

Traffic Study #5 Synchro Analysis Mid-Corridor – June 26, 2008 Two Lane Traffic Evaluation of University Avenue

Introduction

The purpose of the Two Lane Traffic Evaluation of University Avenue is to determine impacts to roadway and intersection operations resulting from operating a single through lane in each direction as part of the Central Corridor LRT project. The study will determine the expected level of service (LOS) at intersections along University Avenue for a geometric configuration for the following eastbound and westbound lanes on University Avenue:

- One through lane in each direction on University Avenue from Eustis Street to Rice Street in Saint Paul.
- Left turn lanes at the intersections are set with lengths as per existing conditions.
- Right turn lanes at the intersections are set at a 200 foot length.

The proposed University Avenue alternatives will be evaluated using Synchro traffic analysis software. Synchro analysis software uses Highway Capacity Manual (HCM) procedures to evaluate traffic signal and urban street operations in a static condition. With Synchro, a model is built to accurately reflect the urban street scenario of an alternative. This analysis was chosen to allow for additional alternatives to be evaluated and compared in a short time frame. The results will also be simulated with the SimTraffic software module. SimTraffic will provide a visual simulation of the planned operations in the peak hour.

Study Analysis and Methodology

The Existing Conditions analysis was completed for on-corridor and off-corridor intersections as part of the Central Corridor LRT modeling task. The AM and PM peak hours are used as the baseline for the data analyzed in this study. The alternatives evaluated include:

Existing Conditions

- AM and PM peak hour traffic analysis of Mid-Corridor intersections on University Avenue.
- Traffic volumes obtained in 2007 and adjusted for impacts from the I-35W bridge collapse.
- Analysis results are from the project modeling task.

University Avenue Modified to Two-Lane Section

- AM and PM peak hour traffic analysis of mid-corridor intersections on University Avenue assuming one through lane of traffic in each direction. The existing traffic volumes are used in the analysis, however, the volumes are projected to increase in the opening year (this becomes a fatal flaw analysis).
- Left turn lanes maintained as existing.
- Right turn lanes set at 200 feet. The remaining width between intersections is assumed to have other uses.
- The existing signal timings in the mid-corridor are coded based on phasing and timing provided by the City of Saint Paul.

University Avenue Modified to Two-Lane Section with a 10% Reduction in Through Traffic

- AM and PM peak hour traffic analysis of mid-corridor intersections on University Avenue assuming one through lane of traffic in each direction. The volumes are reduced by 10% to evaluate the impacts of potential traffic diversion in the corridor.
- The through traffic volumes (eastbound and westbound) are reduced by 10%. Turning traffic is not reduced.
- Left turn lanes maintained as existing.
- Right turn lanes set at 200 feet. The remaining width between intersections is assumed to have other uses.
- The existing signal timings in the mid-corridor are coded based on phasing and timing provided by the City of Saint Paul.

Summary of Findings

The detailed results of the analysis, including AM and PM peak hour Synchro results are provided by area. The following summarizes the results:

University Avenue Modified to Two-Lane Section

- In the AM peak hour, two intersections are at LOS E and two intersections at LOS F.
- In the PM peak hour, three intersections are at LOS E and 10 intersections at LOS F.

- The SimTraffic analysis of the corridor results in significant queuing and delays at intersections. The resulting operation is actually worse than indicated in the level of service table. The average travel speed for the PM peak hour under the two lane scenario eastbound is 5 mph and westbound is 10 mph. (This compares to 18 mph EB and 19 mph WB under existing conditions).

University Avenue Modified to Two-Lane Section with a 10% Reduction in Through Traffic

- The 10% reduction in through traffic results in minor improvements in queuing.
- In the AM peak hour, one intersection is at LOS E and one intersection at LOS F.
- In the PM peak hour, two intersections are at LOS E and seven intersections at LOS F.
- The SimTraffic analysis of the corridor still results in significant queuing and delays at intersections. The resulting operation is actually worse than indicate in the level of service table.

