

Note - this document is included in Appendix III -  
Traffic Information of the Midtown Redevelopment Final  
Design Report

# **TRAFFIC ANALYSIS**

## **Broad Street Two-Way Conversion**

### **Chestnut Street to Stone Street City of Rochester, New York**

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## **Introduction**

The City of Rochester and Monroe County Department of Transportation are investigating the conversion of Broad St from one-way to two-way traffic. The segment of Broad St to the east of Chestnut St is being analyzed as part of the City's Broad-Court-Chestnut (BCC) project, while the segment between Chestnut St and Stone St has been analyzed as part of the Midtown Redevelopment project. Phase 1 of the Midtown project would include the two-way conversion between Chestnut St and S. Clinton Ave, and Phase 2 would include the two-way conversion between S. Clinton Ave and Stone St.

The traffic analysis for the two-way conversion of Broad St between Chestnut St and Stone St has been completed by LaBella Associates per discussions at a coordination meeting on December 3, 2010. The analysis incorporates design and analysis that has recently been completed by Clark Patterson-Lee and SRF & Associates for the portion of Broad St to the east of Chestnut St as part of the City's BCC project.

Following is a description of the methodology used, proposed lane and intersection configuration, and a summary of the results that support the full two-way conversion of Broad St. Plans, traffic volume diagrams, and Synchro capacity analysis reports are included in the Appendix.

## **Methodology**

### **Intersections Analyzed**

- Broad St / Chestnut St
- Broad St / Road "E" (Future Intersection)
- Broad St / Midtown Garage Ramp
- Broad St / Clinton Ave
- Broad St / Stone St / Bausch & Lomb Place
- Broad St / South Ave

### **Existing Traffic Counts**

Traffic counts were taken by LaBella Associates at the intersections with Clinton Ave and Chestnut St in September 2010. Traffic counts from 2008 were used at the Stone St and South Ave intersections. Refer to Figure 1 for a summary of the existing traffic volumes along Broad Street.

### **Background Traffic Volumes**

The existing traffic counts were projected to the design year 2032 (ETC+20 for the Midtown Redevelopment) using a growth rate of 0.5% per year. Traffic volumes for the components of the former Renaissance Square project (downtown transit center, MCC campus) were also added to determine background, or "No-Build" traffic volumes. Refer to Figure 2 for a summary of the Broad St background traffic volumes.

### **Future Traffic Volumes**

Trips generated from the proposed Midtown Redevelopment were added to the background traffic volumes (refer to Figure 3 for Midtown trip generation volumes). Broad St eastbound traffic volumes were derived from the MCDOT City Coordination Spreadsheet and also added to the background traffic volumes (refer to Figure 4). The background, Midtown and Broad St eastbound volumes were combined to determine the future traffic volumes with a full two-way conversion of Broad St (refer to Figure 5). The Synchro software package was utilized to model the studied intersections. Existing signal timings (provided by MCDOT and verified in the field) were used.

### **Proposed Intersection and Lane Configuration**

Following is a description of the proposed travel lane and intersection configuration for the segments of Broad Street and intersections affected by the two-way conversion (also refer to Dwgs. BP-01 and BP-02):

