

# Appendix E: 2nd Street Corridor Traffic Operational Analysis/Assessment

## I. Introduction

The study analyzes the 2nd Street Southwest Corridor from 6th Avenue to TH 52. It is based upon the existing daily traffic volumes provided by the City Public Works Department and also the projected daily traffic volumes provided by ROCOG. The study provides a planning level assessment of the capacity of the 2nd Street Corridor. This assessment will allow for a generalized corridor capacity on a daily basis to determine the impacts of the existing land uses and the City-projected changes. Intersections that were examined as part of this study include:

- 2nd Street & West Frontage Road TH 52.
- 2nd Street & East Frontage Road TH 52.
- 2nd Street & 16th Avenue.
- 2nd Street & 14th Avenue.
- 2nd Street & 11th Avenue.
- 2nd Street & 6th Avenue.

## II. Data Collection

### 2000-2006 Historical Traffic Volumes

Historical Traffic Counts for the years 2000 – 2006 were obtained from the MnDOT website. These counts are conducted by-annually and are adjusted based upon day of week and month of year. They have been used to compute a historical traffic growth factor that can be compared to projected growth factor. Current turning movement counts have also been obtained. These are from the City of Rochester Public Works Department, and are counts taken in 2006 for the Traffic Signal Retiming Study.

Table 1

2nd Street SW Traffic Volumes														
Year	2000	2002	2004	2006	2000-2006 Historic Traffic				2035 ROCOG Traffic Projections range					
Source	MnDOT	MnDOT	MnDOT	MnDOT	Growth	Ratio			Range			ratio		
Location						2006 volume /2000 volume	Growth Factor	yearly % growth	low	high	Recomm ended Volume *	2035 volume /2000 volume	Growth Factor	yearly % Growth
6 <sup>th</sup> -11th	17,300	16,200	19,900	17,800	500	1.029	1.0047	0.474	28,000	33,700	26,000	1.783	1.017	1.667
11-16th	18,700	18,900	19,000	19,500	800	1.043	1.0070	0.76	17,000	28,000	29,800	1.203	1.005	0.530
16-TH 52	22,400	22,300	21,700	23,200	800	1.036	1.0059	0.584	33,700	43,750	42,300	1.729	1.016	1.577

\* These volumes were recommended by the Working Session Members

**Dates of Turning Movement Counts** (all are 6:45-8:45AM & 3:30–5:45 PM)

Intersection	Date Counted
• 2nd St & W Frontage Rd TH 52.	11-09-2006
• 2nd St & E Frontage Rd TH 52.	11-14-2006
• 2nd St & 16th Avenue.	11-19-2006
• 2nd St & 14th Avenue.	11-16-2006
• 2nd St & 11th Avenue.	11-28-2006
• 2nd St & 6th Avenue.	11-29-2006

**Projected Traffic Volumes**

Projected Traffic Counts for the year 2035 were obtained from the ROCOG staff. These are presented graphically and are attached in the appendix. They show the Average Daily Traffic in a range. For this study, the average of the range is used. However, the working session members adjusted these to be the numbers seen in the chart.

ROCOG also provides Projected Turning Movements Counts from the Model. However these must be adjusted to account for new information that has been discovered since their generation and also converted to Peak Hour Movements. A peak hour factor of 11.4% has been used for this study. It is calculated by dividing the current

year park hour traffic by the current year ADT. For 2nd Street at the East Frontage Road this equals  $2,657 / 23,200 = .114$

**III. Traffic Analysis**

**A. Corridor Details**

The roadway currently has 2 through lanes in each direction with left-turn lanes provided at the following locations:

- East & West Bound at 6th Avenue
- East Bound at 11th Avenue
- East Bound at 16th Avenue
- Dual East Bound at the East Frontage Road
- Dual West Bound at the West Frontage Road

In addition, there are right turn lanes provided at the following locations:

- West Bound at 11th Avenue
- West Bound at the East Frontage Road

## B. Corridor Capacity

The daily capacity of any individual roadway is based upon many factors which may include the number of lanes provided, the number of access points per mile, the number of signalized intersections per mile, percentage of truck and/or bus traffic, and the physical grade of the roadway. However, for planning purposes, a generalized average daily traffic (ADT) threshold for the roadway is used. Table 2 shows the generalized ADT volume thresholds for a roadway type and a number of lanes in terms of level of service (LOS). This is a qualitative measure describing operational conditions within a traffic stream, generally in terms of service measures such as speed, freedom to maneuver, traffic interruptions, and comfort. An LOS of A represents the best results with little or no delay. An LOS of F represents the worst results with excessive delay and queues. An LOS of D is usually the lowest accepted by most agencies.

