

Appendix B

11th Avenue and 42nd Street Intersection Layout and Analysis



MEMORANDUM

**TO: Earl Haugen, Executive Director
GF-EGF Metropolitan Planning Organization**

**FROM: Richard G. Lane, P.E.
Senior Associate**

DATE: JULY 20, 2005

**SUBJECT: ALERUS CENTER EVENT TRAFFIC STUDY
CANAD CENTER DEVELOPMENT PRELIMINARY TRAFFIC OPERATIONS ANALYSIS**

INTRODUCTION

One of the Canad Center site plan issues still being discussed is the need for a full access intersection at 11th Avenue South. The current proposed site plan shows a parking lot access drive at approximately 11th Avenue South, without access to 42nd Street, that serves the existing VIP parking area and the proposed Lot 3 (Parking East). Providing signalized full access at 11th Avenue South was discussed with City Staff, Alerus staff, Alerus Commission, and the Study Review Committee. If a signalized full access is developed, it will provide access to 42nd Street for daily activities associated with both the Canad and Alerus Centers. To help with this discussion, we conducted a traffic operational analysis with the daily traffic generated by the Alerus Center and the proposed Canad Center, to determine how the existing configuration will operate on a daily basis. The proposed 11th Avenue South signalized full access was then tested to determine if it would be warranted by the projected daily traffic and to determine how it would operate.

EXISTING CONFIGURATION

To determine how future daily traffic will operate with the proposed Canad Center development, operations for existing conditions with trips generated by the new development were analyzed at the north and center driveways on 42nd Street. Trip generation estimates for the p.m. peak hour were calculated for the proposed development based on land-use type and size, and trip generation rates from the 2003 ITE Trip Generation Reports. The directional trip distribution for the proposed site-generated trips is based on the regional distribution of population and employment, as well as current travel patterns in the area. Peak hour traffic volumes, with existing control and geometrics, are shown in Figure 1.

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Results of the analysis shown in Table 1 indicate that both key intersections currently operate at an overall LOS A, with a worst approach LOS D during the p.m. peak hour, with existing traffic controls and geometric layout. Eastbound left-turning vehicles exiting the Canad Center at both driveways experience significant delay (LOS F) due to the high volume of traffic on 42nd Street.

**Table 1
Existing Peak Hour Capacity Analysis
Level of Service Results**

Intersection	Level of Service
	P.M. Peak Hour
42nd Street/Alerus Center-North Entrance*	A/D
42nd Street/Alerus Center-Center Entrance*	A/D

* indicates an unsignalized intersection. The overall LOS is shown followed by the worst approach LOS