**Traffic Study #5 - Existing Conditions at Mid-Corridor Signalized Intersections
AM Peak Hour Existing vs. Two Lane University Avenue**

University Avenue Intersections		Existing Conditions		Two-Lane Section		10% Reduction in Through Volumes	
		LOS	Delay	LOS	Delay	Two-Lane Section LOS	Two-Lane Section Delay
University Avenue	Eustis Street	B	14.8	E	71.5	D	52.0
University Avenue	Cromwell Avenue	C	27.8	E	65.1	D	44.4
University Avenue	Franklin Avenue	A	9.8	A	7.6	A	7.7
University Avenue	Raymond Avenue	D	53.7	F	88.1	E	71.7
University Avenue	Hampden Avenue	A	8.6	D	40.2	C	21.2
University Avenue	Vandalia Street	B	19.4	C	22.3	B	16.0
University Avenue	Cleveland/Transfer	B	12.1	C	22.2	B	18.4
University Avenue	Prior Avenue	B	18.4	C	21.1	C	20.1
University Avenue	Fairview Avenue	B	17.5	C	23.1	C	22.4
University Avenue	Aldine Street	A	7.6	B	12.9	B	12.5
University Avenue	Fry Street	A	5.5	C	20.3	B	17.3
University Avenue	Snelling Avenue	C	25.0	F	87.6	F	83.2
University Avenue	Pascal Street	A	8.2	B	17.7	B	16.4
University Avenue	Albert Street	A	3.6	B	12.2	B	11.4
University Avenue	Hamline Avenue	C	22.8	C	25.2	C	24.5
University Avenue	Lexington Pkwy	C	32.6	D	36.8	D	35.6
University Avenue	Victoria Street	B	11.7	B	15.8	B	14.7
University Avenue	Dale Street	C	23.0	C	32.1	C	27.4
University Avenue	Western Avenue	B	12.1	B	19.2	B	18.6
University Avenue	Marion Street	B	14.8	B	19.2	B	18.6
University Avenue	Rice Street	C	24.3	C	29.1	C	28.2

- Notes:
1. The "Two-Lane Section" analysis is based on existing traffic volumes
 2. The "10% Reduction in Through Volume" analysis takes the "Two-Lane Section" and reduces the east and west through volumes on University Avenue by 10%

**Traffic Study #5 - Existing Conditions at Mid-Corridor Signalized Intersections
PM Peak Hour Existing vs. Two Lane University Avenue**

University Avenue Intersections		Existing Conditions		Two-Lane Section		10% Reduction in Through Volumes	
		LOS	Delay	LOS	Delay	Two-Lane Section LOS	Two-Lane Section Delay
University Avenue	Eustis Street	D	37.1	F	214.9	F	165.6
University Avenue	Cromwell Avenue	C	23.4	F	101.5	D	51.1
University Avenue	Franklin Avenue	A	6.8	C	31.9	B	15.2
University Avenue	Raymond Avenue	C	34.5	F	141.8	F	97.5
University Avenue	Hampden Avenue	A	6.2	C	25.9	B	15.3
University Avenue	Vandalia Street	D	51.7	F	109.2	F	94.5
University Avenue	Cleveland/Transfer	B	15.8	E	71.9	D	44.4
University Avenue	Prior Avenue	C	26.5	D	41.8	C	34.9
University Avenue	Fairview Avenue	C	24.4	C	33.3	C	29.8
University Avenue	Aldine Street	B	11.1	C	30.2	C	21.2
University Avenue	Fry Street	A	5.3	B	19.9	B	16.9
University Avenue	Snelling Avenue	D	52.5	F	101.4	F	86.4
University Avenue	Pascal Street	B	18.4	F	91.7	E	73.2
University Avenue	Albert Street	B	11.5	F	97.3	E	66.7
University Avenue	Hamline Avenue	D	36.3	F	155.3	F	121.4
University Avenue	Lexington Pkwy	E	79.3	F	216.0	F	178.1
University Avenue	Victoria Street	B	15.4	E	67.8	D	43.8
University Avenue	Dale Street	C	33.2	F	155.2	F	118.4
University Avenue	Western Avenue	B	13.9	E	64.2	D	39.5
University Avenue	Marion Street	B	19.9	D	42.5	C	28.6
University Avenue	Rice Street	C	23.0	D	47.8	D	36.1

- Notes:
1. The "Two-Lane Section" analysis is based on existing traffic volumes
 2. The "10% Reduction in Through Volume" analysis takes the "Two-Lane Section" and reduces the east and west through volumes on University Avenue by 10%