to generally create acceptable levels of operation, for an urban/city environment, at the study intersections. It should be noted that the NB Left turn lane at the W. Main Street/ Genesee St. intersection is projected to operate near its capacity. During the PM peak, 276 vehicles are projected to make the NB left turn; typically, a 2<sup>nd</sup> left turn lane is warranted at approximately 300 vehicles. This movement is projected to operate acceptably but minimal increases in traffic in the future (in excess of Future Build conditions) or on non-typical days may generate additional impacts.

The SB approach to the W. Main Street/ Genesee St. intersection is not projected to queue into the roundabout during the morning and evening peak conditions for a typical day. It should be noted that if events such as an accident or unprecedented long term future growth were to occur, traffic from this approach could queue into the roundabout. If this were to occur there are options to mitigate the queuing, including the use of a metering signal on the westbound (Brown Street) approach to the roundabout.

To reduce the likelihood of future traffic increases, the promotion of TDM applications such as increased use of public transportation options and ride sharing are recommended as a general mitigation measure to help reduce traffic congestion within the study network. The project is located in an urban setting with access to multiple modes of transportation. The promotion of TDM applications can further reduce vehicular trips and create trips utilizing different modes of transportation including walking, biking, and transit.

It is noted that the most intensive conceptual redevelopment frame along with conventional trip generation methodology was used to project Future Build Condition traffic volumes and thus represents a “worse-case scenario” for determining potential impacts on the local road network. Due to the unique nature of the conceptual redevelopment frame, including the project’s location within a dense urban environment, the likely inclusion of affordable and senior housing units, and the likely outcome of vehicles utilizing alternative routes within the neighborhood, the number of vehicle trips generated by the redevelopment of the area would likely be less than the estimates, having a positive impact on vehicular operations and capacity. In addition, the City of Rochester in the Rochester 2034 Comprehensive Plan includes numerous recommendations to promote multi-modal transportation options and transportation demand management to reduce single occupancy vehicle trips and vehicle miles traveled. Modifications to the methodology, promotion of alternatives, and less intensive development will result in less traffic overall and thus fewer potential impacts. A Traffic Impact Study will be required for the final design of the study area which accounts for all of these factors. It is recommended that this TIS update the trip generation and determine any specific modifications in support of future design development.

## 1.0 Introduction

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### 1.1 Purpose and Objectives

The purpose of this Traffic Impact Study (TIS) is to assess the traffic impacts that the conceptual redevelopment frame within portions of the Bull's Head Urban Renewal Area (BHURA) and Brownfield Opportunity Area (BHBOA) study areas may have on the adjacent transportation network. The objectives of this TIS include:

1. Document existing roadway network
2. Assess the Existing/Future No Build Conditions traffic operations
3. Identify safety deficiencies
4. Develop and assess the Future Build Conditions traffic operations
5. Evaluate the traffic impacts, if any, of the conceptual redevelopment frame on the study area transportation network
6. Identify potential mitigation measures needed to address safety and/or capacity issues that arise from the analysis of the conceptual redevelopment frame.

### 1.2 Background

This project involves the redevelopment of approximately 34 acres of land, the BHURA, in the City of Rochester. The project is being executed in a two phase Urban Renewal Plan (URP). The first URP phase involves removal of blight and preparation of the land for revitalization/redevelopment. A URP covering the second phase will involve adoption of necessary zoning amendments and an urban renewal district. This phase involves the development of conceptual development plans, assessment of their potential environmental impacts and assessment of existing traffic conditions and potential future traffic-related impacts to the transportation network. This study is part of the second URP phase.

### 1.3 Study Area

The study area for this Traffic Impact 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 (see Figure 1).

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 Traffic Impact Study (see Figure 1):

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: Bull's Head Traffic Impact Study Area Map





## 2.0 Existing Conditions Summary & Analysis

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### 2.1 Overview

The existing conditions summary and analysis included a review of information available from the City of Rochester, Monroe County, State of New York, and transportation data collected specifically for this study. Data collection was conducted during the week of January 7<sup>th</sup> to January 11<sup>th</sup> and the week of January 14<sup>th</sup> to January 18<sup>th</sup> (schools were in session at the time traffic counts were taken). Data collected included:

- Traffic operations and observations (vehicle, pedestrian, transit, and bicycle)
- Documentation of roadway and intersection geometry, pavement markings, speed limits, signing, and traffic control
- Morning peak period (7-9am) and evening peak period (4-6pm) vehicle turning movement traffic counts (TMC) and pedestrian crossing counts at all study area intersections
- Traffic signal timing and phasing data

In addition, information reviewed from the City of Rochester, Monroe County, and State of New York included the following:

- Bicycle markings and facilities
- Transit routes and stops
- Accident data for the most recent three years that were available
- Average Annual Daily Traffic (AADT) volumes
- Roadway functional classifications

### 2.2 Study Area Roadway Descriptions

<b>W Main Street</b>	W Main Street is an east-west travel route that has two travel lanes approximately 10 feet wide in each direction with widening at the intersections to accommodate turn lanes. Designated on-street parking is present between Brown Street and York Street on the north side of the roadway. It is classified by the New York State Department of Transportation (NYSDOT) as an Urban Minor Arterial roadway. W Main Street is a main transit route for RTS including route numbers 4 (Genesee), 25 (Thurston/MCC), 8 (Chili), and 28 (Genesee Park/Strong).
<b>Jefferson Avenue</b>	Jefferson Avenue is a north-south travel route that has one travel lane approximately 11 feet wide in each direction with widening at the intersections to accommodate turn lanes. Alternate side on-street parking is available north of West Main Street and designated on-street parking is available on both sides of the roadway south of West Main Street. It is classified by the NYSDOT as an Urban Major Collector roadway.
<b>Henion Street</b>	Henion Street is a southbound one-way only travel route that has one travel lane approximately 10 feet wide. On-street parking is allowed on the east side of the roadway. It is classified by the NYSDOT as a Local Roadway.
<b>Genesee Street</b>	Genesee Street is a north-south travel route that has one travel lane approximately 13 feet wide in each direction with widening at the W Main Street intersection to accommodate turn lanes. On-street parking is available on both sides of the roadway for one hour durations. There are “sharrows” on Genesee Street to denote these lanes as shared vehicle/bicycle lanes. It is

classified by the NYSDOT as an Urban Minor Arterial roadway. There are two transit routes that utilize Genesee Street: 4 (Genesee) and 25 (Thurston/MCC).

<b>Brown Street</b>	Brown Street is a northeast-southwest travel route with one travel lane approximately 15 feet wide in each direction. Designated on-street parking is available on both sides of the street. Brown Street is classified by the NYSDOT as an Urban Major Collector roadway. Brown Street becomes a one-way street outside of the study area with traffic moving southwest from Mill Street to Allen Street.
<b>Chili Avenue</b>	Chili Avenue is a northeast-southwest travel route with one travel lane approximately 12 feet wide in each direction. On-street parking is available on the north side of the roadway for one hour durations. It is classified by the NYSDOT as an Urban Minor Arterial roadway. Chili Avenue serves two RTS transit route: 8 (Chili) and 28 (Genesee Park/Strong).
<b>West Avenue</b>	West Avenue is an east-west travel route with one travel lane approximately 12 feet wide in each direction. Bicycle lanes are present on the roadway, one in each direction. Designated on-street parking is also present on the south side of the roadway. Within the study area, West Avenue is classified by the NYSDOT as an Urban Minor Arterial roadway. West Avenue serves one RTS transit route: 28 (Genesee Strong/Park).
<b>York Street</b>	York Street is a north-south travel route that has one travel lane approximately 12 feet wide in each direction. On-street parking is allowed on the east side of the roadway. It is classified by the NYSDOT as a Local Roadway.
<b>Ames Street</b>	Ames Street is a north-south travel route with one travel lane approximately 12 feet wide in each direction. Bicycle lanes are present on the roadway, one in each direction. On-street parking is available on the east side of the roadway. It is classified by the NYSDOT as an Urban Major Collector roadway.
<b>Child Street</b>	Child Street is a north-south travel route that has one travel lane approximately 12 feet wide in each direction. It is classified by the NYSDOT as an Urban Major Collector roadway to the north of Maple Street and as a Local Roadway to the south of Maple Street. On-street parking is allowed on both sides of Child Street.
<b>Maple Street</b>	Maple Street is an east-west travel route that has one travel lane approximately 14 feet wide in each direction. It is classified by the NYSDOT as Urban Major Collector roadway.

The posted speed limit throughout the study area is 30 mph.

## 2.3 Roadway Functional Classification

Functional classification is the process by which roads, streets, and highways are grouped into classes by the NYSDOT according to the character of service they provide. Individual roads and streets do not serve travel independently but as part of a network of roads through which the traffic moves. Functional classification defines the nature of this movement by defining the part that any particular road or street should play in serving the flow of trips through a highway network, the type of access it provides to adjacent properties and whether the roadway is located in an urban or rural environment (all the roadways in the study area are classified as urban).

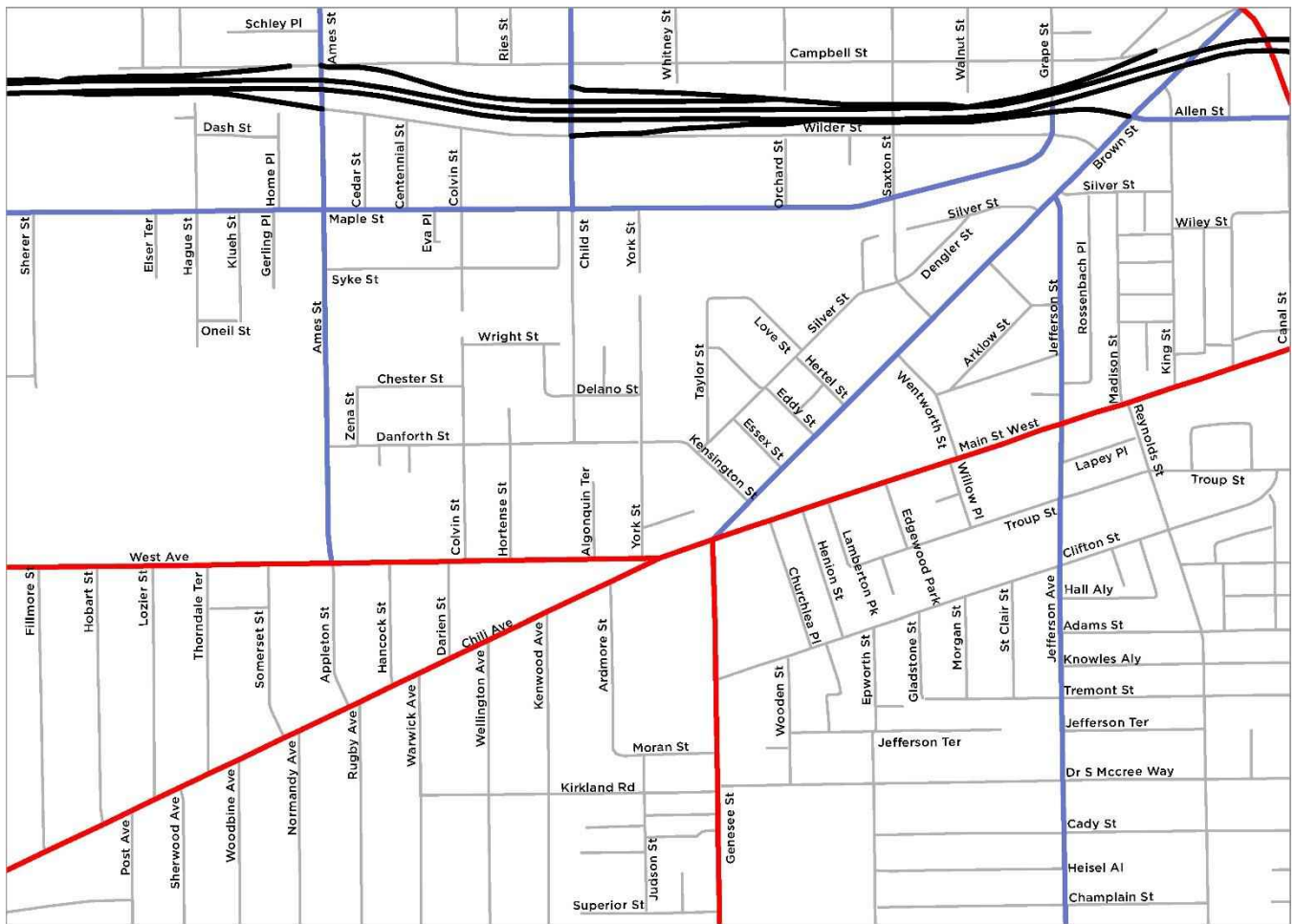
There are four primary functional classes:

- Principal Arterials (class 11)
- Minor Arterials (class 16)
- Collector Roadways (class 17)
- Local Roadways (class 19)

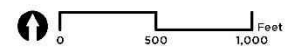
Principal arterials are typically subdivided into interstates, other freeways/expressways, and other principal arterials. Collector streets and roads typically are subdivided into major collectors and minor collectors. By area type, criteria also are provided for differentiation between urban and rural types.

Functional classification of the roadways within the Study Area is shown in Figure 2. West Avenue, Chili Avenue, W Main Street and Genesee Street are classified as Minor Arterials. Ames Street, Maple Street, Brown Street, Jefferson Avenue, and Child Street (north of Maple Street) are classified as Major Collectors. York Street, Child Street (south of Maple Street) and Henion Street are classified as Local Roadways.

Figure 2: Functional Classification



- Principal Arterial Interstate (11)
- Miner Arterial (16)
- Major Collector (17)
- Local (19)



## 2.4 Roadway Average Annual Daily Traffic (AADT)

Average annual daily traffic volumes represent the average volume of traffic that is present on any given roadway over the course of a day and is available from the New York State Department of Transportation. In order to estimate average daily traffic volumes, raw traffic data is collected by the NYSDOT and then adjusted for the time of the year that the data is collected. Figure 3 summarizes the weekday AADT on study roadway segments. A discussion of historic traffic volumes is presented in Section 3.0 on page 28.

Figure 3: Average Annual Daily Traffic Volumes (AADT)



## 2.5 Study Area Intersection Descriptions

The following summarizes the vehicle, transit, pedestrian, and bicycle accommodations for the intersections included in the study area. All study intersections are signal controlled with two to four phases of operation. Signal coordination is present at all study intersections except the Child Street/Maple Street intersection. Coordination is operated/maintained by Monroe County.

Intersection	Vehicle	Transit	Pedestrian	Bicycle
<b>West Ave/ Appleton St/ Ames St</b>	The West Ave approaches have a single shared through/right turn lane and a 50 foot exclusive left turn lane in each direction. The Ames St southbound approach has a 125 foot exclusive right turn and a shared through/left turn lane. Ames Street northbound is a single lane approach from which all movements are made. The intersection is controlled by a two-phase traffic signal.	An RTS stop is posted on West Ave on the nearside of eastbound traffic. The stop is for Route 28 (Genesee Park/Strong), is an in-lane stop, and does not have seating, a shelter, or any other amenity.	Pedestrian facilities include standard crosswalk markings and pedestrian countdown crossing signals for each approach. At most, a pedestrian would need to cross three lanes of vehicular traffic and two lanes of bicycle traffic (approximately 65 feet crossing Ames St). This longer crossing distance is due to the large turning radius at the corner of Ames St and West Ave.	Dedicated bicycle lanes are present on West Ave and Ames St in both directions. Shared lane markings are present on Appleton St in both directions. Although bicycle facilities exist for all approaches to the intersection, the Southbound Ames St approach is the only one with bicycle facilities at the intersection. This approach has a marked bike box.
<b>Child St/ Maple St</b>	All approaches to this intersection are single lane approaches from which all movements are made. The intersection is controlled by a two-phase traffic signal.	An RTS stop is posted on Maple St on the nearside of eastbound traffic and on Child St on the nearside of southbound traffic. Both stops are in-lane and are for Route 9 (Jay/Maple). Neither stop has seating, a shelter, or any other amenity.	Pedestrian facilities include standard crosswalk markings and pedestrian countdown crossing signals for each approach. Pedestrian crossing distances are approximately 45-50 feet for each crossing.	There are no bicycle facilities approaching the intersection and there are no facilities within the intersection.
<b>West Ave/ W Main St/ Chili Ave/ York St</b>	The West Ave approach has a shared through/left turn lane and a shared through/right turn lane. The W Main St approach consists of an exclusive left turn lane and a shared through/right turn lane. The Chili Ave approach has two exclusive right turn lanes and the York St approach has a single lane from which all movements are made. The intersection is controlled by a three-phase traffic signal with a protected left turn for W Main St westbound left turns in concert with an overlapping right turn for Chili Ave traffic and an exclusive phase for York St traffic.	RTS stops are set back from the intersection. A stop is posted on West Ave on the nearside of eastbound traffic and on the farside of westbound traffic (near the intersection of West Ave and Algonquin Ter). Both stops are for Route 28 (Genesee Park/Strong), are in-lane, and do not have seating or a shelter. There are two stops on Chili Ave near this intersection, but are associated with the Chili Ave / Ardmore St intersection. Both stops are for Route 28 and 8 (Chili), are nearside, and in-lane.	Pedestrian facilities include standard crosswalk markings and pedestrian countdown crossing signals across Chili Ave, West Ave, and York Street. Each of the three crosswalks is approximately 40 feet. Considering traffic signal phasing and crosswalk distances, a pedestrian travelling from the St. Mary's Campus to the northeast corner of the intersection (corner of York Street and W Main Street) would take approximately 1 minute. This would require crossing three roadways and approximately 120 feet of pavement.	There are no bicycle facilities for the intersection. The east/west bicycle lanes on West Ave do not have bicycle facilities for this intersection.

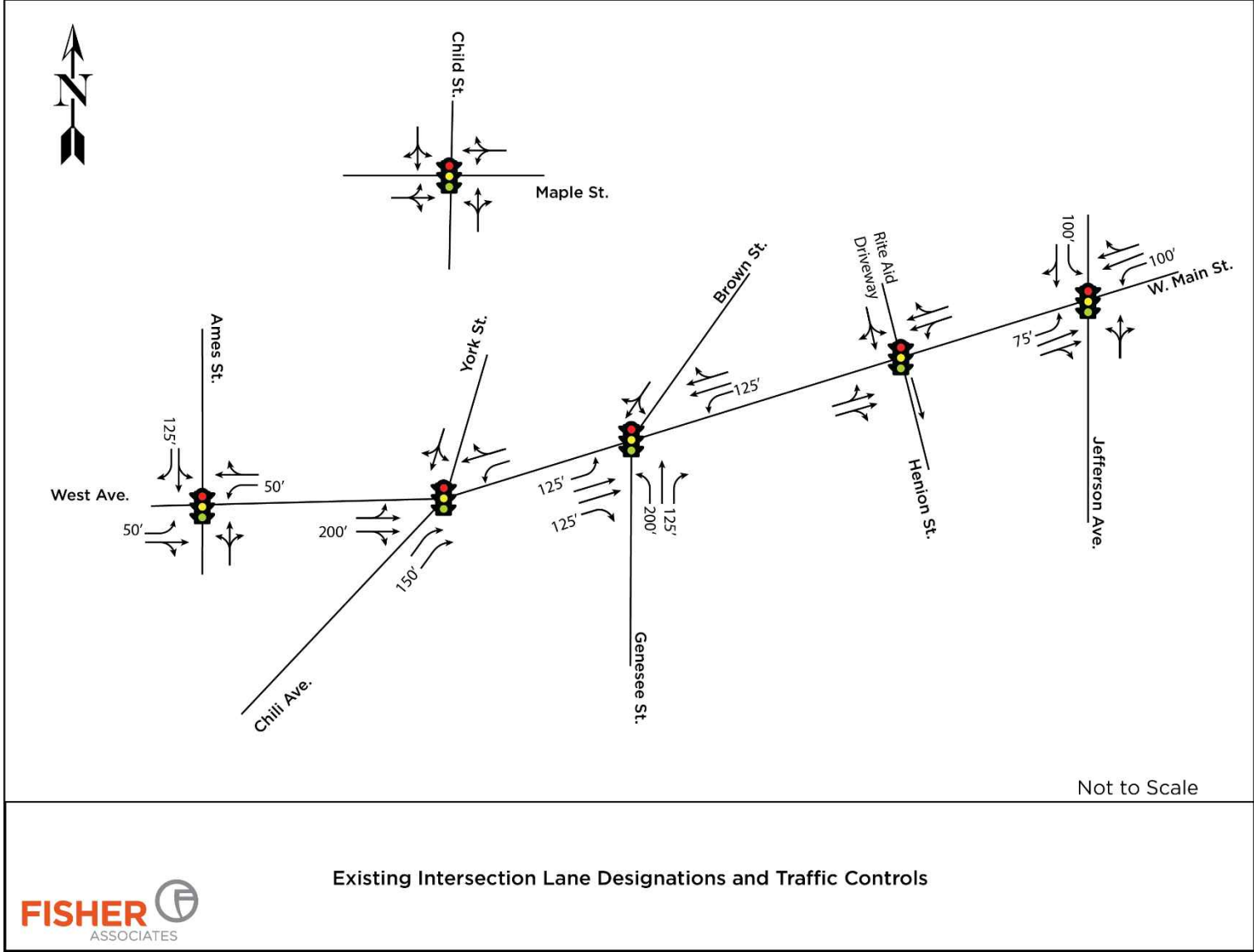
Intersection	Vehicle	Transit	Pedestrian	Bicycle
<b>W Main St/ Genesee St/ Brown St</b>	The W Main St eastbound approach consists of 125 foot exclusive left and right turn lanes and two through lanes. The westbound approach of W Main St Genesee Street consists of a 125 foot exclusive left turn lane, a through lane and a shared through/right turn lane. The Genesee St approach consists of exclusive left (200 foot length), through and right (125 foot length) turn lanes. Brown St consists of a single lane approach from which all movements are made. The intersection is controlled by a four-phase traffic signal with protected+permitted left turns for W Main St traffic and a leading phase for Genesee St traffic.	Most RTS stops associated with this intersection are set back from the intersection. A stop is posted on W Main St on the nearside of westbound traffic for Routes 4, 8, 25, and 28 and on the nearside of eastbound traffic for Routes 8 and 28. In addition, a stop is located on Genesee St on the nearside of northbound traffic and farside of southbound traffic both for Routes 4 and 25. All stops are in-lane. The stop located on W Main St on the nearside of eastbound traffic includes an enclosed shelter with seating capacity for 6 people. All other stops for this intersection have no amenities.	Pedestrian facilities include standard crosswalk markings and pedestrian countdown crossing signals for each approach. Pedestrian crossing distances are excessive with the western crosswalk measuring approximately 80 feet, eastern 120 feet, northern 105 feet, and southern 70 feet. Given a typical pedestrian walking speed of 3.5 feet per second and current crosswalk countdown timer settings, the eastern 120 foot crosswalk and northern 105 foot crosswalk timers do not provide sufficient time for crossing. In addition, the distances result in an increased likelihood of accidents and reduce pedestrian safety.	There are no dedicated bicycle facilities within the intersection. Bicycle share markings on Genesee Street are located approximately 500 feet south of the intersection.
<b>W Main St/ Henion St</b>	The W Main St approaches consist of a shared through/left turn lane and a shared through/right turn lane in each direction. Henion St is one-way away from the intersection and the Right-Aid Driveway is a single lane from which all movements are made. The intersection is controlled by a two-phase traffic signal.	An RTS stop is posted on W Main St on the nearside of eastbound traffic. This stop is in-lane and for Routes 4, 8, 25, and 28). The stop includes an enclosed shelter with seating capacity for 6 people. The stop also includes a public garbage receptacle.	Pedestrian facilities include continental crosswalk markings across both approaches of W Main Street and across Henion St. No markings are across the driveway into the Rite Aid parking lot. Pedestrian countdown crossing signals are provided at all approaches, including across the Rite Aid driveway. Crosswalk distance across W Main St is 50-55 feet, Henion St 20 feet, and Rite Aid driveway 30 feet.	There are no bicycle facilities approaching the intersection and there are no facilities within the intersection.



Intersection	Vehicle	Transit	Pedestrian	Bicycle
<b>W Main St/ Jefferson Ave</b>	The W Main St eastbound approach has a 75 foot exclusive left turn lane, a through lane and a shared through/right turn lane. The W Main St westbound approach consists of a 100 foot exclusive left turn lane, a through lane and a shared through/right turn lane. Jefferson Ave southbound has a 100 foot exclusive left turn lane and a shared through/right turn lane and the northbound approach has a single lane approach from which all movements are made. The intersection is controlled by a two-phase traffic signal.	An RTS stop is posted on W Main St on the nearside of westbound traffic and the nearside of eastbound traffic. Both stops are in-lane and are for Routes 4, 8, 25, and 28. Neither stop has seating, a shelter, or any other amenity.	Pedestrian facilities include standard crosswalk markings and pedestrian countdown crossing signals for each approach. Pedestrian crossing distances range from 45 feet crossing Jefferson Ave and 60 feet crossing W Main Street.	There are no bicycle facilities approaching the intersection and there are no facilities within the intersection.

The existing lane designations, exclusive turn lane lengths and traffic controls at the study area intersections are identified in Figure 4.

Figure 4: Existing Intersection Lane Designations, Turn Lane Lengths & Traffic Controls



xx = Length of turn bay

## 2.6 Turning Movement Traffic Counts

Turning movement traffic data were collected during the week of January 7<sup>th</sup> to January 11<sup>th</sup> and the week of January 14<sup>th</sup> to January 18<sup>th</sup> from 7-9 am and 4-6 pm. These time frames encompassed the weekday morning peak and evening peak hours. The morning peak hour occurred from 7:30 – 8:30 am, the evening peak hour occurred from 4:30 – 5:30 pm. Schools were in session at the time traffic counts were taken.

Existing conditions traffic volumes for the morning peak and evening peak hours are depicted in Figure 5 and Figure 6, respectively. The intersection turning movement count data is provided in the Appendix of this study. In general, traffic volumes are between 30% and 45% higher during the PM peak hour. Traffic volumes are highest within the study area on the section of W Main Street between Genesee Street and Chili Avenue, with the next highest volumes between Henion Street and Genesee Street. The lowest volumes are on West Avenue between Chili Avenue and Ames Street. The highest volume intersection is W Main Street/Genesee Street/Brown Street with the W Main Street/Chili Avenue/West Avenue and W Main Street/Jefferson Avenue intersections having the second most amount of traffic.

Figure 5: Morning Peak Existing Traffic Volumes

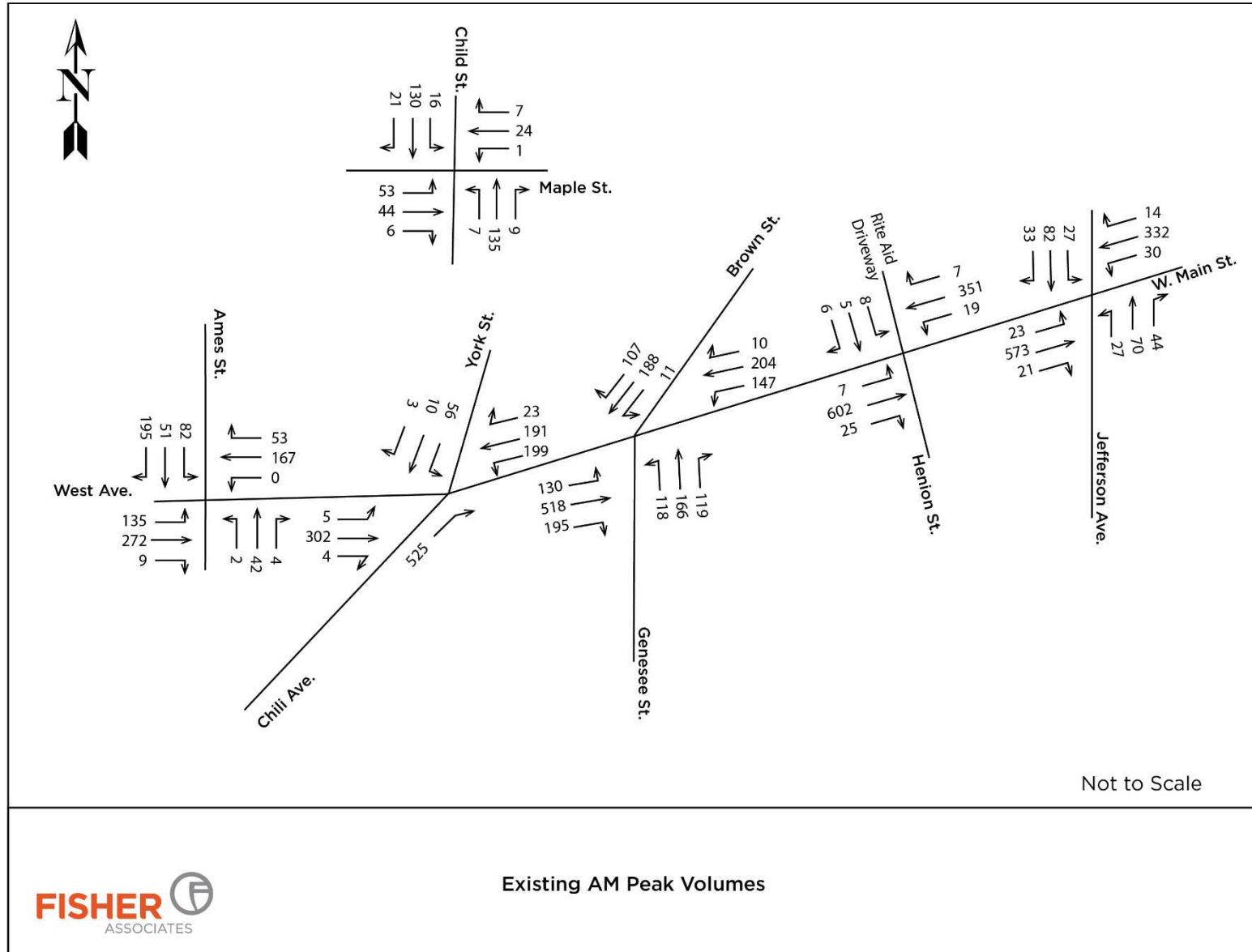
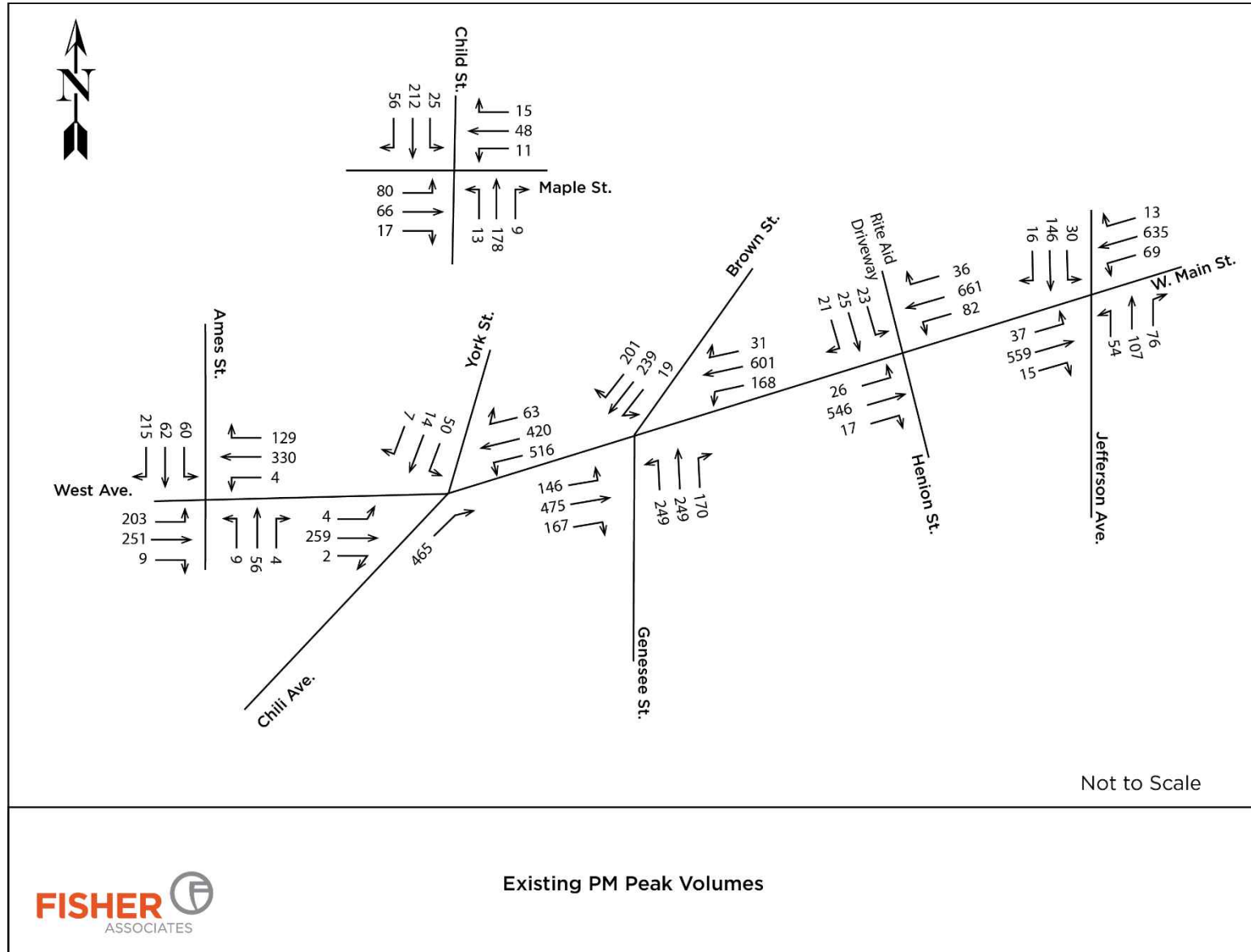


Figure 6: Evening Peak Existing Traffic Volumes



## 2.7 Pedestrian Counts

During the collection of turning movement traffic data, pedestrian crossing data was also collected during the same timeframe. Table 1 below presents a summary of the pedestrian crossing data. The intersection with the highest number of crossings was at W Main Street and Henion Street with 115 crossings from 4-6pm. Pedestrian activity generators (origins and destinations) near this intersection include the two bus stops serving Routes 4, 8, 25, 28, Rite Aid and associated parking lot, and the Bull's Head Plaza and associated parking lot. Other intersections with a relatively high number of pedestrian crossings include the W Main Street/Jefferson Avenue intersection and the W Main Street/West Avenue/ Chili Avenue/York Street intersection. Both intersections have nearby transit stops and mixed-use buildings. Overall, the greatest pedestrian generators include the St. Mary's Campus, the Bull's Head Plaza, and numerous RTS transit stops.

Table 1: Pedestrian Crossing Data

Intersection	AM Peak Period (7-9am)	PM Peak Period (4-6pm)	Total
Child Street/Maple Street	16	22	38
West Avenue/Ames Street	21	50	71
W Main Street/West Avenue/Chili Avenue/York Street	82	74	156
W Main Street/Genesee Street/Brown Street	31	42	73
W Main Street/Henion Street	63	115	178
W Main Street/Jefferson Avenue	41	86	127
<b>Total</b>	<b>254</b>	<b>389</b>	<b>643</b>

xx=Number of pedestrians crossing at intersection

# 2.8 Existing Operations and Capacity Analysis

## Capacity Analysis Methodology

Intersection vehicle capacity analysis was conducted using Synchro 10<sup>1</sup> software. The program is based on methods presented in the 2010 Highway Capacity Manual<sup>2</sup> that describes 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 vehicle 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 and to the letters 'a' to 'f' for stop sign controlled intersections. Delay descriptions for each level of service are as follows:

<i>Traffic Signal Controlled Intersections</i>	<i>Stop Sign Controlled Intersections</i>
A less than 10 seconds	a less than 10 seconds
B 10 to 20 seconds	b 10 to 15 seconds
C 20 to 35 seconds	c 15 to 25 seconds
D 35 to 55 seconds	d 25 to 35 seconds
E 55 to 80 seconds	e 35 to 50 seconds
F 80 seconds or Greater	f 50 seconds or Greater

In general, an overall LOS 'D' with intersection turning movement, LOS 'E' for a traffic signal controlled intersection and a LOS 'e' for a stop controlled intersection or roundabout are generally considered to be the thresholds of acceptable operations in an urban environment.

## Capacity Analysis Results

This section of the study provides a summary of the results of the existing conditions operation analysis for the study intersections. A summary of Intersection Level of Service is provided in Table 2: Existing Intersection Level of Service on Page 21. In the table, movements have been shaded in red to call out locations approaching or at poor operating conditions. Capacity analysis summary reports for existing conditions are provided in the Appendix of this report.

Overall, the results of the capacity analysis reflect field observations which noted steady but manageable traffic flow and queues. The traffic signals were generally able to service all arriving traffic during both peak periods with some delay for left turning vehicles at the study intersections.

The Results of the existing conditions capacity analysis performed for this study indicate that all project intersections operate at an overall Level of Service (LOS) D or better with all individual movements operating at a LOS D or better during both peak periods except for the following locations:



**W Main Street & Jefferson Avenue:**

- Northbound LTR movement: LOS E (PM Peak)
  - Long queues that do not always clear within each cycle were observed in the field.
  - Northbound vehicles were observed running on red due to congestion and insufficient green time.

**W Main Street & Genesee Street/Brown Street:**

- Southbound LTR movement: LOS E (PM Peak)
  - Long but manageable queues were observed in the field; most queues cleared within each cycle.
- Eastbound L movement: LOS E (PM Peak)
  - No significant queuing was observed in the field.

Observations also indicate there were delays and queues caused by bus stops at each intersection excluding the Child Street/Maple Street intersection. Stopped busses created vehicular queues behind them multiple times in an hour, predominantly at the W Main Street/Henion Street intersection. Other intersections were also affected in this way but not as frequently nor as severely.

Table 2: Existing Intersection Level of Service

Study Intersection	Approach	Movement	Morning Peak Hour			Evening Peak Hour		
			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	1.0	A	1	4.1	A	14
		T-TR	2.0	A	4	4.4	A	73
	Westbound	L	3.9	A	10	8.5	A	38
		T-TR	3.5	A	30	8.6	A	130
	Northbound	LTR	18.6	B	67	77.8	E	#289
	Southbound	L	17.2	B	23	35.6	D	46
		TR	15.1	B	55	37.3	D	160
	Overall		6.1	A		19.3	B	
West Main Street & Henion Street / Rite Aid (Signalized)	Eastbound	LT-TR	1.1	A	43	1.9	A	m52
	Westbound	LT-TR	2.6	A	75	11.3	B	m291
	Southbound	LTR	30.7	C	25	28.8	C	66
	Overall		2.3	A		8.4	A	
West Main Street & Genesee Street / Brown Street (Signalized)	Eastbound	L	21.2	C	116	60.8	E	#154
		T-T	25.4	C	222	37.4	D	218
		R	26.0	C	189	38.1	D	175
	Westbound	L	17.2	B	70	30.5	C	77
		T-TR	21.1	C	44	22.4	C	176
		L	24.8	C	92	42.4	D	#227
	Northbound	T	20.9	C	125	18.6	B	163
		R	20.7	C	95	18.0	B	116
	Southbound	LTR	40.5	D	275	64.6	E	#506
	Overall		25.7	C		36.8	D	
	Eastbound	LT-TR	42.9	D	138	41.2	D	101
West Main Street & West Avenue Chili Avenue & York Street (Signalized)	Westbound	L	16.3	B	216	5.9	A	m189
		TR	4.1	A	49	3.5	A	m111
	Northbound	R-R	0.6	A	0	0.4	A	0
	Southbound	LR	45.6	D	81	52.1	D	87
	Overall		16.8	B		10.9	B	
West Avenue & Appleton Street / Ames Street (Signalized)	Eastbound	L	6.0	A	56	8.6	A	113
		TR	5.6	A	101	5.3	A	99
	Westbound	L	0.0	A	0	3.8	A	m2
		TR	4.9	A	71	3.8	A	103
	Northbound	LTR	22.8	C	44	40.0	D	76
	Southbound	LT	32.6	C	106	52.3	D	133
		R	7.5	A	42	9.8	A	61
	Overall		10.2	B		12.2	B	
Child Street & Maple Street (Signalized)	Eastbound	LTR	8.6	A	39	11.6	B	70
	Westbound	LTR	6.3	A	12	8.1	A	33
	Northbound	LTR	7.5	A	56	8.0	A	73
	Southbound	LTR	7.5	A	64	9.0	A	108
	Overall		7.6	A		9.3	A	

**Note\***

- Levels of Service (LOS) were obtained from Synchro 10
- Delay is vehicle delay measured in seconds.
- 95<sup>th</sup> % = 95th percentile queue length (feet)
- m = Volume for 95th percentile queue is metered by upstream signal.
- # = 95th percentile volume exceeds capacity, queue may be longer.
- LTR = Left/Through/Right turn movement



## 2.9 Safety Considerations, Accident History and Analysis

An accident analysis was performed for the study area intersections in accordance with the Highway Design Manual chapter 5. Three years of accident history (October 2015 thru September 2018) were reviewed for patterns and safety concerns and summarized for the study area intersections. Accident history data was obtained from MV-104A Police Accident Reports provided by the City of Rochester, New York, Police Department.

The accident analysis summaries produced using HSA<sup>3</sup> software are available in the Appendix of the report including Accident Rate Calculations, Accident Summary Sheets, Details of Accident Histories and Collision Diagrams.

### Accident Severity

Table 3 below provides a summary of the severity of the accidents for the study intersections. The study accident history reveals that 99 accidents occurred at the study intersections over the three year period. There were no fatalities, however, 22 out of the 99 (22%) total accidents involved an injury. The study accident history also revealed that 4 out of the 99 (4%) accidents involved a pedestrian and no accidents involved a bicycle. Two pedestrian accidents occurred at the W Main Street/Jefferson Avenue intersection and one pedestrian accident occurred at the W Main Street/West Avenue/Chili Avenue/York Street intersection and at the W Main Street/Genesee Street/Brown Street intersection.