It is important to remember that this information is for planning level purposes only. While Table 2 is a good guide, there are existing two-lane roads that are accommodating higher daily volumes of traffic than assumed in this table. Based upon the information in Table 2 and the projected volumes in figure 2, the LOS for each segment of the study corridor can be determined.

**Table 2  
Generalized Average Daily Traffic Volume Thresholds**

Facility Type	Maximum ADT Volume at Level of Service				
	A	B	C	D	E
2-Lane Roadway- Without Turn lanes	3,000	4,500	6,500	8,500	10,000
With Right Turn Lanes	4,750	7,200	10,300	13,500	15,900
3-Lane Roadway- Without Turn lanes	5,250	7,900	11,400	14,900	17,500
With Right Turn Lanes	7,500	11,250	16,250	21,250	25,000
4-Lane Roadway- Without Turn lanes	7,100	10,700	15,400	20,100	23,700
With Right Turn Lanes	9,600	14,400	20,700	27,100	31,900
5-Lane Roadway- Without Turn lanes	10,100	15,200	21,900	28,600	33,700
With Right Turn Lanes	12,600	18,900	27,200	35,600	41,900

## Level of Service (With no roadway changes)

Segment	Current Volume	Current LOS	Year 2035 Projected Volume	Projected LOS
6 <sup>th</sup> -11th	17,800	D	26,000	F
11-16th	19,500	D	29,800	F
16-TH 52	23,200	C	42,300	F

## C. Current Intersection Volumes

The current year p.m. peak hour volumes of the study intersections were analyzed using the Synchro/SimTraffic software package, which uses the methodology presented in the Highway Capacity Manual. These results are also presented in terms of Level of Service. More detailed LOS results and queue analyses are provided in the appendix of this report.

**Rochester 2nd Street Corridor  
Existing Conditions**

2nd Street & 6th Avenue		NB on 6th Ave			SB on 6th Ave			EB on 2nd Street			WB on 2nd Street			Total	
		Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right		
Signalized Intersection	<b>AM Peak Hour</b>	<b>Volume</b>	59	399	18	42	129	33	166	599	180	30	328	51	<b>B</b>
		<b>Delay</b>	29.8	20.8	17.2	36.4	18.2	8.8	25.9	8.6	12.5	30.1	9.8	8.3	
		<b>LOS</b>	<b>C</b>	<b>C</b>	<b>B</b>	<b>D</b>	<b>B</b>	<b>A</b>	<b>C</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>A</b>	<b>A</b>	
		<b>Lanes</b>	1	1		1	1		1	2		1	2		
		<b>Queues</b>	76	274		58	110		161	168-209		49	86-111		
Signalized Intersection	<b>PM Peak Hour</b>	<b>Volume</b>	101	168	24	71	408	104	54	453	124	55	770	85	<b>C</b>
		<b>Delay</b>	75.7	20.9	14.7	33.2	26.6	22.9	49.7	14.4	16.8	33.4	18.6	16.8	
		<b>LOS</b>	<b>E</b>	<b>C</b>	<b>B</b>	<b>C</b>	<b>C</b>	<b>C</b>	<b>D</b>	<b>B</b>	<b>B</b>	<b>C</b>	<b>B</b>	<b>B</b>	
		<b>Lanes</b>	1	1		1	1		1	2		1	2		
		<b>Queues</b>	182	248		123	418		83	176-198		67	237-268		

2nd Street & 11th Avenue		NB on 11th Ave			SB on 11th Ave			EB on 2nd Street			WB on 2nd Street			Total	
		Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right		
Signalized Intersection	<b>AM Peak Hour</b>	<b>Volume</b>				159		77	55	1,083			321	67	<b>A</b>
		<b>Delay</b>				23.3		8.7	12.0	6.2			4.2	3.5	
		<b>LOS</b>				<b>C</b>		<b>A</b>	<b>B</b>	<b>A</b>			<b>A</b>	<b>A</b>	
		<b>Lanes</b>				1		1	1	2			2	1	
		<b>Queues</b>				134		41	54	163-189			81-70	39	
Signalized Intersection	<b>PM Peak Hour</b>	<b>Volume</b>				149		105	105	475			978	164	<b>A</b>
		<b>Delay</b>				27.7		14.8	24.3	4.2			7.1	6.8	
		<b>LOS</b>				<b>C</b>		<b>B</b>	<b>C</b>	<b>A</b>			<b>A</b>	<b>A</b>	
		<b>Lanes</b>				1		1	1	2			2	1	
		<b>Queues</b>				131		71	94	84-96			141-137	46	

