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SRF No. 0065728

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

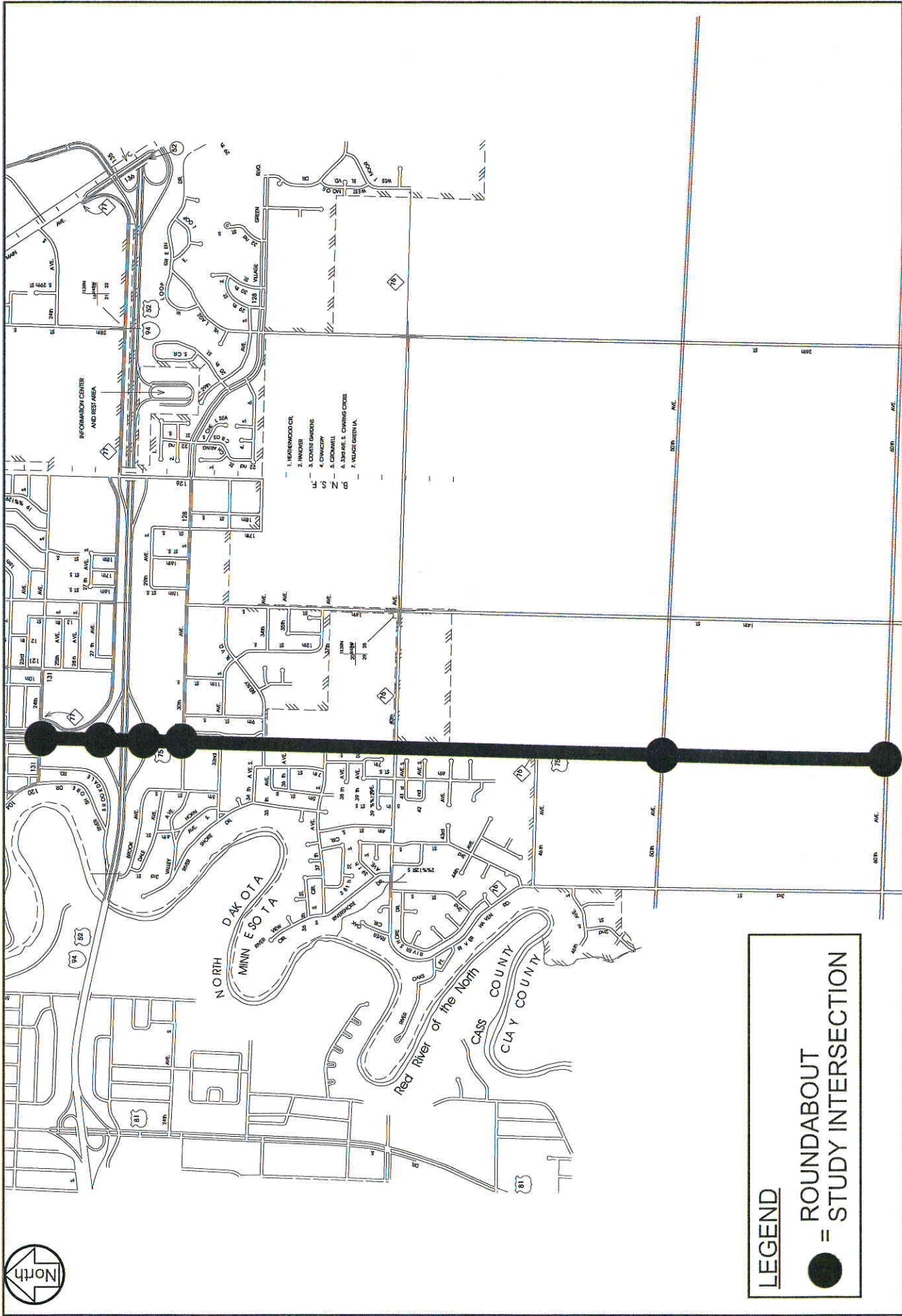
INTRODUCTION

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

One Carlson Parkway North, Suite 150, Minneapolis, MN 55447-4443
Telephone (612) 475-0010 ☐ Fax (612) 475-2429 ☐ <http://www.srfconsulting.com>