Table 3: Intersection Accident Severity

Intersection	Fatality	Injury	Property Damage Only	Non-Reportable	Total
Main Street/Jefferson Avenue	0	8	29	1	38
Main Street/Henion Street	0	0	0	0	0
Main Street/Genesee Street/Brown Street	0	6	18	2	26
Main Street/West Avenue/Chili Avenue/York Street	0	3	10	2	15
West Avenue/Ames Street	0	3	7	1	11
Child Street/Maple Street	0	2	7	0	9
TOTAL	0	22	71	6	99

## Accident Rates

Accident rates were calculated for the study area intersections and compared to the Statewide Average Accident Rates for similar facilities. Table 4 below provides a summary of the accident rates for the study area intersections. Four of the six study area intersections had accident rates over the Statewide Average Rates:

- W Main Street / Jefferson Avenue
- W Main Street / Genesee Street / Brown Street
- West Avenue / Ames Street
- Child Street / Maple Street

Table 4: Intersection Accident Rates

Intersection	Urban Functional Class Statewide Average Rate (Acc/MEV)	Calculated Accident Rate (Acc/MEV)
Main Street/Jefferson Avenue	0.25	1.93
Main Street/Henion Street	0.20	0.00
Main Street/Genesee Street/Brown Street	0.25	0.88
Main Street/West Avenue/Chili Avenue/York Street	0.25	0.08
West Avenue/Ames Street	0.20	0.75
Child Street/Maple Street	0.20	1.13

Acc/MEV – number of accidents/million entering vehicles

## Accident Type

The study area intersections were further examined to identify potential accident patterns. Table 5 below summarizes the accident types that occurred at the study area intersections. The table shows that rear-end (30/99), overtaking (21/99), left turn (15/99) and right angle (14/99) accidents were the predominant accident types at the study area intersections.

Table 5: Intersection Accident Type

Intersection	Rear End	Over- take	Right Angle	Left Turn	Right Turn	Fixed Object	Head On	Side swipe	Ped- estrian	Parked Vehicle	Run Off Road	Total
Main Street/Jefferson Avenue	9	9	7	3	0	3	1	1	1	4	0	38
Main Street/Henion Street	0	0	0	0	0	0	0	0	0	0	0	0
Main Street/Genesee Street/Brown Street	8	7	3	5	1	0	0	0	1	0	1	26
Main Street/West Ave/Chili Ave/York St	6	4	0	1	0	0	0	0	2	2	0	15
West Avenue/Ames Street	6	1	1	3	0	0	0	0	0	0	0	11
Child Street/Maple Street	1	0	3	3	0	1	0	0	0	1	0	9
<b>TOTAL</b>	<b>30</b>	<b>21</b>	<b>14</b>	<b>15</b>	<b>1</b>	<b>4</b>	<b>1</b>	<b>1</b>	<b>4</b>	<b>7</b>	<b>1</b>	<b>99</b>

## Accident Patterns, Causes, and Mitigation

Four of the six study area intersections were identified as having specific accident patterns:

- W Main Street / Jefferson Avenue
- W Main Street / Genesee Street / Brown Street
- W Main Street / West Avenue / Chili Avenue / York Street
- West Avenue / Ames Street

The accidents at all other study area intersections were random in occurrence with no patterns identified. The following is a breakdown of the accident patterns that were identified.

### W Main Street / Jefferson Avenue

#### **Patterns**

The W Main Street/Jefferson Avenue intersection accident history revealed that 38 accidents occurred at the intersection. Overall, rear end accidents, overtaking and right angle accidents accounted for approximately 66% (25/38) of the accidents.

The accident history revealed that nine rear-end accidents occurred at the W Main Street/Jefferson Avenue intersection. Of the nine rear-end accidents, three occurred on each the eastbound, westbound and northbound approaches. Following too closely was identified as a contributing factor in five of the rear-end accidents and driver inattention/distraction was identified as a contributing factor in four of the rear end accidents.

Nine overtaking accidents occurred at the intersection of which four occurred on the eastbound approach, three occurred on the westbound approach, one occurred on the northbound approach and one occurred north of the intersection. Failure to yield right-of-way is identified as a contributing factor in three overtaking accidents, improper passing/lane usage were contributing factors in two overtaking accidents and driver inattention/distraction, turning improperly, unsafe lane changing, and oversized vehicle were identified as contributing factors in one overtaking accident.

Seven right angle accidents occurred at the W Main Street/Jefferson Avenue intersection of which four involved a northbound and a westbound vehicle, two involved a northbound and an eastbound vehicle and one involved a southbound and an eastbound vehicle. Disregard of the traffic control was identified as a contributing factor in four of the right angle accidents, unsafe speed was a contributing factor in two right angle accidents and driver inexperience, failure to yield right-of-way and other vehicular issue are each identified as a contributing factor in one accident.

The majority of the accidents discussed above involved vehicles travelling northbound. Examination of the accident diagram indicates a correctable pattern exists for rear-end accidents and right angle accidents on the intersection's northbound approach and for the eastbound/westbound overtaking accidents.

The remaining accidents at this intersection were random in occurrence with no patterns identified.

#### **Probable Causes**

The rear-end accidents and right angle accidents on the intersection's northbound approach are likely due to congestion. Capacity analysis indicated a LOS E with notable queues on the northbound approach during the PM peak and that the northbound phase is utilizing all available green time. Observations during the evening peak hours noted vehicle queues on the Jefferson Avenue northbound approach did not always clear the intersection during the northbound/southbound phase. Northbound vehicles were also regularly observed travelling thru the intersection after the traffic signal had turned red which may be a factor contributing to the number of right angle accidents at the intersection.

Additionally, observations noted that on-street parking activity and RTS buses stopping at the intersection along with limited sight distances on the northbound approach contributed to congestion at the intersection and may be factors contributing to parked car, rear-end and overtaking accidents.

The eastbound/westbound overtaking accidents are likely due to the striping on West Main Street. Capacity analysis indicted a LOS A on the eastbound and westbound approaches which indicates excessive capacity. The excessive capacity from two lanes in both the eastbound and westbound direction allows drivers to be aggressive and change lanes frequently.

**Potential  
Mitigation  
Measures**

Potential mitigation measures for the northbound approach include signal timing adjustments providing additional time for the northbound approach and striping improvements paired with additional parking restrictions on the northbound approach.

A road diet reducing the eastbound and westbound approaches to one lane in each direction with a center turn lane would better channelize traffic flow and potentially reduce overtaking accidents.

**W Main Street / Genesee Street / Brown Street**

**Patterns**

The W Main Street/Genesee Street/Brown Street intersection accident history revealed that 26 accidents occurred at the intersection. Overall, rear end accidents, overtaking and left-turn accidents accounted for approximately 77% (20/25) of the accidents.

The accident history revealed that eight rear-end accidents occurred at the W Main Street/Genesee Street/Brown Street intersection of which five occurred on the southbound approach, two occurred on the westbound approach and one occurred on the eastbound approach. Following too closely was identified as a contributing factor in nine of the rear-end accidents, driver inattention was identified as a contributing factor in three of the accidents and driver inexperience, disregard of traffic control, reaction to an uninvolved vehicle and slippery pavement were each identified as contributing factors in one rear-end accident.

Seven overtaking accidents occurred at the intersection of which four occurred on the southbound approach, one occurred eastbound and one occurred on the westbound approach. Review of the accident history details reveals that two of the southbound overtaking accidents involved vehicles moving from on-street parking and one eastbound overtaking accident involves a bus. Failure to yield right-of-way was identified as a contributing factor in three of the overtaking accidents, passing/improper lane usage was identified as a contributing factor in two accidents and driver inattention/distraction, following too closely, outside car distraction, aggressive driving/road rage, oversized vehicle and driverless/runaway vehicle were each identified as contributing factor in an overtaking accident.

Five left turn accidents occurred at W Main Street/Genesee Street/Brown Street of which two involved an eastbound left turn, two involved a southbound left turn, and one involved a westbound left turn. Failure to yield right-of-way was identified as a contributing factor in three of the left turn accidents, turning improperly was a contributing factor in two accidents and driver inattention/distraction and other vehicular issue were both identified as contributing factors in one left turn accident.

One pedestrian accident occurred involving a southbound vehicle hitting two pedestrians crossing Genesee Street outside of a pedestrian crosswalk which was attributed to pedestrian error/confusion.

The majority of the accidents discussed above involved vehicles travelling southbound. Examination of the accident diagram indicates a correctable pattern exists for rear-end accidents, overtaking accidents, and potentially left turn accidents on the intersection's southbound approach.

The remaining accidents at this intersection were random in occurrence with no patterns identified.

**Probable Causes**

The rear-end accidents, overtaking accidents, and left turn accidents on the intersection's southbound approach are likely due to congestion. Capacity analysis indicated a LOS E with notable queues on the

southbound approach during the PM peak. The queues were also observed in the field. Capacity analysis also indicates that the southbound phase is utilizing all available green time.

Additionally, the on-street parking on the southbound approach extends close to the intersection and adds vehicular interactions that increase the likelihood of overtaking accidents and additional congestion.

**Potential  
Mitigation  
Measures**

Potential mitigation measures include signal timing adjustments and pushing the on-street parking limits further back from the intersection, traffic calming measures and striping improvements.

**W Main Street / West Avenue / Chili Avenue / York Street**

**Patterns**

The W Main Street/West Avenue/Chili Avenue/York Street intersection accident history revealed that 15 accidents occurred at the intersection. Overall, rear-end and right angle accidents accounted for approximately 67% (10/15) of all the intersection accidents. However, these accident types were random in occurrence with no patterns identified. Potential correctable accident patterns involved pedestrian and parked vehicle accidents.

Two pedestrian accidents occurred on the Chili Avenue northeast-bound approach. One of the pedestrian accidents occurred outside of a crosswalk and was attributed to pedestrian error/confusion and failure to yield right-of-way. The other pedestrian accident was attributed to the driver not yielding the right-of-way and occurred within a crosswalk when a pedestrian did not complete crossing the roadway within the pedestrian phase and a vehicle proceeded forward with the green light striking the pedestrian.

Two parked vehicle accidents occurred and were both related to vehicles parked on the north side of W Main Street, east of the W Main Street/West Avenue/Chili Avenue/York Street intersection. One of the accidents was attributed to an oversized vehicle parked on W Main and passing/improper lane use and the other accident was attributed to driver inattention/distraction and parking in a no parking zone.

The remaining accidents at this intersection were random in occurrence with no patterns identified.

**Probable Causes**

Regarding the pedestrian accidents, review of the pedestrian signal timings on the Chili Avenue approach indicate that there should be sufficient time for pedestrians to cross Chili Avenue safely. Observations noted a number of pedestrians crossing the roadways outside of crosswalks throughout the peak hours which increases the chance of pedestrian accidents. This indicates that the accidents are behavior related and not related to intersection design indicating that there is no correctable pattern.

Regarding the parked vehicle accidents, observations noted delivery trucks parked in the no parking zone in front of the deli on the northeast corner of the intersection resulting in sight distance issues and improper lane usage at the intersection's westbound approach.

Examination of the accident diagram, accident history details and field observations indicate that a correctable problem may exist related to vehicles, particularly heavy vehicles, parked and unloading curbside within the no parking zone on the westbound approach.

**Potential  
Mitigation  
Measures**

Enforcement of the no parking zone on the westbound approach may reduce congestion, minimize sight distance issues and may result in fewer parked cars, overtaking, left turn and rear-end accidents involving westbound vehicles. In addition, another mitigation option includes a loading/delivery zone utilizing space for on-street parking.



### **West Avenue / Ames Street**

**Patterns** The West Avenue/Ames Street intersection accident history revealed that 11 accidents occurred at the intersection. Overall, rear end accidents accounted for approximately 55% (6/11) of the accidents.

Examination of the accident diagram revealed that five of the six rear-end accidents involved vehicles on the southbound approach. The contributing factors indicate that following too closely was a contributing factor in four of the accidents, slippery pavement was a contributing factor in three of the accidents and driver inattention along with vehicle issues were contributing factors in one accident.

The remaining accidents at this intersection were random in occurrence with no patterns identified.

**Probable Causes** Driver behavior and slippery pavement are the probable causes to the rear end accidents.

**Potential Mitigation Measures** Based on examination of the accident diagrams and review of the accident history details, no correctable accident patterns have been identified at the intersection.

## 3.0 Future No Build Conditions

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This section of the study establishes the base conditions upon which the conceptual redevelopment frame will be added to produce future conditions. Projections were made for 5 years out (2024), assuming full build-out of the conceptual redevelopment frame.

### 3.1 Background Growth

An annual compounded growth rate of 0.5% per year was applied to account for potential traffic volume growth within the study area. The annual compounded growth rate was determined using historical traffic volume data. Figure 7 and Figure 8 depict the Future No Build traffic volumes for the 2024 conditions morning and evening peak hours, respectively.

Figure 7: Morning Peak Traffic Volumes - Future No-Build 2024

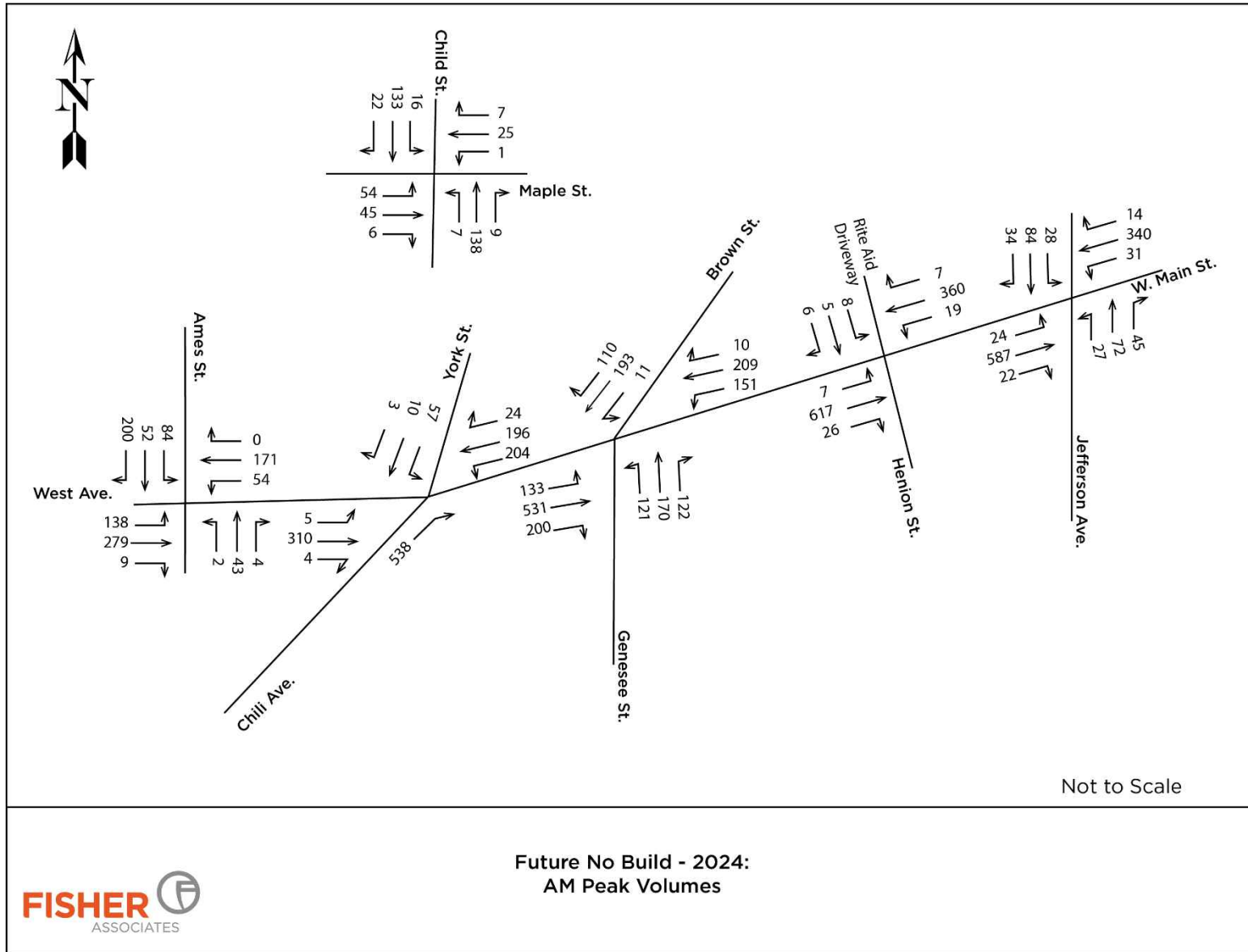
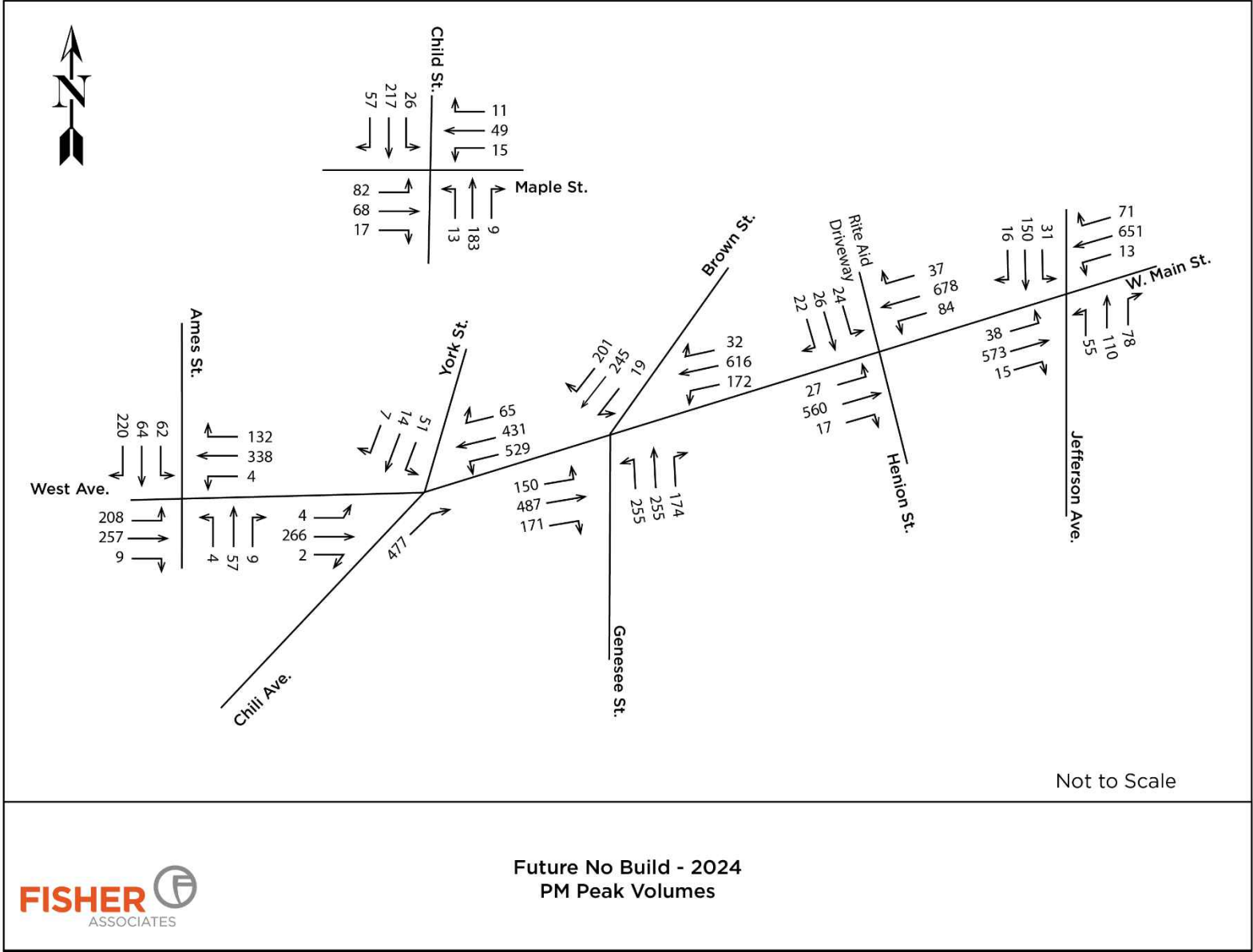


Figure 8: Evening Peak Traffic Volumes - Future No-Build 2024



### 3.2 Future No Build Operations & Capacity Analysis

This section of the report provides Future No Build Conditions operational assessment for the study area intersections.

No Build Conditions capacity analysis results for the morning peak and evening peak hours are summarized in Table 6 on page 32. Also included in Table 6 are the results of the Existing Conditions analysis. Capacity analysis summary reports for Future No Build Conditions are provided in the Appendix of this report.

Capacity analysis conducted for the Future No Build Condition (2024) for each of the study intersections projected similar operations to Existing Conditions with minimal degradation in intersection operations. The degradation is highlighted in the tables summarizing Intersection Level of Service.

All study intersections are projected to continue to operate at an overall Level of Service (LOS) D or better with all individual movements operating at a LOS D or better during both peak periods with the exception of the movements at the West Main Street/Jefferson Avenue intersection (NB LTR) and West Main Street/Genesee Street/Brown Street intersection (EB L, SB LTR) which continue to operate at LOS E as noted under Existing Conditions.

Potential options to improve operations for the northbound approach to the West Main Street/Jefferson Avenue intersection include signal timing adjustments providing additional time for the northbound approach and striping improvements paired with additional parking restrictions on the northbound approach.

Potential options to improve operations for the W Main Street/Genesee Street/Brown Street intersection include signal timing adjustments and pushing the southbound on-street parking limits further back from the intersection along with striping improvements.

Table 6: Existing and Future No-Build Level of Service

Study Intersection	Approach	Movement	Morning Peak Hour						Evening Peak Hour					
			Existing Conditions 2019			Future No Build 2024			Existing Conditions 2019			Future No Build 2024		
			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	1.0	A	1	1.0	A	1	4.1	A	14	4.2	A	15
		T-TR	2.0	A	4	1.9	A	4	4.4	A	73	4.5	A	74
	Westbound	L	3.9	A	10	3.9	A	10	8.5	A	38	8.8	A	39
		T-TR	3.5	A	30	3.5	A	31	8.6	A	130	8.9	A	134
	Northbound	LTR	18.6	B	67	19.0	B	69	77.8	E	#289	78.9	E	#301
		L	17.2	B	23	17.3	B	24	35.6	D	46	35.5	D	46
	Southbound	TR	15.1	B	55	15.2	B	56	37.3	D	160	37.1	D	165
	Overall		6.1	A		6.2	A		19.3	B		19.6	B	
West Main Street & Henion Street / Rite Aid (Signalized)	Eastbound	LT-TR	1.1	A	43	1.1	A	43	1.9	A	m52	1.9	A	m53
	Westbound	LT-TR	2.6	A	75	2.6	A	77	11.3	B	m291	11.5	B	m301
	Southbound	LTR	30.7	C	25	30.7	C	25	28.8	C	66	29.2	C	68
	Overall		2.3	A		2.3	A		8.4	A		8.5	A	
West Main Street & Genesee Street / Brown Street (Signalized)	Eastbound	L	21.2	C	116	21.3	C	115	60.8	E	#154	66.8	E	#169
		T-T	25.4	C	222	25.7	C	224	37.4	D	218	38.5	D	224
		R	26.0	C	189	26.3	C	190	38.1	D	175	38.6	D	180
	Westbound	L	17.2	B	70	18.0	B	71	30.5	C	77	32.9	C	82
		T-TR	21.1	C	44	21.2	C	44	22.4	C	176	23.3	C	178
	Northbound	L	24.8	C	92	25.7	C	96	42.4	D	#227	44.9	D	#239
		T	20.9	C	125	21.0	C	128	18.6	B	163	18.6	B	167
		R	20.7	C	95	20.8	C	98	18.0	B	116	18.0	B	119
	Southbound	LTR	40.5	D	275	40.9	D	284	64.6	E	#506	66.5	E	#522
	Overall		25.7	C		26.1	C		36.8	D		38.2	D	
West Main Street & West Avenue Chili Avenue & York Street (Signalized)	Eastbound	LT-TR	42.9	D	138	42.6	D	141	41.2	D	101	41.2	D	101
	Westbound	L	16.3	B	216	16.6	B	220	5.9	A	m189	6.1	A	m193
		TR	4.1	A	49	4.2	A	52	3.5	A	m111	3.6	A	m114
	Northbound	R-R	0.6	A	0	0.8	A	4	0.4	A	0	0.4	A	0
	Southbound	LR	45.6	D	81	45.7	D	81	52.1	D	87	52.1	D	88
	Overall		16.8	B		16.9	B		10.9	B		10.9	B	
West Avenue & Appleton Street / Ames Street (Signalized)	Eastbound	L	6.0	A	56	6.2	A	59	8.6	A	113	9.1	A	120
		TR	5.6	A	101	5.8	A	106	5.3	A	99	5.4	A	103
	Westbound	L	0.0	A	0	0.0	A	0	3.8	A	m2	4.0	A	m2
		TR	4.9	A	71	5.1	A	74	3.8	A	103	4.1	A	110
	Northbound	LTR	22.8	C	44	22.5	C	44	40.0	D	76	39.6	D	76
		LT	32.6	C	106	32.5	C	108	52.3	D	133	52.3	D	136
	Southbound	R	7.5	A	42	7.4	A	42	9.8	A	61	9.6	A	62
		Overall		10.2	B		10.2	A		12.2	B		12.4	B
Child Street & Maple Street (Signalized)	Eastbound	LTR	8.6	A	39	8.6	A	40	11.6	B	70	11.8	B	73
	Westbound	LTR	6.3	A	12	6.3	A	12	8.1	A	33	8.2	A	34
	Northbound	LTR	7.5	A	56	7.5	A	57	8.0	A	73	8.0	A	74
	Southbound	LTR	7.5	A	64	7.6	A	65	9.0	A	108	9.1	A	110
	Overall		7.6	A		7.7	A		9.3	A		9.4	A	

**Note\***

- Levels of Service (LOS) were obtained from Synchro 10
- Delay is vehicle delay measured in seconds.
- 95<sup>th</sup> % = 95th percentile queue length (feet)
- m = Volume for 95th percentile queue is metered by upstream signal.
- # = 95th percentile volume exceeds capacity, queue may be longer.
- LTR = Left/Through/Right turn movement

= Acceptable Operations

= LOS E or F, and/or Significant Queues

## 4.0 Future Build Conditions

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This section of the report documents the potential number of vehicle trips, trip distribution, and future build operations and capacity within portions of the BHURA and BHBOA study areas based on one of several conceptual redevelopment frames included in the BHURA Plan. This conceptual redevelopment frame represents the most intensive development frame compared to the other frames and was chosen as the highest level of potential development for a conventional traffic study assessment. The number of vehicle trips estimated for the conceptual redevelopment frame utilized conventional methods for trip generation and distribution. Due to the unique nature of the conceptual redevelopment frame, including the project's location within a dense urban environment, the likely inclusion of affordable and senior housing units, and the likely outcome of vehicles utilizing alternative paths within the neighborhood, the number of vehicle trips generated by redevelopment of the area would likely be less than the estimates, having a positive impact on vehicular operations and capacity. In addition, the City of Rochester in the Rochester 2034 Comprehensive Plan includes numerous recommendations to promote multi-modal transportation options and transportation demand management to reduce single occupancy vehicle trips and vehicle miles traveled. To that end, Section 5.0 on page 47 includes recommendations to conduct a more detailed traffic impact study in support of future design development which can account for these factors.

### 4.1 Description of Conceptual Redevelopment Frame

The BHURA comprises approximately 34 acres and is located in Rochester, New York, centered at the convergence of West Main Street, Genesee Street, and Brown Street, West Avenue, and Chili Avenue and is bounded by West Avenue, Colvin Street, Danforth Street, Silver Street, Essex Street, Brown Street, West Main Street, Churchlea Place, Clifton Street, and Genesee Street. The goals and objectives of the BHURA Plan correspond to a phased approach to eliminate blighting conditions in the URA. Based on the identified greatest need and opportunity, the first phase of urban renewal actions are concentrated in the eastern portion of the URA and is referenced as the "Land Assembly Target Area." The conceptual redevelopment frames focus on this Land Assembly Target Area. The conceptual redevelopment frame is shown in Figure 9 on page 34.

As described above, the most intensive conceptual redevelopment frame was chosen as the highest level of potential development for a conventional traffic study assessment. The frame conservatively estimates a total of 125,500 SF of commercial space, 304 residential units (assuming 2-bedroom units at 1,200 SF of rentable area per unit), and the conceptual Rochester Police Department building. It is noted that due to some adjustments to the initial conceptual development frame, including the retention of existing buildings at the corner of West Main and York Streets and Genesee and Clifton Streets, total commercial and residential square footage for the frame shown in Figure 9 on page 34 is estimated to be approximately 10% less than the square footage/units described above, further reducing trips in the study area. To provide a conservative analysis the more intensive initial frame was utilized. The initial frame is included with the trip generation calculations in the Appendix of the report. Based on the transportation system modifications and improvements within the conceptual redevelopment frame, traffic within the adjacent roadway network needs to be re-routed to accommodate the elimination of York Street access at the W. Main Street/West Avenue/Chili Avenue intersection along with the implementation of the Brown Street roundabout. The results of the re-routed traffic are reflected in Figure 10 and Figure 11 which depict the 2024 traffic volumes for the scenario without Trips from Redevelopment for the morning and evening peak periods, respectively.



Figure 9: Conceptual Redevelopment Frame

**Building Height**  
4-stories  
3-stories  
2-stories  
Existing Building

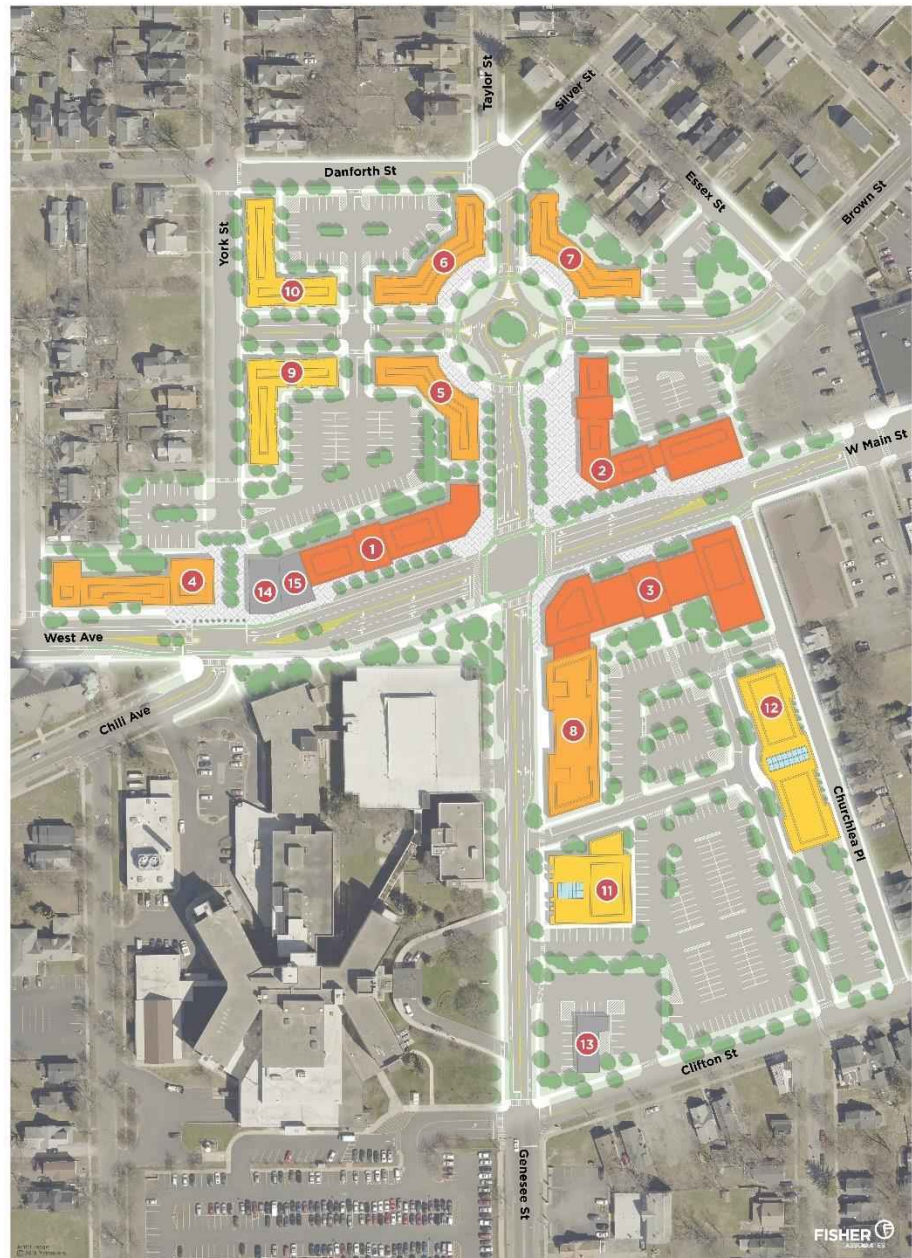
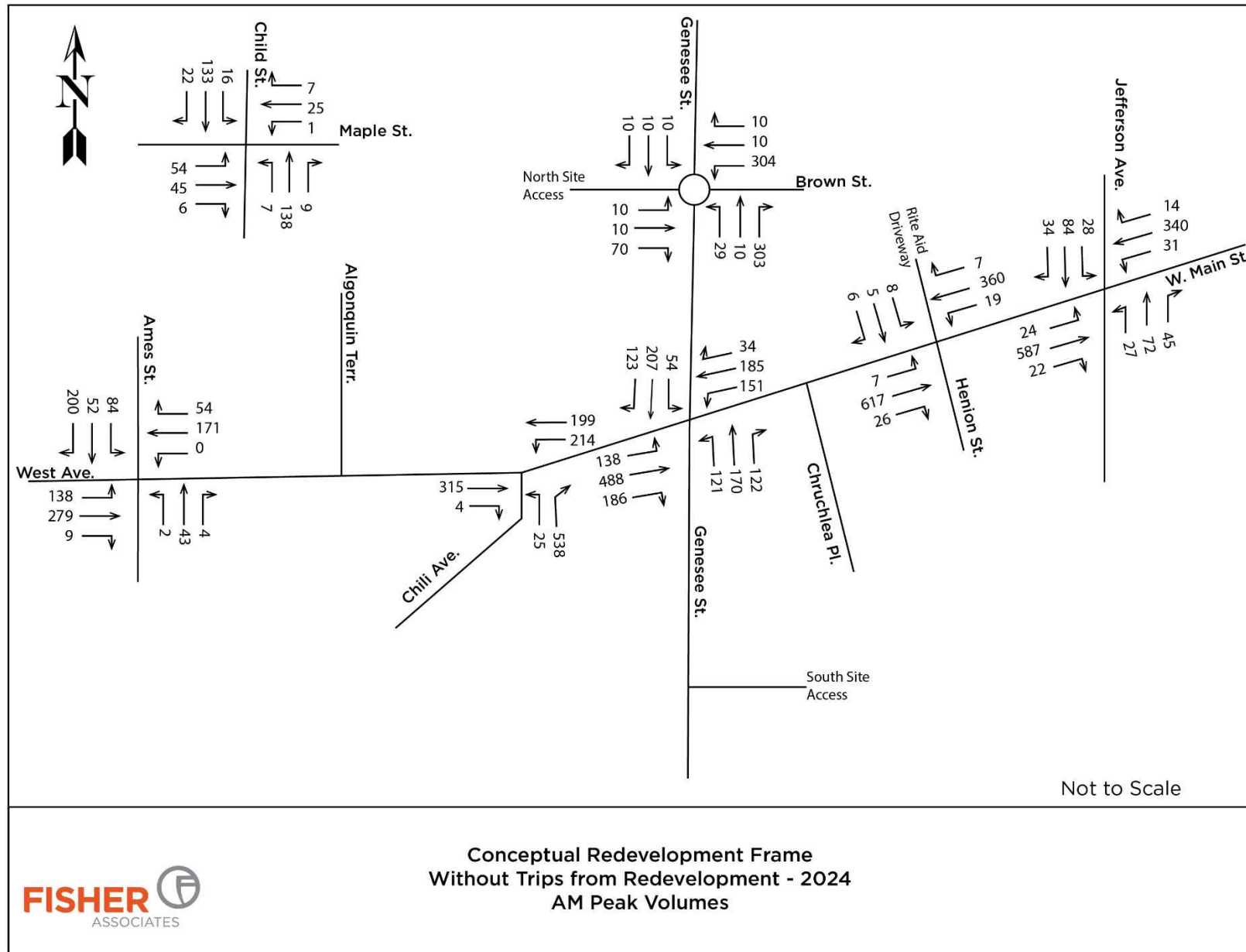


Figure 10: Morning Peak Traffic Volumes – Conceptual Redevelopment Frame without Trips from Redevelopment 2024



Conceptual Redevelopment Frame  
Without Trips from Redevelopment - 2024  
PM Peak Volumes

Not to Scale

## 4.2 Trip Generation

Trip generation estimates for the conceptual redevelopment frame were produced using the Institute of Transportation Engineer's (ITE) Trip Generation Manual, 10<sup>th</sup> edition<sup>4</sup>. Trip generation estimates were calculated for each of the buildings within the conceptual redevelopment frame and then grouped into zones based on the location of the buildings and their access points to the transportation network. These zones are listed below in Table 7 below and depicted in Figure 12: Trip Distribution on page 3939.

Table 7: Trip Generation Zones

Zone	Description
Purple Zone	Parcel located on northeast corner of West Avenue/Algonquin Terrace intersection
Red Zone	Parcel located on the west side of the conceptual Brown Street roundabout
Yellow Zone	Parcel located on northeast corner of the conceptual Brown Street roundabout
Green Zone	Parcel located on southeast corner of the conceptual Brown Street roundabout
Blue Zone	Parcel located on the southeast corner of the W. Main Street/Brown Street/Genesee Street intersection

The trip generation estimates for each building were based on the trip generation characteristics for the following ITE Land Use Codes:

- Land Use Code 220 – Multifamily Housing (Low-Rise)
- Land Use Code 221 – Multifamily Housing (Mid-Rise)
- Land Use Code 231 – Mid-Rise Residential with 1<sup>st</sup>-Floor Commercial
- Land Use Code 710 – General Office Building

There is no ITE Land Use Code that directly correlates to the conceptual Police Station, therefore, a custom rate was utilized. The custom rate is based on ITE Land Use Code 730 – Government Office Building. The trips generated using this rate are in-line with the number of projected employees at the conceptual Police Station and the assumption that they will all arrive during the morning peak hour and leave at various hours during the evening.

All trip generation rates are based on Dense Multi-Use Urban Site data. This data is from dense multi-use urban settings and reflects the more multi-modal nature of trips in these locations compared to general urban/suburban locations.

Internal trips between different land uses within the conceptual redevelopment are anticipated due to the mixed-use nature of the conceptual development frame. However, utilizing the conventional methodologies from ITE resulted in minimal trip credits. The Mid-Rise Residential with 1<sup>st</sup>-Floor Commercial Land Use (Land Use Code 231) already accounts for internal trips between residential and commercial spaces within those multi-use buildings. Additional internal trip credits were calculated for each of the five zones using the methodology in the ITE Trip Generation Handbook, 3<sup>rd</sup> Edition and NCHRP Internal Trip Capture Rates. To keep the trip credits conservative, the trips generated from individual buildings within a zone were utilized in the calculations versus taking credits for the total trips generated for each zone. It should also be noted that higher trip generators such as the conceptual Police Station are not anticipated to generate internal trips. Finally, internal trip methodology does not account for trips within the same land use such as retail to retail. Due to the low number of trips generated for each building within the zones and the other factors discussed above it was determined that no additional internal trips are projected beyond those accounted for in the Mid-Rise Residential with 1<sup>st</sup>-

Floor Commercial Land Use. Trip generation calculations are included in the Appendix of the report. A summary of Trip Generation data for the morning and evening peaks is presented Table 68.

Table 8: Trip Generation Summary – New Trips

Zone	Morning Peak Hour			Evening Peak Hour		
	Entering	Exiting	Total	Entering	Exiting	Total
Purple	2	4	6	4	5	9
Red	15	26	40	24	24	48
Yellow	2	6	8	5	3	8
Green	5	6	11	7	9	16
Blue	111	48	159	37	99	136
<b>Total New Trips</b>	<b>135</b>	<b>90</b>	<b>224</b>	<b>77</b>	<b>140</b>	<b>217</b>

### 4.3 Trip Distribution

The estimated trip generation was distributed onto the adjacent roadway network utilizing the conceptual access points from the conceptual redevelopment frame. This trip distribution was based on the following:

- Existing travel patterns
- Population centers
- Proximity to expressways and other main roadways
- Site layout of the conceptual redevelopment frame

Trip distribution in the form of entering and exiting percentages are depicted in Figure 12. In addition to the trips within the conceptual redevelopment frame it is anticipated that new trips shall access I-490 via Danforth Street and Child Street. These trips/distributions are depicted in the stand-alone Child St/Maple St intersection in the upper left corner of the figures.

Figure 13 and Figure 14 depict the new trips for the morning and evening peak hours, respectively. The new trips generated by the redevelopment project were added to the Future No Build Conditions traffic volumes to produce Future Build Conditions traffic volumes. The trip generation/distribution methodology does not account for the removal of trips associated with the existing land uses within the study area. Several currently occupied businesses will be eliminated/replaced by new development. The exact land uses are not known but do not appear to be major trip generators. Therefore, actual Future Build Conditions traffic volumes are likely lower than projected and the Future Build Conditions traffic volumes used in this study will be conservative. The Future Build Conditions traffic volumes are depicted in Figure 15 and Figure 16 for the morning peak and evening peak hours, respectively.