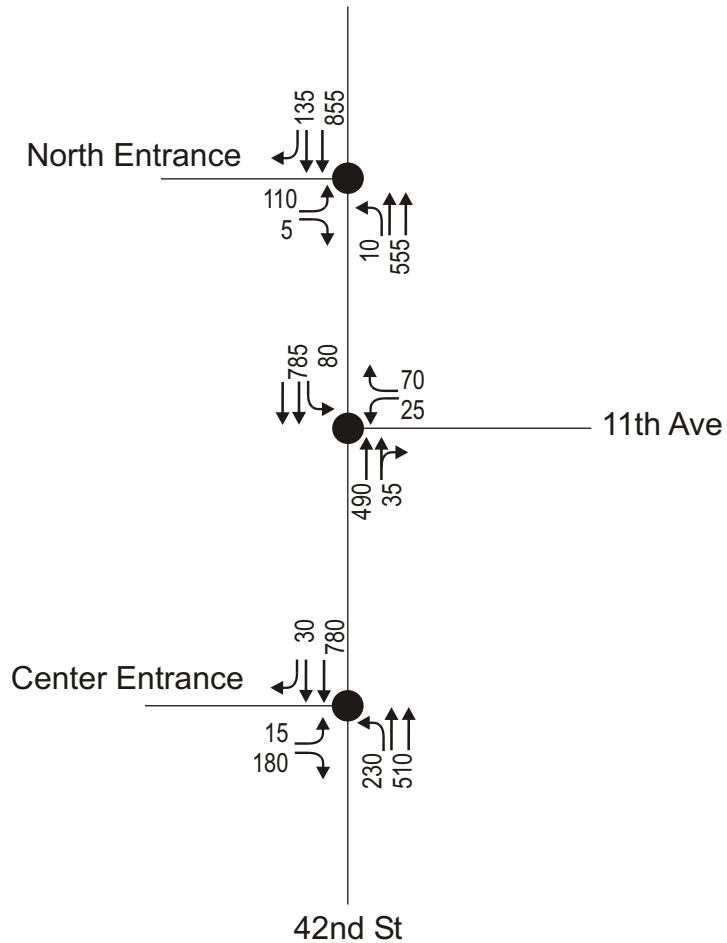
PROPOSED 11TH AVENUE FULL ACCESS

Construction of a west leg at 42nd Street and 11th Avenue South is being considered to improve access to the proposed Canad Center. To model a worst-case scenario, it was assumed that all traffic to and from the Canad Center would use this new access, rather than the existing entrances to the north and south. Peak hour traffic volumes for the proposed full intersection at 42nd Street/11th Avenue South are shown in Figure 1. A peak hour volume warrant analysis (Warrant 3) was conducted to determine if this intersection should be signalized in the future (Year 2006). Warrant analysis results are attached which indicate that a signal is warranted under worst-case peak hour conditions. Addition review of the minor approach traffic volumes indicate that even with a 65 percent reduction in eastbound traffic exiting the Canad Center, a signal is warranted. It should be noted that the westbound minor approach traffic volumes at the existing T-intersection are currently at 96 vehicles, which is slightly below the peak hour warrant threshold of 100 vehicles.

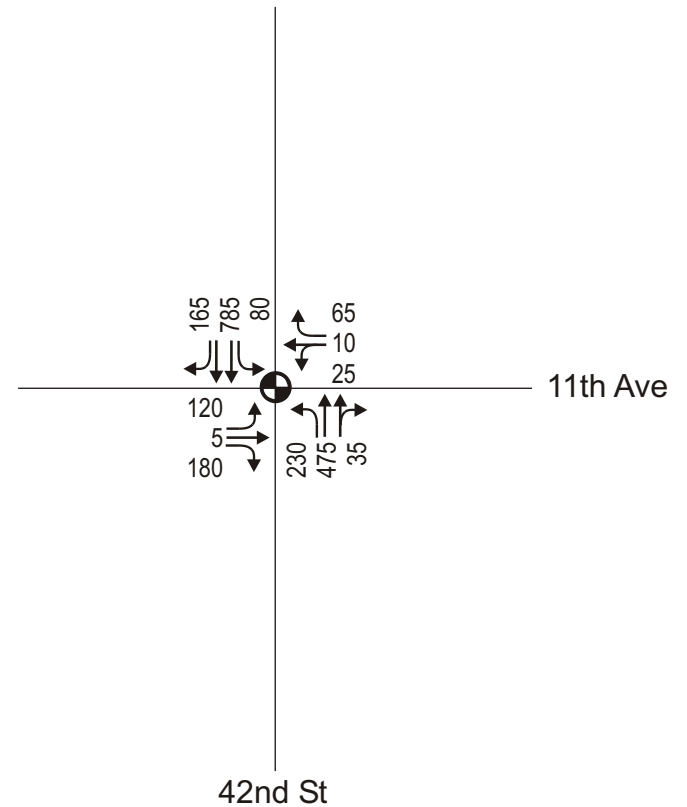
A traffic operations analysis was conducted to determine how future daily traffic will operate at the intersection of 42nd Street/11th Avenue, with the proposed geometrics and traffic signal. Results of the analysis indicate that this intersection will operate at an acceptable LOS B.



EXISTING



PROPOSED



LEGEND

- XX = Background and Projected Daily Traffic
- = Unsignalized Intersection
- ⊕ = Proposed Signalized Intersection



EXISTING AND PROPOSED P.M. PEAK HOUR TURNING MOVEMENT VOLUMES

ALERUS CENTER EVENT TRAFFIC STUDY
City of Grand Forks

Figure 1



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WARRANT ANALYSIS

42nd Ave/Proposed 11th Ave
 Alerus Center Traffic Study
 Grand Forks, ND

Background Information	Location : Grand Forks, ND	Speed (mph)	Lanes	Approach	
	Date: 7/12/2005	40	2 or more	Major Approach 1:	Northbound 42nd Ave
	Analysis Prepared By: Renae Cornelius	40	2 or more	Major Approach 3:	Southbound 42nd Ave
	Population Less than 10,000: No	25	2	Minor Approach 2:	Eastbound Proposed 11th Ave connection
	Seventy Percent Factor Used: Yes	25	2	Minor Approach 4:	Westbound 11th Ave Existing