2nd Street & 14th Avenue		NB on 14th Ave			SB on 14th Ave			EB on 2nd Street			WB on 2nd Street			Total
		Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Signalized Intersection	AM Peak Hour	Volume	241		113			890	407		130	293		30.8
		Delay	44.3		14.0			8.9	12.3		208.4	55.1		
		LOS	<b>D</b>		<b>B</b>			<b>A</b>	<b>B</b>		<b>F</b>	<b>E</b>		
		Lanes	1		1			2			2			
		Queues	277		143			261-318			733-616			
Signalized Intersection	PM Peak Hour	Volume	418		128			500	182		167	800		23.9
		Delay	41.1		17.9			10.9	13.1		53.9	23.9		
		LOS	<b>D</b>		<b>B</b>			<b>B</b>	<b>B</b>		<b>D</b>	<b>C</b>		
		Lanes	1		1			2			2			
		Queues	516		195			210-235			490-504			

2nd Street & 16th Avenue		NB on 16th Ave			SB on 16th Ave			EB on 2nd Street			WB on 2nd Street			Total	
		Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right		
Signalized Intersection	AM Peak Hour	Volume	1	1	1	90	1	80	155	1,287	1	1	491	42	8.2
		Delay	0.0	11.1	14.4	30.7	29.4	14.9	10.9	7.2	0.0	0.0	5.8	4.2	
		LOS	<b>A</b>	<b>B</b>	<b>B</b>	<b>C</b>	<b>C</b>	<b>B</b>	<b>B</b>	<b>A</b>	<b>A</b>	<b>A</b>	<b>A</b>	<b>A</b>	
		Lanes	1	1			1		1	2			2		
		Queues	6	10			141		113	249-275			87-141		
Signalized Intersection	PM Peak Hour	Volume	8	6	9	79	5	272	133	692	8	19	1,276	113	37.5
		Delay	41.5	32.3	3.8	46.7	53.1	34.2	39.0	12.9	8.8	78.8	48.2	53.5	
		LOS	<b>D</b>	<b>C</b>	<b>A</b>	<b>D</b>	<b>D</b>	<b>C</b>	<b>D</b>	<b>B</b>	<b>A</b>	<b>E</b>	<b>D</b>	<b>D</b>	
		Lanes	1	1			1		1	2			2		
		Queues	22	35			320		160	211-226			407-438		

2nd Street & TH 52 East Frontage Rd		NB on E Frontage Rd			SB on E Frontage Rd			EB on 2nd Street			WB on 2nd Street			Total
		Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Signalized Intersection	AM Peak Hour	Volume	119	108	251				136	1,279		253	290	15.2  <b>B</b>
		Delay	42.2	40.3	22.5				46.8	9.5		9.2	4.6	
		LOS	<b>D</b>	<b>D</b>	<b>C</b>				<b>D</b>	<b>A</b>		<b>A</b>	<b>A</b>	
		Lanes	2		1				2	2		4	1	
		Queues	99-168		167				105-119	157-173		67-92-17-0		
Signalized Intersection	PM Peak Hour	Volume	156	176	84				233	577		687	617	21.6  <b>C</b>
		Delay	46.4	43.7	16.8				49.3	14.3		15.0	15.8	
		LOS	<b>D</b>	<b>D</b>	<b>B</b>				<b>D</b>	<b>B</b>		<b>B</b>	<b>B</b>	
		Lanes	2		1				2	2		4	1	
		Queues	196-190		134				122-133	172-167		89-114-159-337		

2nd Street & TH 52 West Frontage Rd		NB on W Frontage Rd			SB on W Frontage Rd			EB on 2nd Street			WB on 2nd Street			Total
		Left	Through	Right	Left	Through	Right	Left	Through	Right	Left	Through	Right	
Signalized Intersection	AM Peak Hour	Volume				721	116	200		660	108	323	97	53.2  <b>D</b>
		Delay				65.7	70.2	33.3		54.0	49.4	39.2	25.1	
		LOS				<b>E</b>	<b>E</b>	<b>C</b>		<b>D</b>	<b>D</b>	<b>D</b>	<b>C</b>	
		Lanes				2		1		4		2	2	
		Queues				413-421		255		58-179-384-405			128-138	
Signalized Intersection	PM Peak Hour	Volume				324	94	164		424	195	251	689	25  <b>C</b>
		Delay				44.2	43.2	23.7		31.7	22.2	32.3	8.1	
		LOS				<b>D</b>	<b>D</b>	<b>C</b>		<b>C</b>	<b>C</b>	<b>C</b>	<b>A</b>	
		Lanes				2		1		4		2	2	
		Queues				174-155		214		84-109-155-219			130-139	