**Key**

- Purple Zone - entering / (exiting)
- Red Zone - entering / (exiting)
- Yellow Zone - entering / (exiting)
- Green Zone - entering / (exiting)
- Blue Zone - entering / (exiting)

**Trip Distribution**

Not to Scale



Figure 13: New Trips – Morning Peak

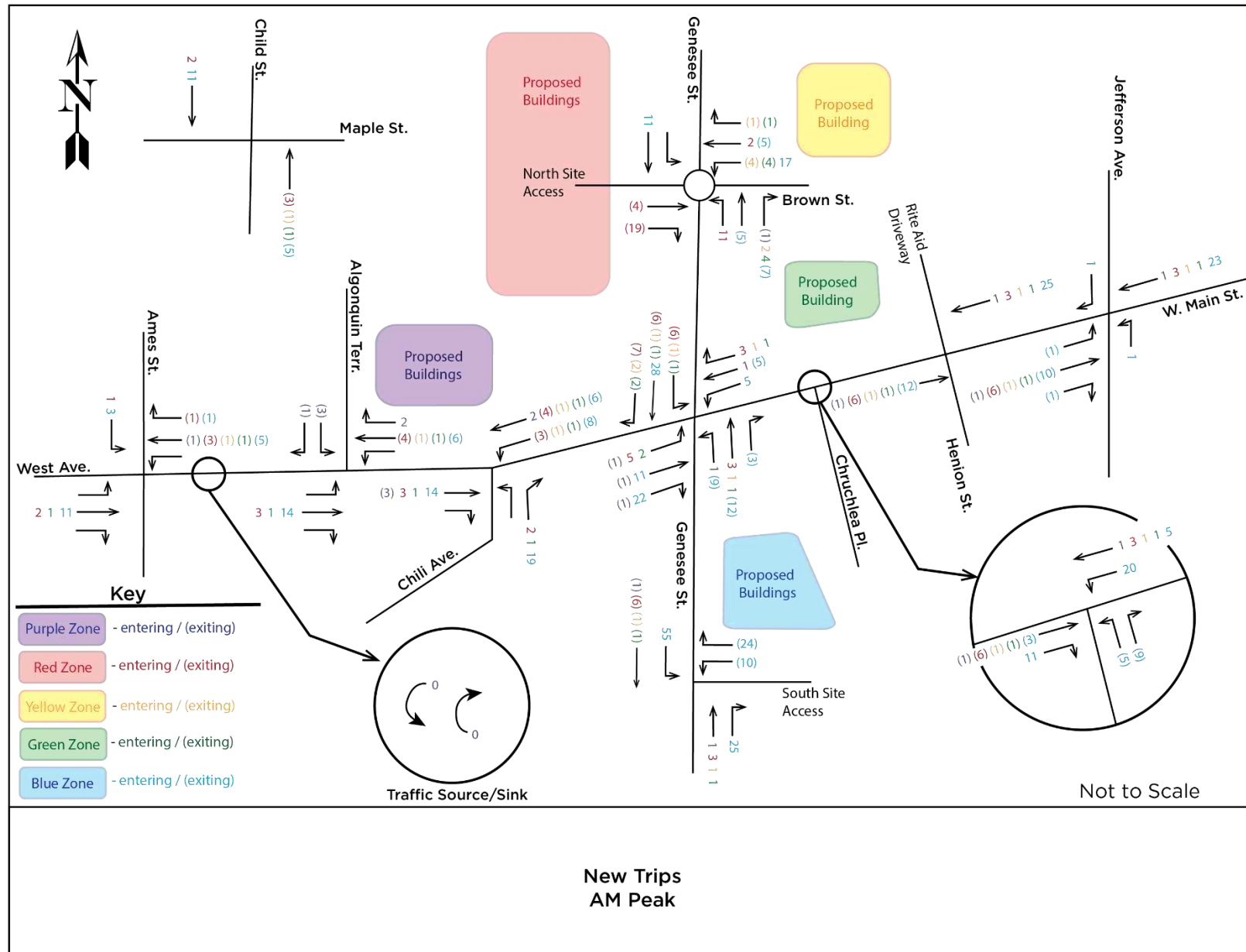


Figure 14: New Trips – Evening Peak

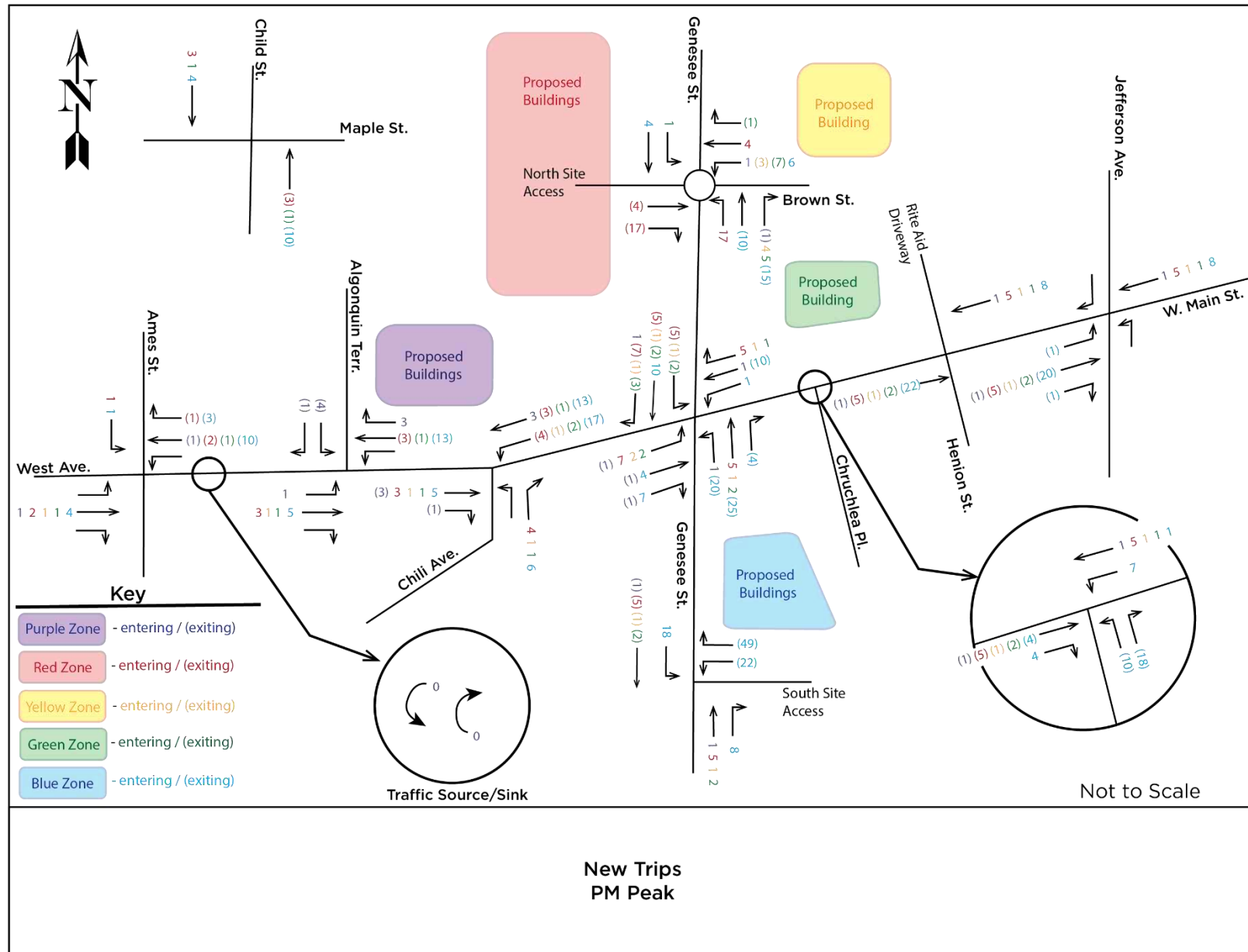




Figure 15: Morning Peak Traffic Volumes - Future Build 2024

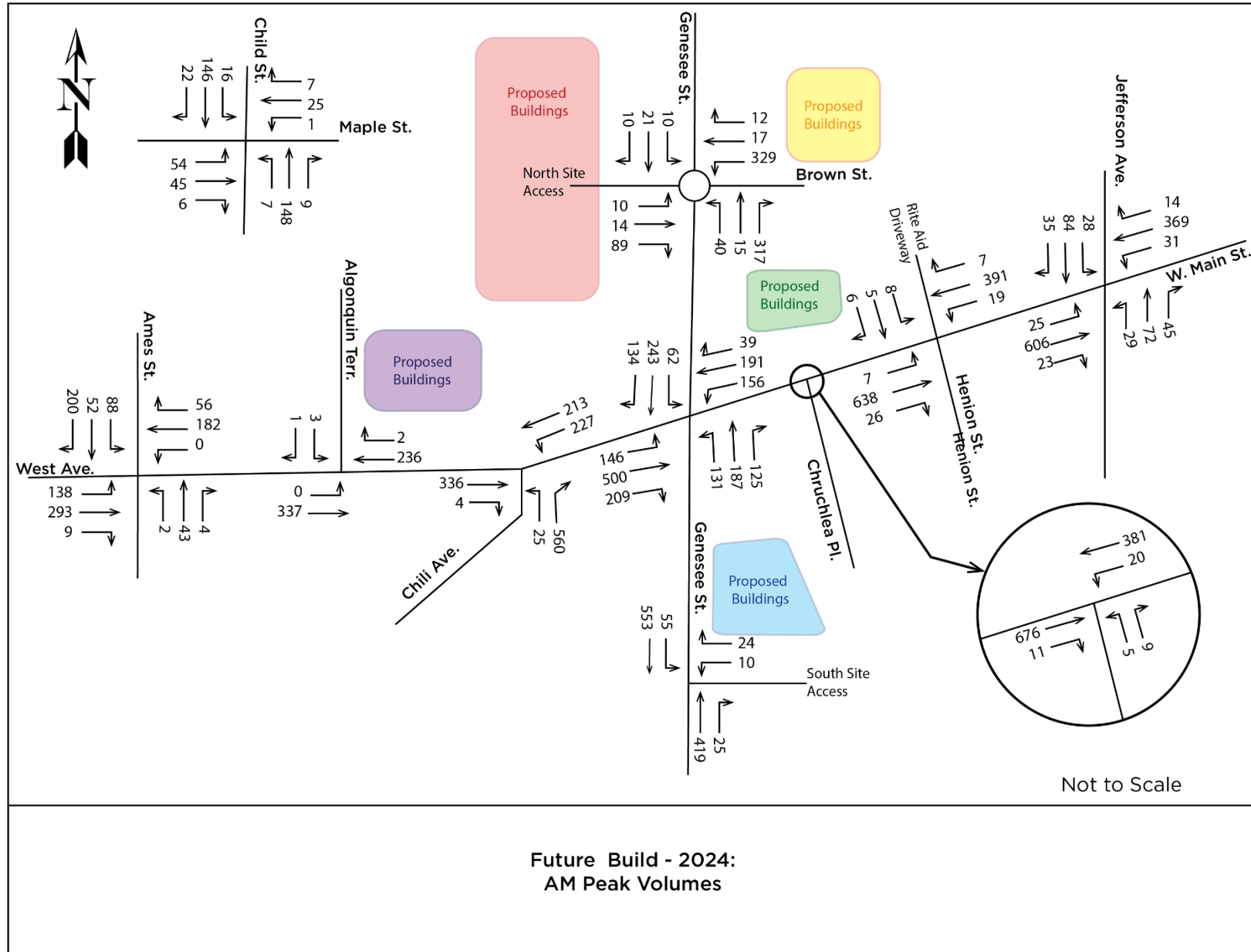
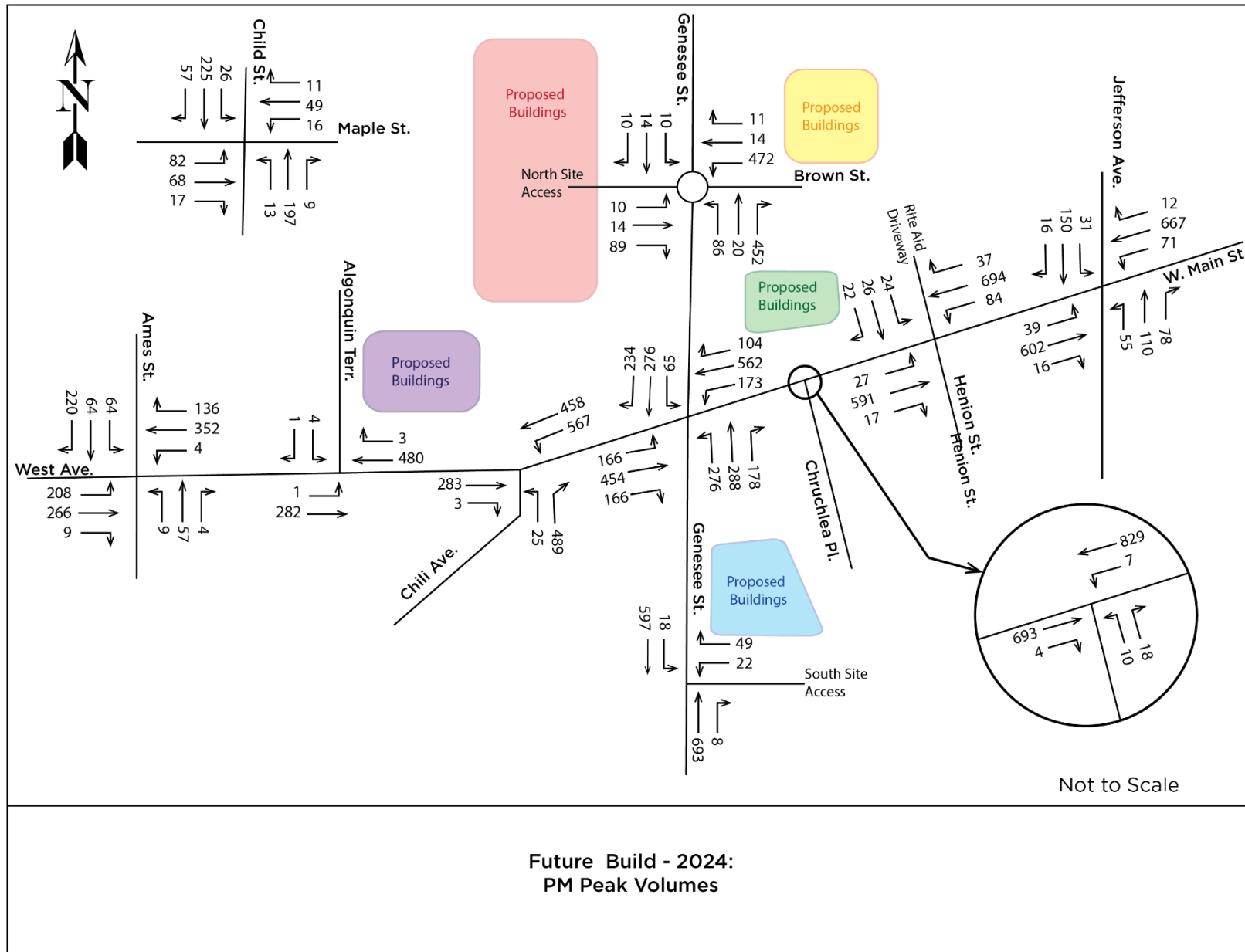


Figure 16: Evening Peak Traffic Volumes - Future Build 2024



## 4.4 Future Build Operations & Capacity Analysis

This section of the report provides the results of the capacity analysis of the conceptual redevelopment frame for the BHURA. Intersection capacity analysis for the signalized and unsignalized intersections was conducted using Synchro as described in Section 2.8. Intersection capacity analysis for the conceptual roundabout was conducted using Sidra Intersection 8<sup>5</sup> and is based on methods presented in the Highway Capacity Manual 6<sup>th</sup> Edition<sup>2</sup> that describe the levels of operation for intersections controlled by roundabouts. Additionally, Simtraffic simulations were utilized to supplement the results Synchro and Sidra analyses to qualitatively determine the impacts of the projected queuing.

Future Build Conditions capacity analysis results for the morning peak and evening peak hours are summarized in Table 9 and Table 10, respectively (pages 45 & 46). Also included in Table 9 and Table 10 are the results of the Existing Conditions and Future No Build Conditions analyses. Capacity analysis summary reports for Future Build Conditions are provided in the Appendix of this report.

The conceptual redevelopment scenario is projected to generally create acceptable levels of operation, for an urban/city environment, at the study intersections. All study intersections are projected to operate at an overall Level of Service (LOS) D or better with all individual movements operating at a LOS D or better during both peak periods with the exception of the NB LTR movement at the West Main Street/Jefferson Avenue intersection. This movement is projected to continue to operate at LOS E as noted under Existing and Future No Build Conditions.

It should be noted that the NB Left turn lane at the W. Main Street/ Genesee St. intersection is projected to operate near its capacity. During the PM peak, 276 vehicles are projected to make the NB left turn; typically, a 2<sup>nd</sup> left turn lane is warranted at approximately 300 vehicles. This movement is projected to operate acceptably but minimal increases in traffic in the future (in excess of Future Build conditions) or on non-typical days may generate additional impacts.

The SB approach to the W. Main Street/ Genesee St. intersection is not projected to queue into the roundabout during the morning and evening peak conditions for a typical day. It should be noted that if events such as an accident or unprecedented long term future growth were to occur, traffic from this approach could queue into the roundabout. If this were to occur there are options to mitigate the queuing, including the use of a metering signal on the westbound (Brown Street) approach to the roundabout.

To reduce the likelihood of future traffic increases, the promotion of TDM applications such as increased use of public transportation options and ride sharing are recommended as a general mitigation measure to help reduce traffic congestion within the study network. The project is located in an urban setting with access to multiple modes of transportation. The promotion of TDM applications can further reduce vehicular trips and create trips utilizing different modes of transportation including walking, biking, and transit.

Table 9: Level of Service Summary – Morning Peak

Study Intersection	Approach	Movement	Existing Conditions 2019			Future No Build 2024			Future Build 2024		
			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	1	0.9	A	m1
		T-TR (T-TR)	2.0	A	4	1.9	A	4	1.5	A	3
	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	3.6	A	34
	Northbound	LTR (LTR)	18.6	B	67	19.0	B	69	19.2	B	70
	Southbound	L (L)	17.2	B	23	17.3	B	24	17.3	B	24
		TR (TR)	15.1	B	55	15.2	B	56	15.2	B	56
Overall		6.1	A		6.2	A		5.9	A		
West Main Street & Henion Street / Rite Aid (Signalized)	Eastbound	(L)	-	-	-	-	-	-	2.0	A	m1
		LT-TR (TR)	1.1	A	43	1.1	A	43	4.1	A	185
	Westbound	(L)	-	-	-	-	-	-	3.4	A	m9
		LT-TR (TR)	2.6	A	75	2.6	A	77	3.7	A	179
	Southbound	LTR (LTR)	30.7	C	25	30.7	C	25	30.7	C	25
Overall		2.3	A		2.3	A		4.5	A		
West Main Street & Genesee Street / Brown Street (Signalized)	Eastbound	L (L)	21.2	C	116	21.3	C	115	12.8	B	m86
		T-T (T-TR)	25.4	C	222	25.7	C	224	25.7	C	289
		R (-)	26.0	C	189	26.3	C	190	-	-	-
	Westbound	L (L)	17.2	B	70	18.0	B	71	23.5	C	#83
		T-TR (T-TR)	21.1	C	44	21.2	C	44	20.0	C	80
	Northbound	L (L)	24.8	C	92	25.7	C	96	31.0	C	100
		T (TR)	20.9	C	125	21.0	C	128	34.9	C	251
		R (-)	20.7	C	95	20.8	C	98	-	-	-
	Southbound	LTR (L)	40.5	D	275	40.9	D	284	41.2	D	75
		- (T)	-	-	-	-	-	-	51.7	D	230
		- (R)	-	-	-	-	-	-	26.0	C	111
Overall		25.7	C		26.1	C		29.1	C		
West Main Street & West Avenue Chili Avenue & York Street (Signalized)	Eastbound	LT-TR (TR)	42.9	D	138	42.6	D	141	53.0	D	287
	Westbound	L (L)	16.3	B	216	16.6	B	220	8.6	A	116
		TR (T)	4.1	A	49	4.2	A	52	1.4	A	57
	Northbound	(L)	-	-	-	-	-	-	41.7	D	39
		R-R (R)	0.6	A	0	0.8	A	4	14.9	B	317
	Southbound	LR (-)	45.6	D	81	45.7	D	81	-	-	-
Overall		16.8	B		16.9	B		22.7	C		
West Avenue & Appleton Street / Ames Street (Signalized)	Eastbound	L (L)	6.0	A	56	6.2	A	59	6.5	A	60
		TR (TR)	5.6	A	101	5.8	A	106	6.0	A	113
	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	5.4	A	81
	Northbound	LTR (LTR)	22.8	C	44	22.5	C	44	22.2	C	43
	Southbound	LT (LT)	32.6	C	106	32.5	C	108	32.5	C	110
		R (R)	7.5	A	42	7.4	A	42	7.3	A	42
Overall		10.2	B		10.2	B		10.3	B		
Child Street & Maple Street (Signalized)	Eastbound	LTR (LTR)	8.6	A	39	8.6	A	40	8.7	A	40
	Westbound	LTR (LTR)	6.3	A	12	6.3	A	12	6.4	A	12
	Northbound	LTR (LTR)	7.5	A	56	7.5	A	57	7.6	A	60
	Southbound	LTR (LTR)	7.5	A	64	7.6	A	65	7.7	A	70
Overall		7.6	A		7.7	A		7.7	A		
West Main Street & Churchlea Place (Unsignalized)	Westbound	- (L)	-	-	-	-	-	-	9.4	a	3
	Northbound	- (LR)	-	-	-	-	-	-	16.5	c	3
Genesee Street & Proposed Access (Unsignalized)	Westbound	- (LR)	-	-	-	-	-	-	16.3	c	10
	Southbound	- (L)	-	-	-	-	-	-	8.6	a	5
Proposed Brown Street Roundabout	Eastbound	- (LTR)	-	-	-	-	-	-	5.3	a	15
	Westbound	- (LTR)	-	-	-	-	-	-	5.8	a	45
	Northbound	- (LTR)	-	-	-	-	-	-	5.6	a	46
	Southbound	- (LTR)	-	-	-	-	-	-	4.6	a	5
	Overall								5.6	a	

**Note\***

- Levels of Service (LOS) were obtained from Synchro 10 & Sidra 8
- Delay is vehicle delay measured in seconds.
- 95<sup>th</sup> % = 95th percentile queue length (feet)
- m = Volume for 95th percentile queue is metered by upstream signal.
- # = 95th percentile volume exceeds capacity, queue may be longer.
- Scenarios: L (LT) [LTR] = Existing & No Build Conditions (Future Build Conditions)

= Acceptable Operations

= LOS E or F, and/or Significant Queues

Table 10: Level of Service Summary – Evening Peak

Study Intersection	Approach	Movement	Existing Conditions 2019			Future No Build 2024			Future Build 2024		
			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	4.2	A	15	8.0	A	24
		T-TR (T-TR)	4.4	A	73	4.5	A	74	6.7	A	117
	Westbound	L (L)	8.5	A	38	8.8	A	39	9.0	A	40
		T-TR (T-TR)	8.6	A	130	8.9	A	134	9.0	A	138
	Northbound	LTR (LTR)	77.8	E	#289	78.9	E	#301	78.9	E	#301
		L (L)	35.6	D	46	35.5	D	46	35.5	D	46
	Southbound	TR (TR)	37.3	D	160	37.1	D	165	37.1	D	165
Overall			19.3	B		19.6	B		20.1	C	
West Main Street & Henion Street / Rite Aid (Signalized)	Eastbound	(L)	-	-	-	-	-	-	3.5	A	m7
		LT-TR (TR)	1.9	A	m52	1.9	A	m53	5.1	A	179
	Westbound	(L)	-	-	-	-	-	-	2.1	A	m11
		LT-TR (TR)	11.3	B	m291	11.5	B	m301	6.6	A	m474
	Southbound	LTR (LTR)	28.8	C	66	29.2	C	68	29.3	C	68
	Overall		8.4	A		8.5	A		6.8	A	
West Main Street & Genesee Street / Brown Street (Signalized)	Eastbound	L (L)	60.8	E	#154	66.8	E	#169	24.4	C	m#140
		T-T (T-TR)	37.4	D	218	38.5	D	224	38.1	D	296
		R (-)	38.1	D	175	38.6	D	180	-	-	-
	Westbound	L (L)	30.5	C	77	32.9	C	82	24.3	C	#124
		T-TR (T-TR)	22.4	C	176	23.3	C	178	29.5	C	#287
		L (L)	42.4	D	#227	44.9	D	#239	54.7	D	#240
	Northbound	T (TR)	18.6	B	163	18.6	B	167	36.6	D	355
		R (-)	18.0	B	116	18.0	B	119	-	-	-
		LTR (L)	64.6	E	#506	66.5	E	#522	42.0	D	78
	Southbound	- (T)	-	-	-	-	-	-	50.5	D	251
		- (R)	-	-	-	-	-	-	26.3	C	178
	Overall		36.8	D		38.2	D		36.0	D	
West Main Street & West Avenue Chili Avenue & York Street (Signalized)	Eastbound	LT-TR (TR)	41.2	D	101	41.2	D	101	51.8	D	#190
	Westbound	L (L)	5.9	A	m189	6.1	A	m193	8.3	A	m173
		TR (T)	3.5	A	m111	3.6	A	m114	3.2	A	m95
	Northbound	(L)	-	-	-	-	-	-	41.9	D	39
		R-R (R)	0.4	A	0	0.4	A	0	7.4	A	181
	Southbound	LR (-)	52.1	D	87	52.1	D	88	-	-	-
	Overall		10.9	B		10.9	B		13.9	B	
West Avenue & Appleton Street / Ames Street (Signalized)	Eastbound	L (L)	8.6	A	113	9.1	A	120	9.6	A	124
		TR (TR)	5.3	A	99	5.4	A	103	5.6	A	108
	Westbound	L (L)	3.8	A	m2	4.0	A	m2	4.0	A	m2
		TR (TR)	3.8	A	103	4.1	A	110	5.5	A	122
	Northbound	LTR (LTR)	40.0	D	76	39.6	D	76	39.3	D	76
		LT (LT)	52.3	D	133	52.3	D	136	52.2	D	137
	Southbound	R (R)	9.8	A	61	9.6	A	62	9.5	A	61
Overall			12.2	B		12.4	B		12.9	B	
Child Street & Maple Street (Signalized)	Eastbound	LTR (LTR)	11.6	B	70	11.8	B	73	12.2	B	76
	Westbound	LTR (LTR)	8.1	A	33	8.2	A	34	8.5	A	36
	Northbound	LTR (LTR)	8.0	A	73	8.0	A	74	8.1	A	80
	Southbound	LTR (LTR)	9.0	A	108	9.1	A	110	9.2	A	115
	Overall		9.3	A		9.4	A		9.5	A	
West Main Street & Churchlea Place (Unsignalized)	Westbound	- (L)	-	-	-	-	-	-	9.3	a	0
	Northbound	- (LR)	-	-	-	-	-	-	26.5	d	13
Genesee Street & Proposed Access (Unsignalized)	Westbound	- (LR)	-	-	-	-	-	-	26.3	d	33
	Southbound	- (L)	-	-	-	-	-	-	9.4	a	3
Proposed Brown Street Roundabout	Eastbound	- (LTR)	-	-	-	-	-	-	6.4	a	17
	Westbound	- (LTR)	-	-	-	-	-	-	8.0	a	77
	Northbound	- (LTR)	-	-	-	-	-	-	7.6	a	87
	Southbound	- (LTR)	-	-	-	-	-	-	5.7	a	5
	Overall								7.6	a	

**Note\***

- Levels of Service (LOS) were obtained from Synchro 10 & Sidra 8
  - Delay is vehicle delay measured in seconds.
  - 95<sup>th</sup> % = 95th percentile queue length (feet)
  - m = Volume for 95th percentile queue is metered by upstream signal.
  - # = 95th percentile volume exceeds capacity, queue may be longer.
- Scenarios: L (LT) = Existing & No Build Conditions (Future Build Conditions)

= Acceptable Operations

= LOS E or F, and/or Significant Queues

## 5.0 Conclusion, Recommendations, and Next Steps

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This Traffic Impact Study (TIS) was conducted 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 frames developed as part of the Bull's Head Urban Renewal Plan. This conceptual redevelopment frame represents the most intensive development compared to the other frames and was chosen as the highest level of potential development for a conventional traffic impact assessment. The results of Future Build capacity analysis indicate that all study intersections are projected to operate at an overall Level of Service (LOS) D or better with all individual movements operating at a LOS D or better during both peak periods with the exception of the NB LTR movement at the West Main Street/Jefferson Avenue intersection. This movement is projected to continue to operate at LOS E as noted under Existing and Future No Build Conditions.

The conceptual redevelopment frame's road configuration is projected to generally create acceptable levels of operation, for an urban/city environment, at the study intersections. It should be noted that the NB Left turn lane at the W. Main Street/ Genesee St. intersection is projected to operate near its capacity. During the PM peak, 276 vehicles are projected to make the NB left turn; typically, a 2<sup>nd</sup> left turn lane is warranted at approximately 300 vehicles. This movement is projected to operate acceptably but minimal increases in traffic in the future (in excess of Future Build conditions) or on non-typical days may generate additional impacts.

The SB approach to the W. Main Street/ Genesee St. intersection is not projected to queue into the roundabout during the morning and evening peak conditions for a typical day. It should be noted that if events such as an accident or unprecedented long term future growth were to occur, traffic from this approach could queue into the roundabout. If this were to occur there are options to mitigate the queuing, including the use of a metering signal on the westbound (Brown Street) approach to the roundabout.

To reduce the likelihood of future traffic increases, the promotion of TDM applications such as increased use of public transportation options and ride sharing are recommended as a general mitigation measure to help reduce traffic congestion within the study network. The project is located in an urban setting with access to multiple modes of transportation. The promotion of TDM applications can further reduce vehicular trips and create trips utilizing different modes of transportation including walking, biking, and transit.

It is noted that the most intensive conceptual redevelopment frame along with conventional trip generation methodology was used to project Future Build Condition traffic volumes and thus represents a "worse-case scenario" for determining potential impacts on the local road network. Due to the unique nature of the conceptual redevelopment frame, including the projects location within a dense urban environment, the likely inclusion of affordable and senior housing units, and the likely outcome of vehicles utilizing alternative paths within the neighborhood, the number of vehicle trips generated by the redevelopment of the area would likely be less than the estimates which would have a positive impact on vehicular operations and capacity. In addition, the City of Rochester in the Rochester 2034 Comprehensive Plan includes numerous recommendations to promote multi-modal transportation options and transportation demand management to reduce single occupancy vehicle trips and vehicle miles traveled. Modifications to the methodology, promotion of alternatives, and less intensive development will result in less traffic overall and thus fewer potential impacts. A Traffic Impact Study will be required for the final design of the study area which accounts for all of these factors. It is recommended that this TIS update the trip generation and determine any specific modifications in support of future design development.

## 6.0 References

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1. Synchro 10 Software.
2. Transportation Research Board. Highway Capacity Manual, 6<sup>th</sup> Edition Washington, DC, 2016.
3. Highway Safety Analysis Software, Version 3.0 published by the X32 Group, Inc.
4. Institute of Transportation Engineer's (ITE) Trip Generation Manual, 10<sup>th</sup> Edition.
5. Akcelik & Associates Pty Ltd, Sidra Intersection 8 Software

# Bull's Head Traffic Impact Study - APPENDIX

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RE Bull's Head Urban Renewal Area & Brownfield Opportunity Area Studies  
City of Rochester, New York

## Contents

- A. Intersection Turning Movement Count Data
- B. Accident Analysis Reports
- C. Capacity Analysis Summary Reports
- D. Trip Generation Data

*Prepared for:*



City of Rochester, New York  
Department of Neighborhood and  
Business Development

*Prepared by:*



Fisher Associates  
180 Charlotte Street  
Rochester, New York 14607



**A. INTERSECTION TURNING MOVEMENT COUNT DATA**

West Main Street/Jefferson Avenue

West Main Street/Henion Street

West Main Street/Brown Street/Genesee Street

West Main Street/Chili Avenue/West Avenue/York Street

West Avenue/Appleton Street/Ames Street

Child Street/Maple Street

**West Main Street/Jefferson Avenue**

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180 Charlotte Street  
Rochester, NY 14607

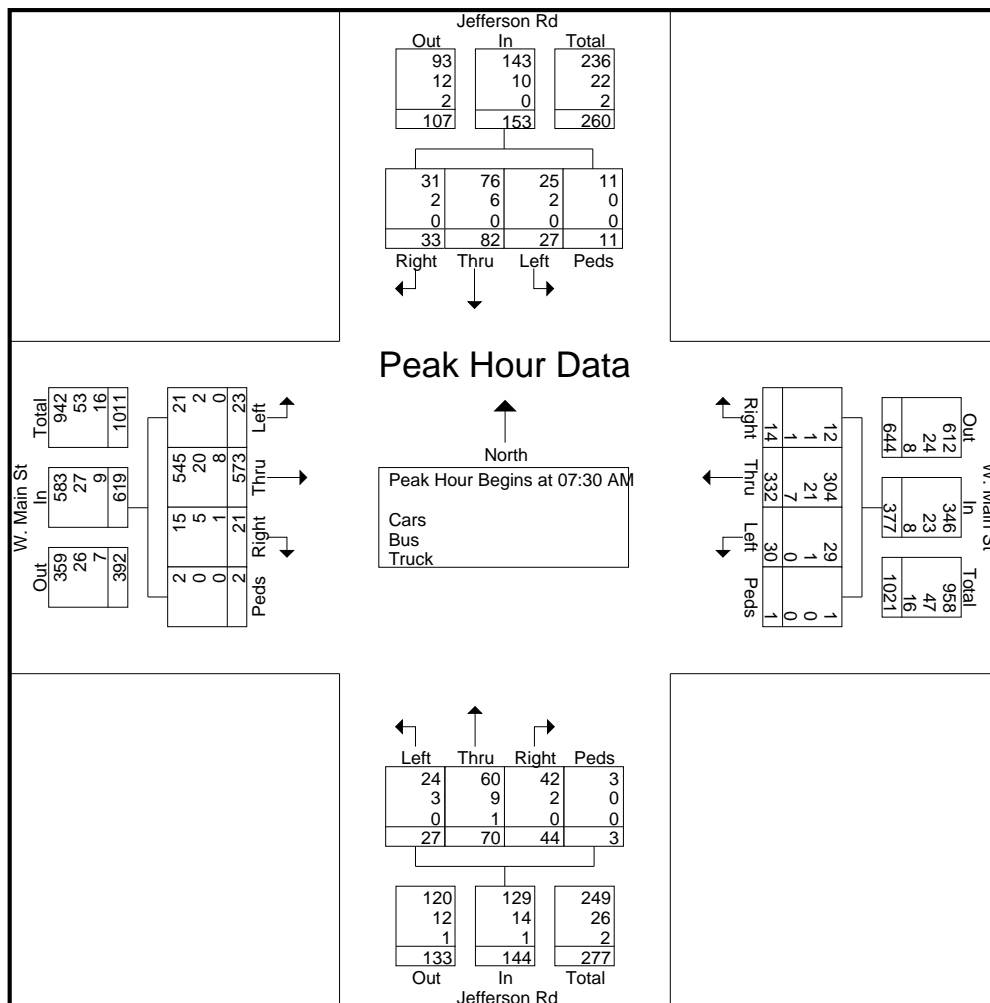
File Name : WMain & Jefferson

Site Code : 00000000

Start Date : 1/16/2019

Page No : 2

	Jefferson Rd Southbound					W. Main St Westbound					Jefferson Rd Northbound					W. Main St Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	3	16	6	1	26	3	68	8	1	80	12	12	6	2	32	4	134	15	0	153	291
07:45 AM	7	20	7	3	37	1	84	9	0	94	8	18	5	0	31	4	151	3	1	159	321
08:00 AM	9	25	7	5	46	3	98	11	0	112	14	19	3	0	36	9	146	3	1	159	353
08:15 AM	14	21	7	2	44	7	82	2	0	91	10	21	13	1	45	4	142	2	0	148	328
Total Volume	33	82	27	11	153	14	332	30	1	377	44	70	27	3	144	21	573	23	2	619	1293
% App. Total	21.6	53.6	17.6	7.2		3.7	88.1	8	0.3		30.6	48.6	18.8	2.1		3.4	92.6	3.7	0.3		
PHF	.589	.820	.964	.550	.832	.500	.847	.682	.250	.842	.786	.833	.519	.375	.800	.583	.949	.383	.500	.973	.916
Cars	31	76	25	11	143	12	304	29	1	346	42	60	24	3	129	15	545	21	2	583	1201
% Cars	93.9	92.7	92.6	100	93.5	85.7	91.6	96.7	100	91.8	95.5	85.7	88.9	100	89.6	71.4	95.1	91.3	100	94.2	92.9
Bus	2	6	2	0	10	1	21	1	0	23	2	9	3	0	14	5	20	2	0	27	74
% Bus	6.1	7.3	7.4	0	6.5	7.1	6.3	3.3	0	6.1	4.5	12.9	11.1	0	9.7	23.8	3.5	8.7	0	4.4	5.7
Truck	0	0	0	0	0	1	7	0	0	8	0	1	0	0	1	1	8	0	0	9	18
% Truck	0	0	0	0	0	7.1	2.1	0	0	2.1	0	1.4	0	0	0.7	4.8	1.4	0	0	1.5	1.4



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180 Charlotte Street  
Rochester, NY 14607

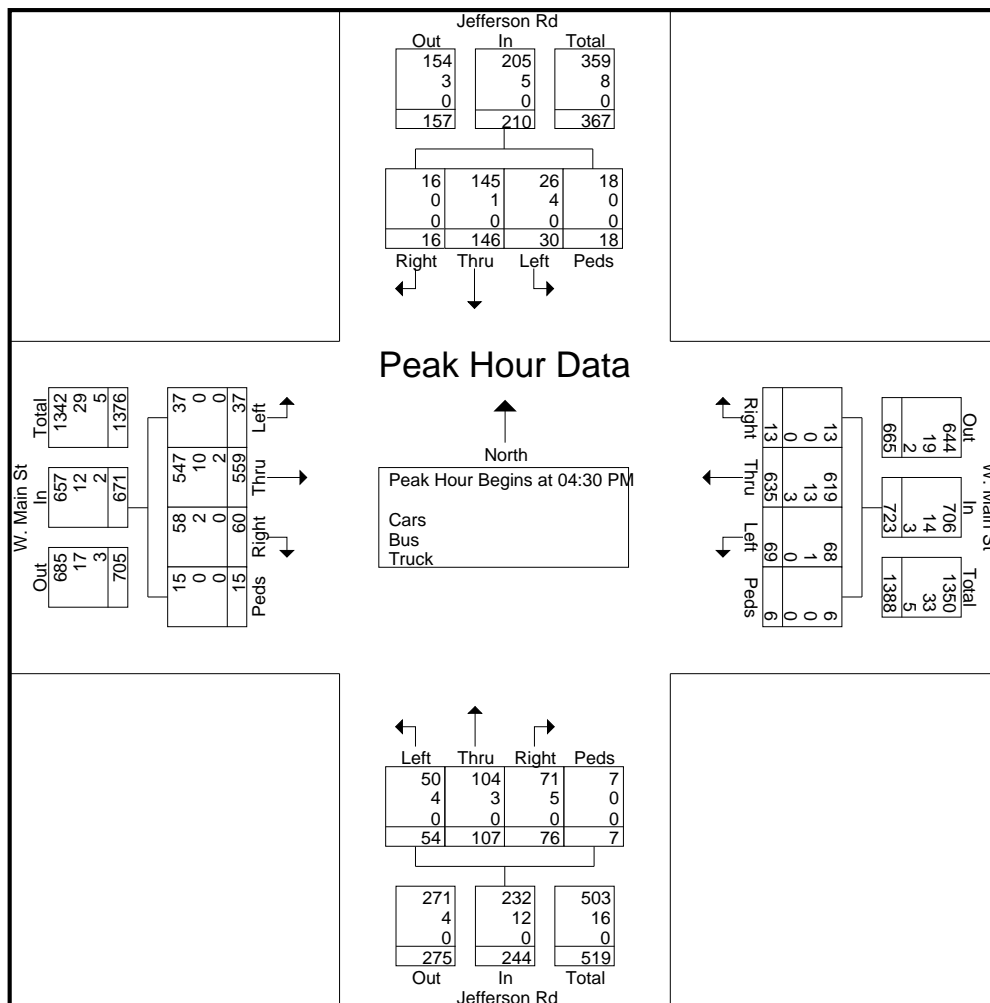
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Site Code : 00000000

Start Date : 1/16/2019

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	Jefferson Rd Southbound					W. Main St Westbound					Jefferson Rd Northbound					W. Main St Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	4	37	8	6	55	3	132	14	0	149	23	31	13	0	67	17	157	14	2	190	461
04:45 PM	6	43	6	4	59	5	145	22	3	175	18	21	13	2	54	11	139	11	7	168	456
05:00 PM	3	38	11	3	55	3	161	15	0	179	20	33	14	3	70	20	124	6	2	152	456
05:15 PM	3	28	5	5	41	2	197	18	3	220	15	22	14	2	53	12	139	6	4	161	475
Total Volume	16	146	30	18	210	13	635	69	6	723	76	107	54	7	244	60	559	37	15	671	1848
% App. Total	7.6	69.5	14.3	8.6		1.8	87.8	9.5	0.8		31.1	43.9	22.1	2.9		8.9	83.3	5.5	2.2		
PHF	.667	.849	.682	.750	.890	.650	.806	.784	.500	.822	.826	.811	.964	.583	.871	.750	.890	.661	.536	.883	.973
Cars	16	145	26	18	205	13	619	68	6	706	71	104	50	7	232	58	547	37	15	657	1800
% Cars	100	99.3	86.7	100	97.6	100	97.5	98.6	100	97.6	93.4	97.2	92.6	100	95.1	96.7	97.9	100	100	97.9	97.4
Bus	0	1	4	0	5	0	13	1	0	14	5	3	4	0	12	2	10	0	0	12	43
% Bus	0	0.7	13.3	0	2.4	0	2.0	1.4	0	1.9	6.6	2.8	7.4	0	4.9	3.3	1.8	0	0	1.8	2.3
Truck	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	2	0	0	2	5
% Truck	0	0	0	0	0	0	0.5	0	0	0.4	0	0	0	0	0	0	0.4	0	0	0.3	0.3