Warrant Analysis: Warrants 1A, 1B and 1C	Hour	Major Approach 1	Major Approach 3	Total 1 + 3	Warrant Met		Minor Approach 2	Minor Approach 4	Largest Minor App.	Warrant Met		Met Same Hours		(80% Warrant)
					420	630				140	70	Condition A	Condition B	Condition C
	6 - 7 AM	0	0	0	0			0	0	0				
7 - 8 AM	0	0	0	0			0	0	0					
8 - 9 AM	0	0	0	0			0	0	0					
9 - 10 AM	0	0	0	0			0	0	0					
10 - 11 AM	0	0	0	0			0	0	0					
11 - 12 AM	0	0	0	0			0	0	0					
12 - 1 PM	0	0	0	0			0	0	0					
1 - 2 PM	0	0	0	0			0	0	0					
2 - 3 PM	0	0	0	0			0	0	0					
3 - 4 PM	0	0	0	0			0	0	0					
4 - 5 PM	0	0	0	0			0	0	0					
5 - 6 PM	741	1025	1766	X	X	307	96	307	X	X	X	X	X	
6 - 7 PM	0	0	0	0			0	0	0					
7 - 8 PM	0	0	0	0			0	0	0					
8 - 9 PM	0	0	0	0			0	0	0					
9 - 10 PM	0	0	0	0			0	0	0					
10 - 11 PM	0	0	0	0			0	0	0					
												1	1	1

Warrant Summary	Warrant and Description		Hours Met	Hours Required	Met/Not Met
	Warrant 1A:	Minimum Vehicular Volume	1	8	Not Met
Warrant 1B:	Interruption of Continuous Traffic	1	8	Not Met	
Warrant 1C:	Combination of Warrants	1	8	Not Met	
Warrant 2:	Four Hour Volumes	1	4	Not Met	
Warrant 3:	Peak Hour Volume	1	1	Met - Warrant 3 Satisfied	