- Chestnut St to S. Clinton Ave Segment: This segment of Broad Street will generally consist of three lanes plus recessed parking lanes. Broad St westbound will include one travel lane with recessed parking, which widens to two travel lanes at the Clinton Ave intersection. The eastbound direction will include one travel lane with recessed parking. A center two-way left turn lane will be provided between Atlas St and the Midtown Parking Garage ramps.
- S. Clinton Ave to Stone St Segment: This segment will include two westbound travel lanes and one eastbound travel lane. The northern curb line and existing recessed parking area for the Clinton Square building will be maintained.
- Stone St to South Ave Segment: The existing curb lines will be maintained. The proposed lane configuration includes one eastbound travel lane and two westbound travel lanes (with left turn lanes at the South Ave intersection). A portion of the existing concrete median will need to be reconstructed to the north to accommodate an eastbound left turn / U-turn lane at Stone St.
- Broad St / Chestnut St Intersection: This intersection will be reconstructed as part of the City's Broad-Court-Chestnut (BCC) project, which will likely precede the Midtown Redevelopment project. Initially, the Broad Street westbound approach will be constructed with two lanes (through / left and through / right). This approach will require re-striping to include one through lane and one left turn lane once the two-way conversion of Broad St is implemented between Chestnut St and S. Clinton Ave. The Broad St eastbound approach will include a left turn lane and a through/right turn lane. It is expected that the BCC project will include underground conduit for the future signal equipment needed for the eastbound approach.
- Broad St / Clinton Ave Intersection: The new Broad St eastbound approach will include a through lane and left turn lane. The westbound approach will include two through travel lanes. On S. Clinton Ave, the existing right curb lane is proposed to be converted to a right turn only lane, as this travel lane becomes a parking / bus lane north of the Broad St intersection. The northbound dual left turn from S. Clinton Ave to Broad St will be maintained, and "cat tracks" may be helpful to guide vehicles through the turn. New signal equipment will be installed for the eastbound approach.
- Broad St / Stone St / B&L Place Intersection: The existing splitter island will be removed to accommodate the new eastbound through movement. A portion of the existing concrete median at the eastbound approach will be reconstructed to allow for a left turn lane. Many vehicles currently make a u-turn at the eastbound approach in order to access the South Ave Parking Garage. AASHTO turning templates indicate that the proposed geometry will accommodate the eastbound u-turn movement. The proposed left turn lane from Broad St westbound to Bausch & Lomb Place will be separated with a striped median to align with the eastbound left turn lane. Signal equipment for the eastbound approach will be relocated (from the splitter island) or replaced.
- Broad St / South Ave Intersection: The existing lane configuration will be maintained at this intersection.

### Level of Service Analysis

A level of service analysis was completed for the Future (Year 2032) condition with the conversion of Broad St to two-way traffic. Results of the analysis are summarized in the following tables:

**Broad St / Chestnut St Intersection (Signalized)**

Street & Approach		Peak Hour	ETC+20 LOS (Approach Delay)
Broad St Eastbound	Left	AM	C (24.7)
		PM	C (28.4)
	Thru/Right	AM	C (21.8)
		PM	C (33.3)
	Overall	AM	C (22.8)
		PM	C (31.9)
Broad St Westbound	Left	AM	C (24.5)
		PM	D (36.7)
	Thru/Right	AM	C (25.8)
		PM	C (21.7)
	Overall	AM	C (25.5)
		PM	C (28.4)
Chestnut St Northbound	Left	AM	B (18.4)
		PM	D (48.4)
	Thru	AM	C (25.8)
		PM	B (18.3)
	Overall	AM	C (23.3)
		PM	C (25.9)
Chestnut St Southbound	Left	AM	A (2.5)
		PM	B (14.0)
	Thru/Right	AM	C (22.1)
		PM	D (37.8)
	Overall	AM	C (21.6)
		PM	D (37.2)
Overall Intersection		AM	C (22.6)
		PM	C (31.1)

**Broad St / Future Road "E" Intersection (Unsignalized)**

Street & Approach		Peak Hour	ETC+20 LOS (Approach Delay)
Broad St Eastbound	Left	AM	B (10.2)
		PM	A (8.8)
Road “E” Southbound	Overall	AM	D (28.9)
		PM	C (17.2)
Overall Intersection		AM	A (1.1)
		PM	A (1.5)

**Broad St / Midtown Garage Ramp Intersection (Unsignalized)**

Street & Approach		Peak Hour	ETC+20 LOS (Approach Delay)
Broad St Westbound	Left	AM	A (9.9)
		PM	A (8.2)
Garage Ramp Northbound	Overall	AM	F (168.9) v/c=1.2
		PM	E (38.8) v/c=0.77
Overall Intersection		AM	B (31.7)
		PM	A (11.7)

**Broad St / Clinton Ave Intersection (Signalized)**

Street & Approach		Peak Hour	ETC+20 LOS (Approach Delay)
Broad St Eastbound	Left	AM	C (32.1)
		PM	E (58.3) v/c 0.69
	Thru	AM	C (30.2)
		PM	D (40.1)
	Overall	AM	C (30.5)
		PM	D (46.7)
Broad St Westbound	Overall	AM	C (25.2)
		PM	D (43.4)
Clinton Ave Northbound	Left	AM	A (6.3)
		PM	A (2.2)
	Thru	AM	A (5.2)
		PM	A (2.2)
	Right	AM	A (0.9)
		PM	A (0.2)
	Overall	AM	A (5.0)
		PM	A (2.0)
Overall Intersection		AM	B (11.8)
		PM	B (16.2)