**West Main Street/Henion Street**

# Fisher Associates

180 Charlotte Street  
Rochester, NY 14607

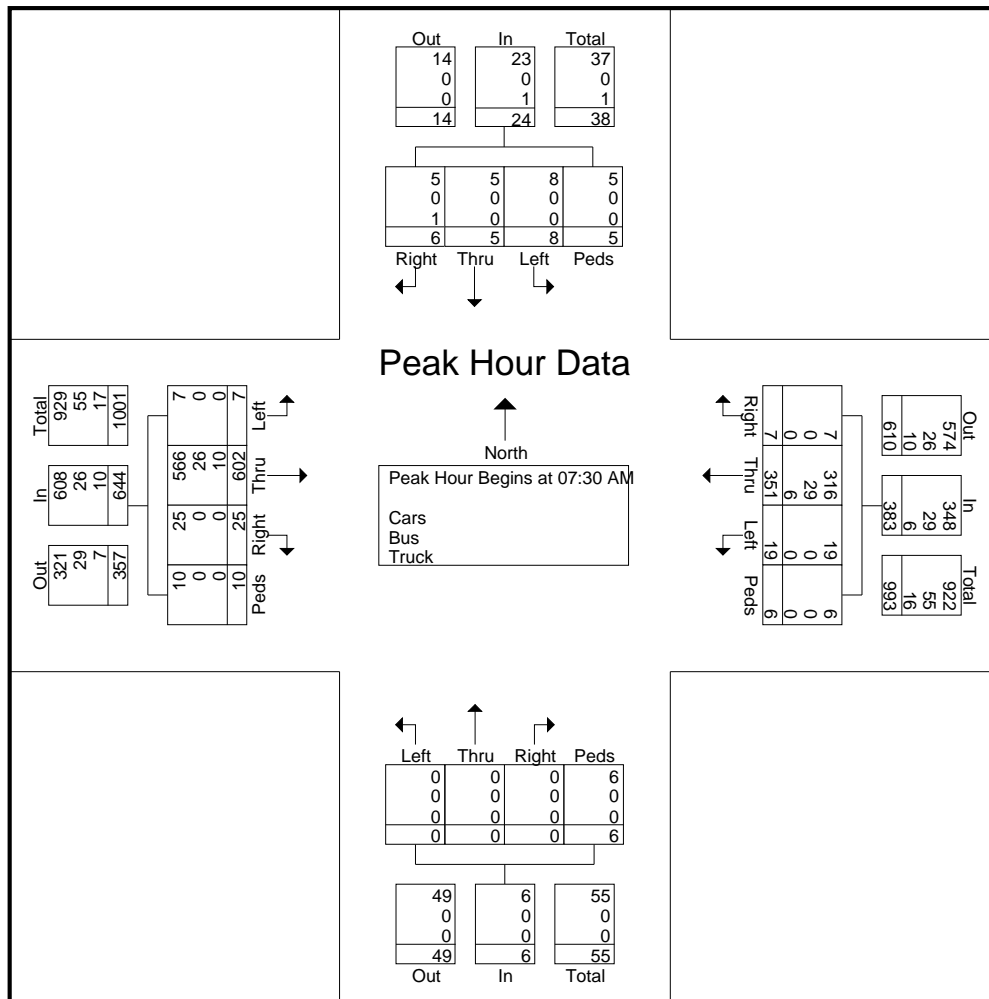
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Site Code : 00000000

Start Date : 1/16/2019

Page No : 2

	Southbound					Westbound					Northbound					Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	2	0	1	1	4	0	82	5	1	88	0	0	0	0	0	7	157	1	4	169	261
07:45 AM	2	1	3	2	8	4	81	3	5	93	0	0	0	2	2	5	158	1	2	166	269
08:00 AM	1	3	3	1	8	1	91	6	0	98	0	0	0	0	0	8	149	2	1	160	266
08:15 AM	1	1	1	1	4	2	97	5	0	104	0	0	0	4	4	5	138	3	3	149	261
Total Volume	6	5	8	5	24	7	351	19	6	383	0	0	0	6	6	25	602	7	10	644	1057
% App. Total	25	20.8	33.3	20.8		1.8	91.6	5	1.6		0	0	0	100		3.9	93.5	1.1	1.6		
PHF	.750	.417	.667	.625	.750	.438	.905	.792	.300	.921	.000	.000	.000	.375	.375	.781	.953	.583	.625	.953	.982
Cars	5	5	8	5	23	7	316	19	6	348	0	0	0	6	6	25	566	7	10	608	985
% Cars	83.3	100	100	100	95.8	100	90.0	100	100	90.9	0	0	0	100	100	100	94.0	100	100	94.4	93.2
Bus	0	0	0	0	0	0	29	0	0	29	0	0	0	0	0	0	26	0	0	26	55
% Bus	0	0	0	0	0	0	8.3	0	0	7.6	0	0	0	0	0	0	4.3	0	0	4.0	5.2
Truck	1	0	0	0	1	0	6	0	0	6	0	0	0	0	0	0	10	0	0	10	17
% Truck	16.7	0	0	0	4.2	0	1.7	0	0	1.6	0	0	0	0	0	0	1.7	0	0	1.6	1.6



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180 Charlotte Street  
Rochester, NY 14607

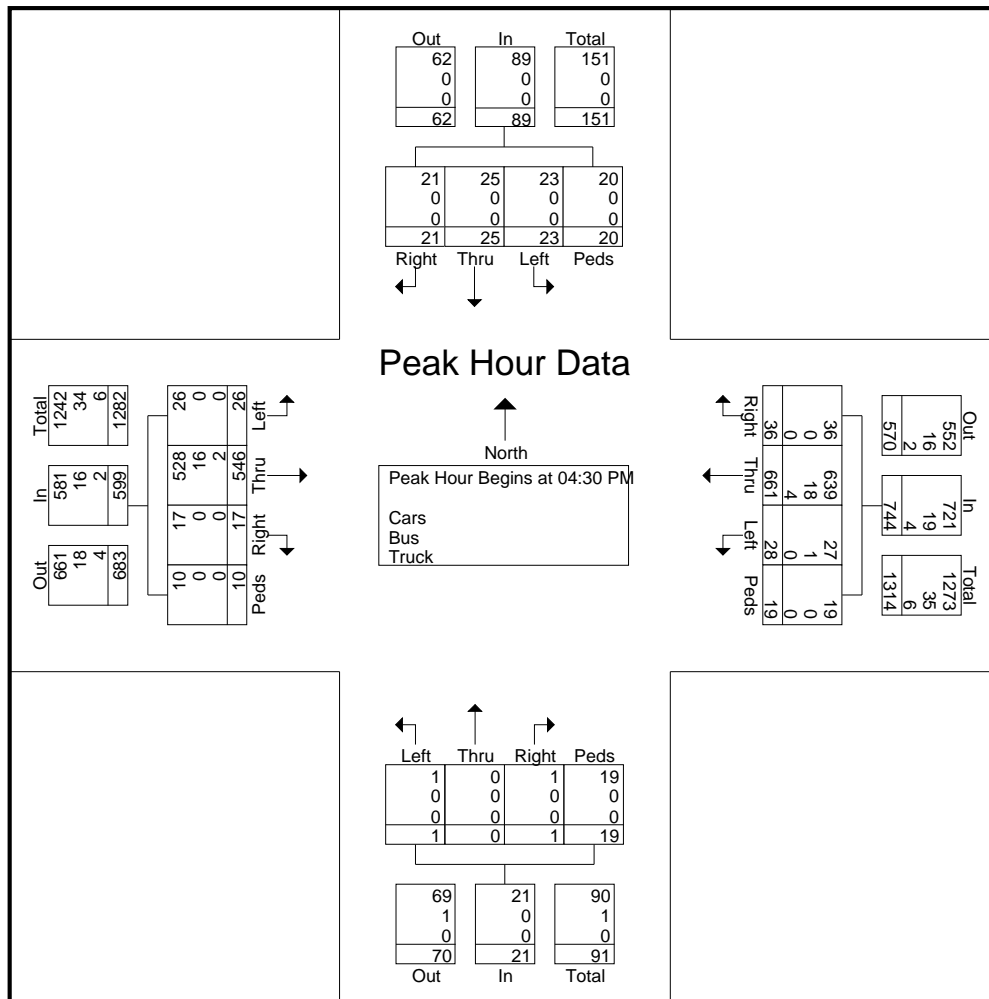
File Name : WMain & Henion

Site Code : 00000000

Start Date : 1/16/2019

Page No : 2

	Southbound					Westbound					Northbound					Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	7	5	6	7	25	11	138	17	8	174	1	0	0	3	4	6	144	4	2	156	359
04:45 PM	6	8	4	5	23	14	134	3	2	153	0	0	0	5	5	4	130	5	2	141	322
05:00 PM	6	5	9	2	22	8	190	5	5	208	0	0	1	6	7	2	128	8	3	141	378
05:15 PM	2	7	4	6	19	3	199	3	4	209	0	0	0	5	5	5	144	9	3	161	394
Total Volume	21	25	23	20	89	36	661	28	19	744	1	0	1	19	21	17	546	26	10	599	1453
% App. Total	23.6	28.1	25.8	22.5		4.8	88.8	3.8	2.6		4.8	0	4.8	90.5		2.8	91.2	4.3	1.7		
PHF	.750	.781	.639	.714	.890	.643	.830	.412	.594	.890	.250	.000	.250	.792	.750	.708	.948	.722	.833	.930	.922
Cars	21	25	23	20	89	36	639	27	19	721	1	0	1	19	21	17	528	26	10	581	1412
% Cars	100	100	100	100	100	100	96.7	96.4	100	96.9	100	0	100	100	100	100	96.7	100	100	97.0	97.2
Bus	0	0	0	0	0	0	18	1	0	19	0	0	0	0	0	0	16	0	0	16	35
% Bus	0	0	0	0	0	0	2.7	3.6	0	2.6	0	0	0	0	0	0	2.9	0	0	2.7	2.4
Truck	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	0	2	0	0	2	6
% Truck	0	0	0	0	0	0	0.6	0	0	0.5	0	0	0	0	0	0	0.4	0	0	0.3	0.4



**West Main Street/Brown Street/Genesee Street**



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180 Charlotte Street  
Rochester, NY 14607

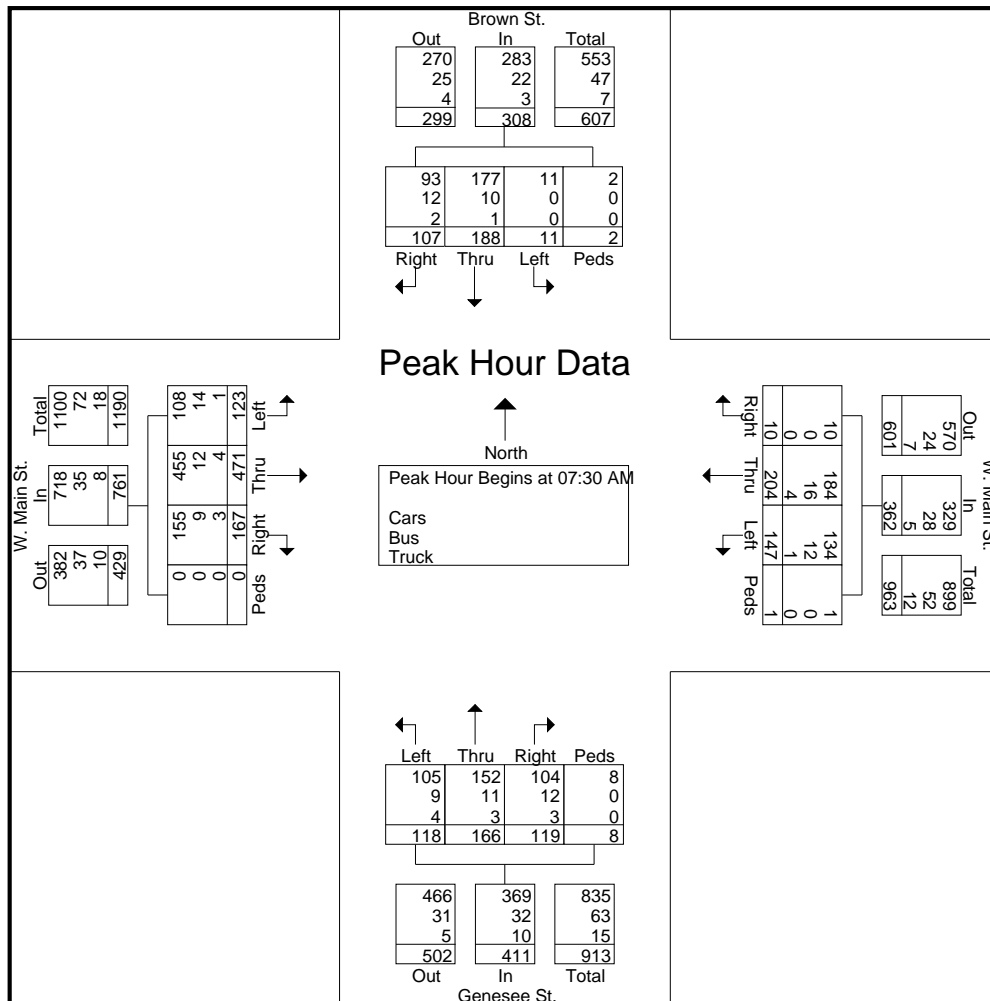
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Site Code : 00000000

Start Date : 1/15/2019

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Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	42	124	24	0	190	2	50	40	0	92	33	45	39	0	117	22	46	4	1	73	472
07:45 AM	53	131	41	0	225	4	53	37	1	95	35	29	28	4	96	29	53	2	0	84	500
08:00 AM	39	107	25	0	171	2	51	32	0	85	37	48	29	1	115	33	44	3	0	80	451
08:15 AM	33	109	33	0	175	2	50	38	0	90	14	44	22	3	83	23	45	2	1	71	419
Total Volume	167	471	123	0	761	10	204	147	1	362	119	166	118	8	411	107	188	11	2	308	1842
% App. Total	21.9	61.9	16.2	0		2.8	56.4	40.6	0.3		29	40.4	28.7	1.9		34.7	61	3.6	0.6		
PHF	.788	.899	.750	.000	.846	.625	.962	.919	.250	.953	.804	.865	.756	.500	.878	.811	.887	.688	.500	.917	.921
Cars	155	455	108	0	718	10	184	134	1	329	104	152	105	8	369	93	177	11	2	283	1699
% Cars	92.8	96.6	87.8	0	94.3	100	90.2	91.2	100	90.9	87.4	91.6	89.0	100	89.8	86.9	94.1	100	100	91.9	92.2
Bus	9	12	14	0	35	0	16	12	0	28	12	11	9	0	32	12	10	0	0	22	117
% Bus	5.4	2.5	11.4	0	4.6	0	7.8	8.2	0	7.7	10.1	6.6	7.6	0	7.8	11.2	5.3	0	0	7.1	6.4
Truck	3	4	1	0	8	0	4	1	0	5	3	3	4	0	10	2	1	0	0	3	26
% Truck	1.8	0.8	0.8	0	1.1	0	2.0	0.7	0	1.4	2.5	1.8	3.4	0	2.4	1.9	0.5	0	0	1.0	1.4



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180 Charlotte Street  
Rochester, NY 14607

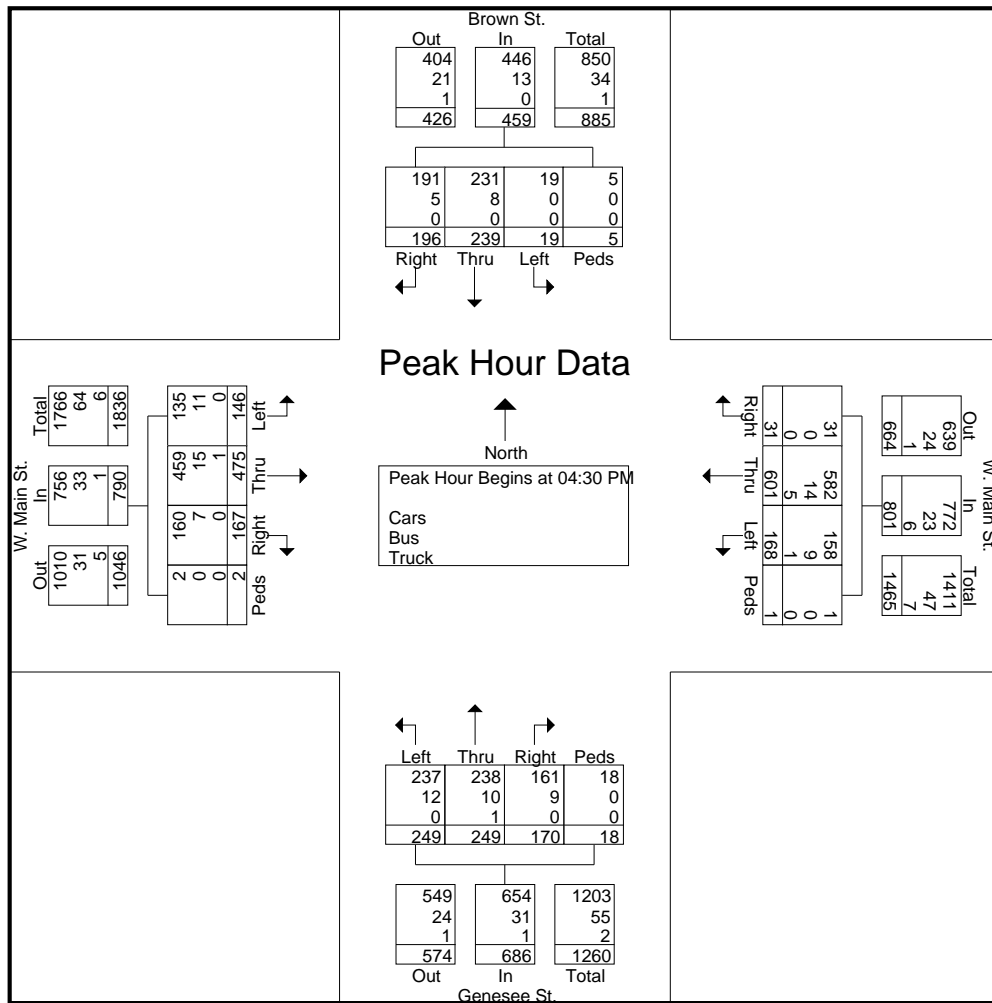
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Site Code : 00000000

Start Date : 1/15/2019

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Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	58	122	41	1	222	9	141	48	0	198	45	62	58	6	171	38	70	3	1	112	703
04:45 PM	40	137	35	0	212	7	131	36	0	174	44	60	73	4	181	55	47	5	1	108	675
05:00 PM	37	109	37	0	183	7	171	49	1	228	47	69	58	0	174	52	56	5	2	115	700
05:15 PM	32	107	33	1	173	8	158	35	0	201	34	58	60	8	160	51	66	6	1	124	658
Total Volume	167	475	146	2	790	31	601	168	1	801	170	249	249	18	686	196	239	19	5	459	2736
% App. Total	21.1	60.1	18.5	0.3		3.9	75	21	0.1		24.8	36.3	36.3	2.6		42.7	52.1	4.1	1.1		
PHF	.720	.867	.890	.500	.890	.861	.879	.857	.250	.878	.904	.902	.853	.563	.948	.891	.854	.792	.625	.925	.973
Cars	160	459	135	2	756	31	582	158	1	772	161	238	237	18	654	191	231	19	5	446	2628
% Cars	95.8	96.6	92.5	100	95.7	100	96.8	94.0	100	96.4	94.7	95.6	95.2	100	95.3	97.4	96.7	100	100	97.2	96.1
Bus	7	15	11	0	33	0	14	9	0	23	9	10	12	0	31	5	8	0	0	13	100
% Bus	4.2	3.2	7.5	0	4.2	0	2.3	5.4	0	2.9	5.3	4.0	4.8	0	4.5	2.6	3.3	0	0	2.8	3.7
Truck	0	1	0	0	1	0	5	1	0	6	0	1	0	0	1	0	0	0	0	0	8
% Truck	0	0.2	0	0	0.1	0	0.8	0.6	0	0.7	0	0.4	0	0	0.1	0	0	0	0	0	0.3



**West Main Street/Chili Avenue/West Avenue/York Street**

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180 Charlotte Street  
Rochester, NY 14607

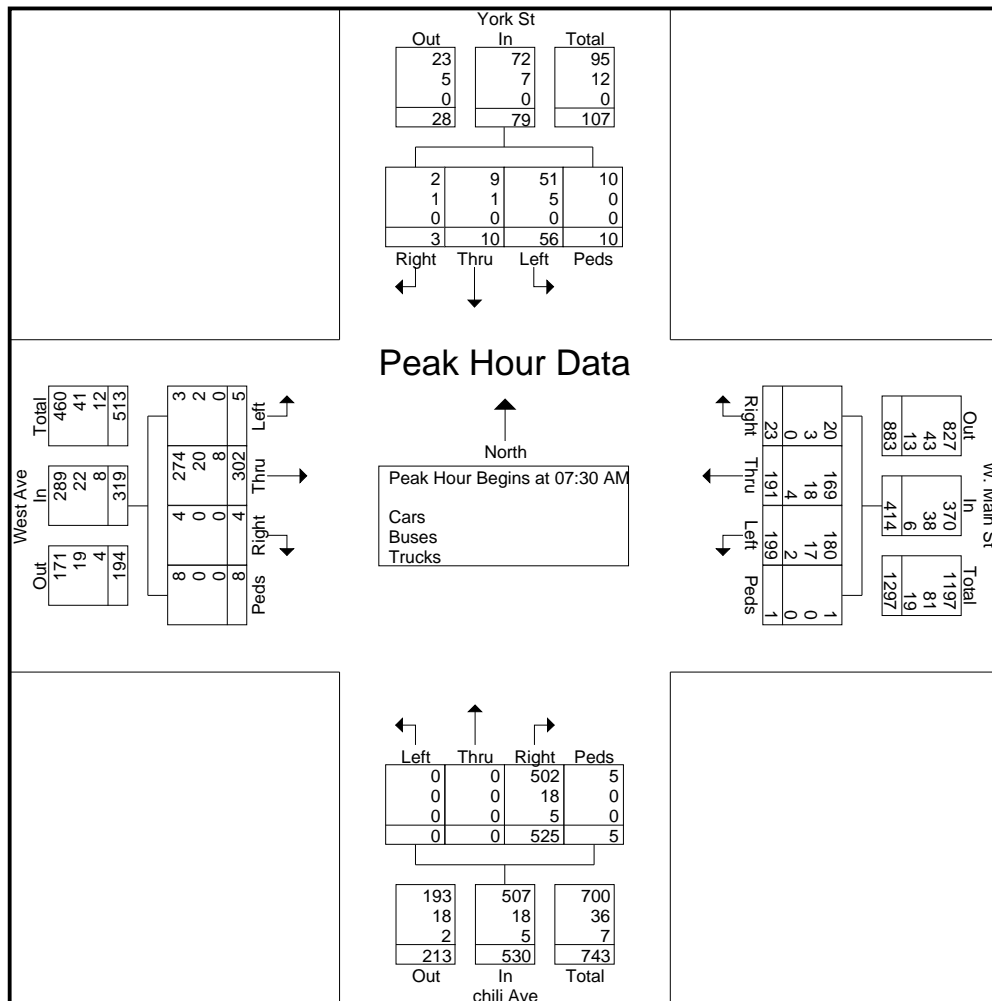
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Site Code : 00000000

Start Date : 1/9/2019

Page No : 2

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Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	2	65	1	1	69	5	44	49	0	98	130	0	0	0	130	0	3	20	2	25	322
07:45 AM	0	99	1	1	101	5	51	54	0	110	129	0	0	2	131	2	1	9	0	12	354
08:00 AM	2	70	0	6	78	6	57	53	1	117	117	0	0	3	120	0	5	12	4	21	336
08:15 AM	0	68	3	0	71	7	39	43	0	89	149	0	0	0	149	1	1	15	4	21	330
Total Volume	4	302	5	8	319	23	191	199	1	414	525	0	0	5	530	3	10	56	10	79	1342
% App. Total	1.3	94.7	1.6	2.5		5.6	46.1	48.1	0.2		99.1	0	0	0.9		3.8	12.7	70.9	12.7		
PHF	.500	.763	.417	.333	.790	.821	.838	.921	.250	.885	.881	.000	.000	.417	.889	.375	.500	.700	.625	.790	.948
Cars	4	274	3	8	289	20	169	180	1	370	502	0	0	5	507	2	9	51	10	72	1238
% Cars	100	90.7	60.0	100	90.6	87.0	88.5	90.5	100	89.4	95.6	0	0	100	95.7	66.7	90.0	91.1	100	91.1	92.3
Buses	0	20	2	0	22	3	18	17	0	38	18	0	0	0	18	1	1	5	0	7	85
% Buses	0	6.6	40.0	0	6.9	13.0	9.4	8.5	0	9.2	3.4	0	0	0	3.4	33.3	10.0	8.9	0	8.9	6.3
Trucks	0	8	0	0	8	0	4	2	0	6	5	0	0	0	5	0	0	0	0	0	19
% Trucks	0	2.6	0	0	2.5	0	2.1	1.0	0	1.4	1.0	0	0	0	0.9	0	0	0	0	0	1.4



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180 Charlotte Street  
Rochester, NY 14607

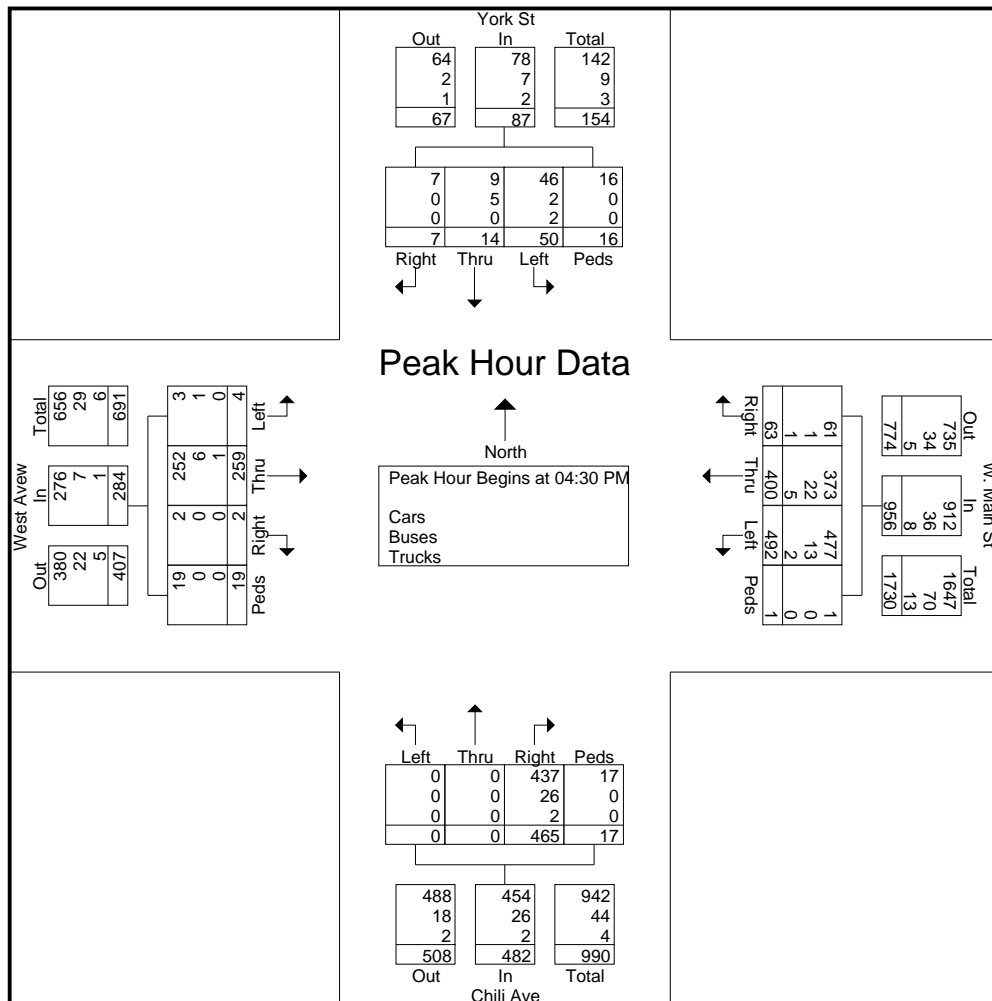
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Site Code : 00000000

Start Date : 1/10/2019

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Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	1	62	3	3	69	19	114	110	1	244	134	0	0	2	136	3	5	15	1	24	473
04:45 PM	0	69	0	2	71	22	79	111	0	212	111	0	0	2	113	1	6	13	6	26	422
05:00 PM	0	73	0	1	74	14	102	135	0	251	108	0	0	8	116	2	2	10	5	19	460
05:15 PM	1	55	1	13	70	8	105	136	0	249	112	0	0	5	117	1	1	12	4	18	454
Total Volume	2	259	4	19	284	63	400	492	1	956	465	0	0	17	482	7	14	50	16	87	1809
% App. Total	0.7	91.2	1.4	6.7		6.6	41.8	51.5	0.1		96.5	0	0	3.5		8	16.1	57.5	18.4		
PHF	.500	.887	.333	.365	.959	.716	.877	.904	.250	.952	.868	.000	.000	.531	.886	.583	.583	.833	.667	.837	.956
Cars	2	252	3	19	276	61	373	477	1	912	437	0	0	17	454	7	9	46	16	78	1720
% Cars	100	97.3	75.0	100	97.2	96.8	93.3	97.0	100	95.4	94.0	0	0	100	94.2	100	64.3	92.0	100	89.7	95.1
Buses	0	6	1	0	7	1	22	13	0	36	26	0	0	0	26	0	5	2	0	7	76
% Buses	0	2.3	25.0	0	2.5	1.6	5.5	2.6	0	3.8	5.6	0	0	0	5.4	0	35.7	4.0	0	8.0	4.2
Trucks	0	1	0	0	1	1	5	2	0	8	2	0	0	0	2	0	0	2	0	2	13
% Trucks	0	0.4	0	0	0.4	1.6	1.3	0.4	0	0.8	0.4	0	0	0	0.4	0	0	4.0	0	2.3	0.7



**West Avenue/Appleton Street/Ames Street**

# Fisher Associates

180 Charlotte Street  
Rochester, NY 14607

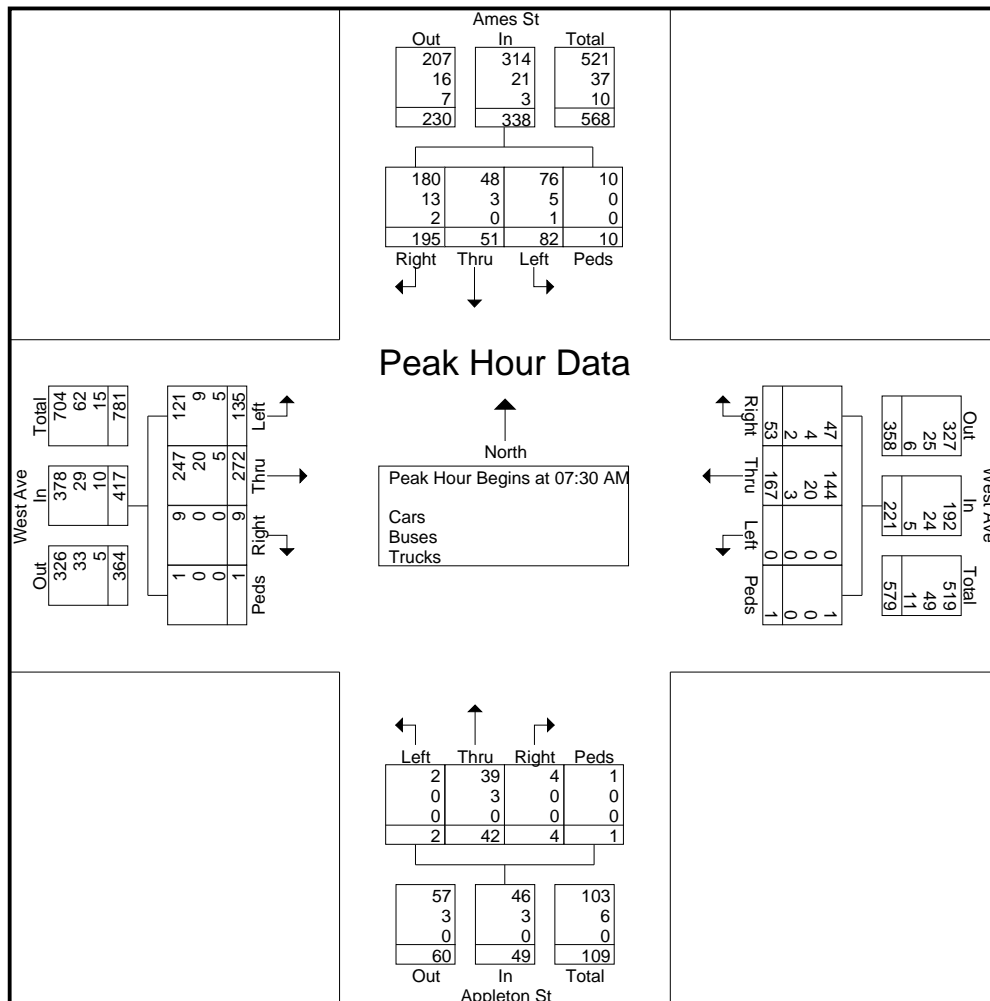
File Name : west & ames - am

Site Code : 00000000

Start Date : 1/9/2019

Page No : 2

	West Ave Eastbound					West Ave Westbound					Appleton St Northbound					Ames St Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:30 AM to 08:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	3	54	31	0	88	17	50	0	1	68	1	10	1	1	13	57	11	28	3	99	268
07:45 AM	1	88	30	0	119	13	38	0	0	51	0	10	0	0	10	41	12	17	1	71	251
08:00 AM	4	70	48	1	123	11	41	0	0	52	3	8	1	0	12	54	16	17	3	90	277
08:15 AM	1	60	26	0	87	12	38	0	0	50	0	14	0	0	14	43	12	20	3	78	229
Total Volume	9	272	135	1	417	53	167	0	1	221	4	42	2	1	49	195	51	82	10	338	1025
% App. Total	2.2	65.2	32.4	0.2		24	75.6	0	0.5		8.2	85.7	4.1	2		57.7	15.1	24.3	3		
PHF	.563	.773	.703	.250	.848	.779	.835	.000	.250	.813	.333	.750	.500	.250	.875	.855	.797	.732	.833	.854	.925
Cars	9	247	121	1	378	47	144	0	1	192	4	39	2	1	46	180	48	76	10	314	930
% Cars	100	90.8	89.6	100	90.6	88.7	86.2	0	100	86.9	100	92.9	100	100	93.9	92.3	94.1	92.7	100	92.9	90.7
Buses	0	20	9	0	29	4	20	0	0	24	0	3	0	0	3	13	3	5	0	21	77
% Buses	0	7.4	6.7	0	7.0	7.5	12.0	0	0	10.9	0	7.1	0	0	6.1	6.7	5.9	6.1	0	6.2	7.5
Trucks	0	5	5	0	10	2	3	0	0	5	0	0	0	0	0	2	0	1	0	3	18
% Trucks	0	1.8	3.7	0	2.4	3.8	1.8	0	0	2.3	0	0	0	0	0	1.0	0	1.2	0	0.9	1.8



# Fisher Associates

180 Charlotte Street  
Rochester, NY 14607

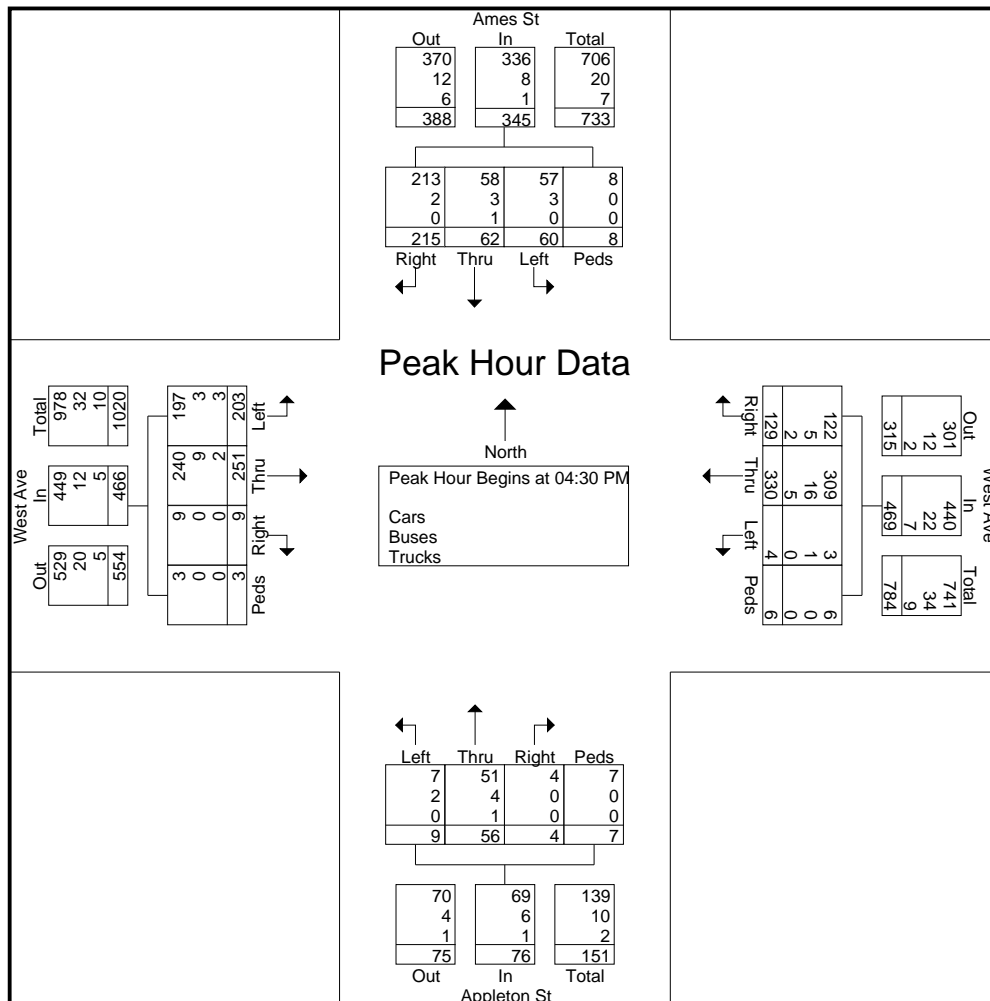
File Name : west & ames - pm

Site Code : 00000000

Start Date : 1/10/2019

Page No : 2

	West Ave Eastbound					West Ave Westbound					Appleton St Northbound					Ames St Southbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	3	56	47	0	106	37	74	1	1	113	2	17	2	4	25	61	17	17	0	95	339
04:45 PM	1	68	53	2	124	36	80	1	1	118	0	14	4	0	18	45	18	14	3	80	340
05:00 PM	2	64	42	1	109	25	73	0	4	102	0	13	3	1	17	62	9	17	2	90	318
05:15 PM	3	63	61	0	127	31	103	2	0	136	2	12	0	2	16	47	18	12	3	80	359
Total Volume	9	251	203	3	466	129	330	4	6	469	4	56	9	7	76	215	62	60	8	345	1356
% App. Total	1.9	53.9	43.6	0.6		27.5	70.4	0.9	1.3		5.3	73.7	11.8	9.2		62.3	18	17.4	2.3		
PHF	.750	.923	.832	.375	.917	.872	.801	.500	.375	.862	.500	.824	.563	.438	.760	.867	.861	.882	.667	.908	.944
Cars	9	240	197	3	449	122	309	3	6	440	4	51	7	7	69	213	58	57	8	336	1294
% Cars	100	95.6	97.0	100	96.4	94.6	93.6	75.0	100	93.8	100	91.1	77.8	100	90.8	99.1	93.5	95.0	100	97.4	95.4
Buses	0	9	3	0	12	5	16	1	0	22	0	4	2	0	6	2	3	3	0	8	48
% Buses	0	3.6	1.5	0	2.6	3.9	4.8	25.0	0	4.7	0	7.1	22.2	0	7.9	0.9	4.8	5.0	0	2.3	3.5
Trucks	0	2	3	0	5	2	5	0	0	7	0	1	0	0	1	0	1	0	0	1	14
% Trucks	0	0.8	1.5	0	1.1	1.6	1.5	0	0	1.5	0	1.8	0	0	1.3	0	1.6	0	0	0.3	1.0





**Child Street/Maple Street**

# Fisher Associates

180 Charlotte Street  
Rochester, NY 14607

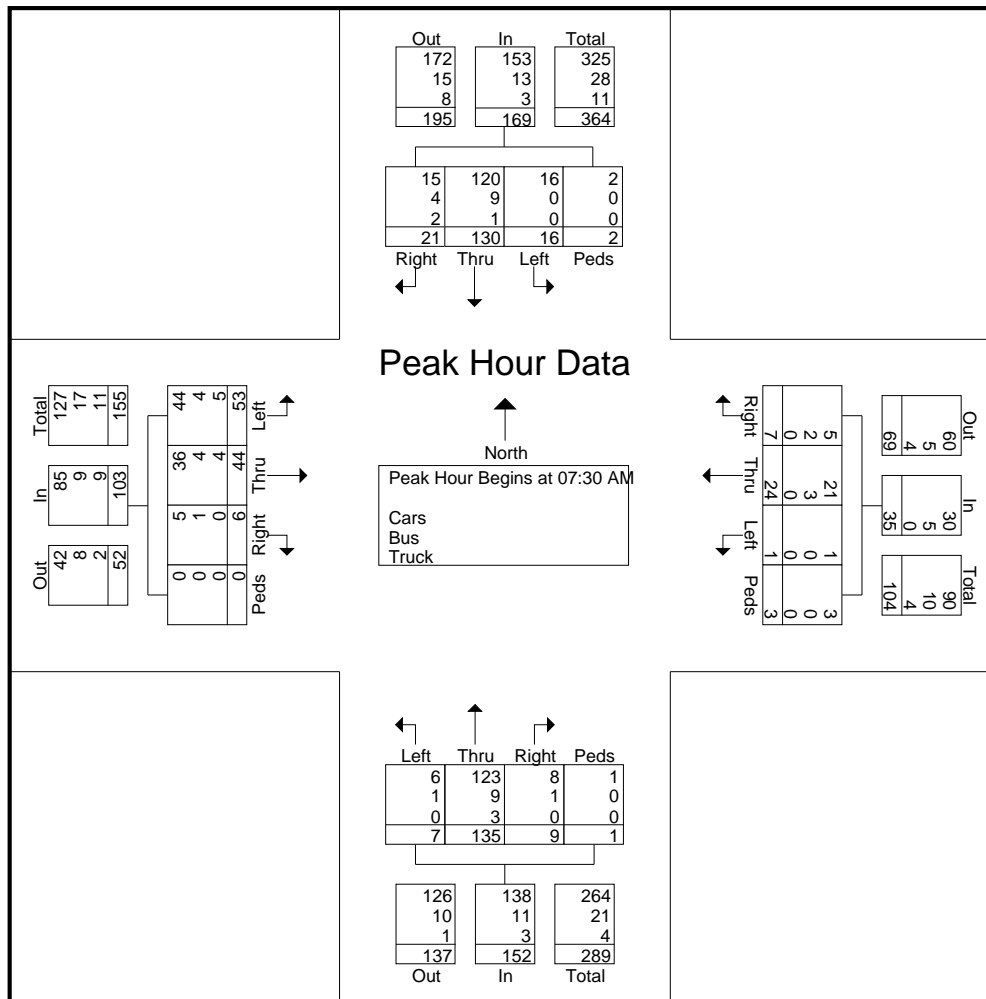
File Name : Child & Maple

Site Code : 00000000

Start Date : 1/17/2019

Page No : 2

	Southbound					Westbound					Northbound					Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:30 AM																					
07:30 AM	2	35	3	0	40	2	3	1	0	6	1	30	2	0	33	1	6	15	0	22	101
07:45 AM	8	35	4	0	47	2	5	0	0	7	2	35	3	0	40	2	13	15	0	30	124
08:00 AM	4	23	4	2	33	3	10	0	3	16	1	28	0	0	29	2	16	14	0	32	110
08:15 AM	7	37	5	0	49	0	6	0	0	6	5	42	2	1	50	1	9	9	0	19	124
Total Volume	21	130	16	2	169	7	24	1	3	35	9	135	7	1	152	6	44	53	0	103	459
% App. Total	12.4	76.9	9.5	1.2		20	68.6	2.9	8.6		5.9	88.8	4.6	0.7		5.8	42.7	51.5	0		
PHF	.656	.878	.800	.250	.862	.583	.600	.250	.250	.547	.450	.804	.583	.250	.760	.750	.688	.883	.000	.805	.925
Cars	15	120	16	2	153	5	21	1	3	30	8	123	6	1	138	5	36	44	0	85	406
% Cars	71.4	92.3	100	100	90.5	71.4	87.5	100	100	85.7	88.9	91.1	85.7	100	90.8	83.3	81.8	83.0	0	82.5	88.5
Bus	4	9	0	0	13	2	3	0	0	5	1	9	1	0	11	1	4	4	0	9	38
% Bus	19.0	6.9	0	0	7.7	28.6	12.5	0	0	14.3	11.1	6.7	14.3	0	7.2	16.7	9.1	7.5	0	8.7	8.3
Truck	2	1	0	0	3	0	0	0	0	0	0	3	0	0	3	0	4	5	0	9	15
% Truck	9.5	0.8	0	0	1.8	0	0	0	0	0	0	2.2	0	0	2.0	0	9.1	9.4	0	8.7	3.3