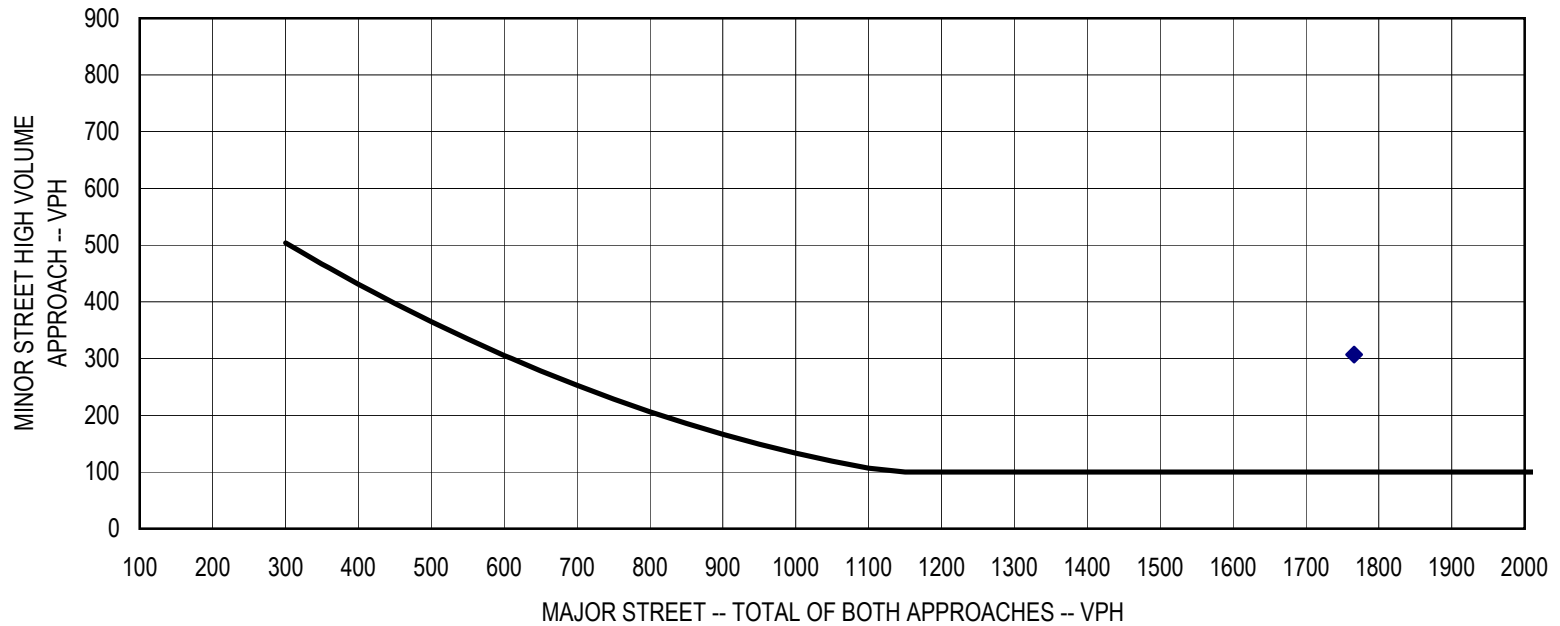


WARRANT ANALYSIS

42nd Ave/Proposed 11th Ave
Alerus Center Traffic Study
Grand Forks, ND

WARRANT 3 - PEAK HOUR WARRANT

Warrant Analysis: Warrant 3



Number of Hours Satisfying Requirements:

- Notes:
1. 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.
 2. INTERSECTION IS EITHER (1) WITHIN A COMMUNITY LESS THAN 10,000 POPULATION OR (2) HAS SPEEDS ABOVE 40 MPH ON MAJOR STREET



MEMORANDUM

TO: Earl Haugen, Executive Director GF-EGF MPO
Allen Grasser, P.E., Grand Forks City Engineer

FROM: Richard G. Lane, P.E.
SRF Consulting Group Inc.

DATE: August 4, 2005

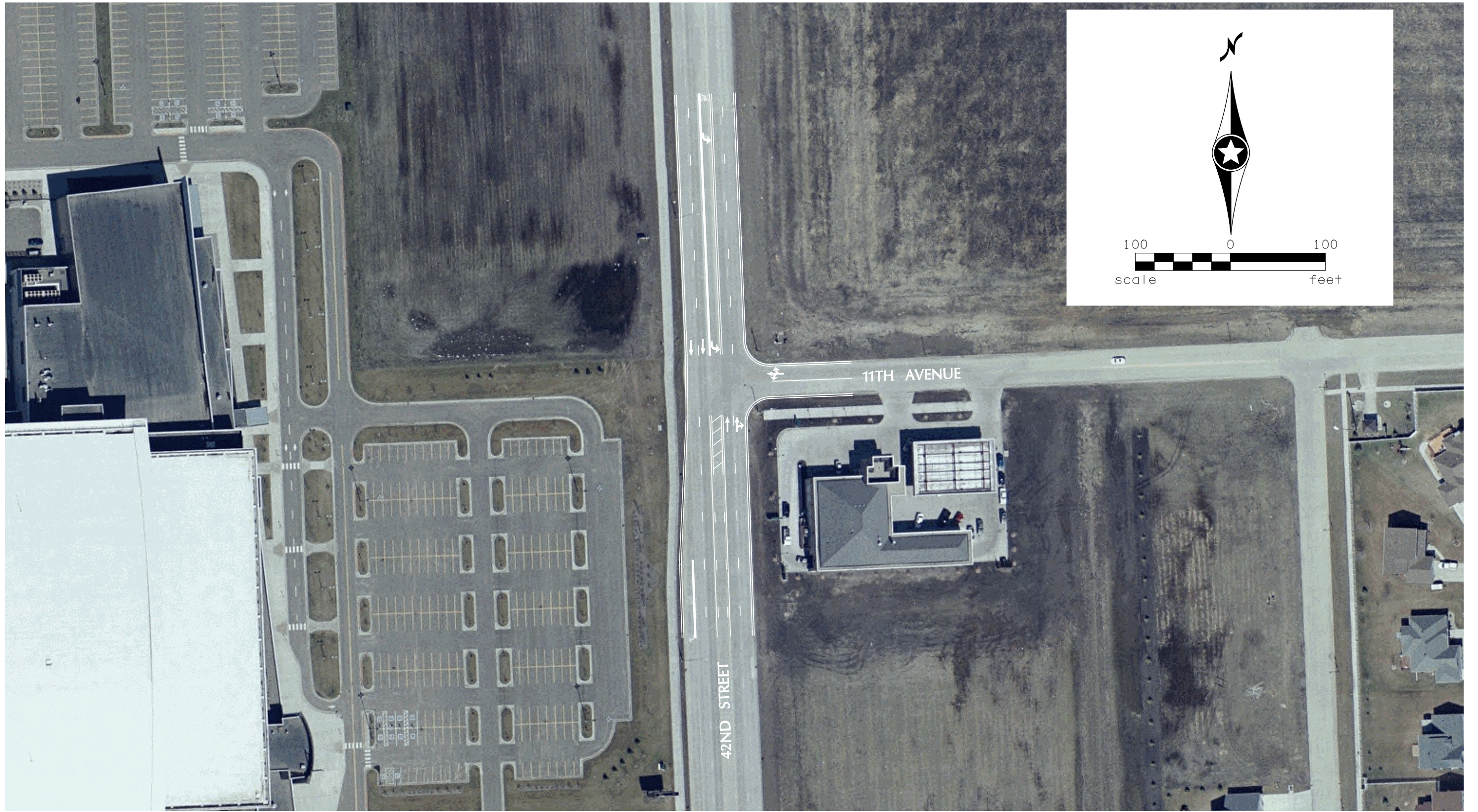
SUBJECT: 11th Avenue & 42nd Street Preliminary Layout