**Broad St / Stone St Intersection (Signalized)**

Street & Approach		Peak Hour	ETC+20 LOS (Approach Delay)
Broad St Eastbound	Left	AM	A (6.2)
		PM	A (2.9)
	Thru/Right	AM	A (0.3)
		PM	A (1.5)
	Overall	AM	A (2.3)
		PM	A (1.8)
Broad St Westbound	Left	AM	A (4.1)
		PM	A (8.3)
	Thru/Right	AM	A (5.3)
		PM	A (9.6)
	Overall	AM	A (5.2)
		PM	A (9.5)
Stone St Southbound	Overall	AM	D (46.2)
		PM	D (41.0)
Overall Intersection		AM	A (4.4)
		PM	B (12.7)

**Broad St / South Ave Intersection (Signalized)**

Street & Approach		Peak Hour	ETC+20 LOS (Approach Delay)	ETC+20 LOS (Approach Delay) With Improvements
Broad St Eastbound	Thru	AM	D (48.4)	N/A
		PM	D (41.4)	C (31.8)
	Right	AM	C (31.9)	N/A
		PM	F (136.7)	E (56.7) v/c 0.89
	Overall	AM	D (44.0)	N/A
		PM	F (94.6)	D (45.7)
Broad St Westbound	Left	AM	C (33.5)	N/A
		PM	C (25.5)	C (28.9)
	Thru/Right	AM	B (14.3)	N/A
		PM	B (10.9)	B (12.2)
	Overall	AM	B (18.6)	N/A
		PM	B (16.8)	B (18.9)
South Ave Southbound	Left	AM	A (9.1)	N/A
		PM	B (11.7)	B (12.6)
	Thru/Right	AM	A (7.5)	N/A
		PM	B (13.1)	B (14.7)
	Overall	AM	A (7.7)	N/A
		PM	B (13.0)	B (14.5)
Overall Intersection		AM	C (20.4)	N/A
		PM	C (29.5)	C (21.8)



### **Conclusions**

The level of service analysis indicates that the Broad St intersections with Chestnut St, Future Road "E", Clinton Ave and Stone St will operate with acceptable levels of service and delay upon the conversion of Broad St from one-way to two-way traffic.

At the Broad St / South Ave intersection, the eastbound approach is projected to operate at LOS "F" under future conditions. Signal timing modifications could improve the approach LOS to "E" with a volume-to-capacity ratio of 0.89. The timing changes include reducing the green time for the exclusive westbound left turn phase and adding the time to the combined eastbound / westbound phase (the existing cycle length would be maintained, as would the phasing for the South Ave approach). This intersection should be monitored once the two-way conversion is implemented and the Midtown site redevelopment progresses to determine if signal timing modifications are needed.

At the Broad St / Midtown Parking Garage ramp intersection, the level of service analysis indicates that the ramp approach will operate at LOS "F" during the morning peak hour. The volume of vehicles exiting the garage is projected based on expected distribution percentages for the garage exit ramps. The majority of the vehicles using the Broad St exit ramp will likely be coming from Level C, where the ramp originates. These vehicles also have the option to use the Court St exit ramp. If the projected delays at the Broad St ramp are realized, then it is likely that more vehicles will utilize the Court St ramp instead. For example, if 30 of the left turning vehicles at the Broad St ramp instead used the Court St ramp, the v/c ratio at the Broad St ramp would be less than 1.0.

Actual delays at the Broad St ramp may be less than projected, due to the likelihood that the nearby signals at S. Clinton Ave and Chestnut St will provide gaps in traffic along Broad St. Nonetheless, this intersection should be monitored as the Midtown Redevelopment progresses in order to evaluate actual traffic volumes and garage usage patterns.

Refer to the Appendix for plans showing the proposed Broad St lane configuration, traffic volume diagrams, turning movement figures, and Synchro capacity analysis reports.