# Fisher Associates

180 Charlotte Street  
Rochester, NY 14607

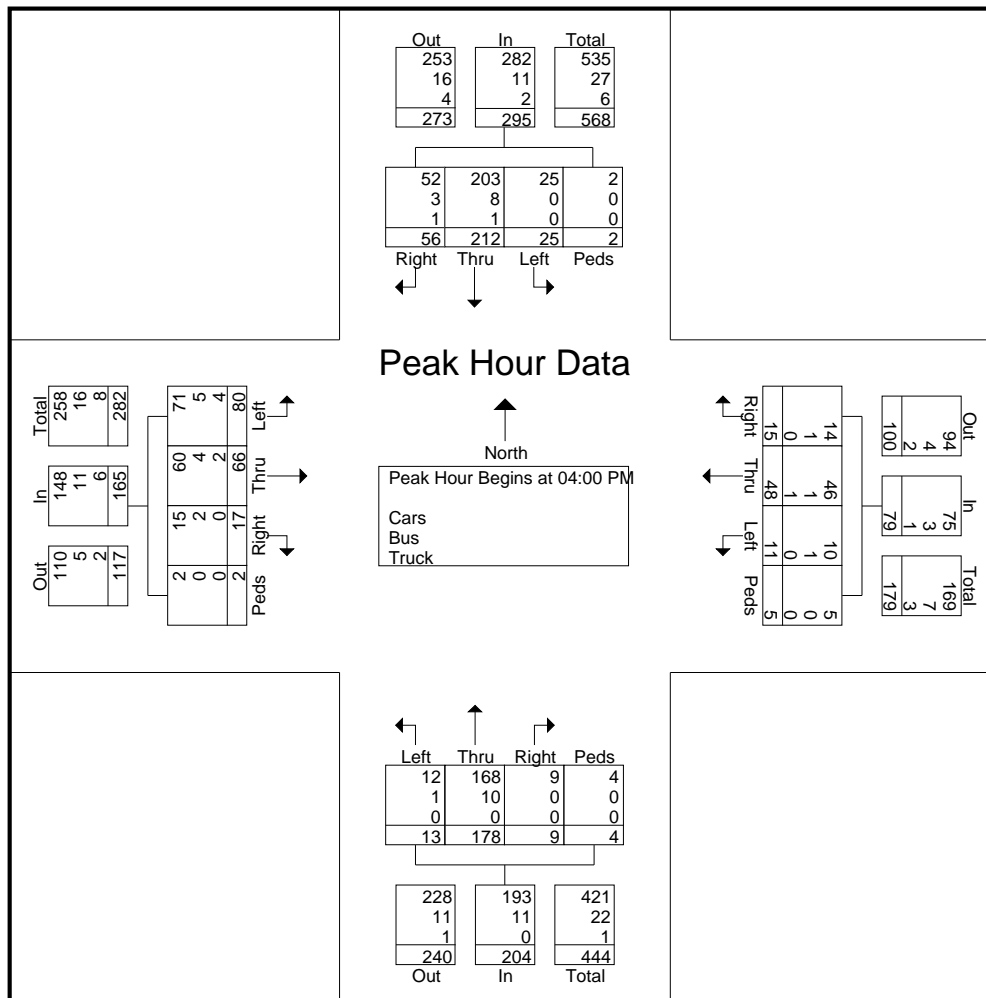
File Name : Child & Maple

Site Code : 00000000

Start Date : 1/17/2019

Page No : 3

	Southbound					Westbound					Northbound					Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 12:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:00 PM																					
04:00 PM	17	61	7	1	86	7	9	6	1	23	3	55	2	1	61	6	20	26	1	53	223
04:15 PM	12	61	6	1	80	2	10	0	2	14	2	31	5	2	40	5	17	18	0	40	174
04:30 PM	14	38	7	0	59	3	14	2	1	20	3	49	3	0	55	3	17	20	0	40	174
04:45 PM	13	52	5	0	70	3	15	3	1	22	1	43	3	1	48	3	12	16	1	32	172
Total Volume	56	212	25	2	295	15	48	11	5	79	9	178	13	4	204	17	66	80	2	165	743
% App. Total	19	71.9	8.5	0.7		19	60.8	13.9	6.3		4.4	87.3	6.4	2		10.3	40	48.5	1.2		
PHF	.824	.869	.893	.500	.858	.536	.800	.458	.625	.859	.750	.809	.650	.500	.836	.708	.825	.769	.500	.778	.833
Cars	52	203	25	2	282	14	46	10	5	75	9	168	12	4	193	15	60	71	2	148	698
% Cars	92.9	95.8	100	100	95.6	93.3	95.8	90.9	100	94.9	100	94.4	92.3	100	94.6	88.2	90.9	88.8	100	89.7	93.9
Bus	3	8	0	0	11	1	1	1	0	3	0	10	1	0	11	2	4	5	0	11	36
% Bus	5.4	3.8	0	0	3.7	6.7	2.1	9.1	0	3.8	0	5.6	7.7	0	5.4	11.8	6.1	6.3	0	6.7	4.8
Truck	1	1	0	0	2	0	1	0	0	1	0	0	0	0	0	0	2	4	0	6	9
% Truck	1.8	0.5	0	0	0.7	0	2.1	0	0	1.3	0	0	0	0	0	0	3.0	5.0	0	3.6	1.2



**B. ACCIDENT ANALYSIS DATA**

**Study Intersections**

# COLLISION DIAGRAM

Key Number = 8

MUNICIPALITY: City of Rochester

COUNTY: MONROE

FILE: HSA Template

INTERSECTION: W. Main St/Jefferson Ave

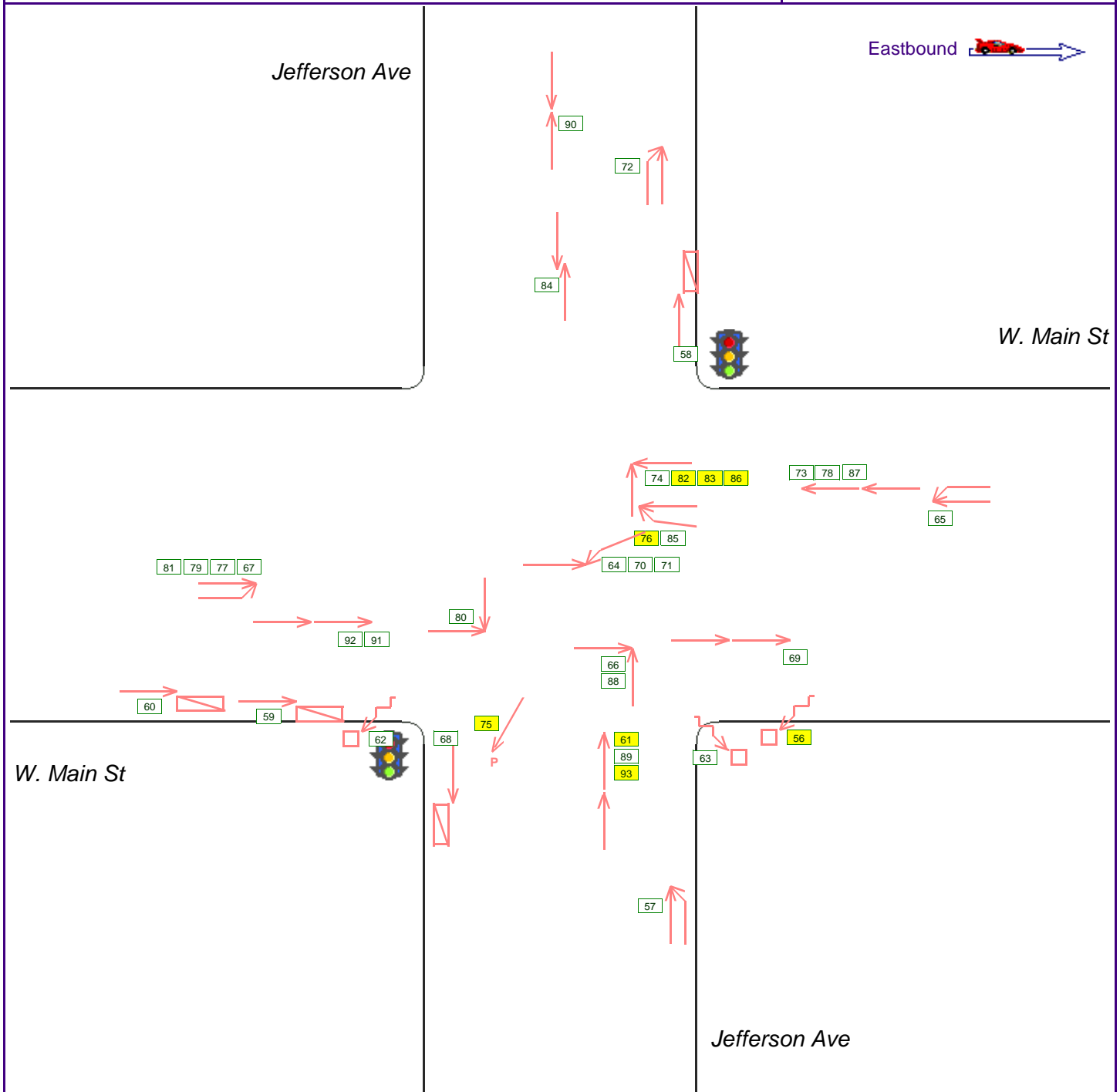
CASE # : \_\_\_\_\_

PERIOD: 3 YEARS 0 MONTHS

FROM 7/1/2015 TO 6/30/2018

BY: LJO

DATE: 2/1/2019



## SYMBOLS

	MOVING VEHICLE	<b>P</b>	PEDESTRIAN
	TURNING VEHICLE	<b>B</b>	BICYCLIST
	BACKING VEHICLE	<b>A</b>	ANIMAL
	PARKED VEHICLE		FIXED OBJECT
	RECORD NUMBER		Injury

## MANNER OF COLLISION

	REAR END		HEAD ON
	LEFT TURN		RIGHT TURN
	LEFT TURN		RIGHT TURN
	OVERTAKE		RIGHT ANGLE
	OUT OF CONTROL		SIDE SWIPE

## ACCIDENT RATE CALCULATIONS

- ☐ Segment
- ☒ Intersection

ROUTE: W. Main St

LOCATION: Jefferson Ave.

REFERENCE MARKERS / NODES: -

TIME PERIOD: 7/1/2015 - 6/30/2018

REMARKS: Selected Accidents

$$\begin{aligned}\text{ACCIDENT RATE} &= \frac{( 38 \text{ selected accidents in } 3.0 \text{ years} ) * ( 1,000,000 )}{(365 \text{ days/yr.}) * ( 3.0 \text{ years} ) * ( 18020 \text{ veh./day} )} \\ &= \underline{1.93} \text{ accidents per million entering vehicles}\end{aligned}$$

(Statewide average rate = 0.25 )

# ACCIDENT SUMMARY SHEET

**ROUTE:** W. Main St      **LOCATION:** Jefferson Ave  
**MUNICIPALITY:** City of Rochester      **COUNTY:** MONROE  
**TIME PERIOD COVERED:** 7/1/2015 - 6/30/2018      **REFERENCE MARKERS / NODES** -  
**REMARKS:** Selected Accidents      **DATE:** 1/28/2019

<b>TIME OF DAY</b> <b># ACC</b> <b>%</b> 6 AM - 10 AM      7      18.4% 10 AM - 4 PM      9      23.7% 4 PM - 7 PM      8      21.1% 7 PM - 12 AM      9      23.7% 12 AM - 6 AM      5      13.2% Unspecified      0      0.0% <b>Total</b> <b>38</b>			<b>DIRECTION</b> <b># ACC</b> <b>%</b> North      21      29.2% South      7      9.7% East      23      31.9% West      21      29.2% <b>Total</b> <b>72</b>			<b>DIRECTION</b> <b># ACC</b> <b>%</b> Northeast      0      0.0% Northwest      0      0.0% Southeast      0      0.0% Southwest      0      0.0% Unspecified      0      0.0%		
<b>WEATHER</b> <b># ACC</b> <b>%</b> Clear      27      71.1% Cloudy      6      15.8% Rain      2      5.3% Snow      3      7.9% Sleet/Hail/Freezing Rain      0      0.0% Fog/Smog/Smoke      0      0.0% Unspecified      0      0.0% <b>Total</b> <b>38</b>			<b>ACCIDENT TYPE</b> <b># ACC</b> <b>%</b> Rear End      9      23.7% Overtake      9      23.7% Right Angle      7      18.4% Left Turn      3      7.9% Right Turn      0      0.0% Fixed Object      3      7.9% Head On      1      2.6% Sideswipe      1      2.6% <b>Total</b> <b>38</b>			<b>ACCIDENT TYPE</b> <b># ACC</b> <b>%</b> Pedestrian      1      2.6% Bicycle      0      0.0% Parked Vehicle      4      10.5% Backing      0      0.0% Run Off The Road      0      0.0% Animal      0      0.0% Other      0      0.0% Unspecified      0      0.0%		
<b>SURFACE</b> <b># ACC</b> <b>%</b> Dry      31      81.6% Wet      5      13.2% Mud/Slush      0      0.0% Snow/Ice      2      5.3% Unspecified      0      0.0% <b>Total</b> <b>38</b>			<b>ACCIDENT SEVERITY</b> <b># ACC</b> <b>%</b> Fatal      0      0.0% Injury      8      21.1% Property Damage      29      76.3% Non-Reportable      1      2.6% <b>Total</b> <b>38</b>					
<b>TIME OF YEAR</b> <b># ACC</b> <b>%</b> Winter (Dec-Feb)      12      31.6% Spring (Mar-May)      9      23.7% Summer (Jun-Aug)      9      23.7% Fall (Sep-Nov)      8      21.1% <b>Total</b> <b>38</b>			<b>TYPE OF VEHICLE</b> <b># ACC</b> <b>%</b> Passenger Cars      71      97.3% Commercial Vehicles      2      2.7% <b>Total</b> <b>73</b>					
<b>DAY OF WEEK</b> <b># ACC</b> <b>%</b> Sunday      3      7.9% Monday      7      18.4% Tuesday      4      10.5% Wednesday      9      23.7% Thursday      7      18.4% Friday      4      10.5% Saturday      4      10.5% <b>Total</b> <b>38</b>			<b>LIGHT CONDITION</b> <b># ACC</b> <b>%</b> Daylight      24      63.2% Dawn/Dusk      0      0.0% Night      14      36.8% Unspecified      0      0.0% <b>Total</b> <b>38</b>					

## SUMMARY OF ACCIDENT SEVERITY BY YEAR:

	2015	2016	2017	2018
Fatal Accidents	0	0	0	0
Injury Accidents	1	0	4	3
Property Damage Accidents	2	15	6	6
Non-Reportable Accidents	0	0	0	1
<b>Total Accidents</b>	<b>3</b>	<b>15</b>	<b>10</b>	<b>10</b>

## DETAILS OF ACCIDENT HISTORY

PERIOD STUDIED: FROM: <u>7/1/2015</u> TO: <u>6/30/2018</u> <u>36</u> MONTHS			# V E H I C L E S	S E V E R I T Y	L I G H T C O N D	R O A D C H A R	S U R F A C E	W E A T H E R	ROUTE NUMBER/STREET NAME: <u>W. Main St</u>			CASE No. _____	
LOCATION: <u>Jefferson Ave</u>									FILE: <u>HSA Template</u>				
MUNICIPALITY: <u>City of Rochester</u> COUNTY: <u>MONROE</u>			REFERENCE MARKERS / NODES: _____			BY: <u>LJO</u>			DATE: <u>1/28/2019</u>				
No.	DATE	TIME							CONTRIB. FACTORS	ACC. TYPE	ACCIDENT DESCRIPTION	KEY #	
61	10/21/2015	20:44	2	INJ	4	1	1	1	4	Rend	V1 RE V2 stopped NB on Jefferson @ Main	8	
62	12/11/2015	21:55	1	PDO	4	1	1	2	6 28	FixO	V1 WB drove onto sidewalk/hit sign post - drugs involved	8	
63	12/22/2015	5:41	1	PDO	4	1	1	1		FixO	V1 EB hit hydrant on SE corner of Jefferson/Main	8	
64	1/11/2016	7:23	2	PDO	1	1	1	1	7	Ltrn	V1 WB hit V2 EB as V1 made WB LT from Main to Jefferson	8	
60	1/13/2016	17:57	2	PDO	1	1	2	4		Park	V1 EB hit V2 parked EB on Main-100'W of Jefferson	8	
58	2/15/2016	17:34	2	PDO	1	1	2	2	13	Park	V1 NB hit V2 parked NB in No Park Zone on Jefferson @ Main	8	
65	3/29/2016	15:25	2	PDO	1	1	1	1	13	Ovtk	V1 & V2(bus) hit Overtaking WB on Main @ Jefferson	8	
66	4/8/2016	19:16	2	PDO	1	1	1	2	60	Rang	V1 NB ran red & V2 EB hit Rt Angle @ Jefferson/Main	8	
67	4/13/2016	9:14	2	PDO	1	1	1	1	7	Ovtk	V1 & V2 hit Overtaking EB on Main - 20'W of Jefferson	8	
59	4/21/2016	17:00	2	PDO	1	1	1	1		Park	V1 EB hit V2 parked EB on Main-100'W of Jefferson	8	
68	5/4/2016	16:30	2	PDO	1	2	1	1	4	Park	V1 SB hit open door of V2 parked SB on Jefferson-15'S of Main	8	
69	5/18/2016	18:01	0	PDO	1	1	1	1	9	Rend	V1 RE V2 stopping EB on Main-15'E of Jefferson	8	
70	8/1/2016	16:55	2	PDO	1	1	1	1	7	Ltrn	V1 WB & V2 EB hit as V1 made WB LT from Main to Jefferson	8	
71	8/17/2016	16:45	2	PDO	1	1	1	1	4	Ltrn	V1 WB & V2 EB hit as V1 made WB LT from Main to Jefferson	8	
72	9/4/2016	8:07	2	PDO	1	2	1	1	7	Ovtk	V1 & V2 hit Overtaking NB as both made NB RT Jefferson to Main	8	
57	10/3/2016	0:45	2	PDO	4	1	1	1	7	Ovtk	V1 NB hit V2 NB as V1 pulled from parked-Jefferson 50'S of Main	8	
74	10/14/2016	2:13	2	PDO	4	1	1	1	7	Rang	V1 Wb & V2 NB hit Rt Angle @ Jefferson/Main	8	
73	10/17/2016	8:47	2	PDO	1	1	2	3	4	Rend	V1 RE V2 stopped WB on Main @ Jefferson	8	
75	1/30/2017	15:28	2	INJ	1	1	1	1	4 14	Ped	V1 hit ped as V1 made WB LT Main to Jefferson	8	
76	5/4/2017	7:42	2	INJ	1	1	1	1	18	Ovtk	V1 hit V2 Overtaking WB-V1 made RT from Left Ln - Main to Jeff	8	
77	7/3/2017	15:34	2	PDO	1	1	1	1	13	Ovtk	V1 & V2 hit Overtaking EB on Main - 75'W of Jefferson	8	
78	8/10/2017	12:30	2	PDO	1	1	1	1	4	Rend	V1 RE V2 stopped WB to make WB LT from Main to Jefferson	8	



## DETAILS OF ACCIDENT HISTORY

PERIOD STUDIED: FROM: <u>7/1/2015</u> TO: <u>6/30/2018</u> <u>36</u> MONTHS			# V E H I C L E S	S E V E R I T Y	L I G H T C O N D	R O A D C H A R	S U R F A C E	W E A T H E R	ROUTE NUMBER/STREET NAME: <u>W. Main St</u>				CASE No. _____	
LOCATION: <u>Jefferson Ave</u>									FILE: <u>HSA Template</u>					
MUNICIPALITY: <u>City of Rochester</u> COUNTY: <u>MONROE</u>				REFERENCE MARKERS / NODES: _____ - _____				BY: <u>LJO</u>						
DATE: <u>1/28/2019</u>														

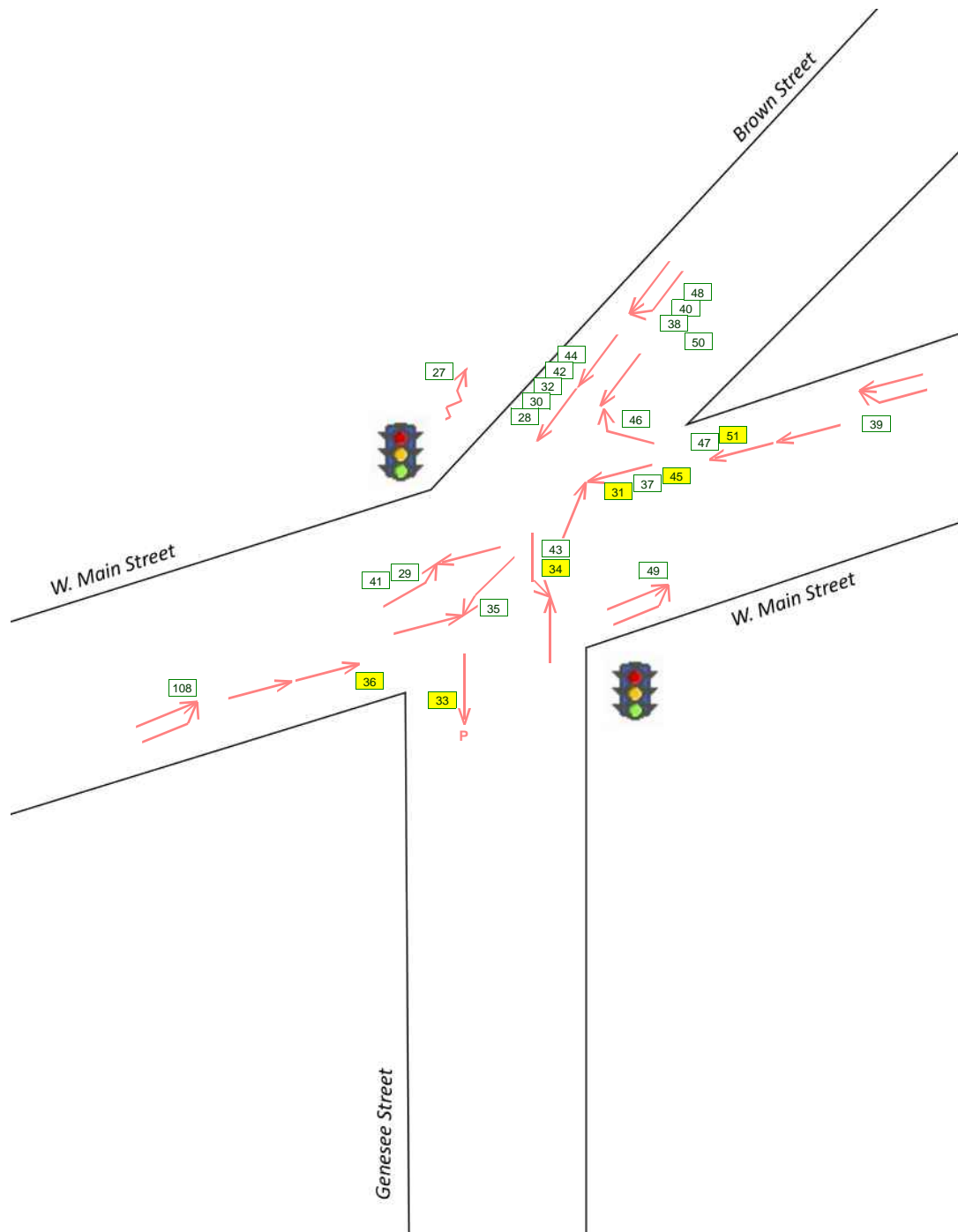
No.	DATE	TIME	#	S	E	V	E	R	I	T	C	O	N	D	S	U	R	F	A	C	E	W	E	A	T	H	E	R	CONTRIB. FACTORS	ACC. TYPE	ACCIDENT DESCRIPTION	KEY #
79	8/24/2017	10:49	2																										7 20 29	Ovtk	V1 EB & V2 from parked - hit Overtaking WB on Main @ Jefferson	8
80	9/13/2017	21:34	2																										17 19	Rang	V1 EB & V1 SB hit Rt Angle @ Jefferson/Main	8
81	9/13/2017	21:54	2																										4	Ovtk	V1 & V2 hit Overtaking EB on Main - 15'E of Jefferson	8
82	10/7/2017	14:30	2																										17 17	Rang	V1 NB & V2 WB hit Rt Angle @ Jefferson/Main	8
83	12/1/2017	7:56	2																										17 17	Rang	V1 NB & V2 WB hit Rt Angle @ Jefferson/Main	8
84	12/30/2017	20:05	2																										2 13	Side	V1 NB SS V2 SB @ Jefferson/Main - V1 DWI	8
86	1/11/2018	12:56	4																										5 17	Rang	V1 NB & V2 WB hit Rt Angle @ Jefferson/Main	8
85	1/23/2018	0:54	2																										45 13 29	Ovtk	V1 & V2 hit Overtaking WB on Main @ Jefferson	8
87	2/3/2018	23:34	2																										9	Rend	V1 RE V2 stopped on Main as V1 made SB RT from Jeff to Main	8
88	2/6/2018	6:31	2																										19	Rang	V1 NB hit V2 (bus) EB Rt Angle @ Jefferson/Main - Slid on Ice	8
90	5/26/2018	1:23	2																										4	HdOn	V1 NB hit V2 SB Head-On on Jefferson - 100' N of Main	8
89	5/27/2018	13:30	2																										9	Rend	V1 RE V2 stopped NB on Jefferson @ Main	8
91	7/4/2018	22:33	2																										4	Rend	V1 RE V2 stopped EB on Main @ Jefferson - DWI	8
92	7/12/2018	11:32	2																										9	Rend	V1 RE V2 stopped EB on Main @ Jefferson	8
56	7/15/2018	23:20	1																										26 46	FixO	V1 WB hit bldg @ 605 Main	8
93	8/2/2018	17:30	2																										9	Rend	V1 RE V2 stopped NB on Jefferson @ Main	8

# COLLISION DIAGRAM

Key Number = 3

MUNICIPALITY: City of Rochester COUNTY: MONROE  
 INTERSECTION: W. Main St./Genesee St./Brown St.  
 PERIOD: 3 YEARS 0 MONTHS FROM 7/1/2015 TO 6/30/2018

FILE: HSA Template  
 CASE # :   
 BY: LJO DATE: 1/18/2019



SYMBOLS		MANNER OF COLLISION	
	MOVING VEHICLE		REAR END
	TURNING VEHICLE		LEFT TURN
	BACKING VEHICLE		LEFT TURN
	PARKED VEHICLE		OVERTAKE
	RECORD NUMBER		OUT OF CONTROL
	PEDESTRIAN		HEAD ON
	BICYCLIST		RIGHT TURN
	ANIMAL		RIGHT TURN
	FIXED OBJECT		RIGHT TURN
	Injury		RIGHT ANGLE
			SIDE SWIPE

## ACCIDENT RATE CALCULATIONS

- ☐ Segment
- ☒ Intersection

ROUTE: W. Main St

LOCATION: W. Main St / Genesee St / Brown St

REFERENCE MARKERS / NODES: -

TIME PERIOD: 7/1/2015 - 6/30/2018

REMARKS: Selected Accidents

$$\begin{aligned}\text{ACCIDENT RATE} &= \frac{( 26 \text{ selected accidents in } 3.0 \text{ years} ) * ( 1,000,000 )}{(365 \text{ days/yr.}) * ( 3.0 \text{ years} ) * ( 27100 \text{ veh./day} )} \\ &= \underline{0.88} \text{ accidents per million entering vehicles}\end{aligned}$$

(Statewide average rate = 0.25 )

# ACCIDENT SUMMARY SHEET

**ROUTE:** W. Main St      **LOCATION:** W. Main St / Genesee St / Brown St  
**MUNICIPALITY:** City of Rochester      **COUNTY:** MONROE  
**TIME PERIOD COVERED:** 7/1/2015 - 6/30/2018      **REFERENCE MARKERS / NODES** -  
**REMARKS:** Selected Accidents      **DATE:** 1/18/2019

<b>TIME OF DAY</b> 6 AM - 10 AM      1      3.8% 10 AM - 4 PM      14      53.8% 4 PM - 7 PM      5      19.2% 7 PM - 12 AM      3      11.5% 12 AM - 6 AM      3      11.5% Unspecified      0      0.0% <b>Total</b> <b>26</b>	<b>DIRECTION</b> North      5      9.4% South      23      43.4% East      10      18.9% West      15      28.3% <b>Total</b> <b>53</b>	<b>DIRECTION</b> Northeast      0      0.0% Northwest      0      0.0% Southeast      0      0.0% Southwest      0      0.0% Unspecified      0      0.0%
<b>WEATHER</b> Clear      17      65.4% Cloudy      4      15.4% Rain      4      15.4% Snow      1      3.8% Sleet/Hail/Freezing Rain      0      0.0% Fog/Smog/Smoke      0      0.0% Unspecified      0      0.0% <b>Total</b> <b>26</b>	<b>ACCIDENT TYPE</b> Rear End      8      30.8% Overtake      7      26.9% Right Angle      3      11.5% Left Turn      5      19.2% Right Turn      1      3.8% Fixed Object      0      0.0% Head On      0      0.0% Sideswipe      0      0.0% <b>Total</b> <b>26</b>	<b>ACCIDENT TYPE</b> Pedestrian      1      3.8% Bicycle      0      0.0% Parked Vehicle      0      0.0% Backing      0      0.0% Run Off The Road      1      3.8% Animal      0      0.0% Other      0      0.0% Unspecified      0      0.0%
<b>SURFACE</b> Dry      20      76.9% Wet      4      15.4% Mud/Slush      0      0.0% Snow/Ice      2      7.7% Unspecified      0      0.0% <b>Total</b> <b>26</b>	<b>ACCIDENT SEVERITY</b> Fatal      0      0.0% Injury      6      23.1% Property Damage      18      69.2% Non-Reportable      2      7.7% <b>Total</b> <b>26</b>	
<b>TIME OF YEAR</b> Winter (Dec-Feb)      6      23.1% Spring (Mar-May)      6      23.1% Summer (Jun-Aug)      7      26.9% Fall (Sep-Nov)      7      26.9% <b>Total</b> <b>26</b>	<b>TYPE OF VEHICLE</b> Passenger Cars      53      91.4% Commercial Vehicles      5      8.6% <b>Total</b> <b>58</b>	
<b>DAY OF WEEK</b> Sunday      1      3.8% Monday      2      7.7% Tuesday      0      0.0% Wednesday      9      34.6% Thursday      2      7.7% Friday      8      30.8% Saturday      4      15.4% <b>Total</b> <b>26</b>	<b>LIGHT CONDITION</b> Daylight      18      69.2% Dawn/Dusk      1      3.8% Night      7      26.9% Unspecified      0      0.0% <b>Total</b> <b>26</b>	

## SUMMARY OF ACCIDENT SEVERITY BY YEAR:

	2015	2016	2017	2018
Fatal Accidents	0	0	0	0
Injury Accidents	0	2	1	3
Property Damage Accidents	1	4	10	3
Non-Reportable Accidents	0	0	0	2
<b>Total Accidents</b>	<b>1</b>	<b>6</b>	<b>11</b>	<b>8</b>

## DETAILS OF ACCIDENT HISTORY

PERIOD STUDIED: FROM: 7/1/2015 TO: 6/30/2018 36 MONTHS			# V E H I C L E S	S E V E R I T Y	L I G H T C O N D	R O A D C H A R	S U R F A C E	W E A T H E R	ROUTE NUMBER/STREET NAME: W. Main St			LOCATION: W. Main St / Genesee St / Brown St			MUNICIPALITY: City of Rochester COUNTY: MONROE			REFERENCE MARKERS / NODES: -			CASE No.		FILE: HSA Template		BY: LJO		DATE: 1/18/2019	
No.	DATE	TIME							CONTRIB. FACTORS	ACC. TYPE	ACCIDENT DESCRIPTION												KEY #					
50	12/25/2015	2:51	2	PDO	4	1	1	2	50 25 28	Ovtk	V1 SB hit V2 SWB as V2 blocked V1 SB on Brown @ Main												3					
51	1/6/2016	13:26	3	INJ	1	1	1	1	9	Rend	V1 RE V2 RE V3 stopped WB on Main @ Brown												3					
33	4/27/2016	20:58	6	INJ	4	1	1	1	14	Ped	V1 SB hit 2 peds outside of Crosswalk @ Brown & Main												3					
49	7/7/2016	15:44	2	PDO	1	1	1	1	13 45	Ovtk	V1 & V2 hit Overtaking EB on Main, 15' E of Brown												3					
48	8/12/2016	13:20	2	PDO	1	3	1	1	4	Ovtk	V1 hit V2 Overtaking SB from parked on Brown												3					
47	11/5/2016	15:21	2	PDO	1	1	1	1	4	Rend	V1 RE V2 stopped WB on Main @ Brown												3					
46	11/19/2016	17:39	2	PDO	4	1	2	3	40	Rtrn	V1 WB hit V2 SB as V1 made wide RT from Main to Brown												3					
45	3/22/2017	21:36	2	INJ	4	1	1	2	7	Rang	V1 NB & V2 WB hit Rt Angle @ Main & Brown												3					
44	3/29/2017	18:16	2	PDO	1	1	1	1	4 17	Rend	V1 RE V2 stopped SB on Brown @ Main												3					
43	4/19/2017	11:06	2	PDO	1	1	2	3	7	Ltrn	V1 SB hit V2 NB as V1 made SB LT from Brown to Main												3					
42	6/14/2017	23:03	2	PDO	4	1	1	1	9 5 26	Rend	V1 RE V2 stopped SWB on Brown @ Main												3					
41	8/7/2017	12:39	2	PDO	1	1	1	1	60 60	Ltrn	V1 EB & V2 WB hit as V1 made EB LT from Main to Brown												3					
40	8/18/2017	18:10	2	PDO	1	1	1	1	7	Ovtk	V1 & V2 hit Overtaking SWB on Brown, 50'N of Main												3					
27	9/1/2017	3:24	1	PDO	5	1	1	1	25 14	ROR	V1 EB on Main @ Brown - ran off road-hit tree to avoid ped.												3					
28	9/1/2017	15:05	2	PDO	1	1	1	1	9	Rend	V1 RE V2 stopped SWB on Brown St @ Main												3					
39	9/6/2017	16:41	2	PDO	1	1	2	3	9	Ovtk	V1 hit V2 Overtaking WB on Main @ Brown												3					
38	10/5/2017	10:24	2	PDO	1	1	1	1	5 7	Ovtk	V1 hit V2 Overtaking SB from parked on Brown, 100'N of Main												3					
37	11/3/2017	17:14	2	PDO	1	1	1	1	4 62	Rang	V1 WB & V2 NB hit Rt Angle @ Main/Brown/Genesee - Glare												3					
36	1/5/2018	12:47	2	INJ	1	1	4	4	9 66	Rend	V1 RE V2 stopped EB on Main @ Brown/Genesee												3					
35	1/13/2018	15:46	2	PDO	1	1	4	1	4 7	Ltrn	V1 WB & V2 Eb hit as V1 made WB LT from Main to Genesee												3					
34	2/2/2018	14:46	2	INJ	1	1	1	1	18	Ltrn	V1 SB 7 V2 NB hit as V1 made SB LT from Brown to Main												3					
30	2/25/2018	12:37	2	N/R	1	1	1	2	9	Rend	V1 RE V2 stopped SWB on Brown St @ Main												3					

## DETAILS OF ACCIDENT HISTORY

Page 2 of 2

PERIOD STUDIED: FROM: <u>7/1/2015</u> TO: <u>6/30/2018</u> <u>36</u> MONTHS			# V E H I C L E S	S E V E R I T Y	L I G H T C O N D	R O A D C H A R	S U R F A C E	W E A T H E R	ROUTE NUMBER/STREET NAME: <u>W. Main St</u>				CASE No. _____	
LOCATION: <u>W. Main St / Genesee St / Brown St</u>									FILE: <u>HSA Template</u>					
MUNICIPALITY: <u>City of Rochester</u>				COUNTY: <u>MONROE</u>				BY: <u>LJO</u>						
REFERENCE MARKERS / NODES: _____				-				DATE: <u>1/18/2019</u>						

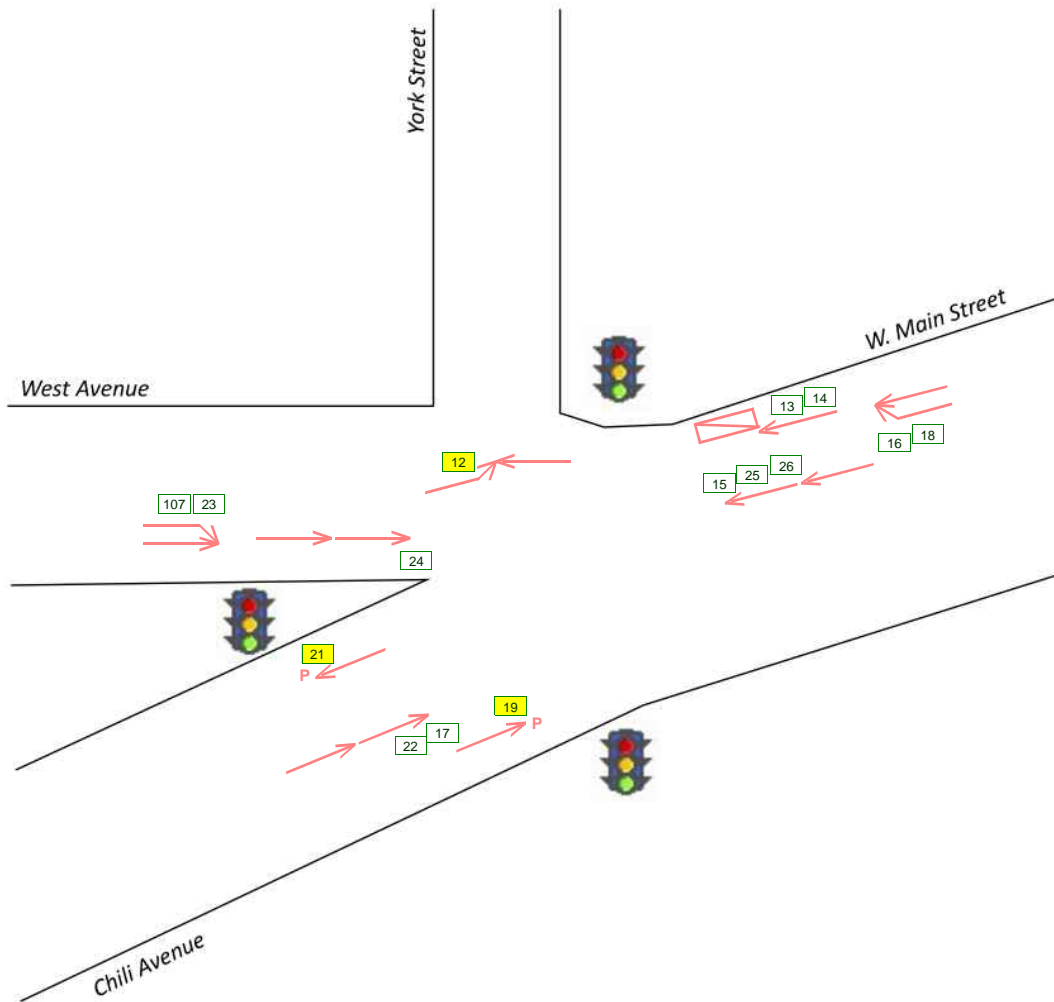
No.	DATE	TIME	#	S	L	R	S	W	CONTRIB. FACTORS	ACC. TYPE	ACCIDENT DESCRIPTION	KEY #
108	3/7/2018	11:00	2	N/R	1	1	1	1	13 7 13 7	Ovtk	V1 & V2 hit Overtaking EB on Main @ Genesee/Brown	3
29	5/16/2018	12:09	2	PDO	1	1	1	2	7 18	Ltrn	V1 EB & V2 WB hit as V1 made EB LT from Main to Brown	3
31	7/2/2018	6:51	4	INJ	2	1	1	1	5	Rang	V1 NB & V2 WB hit Rt Angle @ Main & Genesee	3
32	8/18/2018	2:00	2	PDO	4	1	2	3	4 9	Rend	V1 RE V2 stopped SB on Brown @ Main	3

# COLLISION DIAGRAM

Key Number = 2

MUNICIPALITY: City of Rochester COUNTY: MONROE  
 INTERSECTION: W. Main St./Chili Ave./West Ave./York St.  
 PERIOD: 3 YEARS 0 MONTHS FROM 7/1/2015 TO 6/30/2018

FILE: HSA Template  
 CASE # :   
 BY: LJO DATE: 1/18/2019



## SYMBOLS

	MOVING VEHICLE	<b>P</b>	PEDESTRIAN
	TURNING VEHICLE	<b>B</b>	BICYCLIST
	BACKING VEHICLE	<b>A</b>	ANIMAL
	PARKED VEHICLE		FIXED OBJECT
	RECORD NUMBER		Injury