As we discussed last week, one option being considered to enhance traffic operations at the Alerus/Canad is to develop a full intersection at 11th Avenue South and 42nd Street which is currently a T-intersection with access only to the east. A full intersection at this location would allow an additional access point that would be used for loading a portion of the parking areas and for providing access for shuttle buses during large events. On a daily basis this access would provide for more direct access and better circulation for both the Alerus and Canad. In addition the 11th Avenue intersection is properly spaced to allow for signalization. Signalization is not needed to accommodate large event traffic since officer control would be needed at this intersection during large events. However the signal would greatly improve the day to day operations of the Alerus and Canad. We conducted a traffic operations analysis (refer to memo dated July 20, 2005) using the daily traffic generated by the proposed Canad improvements which showed that a signal at 11th Avenue would be warranted during the peak hour with as little as 35% of the new peak hour traffic using the intersection.

Because this intersection also serve the existing residential area east of 42nd Street and future development areas adjacent to 42nd Street it is very likely that this intersection will be signalized in the future. As shown by the peak hour warrant analysis the existing background traffic on 42nd Street and 11th Avenue are very close to warranting signalization. Therefore installation of a temporary signal should be considered now, and permanent signalization should be implemented as soon as conditions warrant. Adding access to the Alerus and Canad at this intersection may accelerate the need for permanent signalization. An additional benefit of signalizing 11th Avenue is improved pedestrian access to the Alerus and Canad.

Attached are two figures showing the existing intersection configuration (figure 1) and a full access intersection layout (figure 2). We have also developed a planning level preliminary cost estimate for four options:

- Option 1- \$15,000 Maintaining the existing configuration and installation of a temporary signal when warranted by traffic and/or pedestrian activity.
- Option 2 - \$40,000 Construct the full access intersection without signalization (cost estimate for adding the intersection include only the cost to construct the approach to the R-O-W line the on-site work should be included in the developers improvements).
- Option 3 - \$55,000 Construct the full access intersection and installation of a temporary signal when warranted by traffic and/or pedestrian activity.
- Option 4 - \$175,000 Construct the full access intersection and installation of a permanent signal system when warranted by traffic and/or pedestrian activity.



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OPTION 1
11TH AVENUE & 42ND STREET
EXISTING CONFIGURATION
GRAND FORKS, ND

5370
08/03/05

Figure 01



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OPTIONS 2, 3 & 4
11TH AVENUE & 42ND STREET
FULL ACCESS INTERSECTION
GRAND FORKS, ND

5370
 08/03/05

Figure 02