MEMORANDUM

TO: Rick Lane, P.E. Principal
FROM: Todd Polum, P.E., PTOE, Senior Associate
        Jordan Mancl, Engineer
DATE: August 8, 2007
SUBJECT: 8th Street Roundabout Analysis

INTRODUCTION

The following memorandum documents analysis at several intersections along the 8th Street South (TH 75) corridor where roundabouts are being considered as intersection traffic control in the city of Moorhead, Minnesota (Figure 1). Analysis at these intersections was completed for traffic volumes in the Interim Year a.m. and p.m. peak hours. Turning movements for the following intersections were obtained from forecast being prepared as part of the 8th Street Corridor Study:

- 8th Street South and 24th Avenue South
- 8th Street South and I-94 North Ramps
- 8th Street South and I-94 South Ramps
- 8th Street South and 30th Avenue South
- 8th Street South and 50th Avenue South
- 8th Street South and 60th Avenue South
INTERIM YEAR ROUNDBOUGHT ANALYSIS

All of the study intersections are currently signalized except for the intersection of 8th Street South/60th Avenue South. 8th Street South is currently a 4-lane facility at four of the study intersections which means only a double-lane roundabout can be considered at these intersections. The only intersections that have one lane approaches are the intersections of 8th Street South/50th Avenue South and 8th Street South/60th Avenue South.

The roundabout analysis looks primarily at the traffic volume at each of the four intersection approaches. The entry volume at each approach was graphed versus the circulating volume at the same approach. These results were then compared to the volume to capacity threshold for a single or double-lane roundabout entrance to determine whether or not the study intersection will operate under capacity (Chart 1).

Chart 1
Roundabout Capacity Limits

Two separate roundabout analyses were performed at each intersection; one considered a typical roundabout where all traffic volume enters the intersection and one that considers a right-turn bypass lane. The right-turn bypass lane allows traffic making a right turn to avoid entering the circulating traffic in the roundabout. The graphs in Appendix A represent the roundabout analysis results at each intersection.
# FINDINGS AND RESULTS

**Table 1**  
Roundabout Volume to Capacity Results for Interim Traffic Volumes

<table>
<thead>
<tr>
<th>INTERSECTION</th>
<th>AM NB APPROACH</th>
<th>AM EB APPROACH</th>
<th>AM SB APPROACH</th>
<th>AM WB APPROACH</th>
<th>PM NB APPROACH</th>
<th>PM EB APPROACH</th>
<th>PM SB APPROACH</th>
<th>PM WB APPROACH</th>
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<tbody>
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<td>8th St./24th Ave.</td>
<td>3</td>
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<td>2</td>
<td>1</td>
<td>1</td>
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<tr>
<td>8th St./North Ramp</td>
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<td>3</td>
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<td>1</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>8th St./South Ramp</td>
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<td>3</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>8th St./30th Ave.</td>
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<td>1</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>8th St./50th Ave.</td>
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<tr>
<td>8th St./60th Ave.</td>
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</table>

* Full represents a roundabout with full intersection traffic volume, RTB represents a roundabout with Right-Turn Bypasses  
1 = Under Capacity for a Single-Lane Roundabout  
2 = Under Capacity for a Double-Lane Roundabout, Over Capacity for a Single-Lane Roundabout  
3 = Over Capacity for a Single-Lane and a Double-Lane Roundabout

Results of the roundabout analysis at each approach are shown in Table 1. All of the key intersections except for the intersections of 8th Street/50th Avenue and 8th Street/60th Avenue will have at least one approach that will be near or over the capacity for double-lane roundabout (with and without the right-turn bypasses). The approaches for the intersections of 8th Street/50th Avenue and 8th Street/60th Avenue will operate under the capacity for a single-lane roundabout (with and without the right-turn bypasses).
Appendix A