## MANNER OF COLLISION

	REAR END		HEAD ON
	LEFT TURN		RIGHT TURN
	LEFT TURN		RIGHT TURN
	OVERTAKE		RIGHT ANGLE
	OUT OF CONTROL		SIDE SWIPE

## ACCIDENT RATE CALCULATIONS

- ☐ Segment
- ☒ Intersection

ROUTE: W. Main St

LOCATION: W. Main St / West Ave / Chili Ave / York St

REFERENCE MARKERS / NODES: -

TIME PERIOD: 7/1/2015 - 6/30/2018

REMARKS: Selected Accidents

$$\begin{aligned}\text{ACCIDENT RATE} &= \frac{( 15 \text{ selected accidents in } 3.0 \text{ years} ) * ( 1,000,000 )}{(365 \text{ days/yr.}) * ( 3.0 \text{ years} ) * ( 18000 \text{ veh./day} )} \\ &= \underline{0.76} \text{ accidents per million entering vehicles}\end{aligned}$$

(Statewide average rate = 0.20 )



# ACCIDENT SUMMARY SHEET

**ROUTE:** W. Main St      **LOCATION:** Chili Ave / West Ave / York St  
**MUNICIPALITY:** City of Rochester      **COUNTY:** MONROE  
**TIME PERIOD COVERED:** 7/1/2015 - 6/30/2018      **REFERENCE MARKERS / NODES** -  
**REMARKS:** Selected Accidents      **DATE:** 1/29/2019

<b>TIME OF DAY</b> <b># ACC</b> <b>%</b> 6 AM - 10 AM      2      13.3% 10 AM - 4 PM      8      53.3% 4 PM - 7 PM      3      20.0% 7 PM - 12 AM      2      13.3% 12 AM - 6 AM      0      0.0% Unspecified      0      0.0% <b>Total</b> <b>15</b>			<b>DIRECTION</b> <b># ACC</b> <b>%</b> North      0      0.0% South      0      0.0% East      12      41.4% West      17      58.6% <b>Total</b> <b>29</b>			<b>DIRECTION</b> <b># ACC</b> <b>%</b> Northeast      0      0.0% Northwest      0      0.0% Southeast      0      0.0% Southwest      0      0.0% Unspecified      0      0.0%		
<b>WEATHER</b> <b># ACC</b> <b>%</b> Clear      8      53.3% Cloudy      5      33.3% Rain      1      6.7% Snow      0      0.0% Sleet/Hail/Freezing Rain      0      0.0% Fog/Smog/Smoke      0      0.0% Unspecified      1      6.7% <b>Total</b> <b>15</b>			<b>ACCIDENT TYPE</b> <b># ACC</b> <b>%</b> Rear End      6      40.0% Overtake      4      26.7% Right Angle      0      0.0% Left Turn      1      6.7% Right Turn      0      0.0% Fixed Object      0      0.0% Head On      0      0.0% Sideswipe      0      0.0% <b>Total</b> <b>15</b>			<b>ACCIDENT TYPE</b> <b># ACC</b> <b>%</b> Pedestrian      2      13.3% Bicycle      0      0.0% Parked Vehicle      2      13.3% Backing      0      0.0% Run Off The Road      0      0.0% Animal      0      0.0% Other      0      0.0% Unspecified      0      0.0%		
<b>SURFACE</b> <b># ACC</b> <b>%</b> Dry      11      73.3% Wet      3      20.0% Mud/Slush      0      0.0% Snow/Ice      0      0.0% Unspecified      1      6.7% <b>Total</b> <b>15</b>			<b>ACCIDENT SEVERITY</b> <b># ACC</b> <b>%</b> Fatal      0      0.0% Injury      3      20.0% Property Damage      10      66.7% Non-Reportable      2      13.3% <b>Total</b> <b>15</b>					
<b>TIME OF YEAR</b> <b># ACC</b> <b>%</b> Winter (Dec-Feb)      4      26.7% Spring (Mar-May)      3      20.0% Summer (Jun-Aug)      3      20.0% Fall (Sep-Nov)      5      33.3% <b>Total</b> <b>15</b>			<b>TYPE OF VEHICLE</b> <b># ACC</b> <b>%</b> Passenger Cars      26      96.3% Commercial Vehicles      1      3.7% <b>Total</b> <b>27</b>					
<b>DAY OF WEEK</b> <b># ACC</b> <b>%</b> Sunday      1      6.7% Monday      3      20.0% Tuesday      4      26.7% Wednesday      1      6.7% Thursday      1      6.7% Friday      5      33.3% Saturday      0      0.0% <b>Total</b> <b>15</b>			<b>LIGHT CONDITION</b> <b># ACC</b> <b>%</b> Daylight      11      73.3% Dawn/Dusk      1      6.7% Night      3      20.0% Unspecified      0      0.0% <b>Total</b> <b>15</b>					

## SUMMARY OF ACCIDENT SEVERITY BY YEAR:

	2015	2016	2017	2018
Fatal Accidents	0	0	0	0
Injury Accidents	0	2	0	1
Property Damage Accidents	2	3	4	1
Non-Reportable Accidents	0	1	0	1
<b>Total Accidents</b>	<b>2</b>	<b>6</b>	<b>4</b>	<b>3</b>

## DETAILS OF ACCIDENT HISTORY

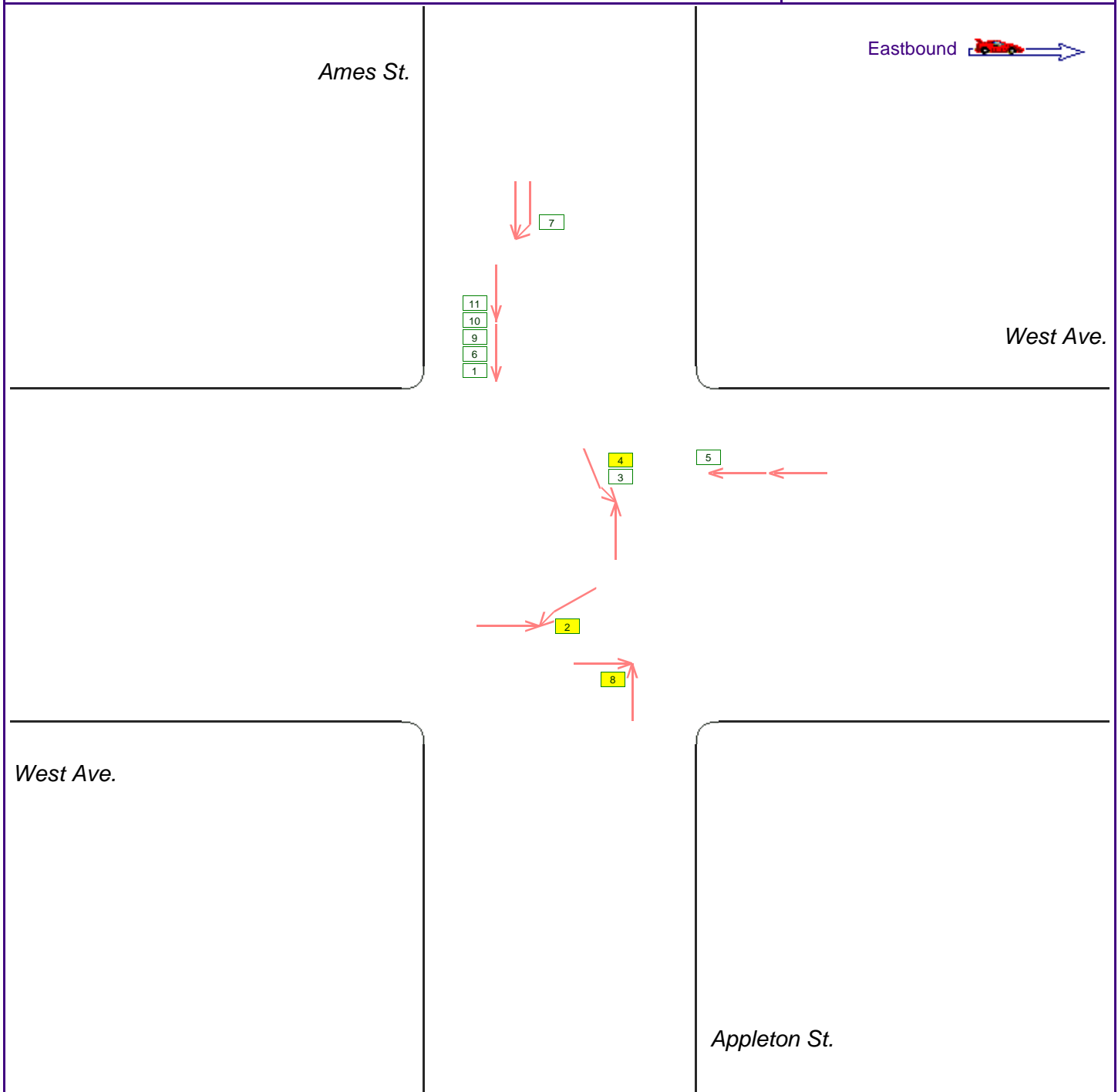
Page 1 of 1

PERIOD STUDIED: FROM: <u>7/1/2015</u> TO: <u>6/30/2018</u> <u>36</u> MONTHS			# V E H I C L E S	S E V E R I T Y	L I G H T C O N D	R O A D C H A R	S U R F A C E	W E A T H E R	ROUTE NUMBER/STREET NAME: <u>W. Main St</u>			CASE No. _____	
LOCATION: <u>W. Main St / West Ave / Chili Ave / York St</u>									FILE: <u>HSA Template</u>				
MUNICIPALITY: <u>City of Rochester</u> COUNTY: <u>MONROE</u>			REFERENCE MARKERS / NODES: _____ - _____			BY: <u>LJO</u>			DATE: <u>1/18/2019</u>				
No.	DATE	TIME							CONTRIB. FACTORS	ACC. TYPE	ACCIDENT DESCRIPTION	KEY #	
23	10/30/2015	13:20	2	PDO	1	1	1	1	60	Ovtk	V1 hit V2 Overtaking EB on West @ York/Main/Chili	2	
26	12/1/2015	17:00	3	PDO	4	1	2	2	4	Rend	V1 RE V2 RE V3 stopping WB on Main @ Chili/West/York	2	
22	2/29/2016	8:40	2	PDO	1	1	0	0	4	Rend	V1 RE V2 stopped EB on Chili @ West/York	2	
14	3/4/2016	11:58	0	PDO	1	1	1	1	4 40	Park	V1 in NoPark Zone hit passing WB V2(bus) w/door @ Main & York	2	
21	5/16/2016	15:45	1	INJ	1	1	1	2	7 14	Ped	V1 WB from Chili/West/York hit ped - ran into road/not in Xwalk	2	
107	6/22/2016	13:07	2	PDO	1	1	1	1	20	Ovtk	V1 & V2 hit Overtaking EB on West @ Main	2	
25	10/2/2016	13:15	2	N/R	1	1	1	1	4	Rend	V1 RE V2 stopped EB on Main @ Chili/West/York	2	
19	10/24/2016	20:18	1	INJ	4	1	1	2	4	Ped	V1 EB w/green light - hit ped in Xwalk on Chili @ West/York	2	
18	1/27/2017	7:56	2	PDO	2	1	1	1	7	Ovtk	V1 hit V2 Overtaking WB on Main St, 20' East of York	2	
13	5/5/2017	13:42	2	PDO	1	1	2	3	13 45	Park	V1 WB hit Delivery Truck V2 parked on W. Main, @ York	2	
15	6/20/2017	16:36	2	PDO	1	1	1	2	4 24	Rend	V1 RE V2 stopped WB on Main @ York	2	
17	10/17/2017	12:40	2	PDO	1	1	1	1	9	Rend	V1 RE V2 stopped on Chili @ York/West	2	
16	1/25/2018	14:33	2	PDO	1	1	2	2	9 20	Ovtk	V1 hit V2 Overtaking WB on Main @ York	2	
12	8/28/2018	17:25	2	INJ	1	1	1	1	7 4	Ltrn	V1 EB & V2 WB hit as V1 made WB LT West to York	2	
24	9/28/2018	20:30	2	N/R	4	1	1	1	4	Rend	V1 RE V2 stopped EB on West @ York/Main/Chili	2	

# COLLISION DIAGRAM

Key Number = 1

MUNICIPALITY: <u>City of Rochester</u>	COUNTY: <u>MONROE</u>	FILE: <u>HSA Template</u>
INTERSECTION: <u>West Ave./Ames St.</u>		CASE # : _____
PERIOD: <u>3</u> YEARS <u>0</u> MONTHS	FROM <u>7/1/2015</u> TO <u>6/30/2018</u>	BY: <u>LJO</u> DATE: <u>1/18/2019</u>



SYMBOLS		MANNER OF COLLISION	
	MOVING VEHICLE		REAR END
	TURNING VEHICLE		LEFT TURN
	BACKING VEHICLE		LEFT TURN
	PARKED VEHICLE		OVERTAKE
	RECORD NUMBER		OUT OF CONTROL
	PEDESTRIAN		HEAD ON
	BICYCLIST		RIGHT TURN
	ANIMAL		RIGHT TURN
	FIXED OBJECT		RIGHT ANGLE
	Injury		SIDE SWIPE

## ACCIDENT RATE CALCULATIONS

- ☐ Segment
- ☒ Intersection

ROUTE: West Ave.

LOCATION: Ames St.

REFERENCE MARKERS / NODES: -

TIME PERIOD: 7/1/2015 - 6/30/2018

REMARKS: Selected Accidents

$$\begin{aligned}\text{ACCIDENT RATE} &= \frac{( 11 \text{ selected accidents in } 3.0 \text{ years} ) * ( 1,000,000 )}{(365 \text{ days/yr.}) * ( 3.0 \text{ years} ) * ( 13320 \text{ veh./day} )} \\ &= \underline{0.75} \text{ accidents per million entering vehicles}\end{aligned}$$

(Statewide average rate = 0.20 )

# ACCIDENT SUMMARY SHEET

**ROUTE:** West Ave.      **LOCATION:** Ames St.  
**MUNICIPALITY:** City of Rochester      **COUNTY:** MONROE  
**TIME PERIOD COVERED:** 7/1/2015 - 6/30/2018      **REFERENCE MARKERS / NODES** -  
**REMARKS:** Selected Accidents      **DATE:** 1/18/2019

<b>TIME OF DAY</b> 6 AM - 10 AM      3      27.3% 10 AM - 4 PM      4      36.4% 4 PM - 7 PM      2      18.2% 7 PM - 12 AM      2      18.2% 12 AM - 6 AM      0      0.0% Unspecified      0      0.0% <b>Total</b> <b>11</b>	<b>DIRECTION</b> North      3      13.0% South      15      65.2% East      2      8.7% West      3      13.0% <b>Total</b> <b>23</b>	<b>DIRECTION</b> Northeast      0      0.0% Northwest      0      0.0% Southeast      0      0.0% Southwest      0      0.0% Unspecified      0      0.0%
<b>WEATHER</b> Clear      4      36.4% Cloudy      5      45.5% Rain      1      9.1% Snow      1      9.1% Sleet/Hail/Freezing Rain      0      0.0% Fog/Smog/Smoke      0      0.0% Unspecified      0      0.0% <b>Total</b> <b>11</b>	<b>ACCIDENT TYPE</b> Rear End      6      54.5% Overtake      1      9.1% Right Angle      1      9.1% Left Turn      3      27.3% Right Turn      0      0.0% Fixed Object      0      0.0% Head On      0      0.0% Sideswipe      0      0.0% <b>Total</b> <b>11</b>	<b>ACCIDENT TYPE</b> Pedestrian      0      0.0% Bicycle      0      0.0% Parked Vehicle      0      0.0% Backing      0      0.0% Run Off The Road      0      0.0% Animal      0      0.0% Other      0      0.0% Unspecified      0      0.0%
<b>SURFACE</b> Dry      7      63.6% Wet      1      9.1% Mud/Slush      0      0.0% Snow/Ice      3      27.3% Unspecified      0      0.0% <b>Total</b> <b>11</b>	<b>ACCIDENT SEVERITY</b> Fatal      0      0.0% Injury      3      27.3% Property Damage      7      63.6% Non-Reportable      1      9.1% <b>Total</b> <b>11</b>	
<b>TIME OF YEAR</b> Winter (Dec-Feb)      2      18.2% Spring (Mar-May)      3      27.3% Summer (Jun-Aug)      3      27.3% Fall (Sep-Nov)      3      27.3% <b>Total</b> <b>11</b>	<b>TYPE OF VEHICLE</b> Passenger Cars      23      100.0% Commercial Vehicles      0      0.0% <b>Total</b> <b>23</b>	
<b>DAY OF WEEK</b> Sunday      0      0.0% Monday      1      9.1% Tuesday      2      18.2% Wednesday      2      18.2% Thursday      2      18.2% Friday      4      36.4% Saturday      0      0.0% <b>Total</b> <b>11</b>	<b>LIGHT CONDITION</b> Daylight      8      72.7% Dawn/Dusk      1      9.1% Night      2      18.2% Unspecified      0      0.0% <b>Total</b> <b>11</b>	

## SUMMARY OF ACCIDENT SEVERITY BY YEAR:

	2015	2016	2017	2018
Fatal Accidents	0	0	0	0
Injury Accidents	0	2	0	1
Property Damage Accidents	0	2	3	2
Non-Reportable Accidents	0	0	0	1
<b>Total Accidents</b>	<b>0</b>	<b>4</b>	<b>3</b>	<b>4</b>

## DETAILS OF ACCIDENT HISTORY

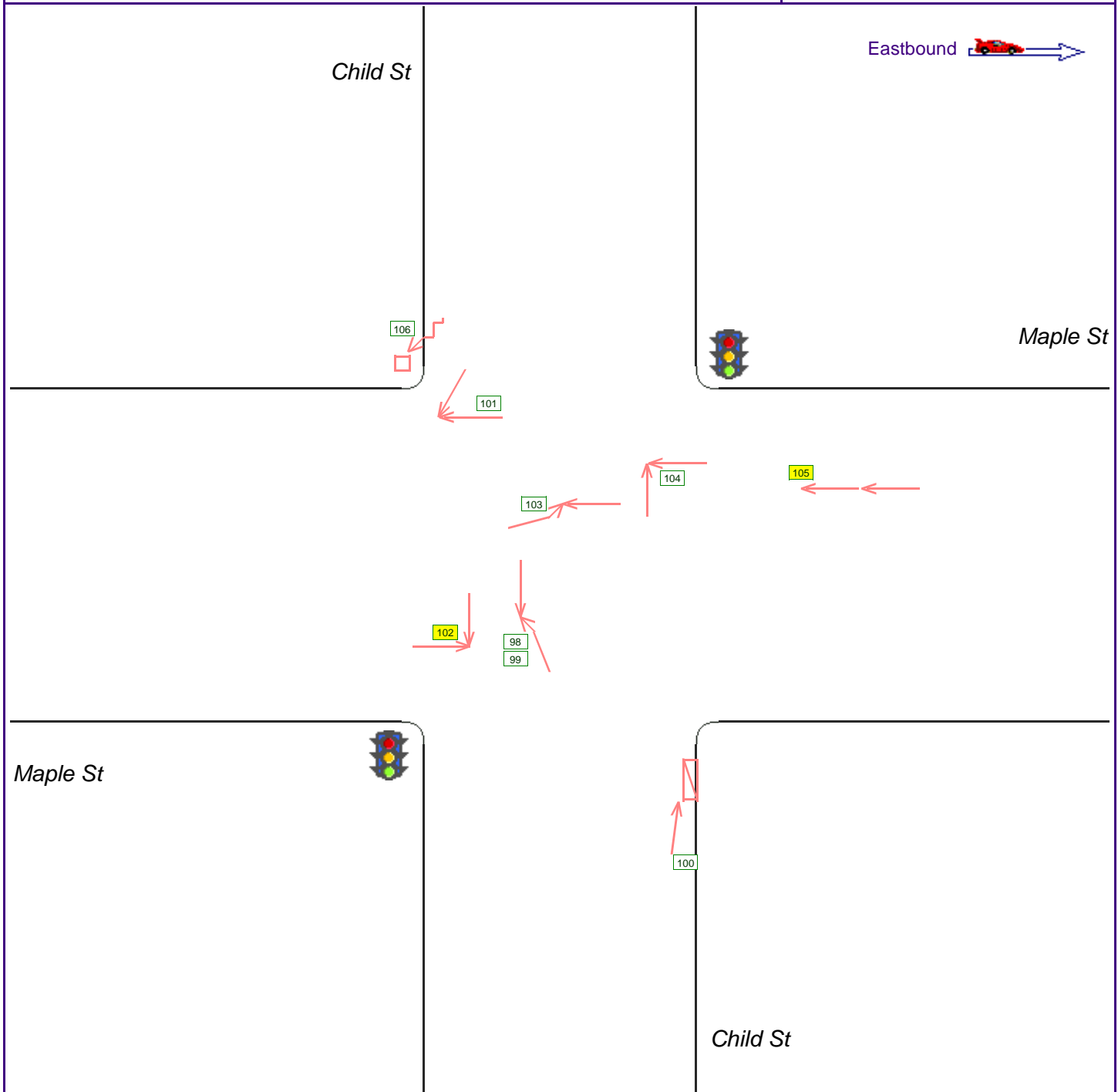
Page 1 of 1















PERIOD STUDIED: FROM: <u>7/1/2015</u> TO: <u>6/30/2018</u> <u>36</u> MONTHS			# V E H I C L E S	S E V E R I T Y	L I G H T C O N D	R O A D C H A R	S U R F A C E	W E A T H E R	ROUTE NUMBER/STREET NAME: <u>West Ave.</u>			CASE No. _____	
LOCATION: <u>Ames St.</u>									FILE: <u>HSA Template</u>				
MUNICIPALITY: <u>City of Rochester</u> COUNTY: <u>MONROE</u>			REFERENCE MARKERS / NODES: _____ - _____			BY: <u>LJO</u>			DATE: <u>1/18/2019</u>				
No.	DATE	TIME							CONTRIB. FACTORS	ACC. TYPE	ACCIDENT DESCRIPTION	KEY #	
1	1/19/2016	13:50	2	PDO	1	1	4	2	9 66	Rend	V1 RE V2 stopped SB on Ames @ West	1	
2	5/4/2016	7:51	2	INJ	1	1	1	1	7	Ltrn	V1 WB & V2 EB hit as V2 made WB LT West to Appleton	1	
4	7/12/2016	13:36	2	INJ	1	1	1	2	7	Ltrn	V1 SB & V2 NB hit as V1 made SB LT Ames to West	1	
3	9/8/2016	8:15	2	PDO	1	1	1	2	7	Ltrn	V1 SB & V2 NB hit as V1 made SB LT Ames to West	1	
5	6/2/2017	12:45	2	PDO	1	1	1	1	9	Rend	V1 RE V2 stopped WB on West @ Ames	1	
6	9/20/2017	16:25	2	PDO	1	1	1	1	9 0	Rend	V1 RE V2 stopping SB on Ames @ West	1	
7	11/23/2017	12:42	2	PDO	1	1	1	2	13 17	Ovtn	V1 hit V2 overtaking SB on Ames @ West	1	
8	2/19/2018	16:52	2	INJ	3	1	2	3	13 17	Rang	V1 EB hit V2 NB Rt Angle @ Ames/West	1	
9	3/9/2018	7:11	2	PDO	1	1	4	4	9 66	Rend	V1 RE V2 stopped SB on Ames @ West	1	
10	3/16/2018	20:26	3	PDO	4	1	4	2	66 66	Rend	V1 RE V2 RE V3 stopped SB on Ames @ West	1	
11	8/24/2018	20:18	2	N/R	4	1	1	1	4 60	Rend	V1 RE V2 stopped SB on Ames @ West	1	

## COLLISION DIAGRAM

Key Number = 9

MUNICIPALITY: City of Rochester COUNTY: MONROE FILE: HSA Template  
 INTERSECTION: Child St/Maple St CASE #: \_\_\_\_\_  
 PERIOD: 3 YEARS 0 MONTHS FROM 7/1/2015 TO 6/30/2018 BY: LJO DATE: 1/29/2019



SYMBOLS			MANNER OF COLLISION	
	MOVING VEHICLE	<b>P</b> PEDESTRIAN		REAR END
	TURNING VEHICLE	<b>B</b> BICYCLIST		HEAD ON
	BACKING VEHICLE	<b>A</b> ANIMAL		RIGHT TURN
	PARKED VEHICLE	 FIXED OBJECT		RIGHT TURN
	RECORD NUMBER	 Injury		RIGHT ANGLE
				OUT OF CONTROL
				SIDE SWIPE

## ACCIDENT RATE CALCULATIONS

- ☐ Segment
- ☒ Intersection

ROUTE: *Child St*

LOCATION: *Maple St*

REFERENCE MARKERS / NODES: -

TIME PERIOD: *7/1/2015 - 6/30/2018*

REMARKS: *Selected Accidents*

$$\begin{aligned}\text{ACCIDENT RATE} &= \frac{( 9 \text{ selected accidents in } 3.0 \text{ years} ) * ( 1,000,000 )}{(365 \text{ days/yr.}) * ( 3.0 \text{ years} ) * ( 7300 \text{ veh./day} )} \\ &= \underline{1.13} \text{ accidents per million entering vehicles}\end{aligned}$$

(Statewide average rate = 0.20 )



# ACCIDENT SUMMARY SHEET

**ROUTE:** *Child St*      **LOCATION:** *Maple St*  
**MUNICIPALITY:** *City of Rochester*      **COUNTY:** *MONROE*  
**TIME PERIOD COVERED:** *7/1/2015 - 6/30/2018*      **REFERENCE MARKERS / NODES** *-*  
**REMARKS:** *Selected Accidents*      **DATE:** *1/29/2019*

<b>TIME OF DAY</b> 6 AM - 10 AM      1      11.1% 10 AM - 4 PM      2      22.2% 4 PM - 7 PM      4      44.4% 7 PM - 12 AM      1      11.1% 12 AM - 6 AM      1      11.1% Unspecified      0      0.0% <b>Total</b> <b>9</b>	<b>DIRECTION</b> North      5      29.4% South      5      29.4% East      2      11.8% West      5      29.4% <b>Total</b> <b>17</b>	<b>DIRECTION</b> Northeast      0      0.0% Northwest      0      0.0% Southeast      0      0.0% Southwest      0      0.0% Unspecified      0      0.0%
<b>WEATHER</b> Clear      7      77.8% Cloudy      2      22.2% Rain      0      0.0% Snow      0      0.0% Sleet/Hail/Freezing Rain      0      0.0% Fog/Smog/Smoke      0      0.0% Unspecified      0      0.0% <b>Total</b> <b>9</b>	<b>ACCIDENT TYPE</b> Rear End      1      11.1% Overtake      0      0.0% Right Angle      3      33.3% Left Turn      3      33.3% Right Turn      0      0.0% Fixed Object      1      11.1% Head On      0      0.0% Sideswipe      0      0.0% <b>Total</b> <b>9</b>	<b>ACCIDENT TYPE</b> Pedestrian      0      0.0% Bicycle      0      0.0% Parked Vehicle      1      11.1% Backing      0      0.0% Run Off The Road      0      0.0% Animal      0      0.0% Other      0      0.0% Unspecified      0      0.0%
<b>SURFACE</b> Dry      9      100.0% Wet      0      0.0% Mud/Slush      0      0.0% Snow/Ice      0      0.0% Unspecified      0      0.0% <b>Total</b> <b>9</b>	<b>ACCIDENT SEVERITY</b> Fatal      0      0.0% Injury      2      22.2% Property Damage      7      77.8% Non-Reportable      0      0.0% <b>Total</b> <b>9</b>	
<b>TIME OF YEAR</b> Winter (Dec-Feb)      0      0.0% Spring (Mar-May)      3      33.3% Summer (Jun-Aug)      5      55.6% Fall (Sep-Nov)      1      11.1% <b>Total</b> <b>9</b>	<b>TYPE OF VEHICLE</b> Passenger Cars      16      94.1% Commercial Vehicles      1      5.9% <b>Total</b> <b>17</b>	
<b>DAY OF WEEK</b> Sunday      0      0.0% Monday      0      0.0% Tuesday      4      44.4% Wednesday      1      11.1% Thursday      0      0.0% Friday      2      22.2% Saturday      2      22.2% <b>Total</b> <b>9</b>	<b>LIGHT CONDITION</b> Daylight      8      88.9% Dawn/Dusk      0      0.0% Night      1      11.1% Unspecified      0      0.0% <b>Total</b> <b>9</b>	

## SUMMARY OF ACCIDENT SEVERITY BY YEAR:

	2015	2016	2017	2018
Fatal Accidents	0	0	0	0
Injury Accidents	0	1	1	0
Property Damage Accidents	0	2	0	5
Non-Reportable Accidents	0	0	0	0
<b>Total Accidents</b>	<b>0</b>	<b>3</b>	<b>1</b>	<b>5</b>

## DETAILS OF ACCIDENT HISTORY

Page 1 of 1

PERIOD STUDIED: FROM: <u>7/1/2015</u> TO: <u>6/30/2018</u> <u>36</u> MONTHS			# V E H I C L E S	S E V E R I T Y	L I G H T C O N D	R O A D C H A R	S U R F A C E	W E A T H E R	ROUTE NUMBER/STREET NAME: <u>Child St</u>			CASE No. _____	
LOCATION: <u>Maple St</u>									FILE: <u>HSA Template</u>				
MUNICIPALITY: <u>City of Rochester</u> COUNTY: <u>MONROE</u>			REFERENCE MARKERS / NODES: _____ - _____			BY: <u>LJO</u>			DATE: <u>1/29/2019</u>				
No.	DATE	TIME								CONTRIB. FACTORS	ACC. TYPE	ACCIDENT DESCRIPTION	KEY #
102	4/23/2016	10:50	2	INJ	1	1	1	1	17	Rang		V1 SB hit V2 EB - Rt Angle as V1 Red Red @ Child/Maple	9
103	6/3/2016	18:00	2	PDO	1	1	1	1	7	Ltrn		V1 EB & V2 WB hit Rt Angle as V1 made EB LT Maple to Child	9
104	8/13/2016	7:20	2	PDO	1	2	1	1	5 7	Rang		V1 NB hit V2 WB-Rt angle as V1 Ran Red @ Child/Maple	9
105	4/18/2017	18:21	2	INJ	1	1	1	1	9	Rend		V1 RE V2 WB on Maple @ Child	9
106	3/20/2018	15:33	1	PDO	1	1	1	1	45	FixO		V1(truck) hit utility pole as V1 made SB RT Child to Main	9
98	8/14/2018	20:52	2	PDO	4	1	1	2	7	Ltrn		V1 SB & V2 NB hit as V1 made NB LT from Child to Maple	9
99	8/15/2018	5:53	2	PDO	1	2	1	1	4	Ltrn		V1 NB & V2 SB hit as V1 made NB LT Child to Maple	9
100	8/21/2018	16:44	2	PDO	1	1	1	2	13	Park		V1 (bus) NB hit V2 parked NB on Child @ Maple	9
101	9/7/2018	16:36	2	PDO	1	1	1	1	7	Rang		V1 SB hit V2 Rt angle as V2 made SB RT from Child to Maple	9

## **C. INTERSECTION CAPACITY ANALYSIS SUMMARY REPORTS**

### **EXISTING CONDITIONS**

Morning Peak Hour

Evening Peak Hour

### **NO BUILD CONDITIONS**

Morning Peak Hour

Evening Peak Hour

### **FUTURE BUILD CONDITIONS**

Morning Peak Hour




















Evening Peak Hour

## **Existing Conditions**

Morning Peak Hour

Lanes, Volumes, Timings  
1: Jefferson & Main

Bull's Head Urban Renewal TIS  
AM Existing













												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	573	21	30	332	14	27	70	44	27	82	33
Future Volume (vph)	23	573	21	30	332	14	27	70	44	27	82	33
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	1514	0	1574	1584	0
Flt Permitted	0.510			0.413				0.906		0.571		
Satd. Flow (perm)	825	3164	0	710	3090	0	0	1386	0	946	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)		1494			653			1957			388	
Travel Time (s)		34.0			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)	24	613	0	36	412	0	0	177	0	33	139	0
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)	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	
Total Lost Time (s)	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 Effect 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	0.27		0.07	0.19			0.51		0.15	0.36	
Control Delay	1.0	2.0		3.9	3.5			18.6		17.2	15.1	
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			18.6		17.2	15.1	
LOS	A	A		A	A			B		B	B	
Approach Delay		2.0			3.5			18.6			15.5	
Approach LOS		A			A			B			B	
Queue Length 50th (ft)	0	2		3	20			33		8	24	
Queue Length 95th (ft)	1	4		10	30			67		23	55	
Internal Link Dist (ft)		1414			573			1877			308	

# Lanes, Volumes, Timings

# Bull's Head Urban Renewal TIS

## 1: Jefferson & Main

AM Existing

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	75			100						100		
Base Capacity (vph)	591	2272		509	2219			365		227	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	0.27		0.07	0.19			0.48		0.15	0.34	

### Intersection Summary

Area Type: Other

Cycle Length: 50

Actuated Cycle Length: 50

Offset: 36 (72%), Referenced to phase 1:EBWB, Start of Green

Natural Cycle: 55

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.51

Intersection Signal Delay: 6.1

Intersection LOS: A

Intersection Capacity Utilization 46.3%

ICU Level of Service A

Analysis Period (min) 15
















Splits and Phases: 1: Jefferson & Main



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













Bull's Head Urban Renewal TIS

AM Existing

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	602	25	19	351	7	0	0	0	8	5	6
Future Volume (vph)	7	602	25	19	351	7	0	0	0	8	5	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	3387	0	0	3248	0	0	0	0	0	1680	0
Flt Permitted		0.951			0.907						0.979	
Satd. Flow (perm)	0	3224	0	0	2954	0	0	0	0	0	1675	0
Right Turn on Red			Yes			Yes				Yes		Yes
Satd. Flow (RTOR)		7			3						8	
Link Speed (mph)		30			30				30		30	
Link Distance (ft)		489			1494				287		158	
Travel Time (s)		11.1			34.0				6.5		3.6	
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)	0	667	0	0	411	0	0	0	0	0	26	0
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	
Total Lost Time (s)		6.0			6.0						6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max					None	None	
Act Effect Green (s)		85.4			85.4						9.8	
Actuated g/C Ratio		0.85			0.85						0.10	
v/c Ratio		0.24			0.16						0.15	
Control Delay		1.1			2.6						30.7	
Queue Delay		0.0			0.0						0.0	
Total Delay		1.1			2.6						30.7	
LOS		A			A						C	
Approach Delay		1.1			2.6						30.7	
Approach LOS		A			A						C	
Queue Length 50th (ft)		9			15						11	
Queue Length 95th (ft)		43			75						25	
Internal Link Dist (ft)		409			1414			207			78	
Turn Bay Length (ft)												
Base Capacity (vph)		2755			2524						491	
Starvation Cap Reductn		0			0						0	

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

Bull's Head Urban Renewal TIS  
AM Existing

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn		0			0						0	
Storage Cap Reductn		0			0						0	
Reduced v/c Ratio		0.24			0.16						0.05	

## Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 83 (83%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.24

Intersection Signal Delay: 2.3

Intersection LOS: A

Intersection Capacity Utilization 45.3%

ICU Level of Service A

Analysis Period (min) 15

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


























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













Bull's Head Urban Renewal TIS

AM Existing

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	130	518	195	147	204	10	118	166	119	11	188	107
Future Volume (vph)	130	518	195	147	204	10	118	166	119	11	188	107
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)	125		125	125		0	200		125	0		0
Storage Lanes	1		1	1		0	1		1	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1504	3271	1409	1546	3052	0	1518	1642	1334	0	1837	0
Flt Permitted	0.595			0.328			0.296				0.987	
Satd. Flow (perm)	940	3271	1364	531	3052	0	473	1642	1317	0	1816	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		378			489			760			385	
Travel Time (s)		8.6			11.1			17.3			8.8	
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)	153	609	229	155	226	0	134	189	135	0	332	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases	2	1		2	1		3	3 4			4	
Permitted Phases	1		1	1			3 4		3 4	4		
Detector Phase	2	1	1	2	1		3	3 4	3 4	4	4	
Switch Phase												
Minimum Initial (s)	6.0	11.0	11.0	6.0	11.0		6.0			10.0	10.0	
Minimum Split (s)	13.0	38.0	38.0	13.0	38.0		11.0			33.0	33.0	
Total Split (s)	14.0	42.0	42.0	14.0	42.0		11.0			33.0	33.0	
Total Split (%)	14.0%	42.0%	42.0%	14.0%	42.0%		11.0%			33.0%	33.0%	
Yellow Time (s)	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		1.0			1.5	1.5	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0				-2.5	
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0		3.0				3.0	
Lead/Lag	Lag	Lead	Lead	Lag	Lead		Lead			Lag	Lag	
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max		None			None	None	
Act Effct Green (s)	50.9	42.6	42.6	50.9	42.6		37.1	40.1	40.1		26.6	
Actuated g/C Ratio	0.51	0.43	0.43	0.51	0.43		0.37	0.40	0.40		0.27	
v/c Ratio	0.29	0.44	0.39	0.44	0.17		0.47	0.29	0.26		0.69	
Control Delay	21.2	25.0	26.0	17.2	21.1		24.8	20.9	20.7		40.5	
Queue Delay	0.0	0.4	0.0	0.0	0.0		0.0	0.0	0.0		0.0	
Total Delay	21.2	25.4	26.0	17.2	21.1		24.8	20.9	20.7		40.5	
LOS	C	C	C	B	C		C	C	C		D	
Approach Delay		24.9			19.5			22.0			40.5	
Approach LOS		C			B			C			D	
Queue Length 50th (ft)	76	183	130	52	57		53	76	54		185	
Queue Length 95th (ft)	116	222	189	70	44		92	125	95		275	
Internal Link Dist (ft)		298			409			680			305	

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

Bull's Head Urban Renewal TIS  
AM Existing

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	125		125	125			200		125			
Base Capacity (vph)	565	1391	580	396	1299		285	714	572		544	
Starvation Cap Reductn	0	356	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	0.27	0.59	0.39	0.39	0.17		0.47	0.26	0.24		0.61	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 89 (89%), Referenced to phase 1:EBWB, Start of Green

Natural Cycle: 95

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 25.7

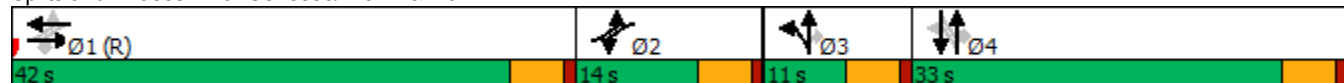
Intersection LOS: C

Intersection Capacity Utilization 74.7%

ICU Level of Service D

















Analysis Period (min) 15

Splits and Phases: 3: Genesee/Brown & Main














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

Bull's Head Urban Renewal TIS  
AM Existing

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	SBR2	NEL	NER
Lane Configurations											
Traffic Volume (vph)	5	302	4	199	191	23	56	10	3	0	525
Future Volume (vph)	5	302	4	199	191	23	56	10	3	0	525
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	11	12	12	12	12	10	10
Storage Length (ft)	0		200	0		0	0	0		0	150
Storage Lanes	0		1	1		0	1	0		0	1
Taper Length (ft)	25			25			25			25	
Satd. Flow (prot)	0	3070	0	1546	1617	0	1600	0	0	0	2551
Flt Permitted		0.950		0.950			0.961				
Satd. Flow (perm)	0	2919	0	1534	1617	0	1598	0	0	0	2551
Right Turn on Red			Yes			Yes			No		Yes
Satd. Flow (RTOR)		1			16						744
Link Speed (mph)		30			30		30			30	
Link Distance (ft)		1759			378		252			1661	
Travel Time (s)		40.0			8.6		5.7			37.8	
Confl. Peds. (#/hr)	10		5	5		10	1		8		1
Peak Hour Factor	0.79	0.79	0.79	0.89	0.89	0.89	0.79	0.79	0.79	0.89	0.89
Heavy Vehicles (%)	40%	9%	0%	9%	11%	13%	9%	10%	33%	0%	4%
Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	393	0	224	241	0	88	0	0	0	590
Turn Type	Perm	NA		Prot	NA		Prot				Over
Protected Phases		2		1	2		3				1
Permitted Phases	2				1						
Detector Phase	2	2		1	2		3				1
Switch Phase											
Minimum Initial (s)	6.0	6.0		22.0	6.0		6.0				22.0
Minimum Split (s)	28.0	28.0		28.0	28.0		24.0				28.0
Total Split (s)	39.0	39.0		37.0	39.0		24.0				37.0
Total Split (%)	39.0%	39.0%		37.0%	39.0%		24.0%				37.0%
Yellow Time (s)	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				1.0
Lost Time Adjust (s)		-2.0		-2.0	-2.0		-2.0				-2.0
Total Lost Time (s)		3.0		3.0	3.0		3.0				3.0
Lead/Lag	Lag	Lag		Lead	Lag						Lead
Lead-Lag Optimize?											
Recall Mode	None	None		C-Max	None		None				C-Max
Act Effct Green (s)		19.8		60.7	84.1		12.7				60.7
Actuated g/C Ratio		0.20		0.61	0.84		0.13				0.61
v/c Ratio		0.68		0.24	0.18		0.43				0.32
Control Delay		42.9		16.3	3.9		45.6				0.6
Queue Delay		0.0		0.0	0.2		0.0				0.0
Total Delay		42.9		16.3	4.1		45.6				0.6
LOS		D		B	A		D				A
Approach Delay		42.9			10.0		45.6			0.6	
Approach LOS		D			A		D			A	
Queue Length 50th (ft)		122		80	34		53				0
Queue Length 95th (ft)		138		216	49		81				0
Internal Link Dist (ft)		1679			298		172			1581	

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

Bull's Head Urban Renewal TIS  
AM Existing

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	SBR2	NEL	NER
Turn Bay Length (ft)											150
Base Capacity (vph)		1051		938	1545		336				1840
Starvation Cap Reductn		0		0	667		0				0
Spillback Cap Reductn		0		0	0		0				0
Storage Cap Reductn		0		0	0		0				0
Reduced v/c Ratio		0.37		0.24	0.27		0.26				0.32

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 12 (12%), Referenced to phase 1:WBTL, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 16.8