#### D. Projected Intersection Volumes

ROCOG also provides Projected Turning Movements Counts from the Model. However these must be adjusted to account for new information that has been discovered since their generation and also converted to Peak Hour Movements. A peak hour factor of 11.4% has been used for this study. It is calculated by dividing the current year park hour traffic by the current year ADT. For 2nd Street at the East Frontage Road this equals  $2,657 / 23,200 = .114$

#### IV. Identified Priority Needs and Traffic Improvements

Several priority needs and traffic improvements were identified in a working session with the City DPW staff. The following ideas were identified and prioritized. A review of the concepts will follow that will allow for an evaluation of the effectiveness of traffic & pedestrian flow with regards to operations and safety. Revisions to the concepts will be made to ensure maximum safety & traffic flow.

At this time these are only suggestions going into the working session.

1. Replace the pavement with new concrete pavement.
2. Add right turn lanes for all intersections with signals, where feasible.
3. Move the Mayo Shuttle bus access from 12th Avenue to 11th Avenue.
4. Synchronize the traffic signals all hours which meet warrant # one, weekdays & weekends.
5. Increase the private driveway spacing to meet the current Thoroughfare plan standards.
6. Provide an off-street indoor waiting area for transit passengers for both directions at St Marys Hospital.
7. Eliminate left-turns from minor side streets 9th Avenue, 12th Avenue, 13th Avenue, 15th Avenue and 16th Avenue West.
8. Remove parking from 6th Avenue to 11th Avenue.
9. Widen the sidewalks and boulevards from 6th Avenue to 11th Avenue.
10. Review the current City of Rochester 6-year Capital Improvement Plan (CIP) for projects.
  - a) St. Mary's transit hub – expand the passenger waiting and shelter area, signage.

- b) Reconstruct 2nd Street SW from 2nd Avenue to 6th Avenue with concrete pavement
- c) Signal Optimization – yearly.

#### V. Conclusions & Recommendations

Based upon the information presented in this report, the following recommendations have been drawn regarding the

- Traffic volumes are expected to continue to increase as more jobs are created within the corridor.
- 2nd Street Corridor can not be expected to accommodate all of the desired trips. Expansion of capacity on parallel routes is needed along with continued transfer of trips to transit & non-motorized methods.
- Addition of a right turn lane for east bound traffic at 14th Avenue would be valuable.
- Management of access into driveways and minor side streets would also be valuable.

#### VI. Appendix

- MnDOT bi-annual traffic count data for 2000, 2002, 2004 and 2006 -4 sheets
- City of Rochester turn count data for AM & PM hours at 6 signalized intersections in the corridor.
- ROCOG 2035 Traffic Projections - 4 sheets
- SimTraffic Performance Report Existing PM – 3 sheets

**Meeting Minutes**  
**2nd Street Corridor Neighborhood Planning & Design**  
**Working Session Meeting**

Thursday November 29, 2007 – 2:00 PM  
Rochester Public Works

Attendance: City – R. Freese, G. Shannon  
Bonestroo – G. Martin, D. Rossman, D. Trangsrud

**1. Review of Proposal Elements 109 & 110**

This was reviewed with No comments, it has been reviewed by the main Taskforce.

**2. Review of Draft Traffic Report Task 109** This was reviewed with the following comments:

- a. Page 1 – year 2035 ROCOG Traffic Projections, use 26,000 for east district, 29,800 for St. Marys District and 42,300 for Gateway District.
- b. Page 2 – Data Collection: add a chart with the number of driveways in each district.
- c. Page 3 – LOS 2035 add “with no roadway changes” to the chart, and all levels at LOS “F”.
- d. Page 5 – Traffic Improvements #2; add “where feasible”

**3. Review of Draft Parking report Task 110**

This was reviewed with the following comments:

- a. Revise the note on hours and days of the current parking restriction from 6th to 11th to read: “during the hours of 9:00 AM to 5:00 PM Monday thru Saturday.

**4. Identify Priority Needs, Traffic and Improvement**

See the current CIP 2007-2012

St. Marys transit hub - expanded passenger waiting and shelter area, signage - 2008

Reconstruct 2 St SW from 2 Av SW to 6 Av SW with concrete pavement. – 2008

Signal Optimization (Labor & materials) – yearly