Intersection LOS: B

Intersection Capacity Utilization 60.5%

ICU Level of Service B

Analysis Period (min) 15




















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



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













Bull's Head Urban Renewal TIS

AM Existing

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	135	272	9	0	167	53	2	42	4	82	51	195
Future Volume (vph)	135	272	9	0	167	53	2	42	4	82	51	195
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	0.582							0.991			0.826	
Satd. Flow (perm)	932	1622	0	1773	1498	0	0	1750	0	0	1470	1462
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			30			5				229
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1910			1759			673			962	
Travel Time (s)		43.4			40.0			15.3			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)	159	331	0	0	271	0	0	55	0	0	156	229
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)	57.2	57.2			57.2			16.8			16.8	15.3
Actuated g/C Ratio	0.72	0.72			0.72			0.21			0.21	0.19
v/c Ratio	0.24	0.29			0.25			0.15			0.50	0.49
Control Delay	6.0	5.6			4.9			22.8			32.6	7.5
Queue Delay	0.0	0.0			0.0			0.0			0.0	0.0
Total Delay	6.0	5.6			4.9			22.8			32.6	7.5
LOS	A	A			A			C			C	A
Approach Delay		5.7			4.9			22.8			17.7	
Approach LOS		A			A			C			B	
Queue Length 50th (ft)	22	48			33			21			70	0
Queue Length 95th (ft)	56	101			71			44			106	42
Internal Link Dist (ft)		1830			1679			593			882	

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

Bull's Head Urban Renewal TIS  
AM Existing

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	50											125
Base Capacity (vph)	665	1160			1078			703			588	699
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	0.24	0.29			0.25			0.08			0.27	0.33

Intersection Summary

Area Type: Other

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 37 (46%), Referenced to phase 1:EBWB, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.50

Intersection Signal Delay: 10.2

Intersection LOS: B

Intersection Capacity Utilization 69.8%

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 Urban Renewal TIS  
AM Existing

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	44	6	1	24	7	7	135	9	16	130	21
Future Volume (vph)	53	44	6	1	24	7	7	135	9	16	130	21
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	1667	0	0	1681	0	0	1889	0	0	1692	0
Flt Permitted		0.831			0.989			0.986			0.966	
Satd. Flow (perm)	0	1419	0	0	1666	0	0	1867	0	0	1642	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			13			6			13	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1354			1774			247			405	
Travel Time (s)		30.8			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	126	0	0	59	0	0	199	0	0	194	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		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 Effect Green (s)		13.5			13.5			20.1			20.1	
Actuated g/C Ratio		0.37			0.37			0.56			0.56	
v/c Ratio		0.24			0.09			0.19			0.21	
Control Delay		8.6			6.3			7.5			7.5	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		8.6			6.3			7.5			7.5	
LOS		A			A			A			A	
Approach Delay		8.6			6.3			7.5			7.5	
Approach LOS		A			A			A			A	
Queue Length 50th (ft)		12			4			18			17	
Queue Length 95th (ft)		39			12			56			64	
Internal Link Dist (ft)		1274			1694			167			325	
Turn Bay Length (ft)												
Base Capacity (vph)		1300			1526			1710			1505	
Starvation Cap Reductn		0			0			0			0	

# Lanes, Volumes, Timings 6: Child & Maple

Bull's Head Urban Renewal TIS  
AM Existing

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
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: 36.1

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.24

Intersection Signal Delay: 7.6

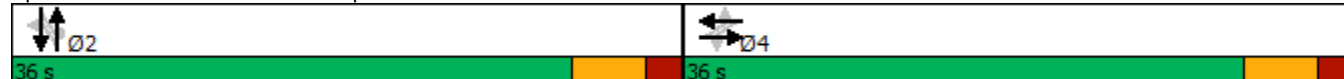
Intersection LOS: A

Intersection Capacity Utilization 33.2%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: Child & Maple
























## **Existing Conditions**

Evening Peak Hour

Lanes, Volumes, Timings  
1: Jefferson & Main

Bull's Head Urban Renewal TIS  
PM Existing













												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	559	15	69	635	13	54	107	76	30	146	16
Future Volume (vph)	37	559	15	69	635	13	54	107	76	30	146	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	1585	0	1491	1725	0
Flt Permitted	0.330			0.391				0.777		0.439		
Satd. Flow (perm)	580	3287	0	684	3260	0	0	1241	0	686	1725	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)		1492			653			1957			388	
Travel Time (s)		33.9			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)	42	652	0	84	790	0	0	272	0	34	182	0
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	
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)	65.7	65.7		65.7	65.7			21.8		21.8	21.8	
Actuated g/C Ratio	0.66	0.66		0.66	0.66			0.22		0.22	0.22	
v/c Ratio	0.11	0.30		0.19	0.37			0.95		0.23	0.48	
Control Delay	4.1	4.4		8.5	8.6			77.8		35.6	37.3	
Queue Delay	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Total Delay	4.1	4.4		8.5	8.6			77.8		35.6	37.3	
LOS	A	A		A	A			E		D	D	
Approach Delay		4.4			8.6			77.8			37.1	
Approach LOS		A			A			E			D	
Queue Length 50th (ft)	7	57		20	113			156		18	97	
Queue Length 95th (ft)	14	73		38	130			#289		46	160	
Internal Link Dist (ft)		1412			573			1877			308	

# Lanes, Volumes, Timings

# Bull's Head Urban Renewal TIS

## 1: Jefferson & Main

PM Existing

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	75			100						100		
Base Capacity (vph)	381	2162		449	2144			308		161	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	0.11	0.30		0.19	0.37			0.88		0.21	0.44	

### Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 89 (89%), Referenced to phase 1:EBWB, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.95

Intersection Signal Delay: 19.3

Intersection LOS: B

Intersection Capacity Utilization 92.3%

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 Urban Renewal TIS

PM Existing

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	546	17	82	661	36	0	0	0	23	25	21
Future Volume (vph)	26	546	17	82	661	36	0	0	0	23	25	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	3486	0	0	3420	0	0	0	0	0	1777	0
Flt Permitted		0.889			0.795						0.984	
Satd. Flow (perm)	0	3104	0	0	2728	0	0	0	0	0	1763	0
Right Turn on Red			Yes			Yes				Yes		Yes
Satd. Flow (RTOR)		5			8						23	
Link Speed (mph)		30			30				30		30	
Link Distance (ft)		490			1492				322		169	
Travel Time (s)		11.1			33.9				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)	0	633	0	0	875	0	0	0	0	0	78	0
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	
Total Lost Time (s)		6.0			6.0						6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max					None	None	
Act Effect Green (s)		78.1			78.1						13.5	
Actuated g/C Ratio		0.78			0.78						0.14	
v/c Ratio		0.26			0.41						0.30	
Control Delay		1.9			11.3						28.8	
Queue Delay		0.0			0.0						0.0	
Total Delay		1.9			11.3						28.8	
LOS		A			B						C	
Approach Delay		1.9			11.3						28.8	
Approach LOS		A			B						C	
Queue Length 50th (ft)		3			164						34	
Queue Length 95th (ft)		m52			m291						66	
Internal Link Dist (ft)		410			1412				242		89	
Turn Bay Length (ft)												
Base Capacity (vph)		2425			2132						527	
Starvation Cap Reductn		0			0						0	

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

Bull's Head Urban Renewal TIS  
PM Existing

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn		0			0						0	
Storage Cap Reductn		0			0						0	
Reduced v/c Ratio		0.26			0.41						0.15	

## Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 54 (54%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.41

Intersection Signal Delay: 8.4

Intersection LOS: A

Intersection Capacity Utilization 70.9%

ICU Level of Service C

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 Urban Renewal TIS













PM Existing

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	146	475	167	168	601	31	249	249	170	19	239	196
Future Volume (vph)	146	475	167	168	601	31	249	249	170	19	239	196
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)	125		125	125		0	200		125	0		0
Storage Lanes	1		1	1		0	1		1	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1560	3271	1449	1589	3248	0	1604	1705	1436	0	1898	0
Flt Permitted	0.220			0.343			0.222				0.979	
Satd. Flow (perm)	360	3271	1379	567	3248	0	375	1705	1417	0	1862	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		378			490			760			752	
Travel Time (s)		8.6			11.1			17.3			17.1	
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)	164	534	188	191	718	0	262	262	179	0	488	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases	2	1		2	1		3	3 4			4	
Permitted Phases	1		1	1			3 4		3 4	4		
Detector Phase	2	1	1	2	1		3	3 4	3 4	4	4	
Switch Phase												
Minimum Initial (s)	6.0	11.0	11.0	6.0	11.0		6.0			10.0	10.0	
Minimum Split (s)	13.0	36.0	36.0	13.0	36.0		12.0			33.0	33.0	
Total Split (s)	13.0	36.0	36.0	13.0	36.0		18.0			33.0	33.0	
Total Split (%)	13.0%	36.0%	36.0%	13.0%	36.0%		18.0%			33.0%	33.0%	
Yellow Time (s)	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		1.0			1.5	1.5	
Lost Time Adjust (s)	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		5.0				5.5	
Lead/Lag	Lag	Lead	Lead	Lag	Lead		Lead			Lag	Lag	
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max		None			None	None	
Act Effct Green (s)	38.7	31.5	31.5	38.7	31.5		41.3	46.3	46.3		27.8	
Actuated g/C Ratio	0.39	0.32	0.32	0.39	0.32		0.41	0.46	0.46		0.28	
v/c Ratio	0.73	0.52	0.43	0.65	0.70		0.83	0.33	0.27		0.94	
Control Delay	60.8	37.4	38.1	30.5	22.4		42.4	18.6	18.0		64.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0		0.0	
Total Delay	60.8	37.4	38.1	30.5	22.4		42.4	18.6	18.0		64.6	
LOS	E	D	D	C	C		D	B	B		E	
Approach Delay		41.8			24.1			27.3			64.6	
Approach LOS		D			C			C			E	
Queue Length 50th (ft)	84	167	110	91	217		105	103	68		306	
Queue Length 95th (ft)	#154	218	175	77	176		#227	163	116		#506	
Internal Link Dist (ft)		298			410			680			672	

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

Bull's Head Urban Renewal TIS

PM Existing

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	125		125	125			200		125			
Base Capacity (vph)	238	1030	434	305	1022		319	777	645		517	
Starvation Cap Reductn	0	0	0	0	0		0	0	0		0	
Spillback Cap Reductn	0	0	0	0	5		0	0	0		0	
Storage Cap Reductn	0	0	0	0	0		0	0	0		0	
Reduced v/c Ratio	0.69	0.52	0.43	0.63	0.71		0.82	0.34	0.28		0.94	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 67 (67%), Referenced to phase 1:EBWB, Start of Green

Natural Cycle: 95

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.94

Intersection Signal Delay: 36.8

Intersection LOS: D

Intersection Capacity Utilization 91.7%





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: 3: Genesee/Brown & Main

			
Ø1 (R)	Ø2	Ø3	Ø4
36 s	13 s	18 s	33 s

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

Bull's Head Urban Renewal TIS

PM Existing












											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	SBR2	NEL	NER
Lane Configurations											
Traffic Volume (vph)	4	259	2	516	420	63	50	14	7	0	465
Future Volume (vph)	4	259	2	516	420	63	50	14	7	0	465
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	11	12	12	12	12	10	10
Storage Length (ft)	0		200	0		0	0	0		0	150
Storage Lanes	0		1	1		0	1	0		0	1
Taper Length (ft)	25			25			25			25	
Satd. Flow (prot)	0	3254	0	1636	1680	0	1528	0	0	0	2503
Flt Permitted		0.945		0.950			0.966				
Satd. Flow (perm)	0	3077	0	1605	1680	0	1527	0	0	0	2503
Right Turn on Red			Yes			Yes			No		Yes
Satd. Flow (RTOR)		1			19						829
Link Speed (mph)		30			30		30			30	
Link Distance (ft)		1759			378		252			1659	
Travel Time (s)		40.0			8.6		5.7			37.7	
Confl. Peds. (#/hr)	16		17	17		16	1		19		1
Peak Hour Factor	0.96	0.96	0.96	0.95	0.95	0.95	0.84	0.84	0.84	0.89	0.89
Heavy Vehicles (%)	25%	3%	0%	3%	7%	3%	8%	36%	0%	2%	6%
Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	276	0	543	508	0	85	0	0	0	522
Turn Type	Perm	NA		Prot	NA		Prot				Over
Protected Phases		2		1	1 2		3				1
Permitted Phases	2				1						
Detector Phase	2	2		1	1 2		3				1
Switch Phase											
Minimum Initial (s)	6.0	6.0		22.0			6.0				22.0
Minimum Split (s)	28.0	28.0		28.0			24.0				28.0
Total Split (s)	37.0	37.0		39.0			24.0				39.0
Total Split (%)	37.0%	37.0%		39.0%			24.0%				39.0%
Yellow Time (s)	4.0	4.0		4.0			4.0				4.0
All-Red Time (s)	1.0	1.0		1.0			1.0				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	Lag		Lead							Lead
Lead-Lag Optimize?											
Recall Mode	None	None		C-Max			None				C-Max
Act Effct Green (s)		13.7		62.7	82.4		10.8				62.7
Actuated g/C Ratio		0.14		0.63	0.82		0.11				0.63
v/c Ratio		0.65		0.53	0.37		0.52				0.28
Control Delay		41.2		5.6	3.3		52.1				0.4
Queue Delay		0.0		0.3	0.2		0.0				0.0
Total Delay		41.2		5.9	3.5		52.1				0.4
LOS		D		A	A		D				A
Approach Delay		41.2			4.8		52.1			0.4	
Approach LOS		D			A		D			A	
Queue Length 50th (ft)		92		63	51		53				0
Queue Length 95th (ft)		101		m189	m111		87				0
Internal Link Dist (ft)		1679			298		172			1579	



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

Bull's Head Urban Renewal TIS

PM Existing

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	SBR2	NEL	NER
Turn Bay Length (ft)											150
Base Capacity (vph)		985		1025	1607		290				1878
Starvation Cap Reductn		0		120	488		0				0
Spillback Cap Reductn		0		0	0		0				0
Storage Cap Reductn		0		0	0		0				0
Reduced v/c Ratio		0.28		0.60	0.45		0.29				0.28

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 72 (72%), Referenced to phase 1:WBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.65

Intersection Signal Delay: 10.9

Intersection LOS: B

Intersection Capacity Utilization 78.8%

ICU Level of Service D

Analysis Period (min) 15




















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

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















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

Bull's Head Urban Renewal TIS  
PM Existing

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	203	251	9	4	330	129	9	56	4	60	62	215
Future Volume (vph)	203	251	9	4	330	129	9	56	4	60	62	215
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	1696	0	0	1758	1599
Flt Permitted	0.433			0.586				0.948			0.803	
Satd. Flow (perm)	742	1697	0	826	1593	0	0	1618	0	0	1436	1554
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			31			3				236
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1910			1759			679			962	
Travel Time (s)		43.4			40.0			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)	221	283	0	5	534	0	0	91	0	0	134	236
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)	73.7	73.7		73.7	73.7			14.8			14.8	14.8
Actuated g/C Ratio	0.74	0.74		0.74	0.74			0.15			0.15	0.15
v/c Ratio	0.40	0.23		0.01	0.45			0.38			0.63	0.55
Control Delay	8.6	5.3		3.8	3.8			40.0			52.3	9.8
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Delay	8.6	5.3		3.8	3.8			40.0			52.3	9.8
LOS	A	A		A	A			D			D	A
Approach Delay		6.7			3.8			40.0			25.2	
Approach LOS		A			A			D			C	
Queue Length 50th (ft)	44	47		0	25			51			81	0
Queue Length 95th (ft)	113	99		m2	103			76			133	61
Internal Link Dist (ft)		1830			1679			599			882	

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

Bull's Head Urban Renewal TIS  
PM Existing

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	50			50								125
Base Capacity (vph)	546	1250		608	1181			560			495	690
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	0.40	0.23		0.01	0.45			0.16			0.27	0.34

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 83 (83%), Referenced to phase 1:EBWB, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.63

Intersection Signal Delay: 12.2

Intersection LOS: B

Intersection Capacity Utilization 73.8%

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 Urban Renewal TIS

PM Existing

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	66	17	11	48	15	13	178	9	25	212	56
Future Volume (vph)	80	66	17	11	48	15	13	178	9	25	212	56
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	1848	0	0	1954	0	0	1760	0
Flt Permitted		0.823			0.944			0.971			0.964	
Satd. Flow (perm)	0	1485	0	0	1758	0	0	1903	0	0	1703	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			17			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	210	0	0	86	0	0	238	0	0	341	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		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 Effect Green (s)		15.6			15.6			20.8			20.8	
Actuated g/C Ratio		0.37			0.37			0.49			0.49	
v/c Ratio		0.38			0.13			0.26			0.40	
Control Delay		11.6			8.1			8.0			9.0	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		11.6			8.1			8.0			9.0	
LOS		B			A			A			A	
Approach Delay		11.6			8.1			8.0			9.0	
Approach LOS		B			A			A			A	
Queue Length 50th (ft)		27			9			27			40	
Queue Length 95th (ft)		70			33			73			108	
Internal Link Dist (ft)		597			1694			167			325	
Turn Bay Length (ft)												
Base Capacity (vph)		1186			1405			1518			1362	
Starvation Cap Reductn		0			0			0			0	

Lanes, Volumes, Timings  
6: Child & Maple

Bull's Head Urban Renewal TIS  
PM Existing

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.18			0.06			0.16			0.25	

Intersection Summary

Area Type: Other

Cycle Length: 72

Actuated Cycle Length: 42.6

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.40

Intersection Signal Delay: 9.3

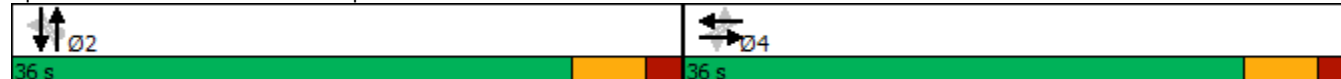
Intersection LOS: A

Intersection Capacity Utilization 44.7%

ICU Level of Service A

Analysis Period (min) 15




















Splits and Phases: 6: Child & Maple















**No Build Conditions**  
Morning Peak Hour

Lanes, Volumes, Timings  
1: Jefferson & Main

Bull's Head Urban Renewal TIS  
AM 2024 No Build

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	587	22	31	340	14	28	72	45	28	84	34
Future Volume (vph)	24	587	22	31	340	14	28	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	1514	0	1574	1584	0
Flt Permitted	0.506			0.406				0.905		0.563		
Satd. Flow (perm)	819	3164	0	698	3090	0	0	1384	0	933	1584	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			17			42			38	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1494			653			1957			388	
Travel Time (s)		34.0			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	181	0	34	142	0
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)	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	
Total Lost Time (s)	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			0.53		0.16	0.37	
Control Delay	1.0	1.9		3.9	3.5			19.0		17.3	15.2	
Queue Delay	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Total Delay	1.0	1.9		3.9	3.5			19.0		17.3	15.2	
LOS	A	A		A	A			B		B	B	
Approach Delay		1.9			3.5			19.0			15.6	
Approach LOS		A			A			B			B	
Queue Length 50th (ft)	0	2		3	20			34		8	25	
Queue Length 95th (ft)	1	4		10	31			69		24	56	
Internal Link Dist (ft)		1414			573			1877			308	

Lanes, Volumes, Timings  
1: Jefferson & Main

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	75			100						100		
Base Capacity (vph)	587	2271		500	2218			364		223	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			0.50		0.15	0.35	

Intersection Summary	
Area Type:	Other
Cycle Length: 50	
Actuated Cycle Length: 50	
Offset: 36 (72%), Referenced to phase 1:EBWB, Start of Green	
Natural Cycle: 55	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.53	
Intersection Signal Delay: 6.2	Intersection LOS: A
Intersection Capacity Utilization 47.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: Jefferson & Main




















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













Bull's Head Urban Renewal TIS

AM 2024 No Build

												
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
Satd. Flow (prot)	0	3387	0	0	3251	0	0	0	0	0	1680	0
Flt Permitted		0.951			0.907						0.979	
Satd. Flow (perm)	0	3224	0	0	2954	0	0	0	0	0	1675	0
Right Turn on Red			Yes			Yes				Yes		Yes
Satd. Flow (RTOR)		7			3						8	
Link Speed (mph)		30			30				30		30	
Link Distance (ft)		489			1494				287		158	
Travel Time (s)		11.1			34.0				6.5		3.6	
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)	0	683	0	0	420	0	0	0	0	0	26	0
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	
Total Lost Time (s)		6.0			6.0						6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max					None	None	
Act Effect Green (s)		85.4			85.4						9.8	
Actuated g/C Ratio		0.85			0.85						0.10	
v/c Ratio		0.25			0.17						0.15	
Control Delay		1.1			2.6						30.7	
Queue Delay		0.0			0.0						0.0	
Total Delay		1.1			2.6						30.7	
LOS		A			A						C	
Approach Delay		1.1			2.6						30.7	
Approach LOS		A			A						C	
Queue Length 50th (ft)		9			16						11	
Queue Length 95th (ft)		43			77						25	
Internal Link Dist (ft)		409			1414				207		78	
Turn Bay Length (ft)												
Base Capacity (vph)		2755			2524						491	
Starvation Cap Reductn		0			0						0	

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

Bull's Head Urban Renewal TIS  
AM 2024 No Build

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn		0			0						0	
Storage Cap Reductn		0			0						0	
Reduced v/c Ratio		0.25			0.17						0.05	

## Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 83 (83%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 65

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.25

Intersection Signal Delay: 2.3

Intersection LOS: A

Intersection Capacity Utilization 45.5%

ICU Level of Service A

Analysis Period (min) 15






















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



# Lanes, Volumes, Timings

## 3: Genesee/Brown & Main













Bull's Head Urban Renewal TIS  
AM 2024 No Build

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	133	531	200	151	209	10	121	170	122	11	193	110
Future Volume (vph)	133	531	200	151	209	10	121	170	122	11	193	110
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)	125		125	125		0	200		125	0		0
Storage Lanes	1		1	1		0	1		1	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1504	3271	1409	1546	3051	0	1518	1642	1334	0	1836	0
Flt Permitted	0.591			0.318			0.288				0.988	
Satd. Flow (perm)	934	3271	1364	515	3051	0	460	1642	1317	0	1818	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		378			489			760			385	
Travel Time (s)		8.6			11.1			17.3			8.8	
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)	156	625	235	159	231	0	138	193	139	0	342	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases	2	1		2	1		3	3 4			4	
Permitted Phases	1		1	1			3 4		3 4	4		
Detector Phase	2	1	1	2	1		3	3 4	3 4	4	4	
Switch Phase												
Minimum Initial (s)	6.0	11.0	11.0	6.0	11.0		6.0			10.0	10.0	
Minimum Split (s)	13.0	38.0	38.0	13.0	38.0		11.0			33.0	33.0	
Total Split (s)	14.0	42.0	42.0	14.0	42.0		11.0			33.0	33.0	
Total Split (%)	14.0%	42.0%	42.0%	14.0%	42.0%		11.0%			33.0%	33.0%	
Yellow Time (s)	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		1.0			1.5	1.5	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0				-2.5	
Total Lost Time (s)	3.0	3.0	3.0	3.0	3.0		3.0				3.0	
Lead/Lag	Lag	Lead	Lead	Lag	Lead		Lead			Lag	Lag	
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max		None			None	None	
Act Effct Green (s)	50.8	42.3	42.3	50.8	42.3		37.2	40.2	40.2		26.8	
Actuated g/C Ratio	0.51	0.42	0.42	0.51	0.42		0.37	0.40	0.40		0.27	
v/c Ratio	0.30	0.45	0.41	0.46	0.18		0.49	0.29	0.26		0.70	
Control Delay	21.3	25.2	26.3	18.0	21.2		25.7	21.0	20.8		40.9	
Queue Delay	0.0	0.5	0.0	0.0	0.0		0.0	0.0	0.0		0.0	
Total Delay	21.3	25.7	26.3	18.0	21.2		25.7	21.0	20.8		40.9	
LOS	C	C	C	B	C		C	C	C		D	
Approach Delay		25.1			19.9			22.3			40.9	
Approach LOS		C			B			C			D	
Queue Length 50th (ft)	78	189	134	54	59		54	77	55		190	
Queue Length 95th (ft)	115	224	190	71	44		96	128	98		284	
Internal Link Dist (ft)		298			409			680			305	

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

Bull's Head Urban Renewal TIS

AM 2024 No Build

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	125		125	125			200		125			
Base Capacity (vph)	560	1382	576	387	1289		281	712	571		545	
Starvation Cap Reductn	0	343	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	0.28	0.60	0.41	0.41	0.18		0.49	0.27	0.24		0.63	

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 89 (89%), Referenced to phase 1:EBWB, Start of Green

Natural Cycle: 95

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 26.1

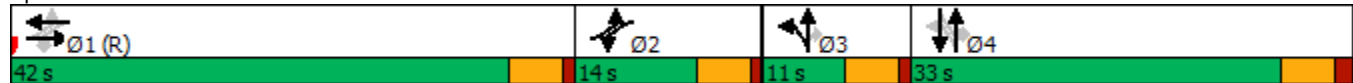
Intersection LOS: C

Intersection Capacity Utilization 75.6%

ICU Level of Service D

















Analysis Period (min) 15

Splits and Phases: 3: Genesee/Brown & Main














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

Bull's Head Urban Renewal TIS  
AM 2024 No Build

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	SBR2	NEL	NER
Lane Configurations											
Traffic Volume (vph)	5	310	4	204	196	24	57	10	3	0	538
Future Volume (vph)	5	310	4	204	196	24	57	10	3	0	538
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	11	12	12	12	12	10	10
Storage Length (ft)	0		200	0		0	0	0		0	150
Storage Lanes	0		1	1		0	1	0		0	1
Taper Length (ft)	25			25			25			25	
Satd. Flow (prot)	0	3071	0	1546	1617	0	1601	0	0	0	2551
Flt Permitted		0.950		0.950			0.961				
Satd. Flow (perm)	0	2919	0	1535	1617	0	1598	0	0	0	2551
Right Turn on Red			Yes			Yes			No		Yes
Satd. Flow (RTOR)		1			16						731
Link Speed (mph)		30			30		30			30	
Link Distance (ft)		1759			378		252			1661	
Travel Time (s)		40.0			8.6		5.7			37.8	
Confl. Peds. (#/hr)	10		5	5		10	1		8		1
Peak Hour Factor	0.79	0.79	0.79	0.89	0.89	0.89	0.79	0.79	0.79	0.89	0.89
Heavy Vehicles (%)	40%	9%	0%	9%	11%	13%	9%	10%	33%	0%	4%
Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	403	0	229	247	0	89	0	0	0	604
Turn Type	Perm	NA		Prot	NA		Prot				Over
Protected Phases		2		1	2		3				1
Permitted Phases	2				1						
Detector Phase	2	2		1	2		3				1
Switch Phase											
Minimum Initial (s)	6.0	6.0		22.0	6.0		6.0				22.0
Minimum Split (s)	28.0	28.0		28.0	28.0		24.0				28.0
Total Split (s)	39.0	39.0		37.0	39.0		24.0				37.0
Total Split (%)	39.0%	39.0%		37.0%	39.0%		24.0%				37.0%
Yellow Time (s)	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				1.0
Lost Time Adjust (s)		-2.0		-2.0	-2.0		-2.0				-2.0
Total Lost Time (s)		3.0		3.0	3.0		3.0				3.0
Lead/Lag	Lag	Lag		Lead	Lag						Lead
Lead-Lag Optimize?											
Recall Mode	None	None		C-Max	None		None				C-Max
Act Effct Green (s)		20.2		60.2	84.0		12.8				60.2
Actuated g/C Ratio		0.20		0.60	0.84		0.13				0.60
v/c Ratio		0.68		0.25	0.18		0.44				0.33
Control Delay		42.6		16.6	4.1		45.7				0.8
Queue Delay		0.0		0.0	0.2		0.0				0.0
Total Delay		42.6		16.6	4.2		45.7				0.8
LOS		D		B	A		D				A
Approach Delay		42.6			10.2		45.7			0.8	
Approach LOS		D			B		D			A	
Queue Length 50th (ft)		125		82	34		54				0
Queue Length 95th (ft)		141		220	52		81				4
Internal Link Dist (ft)		1679			298		172			1581	

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

Bull's Head Urban Renewal TIS  
AM 2024 No Build

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	SBR2	NEL	NER
Turn Bay Length (ft)											150
Base Capacity (vph)		1051		931	1540		336				1827
Starvation Cap Reductn		0		0	662		0				0
Spillback Cap Reductn		0		0	0		0				0
Storage Cap Reductn		0		0	0		0				0
Reduced v/c Ratio		0.38		0.25	0.28		0.26				0.33

Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 12 (12%), Referenced to phase 1:WBTL, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 16.9

Intersection LOS: B

Intersection Capacity Utilization 60.7%

ICU Level of Service B

Analysis Period (min) 15




















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



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

Bull's Head Urban Renewal TIS

AM 2024 No Build

												
Lane Group	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			1759			673			962	
Travel Time (s)		43.4			40.0			15.3			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
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
Queue Delay	0.0	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			1679			593			882	

Bull's Head Urban Renewal TIS  
AM 2024 No Build

















Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 37 (46%), 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	













 Ø1 (R)	 Ø2
45 s	35 s



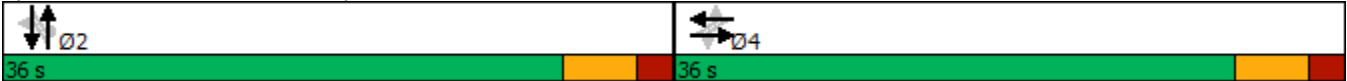
Lanes, Volumes, Timings  
6: Child & Maple

Bull's Head Urban Renewal TIS  
AM 2024 No Build

												
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)		1354			1774			247			405	
Travel Time (s)		30.8			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
Turn Type	Perm	NA		Perm	NA		Perm	NA		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 Effect 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	
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)		1274			1694			167			325	
Turn Bay Length (ft)												
Base Capacity (vph)		1305			1535			1716			1506	
Starvation Cap Reductn		0			0			0			0	

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
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






















**No Build Conditions**













Evening Peak Hour

Lanes, Volumes, Timings  
1: Jefferson & Main

Bull's Head Urban Renewal TIS  
PM 2024 No Build

												
Lane Group	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)		1492			653			1957			388	
Travel Time (s)		33.9			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
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	
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	4.2	4.5		8.8	8.9			78.9		35.5	37.1	
Queue Delay	0.0	0.0		0.0	0.0			0.0		0.0	0.0	
Total Delay	4.2	4.5		8.8	8.9			78.9		35.5	37.1	
LOS	A	A		A	A			E		D	D	
Approach Delay		4.5			8.9			78.9			36.8	
Approach LOS		A			A			E			D	
Queue Length 50th (ft)	7	58		21	117			162		18	100	
Queue Length 95th (ft)	15	74		39	134			#301		46	165	
Internal Link Dist (ft)		1412			573			1877			308	

Lanes, Volumes, Timings  
1: Jefferson & Main

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
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:	89 (89%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle:	70
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.96
Intersection Signal Delay:	19.6
Intersection Capacity Utilization	92.7%
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 Urban Renewal TIS

PM 2024 No Build

												
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
Satd. Flow (prot)	0	3486	0	0	3420	0	0	0	0	0	1777	0
Flt Permitted		0.885			0.791						0.984	
Satd. Flow (perm)	0	3090	0	0	2715	0	0	0	0	0	1763	0
Right Turn on Red			Yes			Yes				Yes		Yes
Satd. Flow (RTOR)		5			9						23	
Link Speed (mph)		30			30				30		30	
Link Distance (ft)		490			1492				322		169	
Travel Time (s)		11.1			33.9				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)	0	649	0	0	898	0	0	0	0	0	81	0
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	
Total Lost Time (s)		6.0			6.0						6.0	
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	C-Max	C-Max		C-Max	C-Max					None	None	
Act Effect Green (s)		78.0			78.0						13.6	
Actuated g/C Ratio		0.78			0.78						0.14	
v/c Ratio		0.27			0.42						0.31	
Control Delay		1.9			11.5						29.2	
Queue Delay		0.0			0.0						0.0	
Total Delay		1.9			11.5						29.2	
LOS		A			B						C	
Approach Delay		1.9			11.5						29.2	
Approach LOS		A			B						C	
Queue Length 50th (ft)		4			172						36	
Queue Length 95th (ft)		m53			m301						68	
Internal Link Dist (ft)		410			1412				242		89	
Turn Bay Length (ft)												
Base Capacity (vph)		2412			2120						527	
Starvation Cap Reductn		0			0						0	






















												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn		0			0						0	
Storage Cap Reductn		0			0						0	
Reduced v/c Ratio		0.27			0.42						0.15	
Intersection Summary												
Area Type:	Other											
Cycle Length: 100												
Actuated Cycle Length: 100												
Offset: 54 (54%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green												
Natural Cycle: 65												
Control Type: Actuated-Coordinated												
Maximum v/c Ratio: 0.42												
Intersection Signal Delay: 8.5				Intersection LOS: A								
Intersection Capacity Utilization 71.6%				ICU Level of Service C								
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 Urban Renewal TIS  
PM 2024 No Build

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	487	171	172	616	32	255	255	174	19	245	201
Future Volume (vph)	150	487	171	172	616	32	255	255	174	19	245	201
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)	125		125	125		0	200		125	0		0
Storage Lanes	1		1	1		0	1		1	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1560	3271	1449	1589	3248	0	1604	1705	1436	0	1898	0
Flt Permitted	0.205			0.330			0.218				0.979	
Satd. Flow (perm)	336	3271	1379	546	3248	0	368	1705	1417	0	1862	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		378			490			760			752	
Travel Time (s)		8.6			11.1			17.3			17.1	
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)	169	547	192	195	736	0	268	268	183	0	499	0
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm	Perm	NA	
Protected Phases	2	1		2	1		3	3 4			4	
Permitted Phases	1		1	1			3 4		3 4	4		
Detector Phase	2	1	1	2	1		3	3 4	3 4	4	4	
Switch Phase												
Minimum Initial (s)	6.0	11.0	11.0	6.0	11.0		6.0			10.0	10.0	
Minimum Split (s)	13.0	36.0	36.0	13.0	36.0		12.0			33.0	33.0	
Total Split (s)	13.0	36.0	36.0	13.0	36.0		18.0			33.0	33.0	
Total Split (%)	13.0%	36.0%	36.0%	13.0%	36.0%		18.0%			33.0%	33.0%	
Yellow Time (s)	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		1.0			1.5	1.5	
Lost Time Adjust (s)	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		5.0				5.5	
Lead/Lag	Lag	Lead	Lead	Lag	Lead		Lead			Lag	Lag	
Lead-Lag Optimize?												
Recall Mode	None	C-Max	C-Max	None	C-Max		None			None	None	
Act Effct Green (s)	38.3	31.0	31.0	38.3	31.0		41.7	46.7	46.7		28.1	
Actuated g/C Ratio	0.38	0.31	0.31	0.38	0.31		0.42	0.47	0.47		0.28	
v/c Ratio	0.78	0.54	0.45	0.68	0.73		0.85	0.34	0.28		0.95	
Control Delay	66.8	38.0	38.6	32.9	23.2		44.9	18.6	18.0		66.5	
Queue Delay	0.0	0.5	0.0	0.0	0.1		0.0	0.0	0.0		0.0	
Total Delay	66.8	38.5	38.6	32.9	23.3		44.9	18.6	18.0		66.5	
LOS	E	D	D	C	C		D	B	B		E	
Approach Delay		43.7			25.3			28.3			66.5	
Approach LOS		D			C			C			E	
Queue Length 50th (ft)	86	171	112	93	224		107	106	70		315	
Queue Length 95th (ft)	#169	224	180	82	178		#239	167	119		#522	
Internal Link Dist (ft)		298			410			680			672	



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

Bull's Head Urban Renewal TIS  
PM 2024 No Build

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)	125		125	125			200		125			
Base Capacity (vph)	228	1014	427	296	1006		317	781	649		523	
Starvation Cap Reductn	0	158	0	0	0		0	0	0		0	
Spillback Cap Reductn	0	0	0	0	8		0	0	0		0	
Storage Cap Reductn	0	0	0	0	0		0	0	0		0	
Reduced v/c Ratio	0.74	0.64	0.45	0.66	0.74		0.85	0.34	0.28		0.95	

## Intersection Summary

Area Type: Other

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 67 (67%), Referenced to phase 1:EBWB, Start of Green

Natural Cycle: 95

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.95

Intersection Signal Delay: 38.2

Intersection LOS: D

Intersection Capacity Utilization 92.9%





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: 3: Genesee/Brown & Main

			
Ø1 (R)	Ø2	Ø3	Ø4
36 s	13 s	18 s	33 s

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

Bull's Head Urban Renewal TIS  
PM 2024 No Build

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	SBR2	NEL	NER
Lane Configurations											
Traffic Volume (vph)	4	266	2	529	431	65	51	14	7	0	477
Future Volume (vph)	4	266	2	529	431	65	51	14	7	0	477
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	10	10	10	10	11	12	12	12	12	10	10
Storage Length (ft)	0		200	0		0	0	0		0	150
Storage Lanes	0		1	1		0	1	0		0	1
Taper Length (ft)	25			25			25			25	
Satd. Flow (prot)	0	3254	0	1636	1678	0	1531	0	0	0	2503
Flt Permitted		0.945		0.950			0.966				
Satd. Flow (perm)	0	3077	0	1606	1678	0	1529	0	0	0	2503
Right Turn on Red			Yes			Yes			No		Yes
Satd. Flow (RTOR)		1			19						816
Link Speed (mph)		30			30		30			30	
Link Distance (ft)		1759			378		252			1659	
Travel Time (s)		40.0			8.6		5.7			37.7	
Confl. Peds. (#/hr)	16		17	17		16	1		19		1
Peak Hour Factor	0.96	0.96	0.96	0.95	0.95	0.95	0.84	0.84	0.84	0.89	0.89
Heavy Vehicles (%)	25%	3%	0%	3%	7%	3%	8%	36%	0%	2%	6%
Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	283	0	557	522	0	86	0	0	0	536
Turn Type	Perm	NA		Prot	NA		Prot				Over
Protected Phases		2		1	1 2		3				1
Permitted Phases	2				1						
Detector Phase	2	2		1	1 2		3				1
Switch Phase											
Minimum Initial (s)	6.0	6.0		22.0			6.0				22.0
Minimum Split (s)	28.0	28.0		28.0			24.0				28.0
Total Split (s)	37.0	37.0		39.0			24.0				39.0
Total Split (%)	37.0%	37.0%		39.0%			24.0%				39.0%
Yellow Time (s)	4.0	4.0		4.0			4.0				4.0
All-Red Time (s)	1.0	1.0		1.0			1.0				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	Lag		Lead							Lead
Lead-Lag Optimize?											
Recall Mode	None	None		C-Max			None				C-Max
Act Effct Green (s)		13.9		62.5	82.4		10.8				62.5
Actuated g/C Ratio		0.14		0.62	0.82		0.11				0.62
v/c Ratio		0.66		0.55	0.38		0.52				0.29
Control Delay		41.2		5.7	3.3		52.1				0.4
Queue Delay		0.0		0.3	0.3		0.0				0.0
Total Delay		41.2		6.1	3.6		52.1				0.4
LOS		D		A	A		D				A
Approach Delay		41.2			4.9		52.1			0.4	
Approach LOS		D			A		D			A	
Queue Length 50th (ft)		94		66	52		53				0
Queue Length 95th (ft)		101		m193	m114		88				0
Internal Link Dist (ft)		1679			298		172			1579	

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR	SBR2	NEL	NER
Turn Bay Length (ft)											150
Base Capacity (vph)	985		1022		1603		290		1870		
Starvation Cap Reductn	0		117		486		0		0		
Spillback Cap Reductn	0		0		0		0		0		
Storage Cap Reductn	0		0		0		0		0		
Reduced v/c Ratio	0.29		0.62		0.47		0.30		0.29		
Intersection Summary											
Area Type:	Other										
Cycle Length: 100											
Actuated Cycle Length: 100											
Offset: 72 (72%), Referenced to phase 1:WBTL, Start of Green											
Natural Cycle: 90											
Control Type: Actuated-Coordinated											
Maximum v/c Ratio: 0.66											
Intersection Signal Delay: 10.9						Intersection LOS: B					
Intersection Capacity Utilization 79.7%						ICU Level of Service D					
Analysis Period (min) 15											
m Volume for 95th percentile queue is metered by upstream signal.											




















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



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

Bull's Head Urban Renewal TIS

PM 2024 No Build

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	208	257	9	4	338	132	9	57	4	62	64	220
Future Volume (vph)	208	257	9	4	338	132	9	57	4	62	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	1698	0	0	1758	1599
Flt Permitted	0.425			0.583				0.949			0.801	
Satd. Flow (perm)	729	1697	0	822	1593	0	0	1620	0	0	1432	1554
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			30			3				242
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1910			1759			679			962	
Travel Time (s)		43.4			40.0			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	138	242
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)	73.4	73.4		73.4	73.4			15.1			15.1	15.1
Actuated g/C Ratio	0.73	0.73		0.73	0.73			0.15			0.15	0.15
v/c Ratio	0.42	0.23		0.01	0.46			0.37			0.64	0.55
Control Delay	9.1	5.4		4.0	4.1			39.6			52.3	9.6
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Delay	9.1	5.4		4.0	4.1			39.6			52.3	9.6
LOS	A	A		A	A			D			D	A
Approach Delay		7.0			4.1			39.6			25.1	
Approach LOS		A			A			D			C	
Queue Length 50th (ft)	47	49		0	25			52			84	0
Queue Length 95th (ft)	120	103		m2	110			76			136	62
Internal Link Dist (ft)		1830			1679			599			882	

Bull's Head Urban Renewal TIS  
PM 2024 No Build

Intersection Summary	
Area Type:	Other
Cycle Length: 100	
Actuated Cycle Length: 100	
Offset: 83 (83%), Referenced to phase 1:EBWB, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.64	
Intersection Signal Delay: 12.4	Intersection LOS: B
Intersection Capacity Utilization 74.0%	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

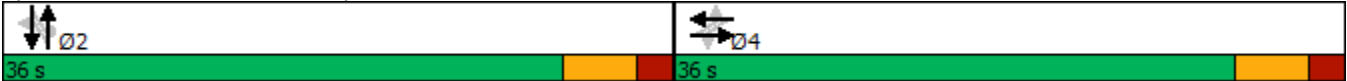
Bull's Head Urban Renewal TIS

PM 2024 No Build

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	68	17	11	49	15	13	183	9	26	217	57
Future Volume (vph)	82	68	17	11	49	15	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	1852	0	0	1954	0	0	1760	0
Flt Permitted		0.822			0.944			0.972			0.963	
Satd. Flow (perm)	0	1483	0	0	1760	0	0	1905	0	0	1701	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			17			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
Turn Type	Perm	NA		Perm	NA		Perm	NA		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 Effect 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			8.2			8.0			9.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		11.8			8.2			8.0			9.1	
LOS		B			A			A			A	
Approach Delay		11.8			8.2			8.0			9.1	
Approach LOS		B			A			A			A	
Queue Length 50th (ft)		28			9			28			41	
Queue Length 95th (ft)		73			34			74			110	
Internal Link Dist (ft)		597			1694			167			325	
Turn Bay Length (ft)												
Base Capacity (vph)		1182			1404			1516			1358	
Starvation Cap Reductn		0			0			0			0	

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
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



**FUTURE BUILD CONDITIONS**

Morning Peak Hour






















# Lanes, Volumes, Timings

## 1: Jefferson & Main













# Bull's Head Urban Renewal TIS

AM 2024 Full Build

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	25	606	23	31	369	14	29	72	45	28	84	35
Future Volume (vph)	25	606	23	31	369	14	29	72	45	28	84	35
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	3160	0	1636	3091	0	0	1514	0	1574	1583	0
Flt Permitted	0.489			0.396				0.902		0.562		
Satd. Flow (perm)	791	3160	0	681	3091	0	0	1379	0	931	1583	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			15			42			39	
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)	26	649	0	37	456	0	0	182	0	34	143	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)		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)	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	
Total Lost Time (s)	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	0.05	0.29		0.08	0.21			0.53		0.16	0.37	
Control Delay	0.9	1.5		3.9	3.6			19.2		17.3	15.2	

Lanes, Volumes, Timings  
1: Jefferson & Main

Bull's Head Urban Renewal TIS  
AM 2024 Full Build

												
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	0.9	1.5		3.9	3.6			19.2		17.3	15.2	
LOS	A	A		A	A			B		B	B	
Approach Delay		1.5			3.6			19.2			15.6	
Approach LOS		A			A			B			B	
Queue Length 50th (ft)	0	7		3	22			35		8	25	
Queue Length 95th (ft)	m1	3		10	34			70		24	56	
Internal Link Dist (ft)		245			573			1877			308	
Turn Bay Length (ft)	75			100						100		
Base Capacity (vph)	566	2266		487	2217			362		223	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	0.05	0.29		0.08	0.21			0.50		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: 0.53

Intersection Signal Delay: 5.9

Intersection LOS: A

Intersection Capacity Utilization 47.4%

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 Urban Renewal TIS













AM 2024 Full Build

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	638	26	19	391	7	0	0	0	8	5	6
Future Volume (vph)	7	638	26	19	391	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
Storage Lanes	1		0	1		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	0.510			0.368							0.979	
Satd. Flow (perm)	962	1783	0	697	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	699	0	21	433	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	0.46		0.04	0.30						0.15	
Control Delay	2.0	4.0		3.4	3.7						30.7	

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

Bull's Head Urban Renewal TIS

AM 2024 Full Build

												
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	2.0	4.1		3.4	3.7						30.7	
LOS	A	A		A	A						C	
Approach Delay		4.1			3.7						30.7	
Approach LOS		A			A						C	
Queue Length 50th (ft)	0	40		2	43						11	
Queue Length 95th (ft)	m1	185		m9	179						25	
Internal Link Dist (ft)		97			1087			242			89	
Turn Bay Length (ft)	50			50								
Base Capacity (vph)	821	1523		595	1442						487	
Starvation Cap Reductn	0	138		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	0.50		0.04	0.30						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: 0.46

Intersection Signal Delay: 4.5

Intersection LOS: A

Intersection Capacity Utilization 56.4%

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 Urban Renewal TIS













AM 2024 Full Build

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	146	500	209	156	191	39	131	187	125	62	243	134
Future Volume (vph)	146	500	209	156	191	39	131	187	125	62	243	134
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	3059	0	1546	3021	0	1518	1507	0	1685	1972	1334
Flt Permitted	0.601			0.211			0.244			0.549		
Satd. Flow (perm)	949	3059	0	342	3021	0	390	1507	0	973	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)	172	834	0	164	242	0	149	355	0	67	264	146
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)		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)	49.5	39.9		51.2	40.8		34.7	34.2		17.9	17.9	32.9
Actuated g/C Ratio	0.50	0.40		0.51	0.41		0.35	0.34		0.18	0.18	0.33
v/c Ratio	0.33	0.68		0.55	0.20		0.57	0.69		0.39	0.75	0.33
Control Delay	12.8	24.7		23.5	20.0		31.0	34.9		41.2	51.7	26.0

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

Bull's Head Urban Renewal TIS

AM 2024 Full Build

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.9		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	12.8	25.7		23.5	20.0		31.0	34.9		41.2	51.7	26.0
LOS	B	C		C	C		C	C		D	D	C
Approach Delay		23.5			21.4			33.8			42.4	
Approach LOS		C			C			C			D	
Queue Length 50th (ft)	48	170		49	47		67	190		38	161	68
Queue Length 95th (ft)	m86	289		#83	80		100	251		75	230	111
Internal Link Dist (ft)		298			233			275			227	
Turn Bay Length (ft)	150			200						100		200
Base Capacity (vph)	524	1221		300	1233		281	670		257	522	441
Starvation Cap Reductn	0	165		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	0.33	0.79		0.55	0.20		0.53	0.53		0.26	0.51	0.33

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: 0.75

Intersection Signal Delay: 29.1

Intersection LOS: C

Intersection Capacity Utilization 69.5%

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.

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

Splits and Phases: 3: Genesee/Brown & Main

 Ø1	 Ø2 (R)	 Ø3	 Ø4
12 s	38 s	18 s	32 s
 Ø5	 Ø6 (R)	 Ø8	
12 s	38 s	50 s	

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

Bull's Head Urban Renewal TIS

AM 2024 Full Build

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø6
Lane Configurations							
Traffic Volume (vph)	336	4	227	213	25	560	
Future Volume (vph)	336	4	227	213	25	560	
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			0.195		0.950		
Satd. Flow (perm)	1625	0	317	1655	1767	1417	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	1					235	
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)	430	0	255	239	28	629	
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)	30.3		85.2	87.2	9.2	56.7	
Actuated g/C Ratio	0.30		0.85	0.87	0.09	0.57	
v/c Ratio	0.87		0.29	0.17	0.17	0.68	
Control Delay	51.2		8.4	1.4	41.7	14.8	

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

Bull's Head Urban Renewal TIS  
AM 2024 Full Build

	→	↘	↙	←	↖	↗	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø6
Queue Delay	1.8		0.2	0.0	0.0	0.1	
Total Delay	53.0		8.6	1.4	41.7	14.9	
LOS	D		A	A	D	B	
Approach Delay	53.0			5.1	16.0		
Approach LOS	D			A	B		
Queue Length 50th (ft)	254		19	6	17	153	
Queue Length 95th (ft)	287		116	57	39	317	
Internal Link Dist (ft)	1674			298	56		
Turn Bay Length (ft)							
Base Capacity (vph)	601		883	1443	335	920	
Starvation Cap Reductn	0		166	0	0	0	
Spillback Cap Reductn	67		0	0	0	9	
Storage Cap Reductn	0		0	0	0	0	
Reduced v/c Ratio	0.81		0.36	0.17	0.08	0.69	

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: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.87

Intersection Signal Delay: 22.7

Intersection LOS: C

Intersection Capacity Utilization 61.1%

ICU Level of Service B

Analysis Period (min) 15

\* User Entered Value

Splits and Phases: 4: Chili & West /Main




















 Ø1 (R)	 Ø2	 Ø8
34 s	42 s	24 s
 Ø6		
76 s		



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













Bull's Head Urban Renewal TIS

AM 2024 Full Build

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	138	293	9	0	182	56	2	43	4	88	52	200
Future Volume (vph)	138	293	9	0	182	56	2	43	4	88	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	1500	0	0	1762	0	0	1727	1495
Flt Permitted	0.564							0.991			0.820	
Satd. Flow (perm)	903	1622	0	1773	1500	0	0	1749	0	0	1459	1462
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			29			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	356	0	0	294	0	0	56	0	0	165	235
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)		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)	56.6	56.6			56.6			17.4			17.4	15.9
Actuated g/C Ratio	0.71	0.71			0.71			0.22			0.22	0.20
v/c Ratio	0.25	0.31			0.28			0.15			0.52	0.49
Control Delay	6.5	6.0			5.4			22.2			32.5	7.3

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

Bull's Head Urban Renewal TIS  
AM 2024 Full Build

												
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
Total Delay	6.5	6.0			5.4			22.2			32.5	7.3
LOS	A	A			A			C			C	A
Approach Delay		6.2			5.4			22.2			17.7	
Approach LOS		A			A			C			B	
Queue Length 50th (ft)	24	54			39			21			73	0
Queue Length 95th (ft)	60	113			81			43			110	42
Internal Link Dist (ft)		1830			1674			599			882	
Turn Bay Length (ft)	50											125
Base Capacity (vph)	638	1147			1068			702			583	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	0.31			0.28			0.08			0.28	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: 0.52

Intersection Signal Delay: 10.3

Intersection LOS: B

Intersection Capacity Utilization 70.1%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 5: Appleton/Ames & West































# Lanes, Volumes, Timings

## 6: Child & Maple

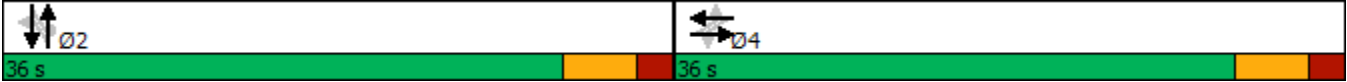
Bull's Head Urban Renewal TIS

AM 2024 Full Build




												
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	148	9	16	146	22
Future Volume (vph)	54	45	6	1	25	7	7	148	9	16	146	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	1890	0	0	1695	0
Flt Permitted		0.831			0.989			0.987			0.968	
Satd. Flow (perm)	0	1420	0	0	1669	0	0	1869	0	0	1647	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			13			5			13	
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	216	0	0	215	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)		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		Perm	NA		Perm	NA		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			20.0			20.0	
Actuated g/C Ratio		0.38			0.38			0.55			0.55	
v/c Ratio		0.24			0.09			0.21			0.23	
Control Delay		8.7			6.4			7.6			7.7	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		8.7			6.4			7.6			7.7	
LOS		A			A			A			A	

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		8.7			6.4			7.6			7.7	
Approach LOS		A			A			A			A	
Queue Length 50th (ft)		12			4			20			19	
Queue Length 95th (ft)		40			12			60			70	
Internal Link Dist (ft)		597			1694			167			325	
Turn Bay Length (ft)												
Base Capacity (vph)		1301			1530			1713			1510	
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			0.13			0.14	
Intersection Summary												
Area Type:	Other											
Cycle Length: 72												
Actuated Cycle Length: 36.1												
Natural Cycle: 50												
Control Type: Actuated-Uncoordinated												
Maximum v/c Ratio: 0.24												
Intersection Signal Delay: 7.7					Intersection LOS: A							
Intersection Capacity Utilization 34.4%					ICU Level of Service A							
Analysis Period (min) 15												

Splits and Phases: 6: Child & Maple



Intersection						
Int Delay, s/veh	0.4					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↖	↑	↘	
Traffic Vol, veh/h	676	11	20	381	5	9
Future Vol, veh/h	676	11	20	381	5	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	50	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	751	12	22	423	6	10
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	763	0	1224	382
Stage 1	-	-	-	-	757	-
Stage 2	-	-	-	-	467	-
Critical Hdwy	-	-	4.13	-	6.63	6.93
Critical Hdwy Stg 1	-	-	-	-	5.83	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	-	-	2.219	-	3.519	3.319
Pot Cap-1 Maneuver	-	-	847	-	184	617
Stage 1	-	-	-	-	425	-
Stage 2	-	-	-	-	630	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	847	-	179	617
Mov Cap-2 Maneuver	-	-	-	-	179	-
Stage 1	-	-	-	-	425	-
Stage 2	-	-	-	-	614	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.5		16.5	
HCM LOS	C					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	329	-	-	847	-	
HCM Lane V/C Ratio	0.047	-	-	0.026	-	
HCM Control Delay (s)	16.5	-	-	9.4	-	
HCM Lane LOS	C	-	-	A	-	
HCM 95th %tile Q(veh)	0.1	-	-	0.1	-	

Intersection						
Int Delay, s/veh	1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	10	24	419	25	55	553
Future Vol, veh/h	10	24	419	25	55	553
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	27	466	28	61	614
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	1216	480	0	0	494	0
Stage 1	480	-	-	-	-	-
Stage 2	736	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	200	586	-	-	1070	-
Stage 1	622	-	-	-	-	-
Stage 2	474	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	183	586	-	-	1070	-
Mov Cap-2 Maneuver	183	-	-	-	-	-
Stage 1	622	-	-	-	-	-
Stage 2	433	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	16.3	0		0.8		
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	-	356	1070	-	
HCM Lane V/C Ratio	-	-	0.106	0.057	-	
HCM Control Delay (s)	-	-	16.3	8.6	0	
HCM Lane LOS	-	-	C	A	A	
HCM 95th %tile Q(veh)	-	-	0.4	0.2	-	

# MOVEMENT SUMMARY

 **Site: 101 [Proposed Dev Access/Brown St]**

AM with Development  
Site Category: (None)  
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: Brown St												
3	L2	43	2.0	0.314	5.6	LOS A	1.8	46.0	0.18	0.06	0.18	18.0
8	T1	16	2.0	0.314	5.6	LOS A	1.8	46.0	0.18	0.06	0.18	21.7
18	R2	345	3.0	0.314	5.6	LOS A	1.8	46.0	0.18	0.06	0.18	21.4
Approach		404	2.9	0.314	5.6	LOS A	1.8	46.0	0.18	0.06	0.18	21.0
East: Brown St												
1	L2	358	3.0	0.313	5.8	LOS A	1.8	44.9	0.25	0.12	0.25	18.6
6	T1	18	2.0	0.313	5.7	LOS A	1.8	44.9	0.25	0.12	0.25	21.7
16	R2	13	2.0	0.313	5.7	LOS A	1.8	44.9	0.25	0.12	0.25	19.8
Approach		389	2.9	0.313	5.8	LOS A	1.8	44.9	0.25	0.12	0.25	18.7
North: North Access Rd												
7	L2	11	2.0	0.051	4.6	LOS A	0.2	5.2	0.48	0.37	0.48	25.4
4	T1	23	2.0	0.051	4.6	LOS A	0.2	5.2	0.48	0.37	0.48	22.9
14	R2	11	2.0	0.051	4.6	LOS A	0.2	5.2	0.48	0.37	0.48	21.8
Approach		45	2.0	0.051	4.6	LOS A	0.2	5.2	0.48	0.37	0.48	23.3
West: West Access Rd												
5	L2	11	2.0	0.137	5.3	LOS A	0.6	14.8	0.50	0.41	0.50	17.4
2	T1	15	2.0	0.137	5.3	LOS A	0.6	14.8	0.50	0.41	0.50	24.5
12	R2	97	2.0	0.137	5.3	LOS A	0.6	14.8	0.50	0.41	0.50	20.7
Approach		123	2.0	0.137	5.3	LOS A	0.6	14.8	0.50	0.41	0.50	20.9
All Vehicles		961	2.7	0.314	5.6	LOS A	1.8	46.0	0.26	0.14	0.26	20.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Organisation: FISHER ASSOCIATES | Processed: Wednesday, October 30, 2019 11:54:12 AM

Project: J:\Projects\154079-00-Bulls\_Head\_BOA\_Urban\_Renewal\Eng\Traffic\Synchro\Concept 2B\AM Roundabout with Development.sip8




















**FUTURE BUILD CONDITIONS**

Evening Peak Hour















Lanes, Volumes, Timings  
1: Jefferson & Main

Bull's Head Urban Renewal TIS  
PM 2024 Full Build

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	602	16	71	667	13	55	110	78	31	150	16
Future Volume (vph)	39	602	16	71	667	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	0.313			0.367				0.773		0.436		
Satd. Flow (perm)	551	3287	0	642	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)	44	702	0	87	829	0	0	279	0	35	187	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)		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	
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	0.33		0.21	0.39			0.96		0.23	0.48	
Control Delay	8.0	6.7		9.0	9.0			78.9		35.5	37.1	

Lanes, Volumes, Timings  
1: Jefferson & Main

Bull's Head Urban Renewal TIS  
PM 2024 Full Build

												
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	8.0	6.7		9.0	9.0			78.9		35.5	37.1	
LOS	A	A		A	A			E		D	D	
Approach Delay		6.8			9.0			78.9			36.8	
Approach LOS		A			A			E			D	
Queue Length 50th (ft)	2	19		21	121			162		18	100	
Queue Length 95th (ft)	24	117		40	138			#301		46	165	
Internal Link Dist (ft)		245			573			1877			308	
Turn Bay Length (ft)	75			100						100		
Base Capacity (vph)	358	2143		418	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	0.33		0.21	0.39			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: 20.1

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 Urban Renewal TIS

PM 2024 Full Build

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	591	17	84	694	37	0	0	0	24	26	22
Future Volume (vph)	27	591	17	84	694	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
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1805	1836	0	1736	1791	0	0	0	0	0	1768	0
Flt Permitted	0.288			0.373							0.984	
Satd. Flow (perm)	547	1836	0	675	1791	0	0	0	0	0	1744	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			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	653	0	94	822	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	0.46		0.18	0.59						0.32	
Control Delay	3.5	4.8		2.1	6.6						29.3	

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

Bull's Head Urban Renewal TIS  
PM 2024 Full Build

												
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	3.5	5.1		2.1	6.6						29.3	
LOS	A	A		A	A						C	
Approach Delay		5.0			6.1						29.3	
Approach LOS		A			A						C	
Queue Length 50th (ft)	2	55		3	108						36	
Queue Length 95th (ft)	m7	179		m11	m474						68	
Internal Link Dist (ft)		97			1087			242			89	
Turn Bay Length (ft)	50			50								
Base Capacity (vph)	426	1433		526	1398						522	
Starvation Cap Reductn	0	247		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	0.55		0.18	0.59						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: 0.59

Intersection Signal Delay: 6.8

Intersection LOS: A

Intersection Capacity Utilization 88.0%

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 Urban Renewal TIS  
PM 2024 Full Build

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	166	454	166	173	562	104	276	288	178	65	276	234
Future Volume (vph)	166	454	166	173	562	104	276	288	178	65	276	234
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	3085	0	1589	3195	0	1604	1594	0	1685	2029	1463
Flt Permitted	0.193			0.244			0.211			0.485		
Satd. Flow (perm)	316	3085	0	404	3195	0	356	1594	0	859	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)	187	697	0	197	757	0	291	490	0	70	297	252
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)		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)	46.4	32.3		44.9	31.5		39.3	38.8		19.3	19.3	33.9
Actuated g/C Ratio	0.46	0.32		0.45	0.32		0.39	0.39		0.19	0.19	0.34
v/c Ratio	0.58	0.70		0.58	0.75		0.91	0.79		0.42	0.76	0.51
Control Delay	24.4	37.6		24.3	29.5		54.7	36.6		42.0	50.5	26.3

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

Bull's Head Urban Renewal TIS

PM 2024 Full Build

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Delay	0.0	0.5		0.0	0.1		0.0	0.0		0.0	0.0	0.0
Total Delay	24.4	38.1		24.3	29.5		54.7	36.6		42.0	50.5	26.3
LOS	C	D		C	C		D	D		D	D	C
Approach Delay		35.2			28.5			43.3			39.7	
Approach LOS		D			C			D			D	
Queue Length 50th (ft)	72	228		46	237		134	269		40	181	114
Queue Length 95th (ft)	m#140	296		#124	#287		#240	355		78	251	178
Internal Link Dist (ft)		298			233			275			227	
Turn Bay Length (ft)	150			200						100		200
Base Capacity (vph)	322	996		339	1007		327	789		253	598	491
Starvation Cap Reductn	0	72		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	7		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.58	0.75		0.58	0.76		0.89	0.62		0.28	0.50	0.51

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: 0.91

Intersection Signal Delay: 36.0

Intersection LOS: D

Intersection Capacity Utilization 78.1%

ICU Level of Service D

Analysis Period (min) 15

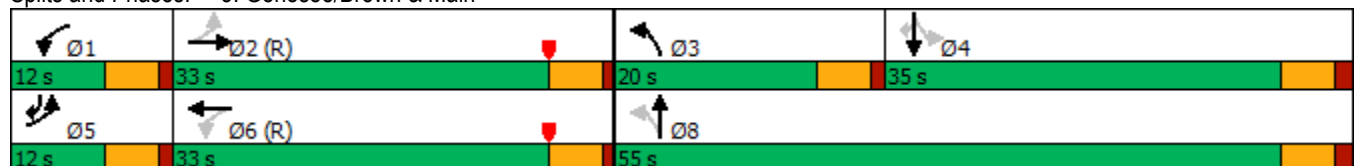
\* User Entered Value

# 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 Urban Renewal TIS

PM 2024 Full Build

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø6
Lane Configurations							
Traffic Volume (vph)	283	3	567	458	25	489	
Future Volume (vph)	283	3	567	458	25	489	
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)	1719	0	1636	1717	1770	1422	
Flt Permitted			0.222		0.950		
Satd. Flow (perm)	1719	0	375	1717	1681	1422	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)						180	
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)	298	0	597	482	28	549	
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)	20.6		85.2	87.2	9.3	69.4	
Actuated g/C Ratio	0.21		0.85	0.87	0.09	0.69	
v/c Ratio	0.84		0.56	0.32	0.18	0.53	
Control Delay	51.8		8.0	2.8	41.9	7.2	

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

Bull's Head Urban Renewal TIS  
PM 2024 Full Build

	→	↘	↙	←	↖	↗	
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø6
Queue Delay	0.0		0.3	0.4	0.0	0.2	
Total Delay	51.8		8.3	3.2	41.9	7.4	
LOS	D		A	A	D	A	
Approach Delay	51.8			6.1	9.0		
Approach LOS	D			A	A		
Queue Length 50th (ft)	187		118	64	17	96	
Queue Length 95th (ft)	#190		m173	m95	39	181	
Internal Link Dist (ft)	1674			298	56		
Turn Bay Length (ft)							
Base Capacity (vph)	412		1071	1496	319	1042	
Starvation Cap Reductn	0		123	546	0	0	
Spillback Cap Reductn	0		0	0	0	74	
Storage Cap Reductn	0		0	0	0	0	
Reduced v/c Ratio	0.72		0.63	0.51	0.09	0.57	

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: 0.84

Intersection Signal Delay: 13.9

Intersection LOS: B

Intersection Capacity Utilization 64.3%

ICU Level of Service C

Analysis Period (min) 15

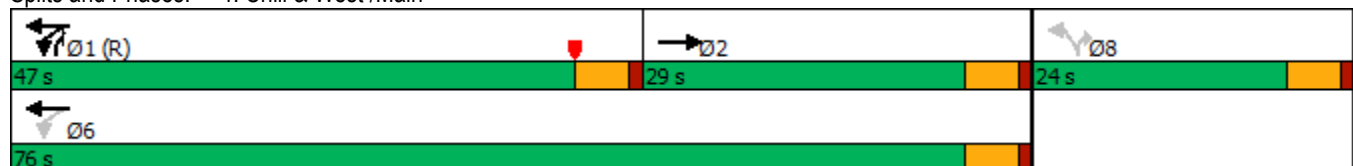
\* User Entered Value

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

Queue shown is maximum after two cycles.

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 Urban Renewal TIS

PM 2024 Full Build

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	208	266	9	4	352	136	9	57	4	64	64	220
Future Volume (vph)	208	266	9	4	352	136	9	57	4	64	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	1698	0	0	1758	1599
Flt Permitted	0.412			0.578				0.949			0.800	
Satd. Flow (perm)	707	1697	0	815	1593	0	0	1620	0	0	1430	1554
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			30			3				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	299	0	5	567	0	0	92	0	0	140	242
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)		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)	73.2	73.2		73.2	73.2			15.3			15.3	15.3
Actuated g/C Ratio	0.73	0.73		0.73	0.73			0.15			0.15	0.15
v/c Ratio	0.44	0.24		0.01	0.48			0.37			0.64	0.55
Control Delay	9.6	5.6		4.0	5.5			39.3			52.2	9.5

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

Bull's Head Urban Renewal TIS  
PM 2024 Full Build

												
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	9.6	5.6		4.0	5.5			39.3			52.2	9.5
LOS	A	A		A	A			D			D	A
Approach Delay		7.3			5.5			39.3			25.2	
Approach LOS		A			A			D			C	
Queue Length 50th (ft)	48	51		1	78			52			85	0
Queue Length 95th (ft)	124	108		m2	122			76			137	61
Internal Link Dist (ft)		1830			1674			599			882	
Turn Bay Length (ft)	50			50								125
Base Capacity (vph)	517	1242		596	1173			560			493	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	0.44	0.24		0.01	0.48			0.16			0.28	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: 12.9

Intersection LOS: B

Intersection Capacity Utilization 74.1%

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 Urban Renewal TIS

PM 2024 Full Build

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	68	17	11	49	15	13	197	9	26	225	57
Future Volume (vph)	82	68	17	11	49	15	13	197	9	26	225	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	1852	0	0	1954	0	0	1763	0
Flt Permitted		0.822			0.944			0.973			0.962	
Satd. Flow (perm)	0	1483	0	0	1760	0	0	1907	0	0	1702	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			17			4			21	
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	261	0	0	358	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)		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		Perm	NA		Perm	NA		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)		15.8			15.8			21.6			21.6	
Actuated g/C Ratio		0.36			0.36			0.50			0.50	
v/c Ratio		0.39			0.13			0.28			0.42	
Control Delay		12.2			8.5			8.1			9.2	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		12.2			8.5			8.1			9.2	
LOS		B			A			A			A	

Lanes, Volumes, Timings  
6: Child & Maple

Bull's Head Urban Renewal TIS  
PM 2024 Full Build

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach Delay		12.2			8.5			8.1			9.2	
Approach LOS		B			A			A			A	
Queue Length 50th (ft)		29			9			30			43	
Queue Length 95th (ft)		76			36			80			115	
Internal Link Dist (ft)		597			1694			167			325	
Turn Bay Length (ft)												
Base Capacity (vph)		1161			1379			1491			1335	
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			0.18			0.27	

Intersection Summary

Area Type: Other

Cycle Length: 72

Actuated Cycle Length: 43.6

Natural Cycle: 50

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.42

Intersection Signal Delay: 9.5

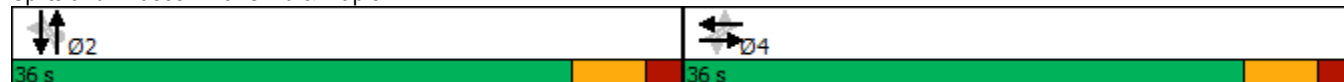
Intersection LOS: A

Intersection Capacity Utilization 46.4%




ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 6: Child & Maple



Intersection						
Int Delay, s/veh	0.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑		↖	↑	↘	
Traffic Vol, veh/h	693	4	7	829	10	18
Future Vol, veh/h	693	4	7	829	10	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	50	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	770	4	8	921	11	20
Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	774	0	1709	387
Stage 1	-	-	-	-	772	-
Stage 2	-	-	-	-	937	-
Critical Hdwy	-	-	4.13	-	6.63	6.93
Critical Hdwy Stg 1	-	-	-	-	5.83	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	-	-	2.219	-	3.519	3.319
Pot Cap-1 Maneuver	-	-	839	-	90	612
Stage 1	-	-	-	-	417	-
Stage 2	-	-	-	-	380	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	839	-	89	612
Mov Cap-2 Maneuver	-	-	-	-	89	-
Stage 1	-	-	-	-	417	-
Stage 2	-	-	-	-	376	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0.1		26.5	
HCM LOS	D					
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	
Capacity (veh/h)	198	-	-	839	-	
HCM Lane V/C Ratio	0.157	-	-	0.009	-	
HCM Control Delay (s)	26.5	-	-	9.3	-	
HCM Lane LOS	D	-	-	A	-	
HCM 95th %tile Q(veh)	0.5	-	-	0	-	

Intersection						
Int Delay, s/veh	1.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	22	49	693	8	18	597
Future Vol, veh/h	22	49	693	8	18	597
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	24	54	770	9	20	663
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	1478	775	0	0	779	0
Stage 1	775	-	-	-	-	-
Stage 2	703	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	139	398	-	-	838	-
Stage 1	454	-	-	-	-	-
Stage 2	491	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	134	398	-	-	838	-
Mov Cap-2 Maneuver	134	-	-	-	-	-
Stage 1	454	-	-	-	-	-
Stage 2	472	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	26.3	0		0.3		
HCM LOS	D					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBL	SBT	
Capacity (veh/h)	-	- 247		838	-	
HCM Lane V/C Ratio	-	- 0.319		0.024	-	
HCM Control Delay (s)	-	- 26.3		9.4	0	
HCM Lane LOS	-	- D		A	A	
HCM 95th %tile Q(veh)	-	- 1.3		0.1	-	

# MOVEMENT SUMMARY

 **Site: 101 [Proposed Dev Access/Brown St]**

PM with Development  
Site Category: (None)  
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: Brown St												
3	L2	93	2.0	0.471	7.6	LOS A	3.4	87.0	0.23	0.09	0.23	16.7
8	T1	22	2.0	0.471	7.6	LOS A	3.4	87.0	0.23	0.09	0.23	19.6
18	R2	491	3.0	0.471	7.6	LOS A	3.4	87.0	0.23	0.09	0.23	19.8
Approach		607	2.8	0.471	7.6	LOS A	3.4	87.0	0.23	0.09	0.23	19.3
East: Brown St												
1	L2	513	3.0	0.460	8.0	LOS A	3.0	77.3	0.41	0.25	0.41	17.4
6	T1	15	2.0	0.460	7.9	LOS A	3.0	77.3	0.41	0.25	0.41	20.3
16	R2	12	2.0	0.460	7.9	LOS A	3.0	77.3	0.41	0.25	0.41	18.6
Approach		540	2.9	0.460	8.0	LOS A	3.0	77.3	0.41	0.25	0.41	17.5
North: North Access Rd												
7	L2	12	2.0	0.054	5.7	LOS A	0.2	5.3	0.57	0.49	0.57	24.0
4	T1	15	2.0	0.054	5.7	LOS A	0.2	5.3	0.57	0.49	0.57	21.4
14	R2	11	2.0	0.054	5.7	LOS A	0.2	5.3	0.57	0.49	0.57	20.6
Approach		38	2.0	0.054	5.7	LOS A	0.2	5.3	0.57	0.49	0.57	22.0
West: West Access Rd												
5	L2	11	2.0	0.160	6.4	LOS A	0.7	16.8	0.57	0.53	0.57	16.8
2	T1	15	2.0	0.160	6.4	LOS A	0.7	16.8	0.57	0.53	0.57	23.5
12	R2	97	2.0	0.160	6.4	LOS A	0.7	16.8	0.57	0.53	0.57	19.8
Approach		123	2.0	0.160	6.4	LOS A	0.7	16.8	0.57	0.53	0.57	20.0
All Vehicles		1308	2.8	0.471	7.6	LOS A	3.4	87.0	0.35	0.21	0.35	18.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Roundabout LOS Method: Same as Sign Control.

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).

Roundabout Capacity Model: US HCM 6.

HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.

Gap-Acceptance Capacity: Traditional M1.

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Organisation: FISHER ASSOCIATES | Processed: Wednesday, October 30, 2019 11:51:28 AM

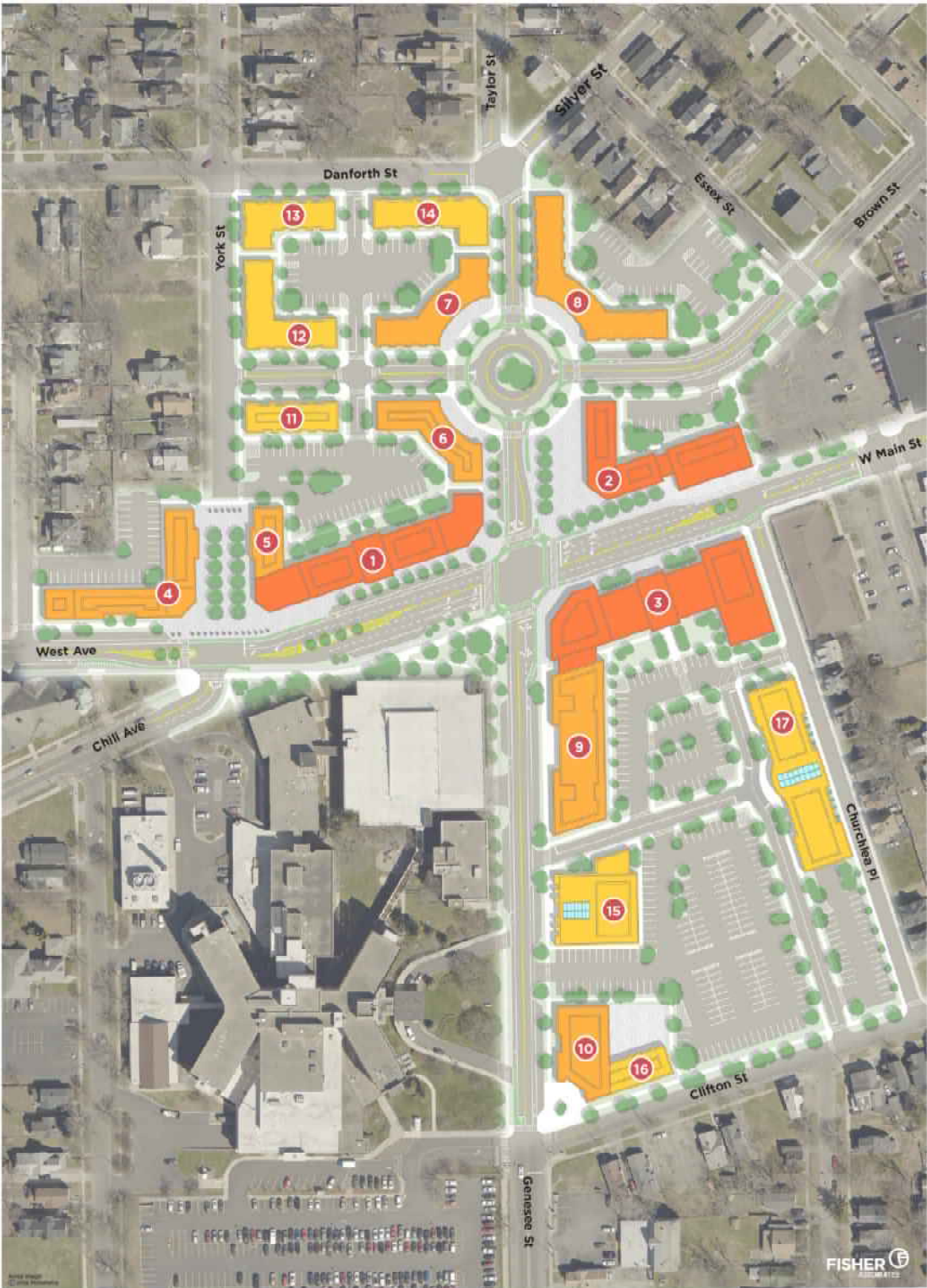
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#### **D. TRIP GENERATION DATA**



Frame 2B

- Building Height
- 4-stories
  - 3-stories
  - 2-stories



Trip Generation - AM Peak

Building / Building part	Total SQFT	Land Use	ITE Land Use Code	Commercial		Residential			Police	Average Rate	New Trips - Mixed Use			New Trips - Residential Only			New Trips - Office			New Trips - Police			New Trips		
				Floors	SQFT	Floors	SQFT	Units*	SQFT		Entering (41%)	Exiting (59%)	Total	Entering (LR-30%) (MR-27%)	Exiting (LR-70%) (MR-73%)	Total	Entering (86%)	Exiting (14%)	Total	Entering (75%)	Exiting (25%)	Total	Entering	Exiting	Total
1	67,000	Mixed-use	231	1	16,750	3	50,250	42	n/a	0.31	5	8	13	-	-	-	-	-	-	-	-	-	5	8	13
2	55,000	Mixed-use	231	1	13,750	3	41,250	34	n/a	0.31	5	6	11	-	-	-	-	-	-	-	-	-	5	6	11
3	97,000	Mixed-use	231	1	24,250	3	72,750	61	n/a	0.31	8	11	19	-	-	-	-	-	-	-	-	-	8	11	19
4	36,000	Mixed-use	231	1	12,000	2	24,000	20	n/a	0.31	2	4	6	-	-	-	-	-	-	-	-	-	2	4	6
5	11,250	Mixed-use	231	1	3,750	2	7,500	6	n/a	0.31	1	1	2	-	-	-	-	-	-	-	-	-	1	1	2
6	21,750	Mixed-use	231	1	7,250	2	14,500	12	n/a	0.31	2	2	4	-	-	-	-	-	-	-	-	-	2	2	4
7	23,250	Res Only	221	n/a	n/a	3	23,250	19	n/a	0.29	-	-	-	2	4	6	-	-	-	-	-	-	2	4	6
8	34,500	Res Only	221	n/a	n/a	3	34,500	29	n/a	0.29	-	-	-	2	6	8	-	-	-	-	-	-	2	6	8
9	42,750	Mixed-use	231	1	14,250	2	28,500	24	n/a	0.31	3	4	7	-	-	-	-	-	-	-	-	-	3	4	7
10	23,250	Mixed-use	231	1	7,750	2	15,500	13	n/a	0.31	2	2	4	-	-	-	-	-	-	-	-	-	2	2	4
11	9,500	Res Only	220	n/a	n/a	2	9,500	8	n/a	0.36	-	-	-	1	2	3	-	-	-	-	-	-	1	2	3
12	15,500	Res Only	220	n/a	n/a	2	15,500	13	n/a	0.36	-	-	-	2	4	5	-	-	-	-	-	-	2	4	5
13	11,500	Res Only	220	n/a	n/a	2	11,500	10	n/a	0.36	-	-	-	1	2	3	-	-	-	-	-	-	1	2	3
14	13,500	Res Only	220	n/a	n/a	2	13,500	11	n/a	0.36	-	-	-	1	3	4	-	-	-	-	-	-	1	3	4
15	22,500	Office	710	2	22,500	n/a	n/a	n/a	n/a	0.83	-	-	-	-	-	-	16	3	19	-	-	-	16	3	19
16	6,500	Mixed-use	231	1	3,250	1	3,250	3	n/a	0.31	0	1	1	-	-	-	-	-	-	-	-	-	0	1	1
17	32,000	Police	Custom	n/a	n/a	n/a	Staff:	99	32,000	1.10	-	-	-	-	-	-	-	-	-	82	27	109	82	27	109
Total					125,500		365,250	403	32,000		28	39	67	9	21	29	16	3	19	82	27	109	135	90	224

Zone Totals	Entering	Exiting	Total
4	2	4	6
1,5,6,7,11,12,13,14	15	26	40
8	2	6	8
2	5	6	11
3,9,10,15,16,17	111	48	159
Total	135	90	224

\* Based on 1,200 SQFT of rentable area per unit. Rentable SQFT includes common areas such as lobbies, hallways, and laundry areas. All units assumed to be two-bedroom.

\*\* Rates based on Dense Multi-Use Urban, Occupied Dwelling Units

Trip Generation - PM Peak

Building / Building part	Total SQFT	Land Use	ITE Land Use Code	Commercial		Residential			Police	Average Rate	New Trips - Mixed Use			New Trips - Residential Only			New Trips - Office			New Trips - Police			New Trips		
				Floors	SQFT	Floors	SQFT	Units*	SQFT		Entering (44%)	Exiting (56%)	Total	Entering (LR-55%) (MR-63%)	Exiting (LR-45%) (MR-37%)	Total	Entering (17%)	Exiting (83%)	Total	Entering (20%)	Exiting (80%)	Total	Entering	Exiting	Total
1	67,000	Mixed-use	231	1	16,750	3	50,250	42	n/a	0.47	9	11	20	-	-	-	-	-	-	-	-	-	9	11	20
2	55,000	Mixed-use	231	1	13,750	3	41,250	34	n/a	0.47	7	9	16	-	-	-	-	-	-	-	-	-	7	9	16
3	97,000	Mixed-use	231	1	24,250	3	72,750	61	n/a	0.47	12	16	28	-	-	-	-	-	-	-	-	-	12	16	28
4	36,000	Mixed-use	231	1	12,000	2	24,000	20	n/a	0.47	4	5	9	-	-	-	-	-	-	-	-	-	4	5	9
5	11,250	Mixed-use	231	1	3,750	2	7,500	6	n/a	0.47	1	2	3	-	-	-	-	-	-	-	-	-	1	2	3
6	21,750	Mixed-use	231	1	7,250	2	14,500	12	n/a	0.47	3	3	6	-	-	-	-	-	-	-	-	-	3	3	6
7	23,250	Res Only	221	n/a	n/a	3	23,250	19	n/a	0.27	-	-	-	3	2	5	-	-	-	-	-	-	3	2	5
8	34,500	Res Only	221	n/a	n/a	3	34,500	29	n/a	0.27	-	-	-	5	3	8	-	-	-	-	-	-	5	3	8
9	42,750	Mixed-use	231	1	14,250	2	28,500	24	n/a	0.47	5	6	11	-	-	-	-	-	-	-	-	-	5	6	11
10	23,250	Mixed-use	231	1	7,750	2	15,500	13	n/a	0.47	3	3	6	-	-	-	-	-	-	-	-	-	3	3	6
11	9,500	Res Only	220	n/a	n/a	2	9,500	8	n/a	0.33	-	-	-	2	1	3	-	-	-	-	-	-	2	1	3
12	15,500	Res Only	220	n/a	n/a	2	15,500	13	n/a	0.33	-	-	-	2	2	4	-	-	-	-	-	-	2	2	4
13	11,500	Res Only	220	n/a	n/a	2	11,500	10	n/a	0.33	-	-	-	2	1	3	-	-	-	-	-	-	2	1	3
14	13,500	Res Only	220	n/a	n/a	2	13,500	11	n/a	0.33	-	-	-	2	2	4	-	-	-	-	-	-	2	2	4
15	22,500	Office	710	2	22,500	n/a	n/a	n/a	n/a	0.87	-	-	-	-	-	-	3	17	20	-	-	-	3	17	20
16	6,500	Mixed-use	231	1	3,250	1	3,250	3	n/a	0.47	0	1	1	-	-	-	-	-	-	-	-	-	0	1	1
17	32,000	Police	Custom	n/a	n/a	n/a	Staff:	99	32,000	0.71	-	-	-	-	-	-	-	-	-	14	56	70	14	56	70
Total					125,500		365,250	403	32,000		44	56	100	16	11	27	3	17	20	14	56	70	77	140	217

Zone Totals	Entering	Exiting	Total
4	4	5	9
1,5,6,7,11,12,13,14	24	24	48
8	5	3	8
2	7	9	16
3,9,10,15,16,17	37	99	136
Total	77	140	217

\* Based on 1,200 SQFT of rentable area per unit. Rentable SQFT includes common areas such as lobbies, hallways, and laundry areas. All units assumed to be two-bedroom.

\*\* Rates based on Dense Multi-Use Urban, Occupied Dwelling Units