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STUDY AREA AND INTERSECTIONS

8TH STREET SOUTH CORRIDOR ROUNDABOUT STUDY
City of Moorhead



0065728
February 2007

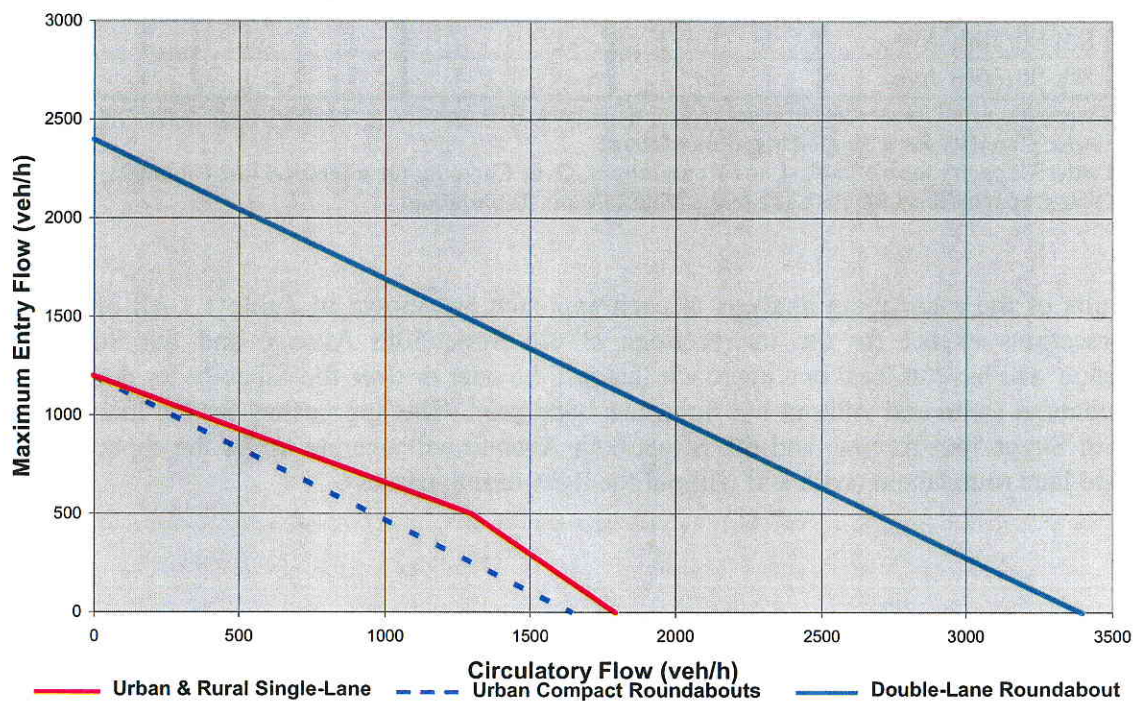
Figure 1

INTERIM YEAR ROUNDABOUT 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

	INTERSECTION	NB APPROACH		EB APPROACH		SB APPROACH		WB APPROACH	
		Full*	RTB*	Full	RTB	Full	RTB	Full	RTB
A M	8th St./24th Ave.	3	2	1	1	1	1	2	2
	8th St./North Ramp	3	3	1	1	2	1	3	3
	8th St./South Ramp	3	3	2	1	1	1	2	2
	8th St./30th Ave.	3	3	1	1	2	2	3	2
	8th St./50th Ave.	1	1	1	1	1	1	1	1
	8th St./60th Ave.	1	1	1	1	1	1	1	1
P M	8th St./24th Ave.	2	2	2	2	3	2	2	2
	8th St./North Ramp	3	3	1	1	3	2	2	2
	8th St./South Ramp	3	2	3	2	2	2	2	2
	8th St./30th Ave.	2	2	2	2	3	3	2	2
	8th St./50th Ave.	1	1	1	1	1	1	1	1
	8th St./60th Ave.	1	1	1	1	1	1	1	1

* 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

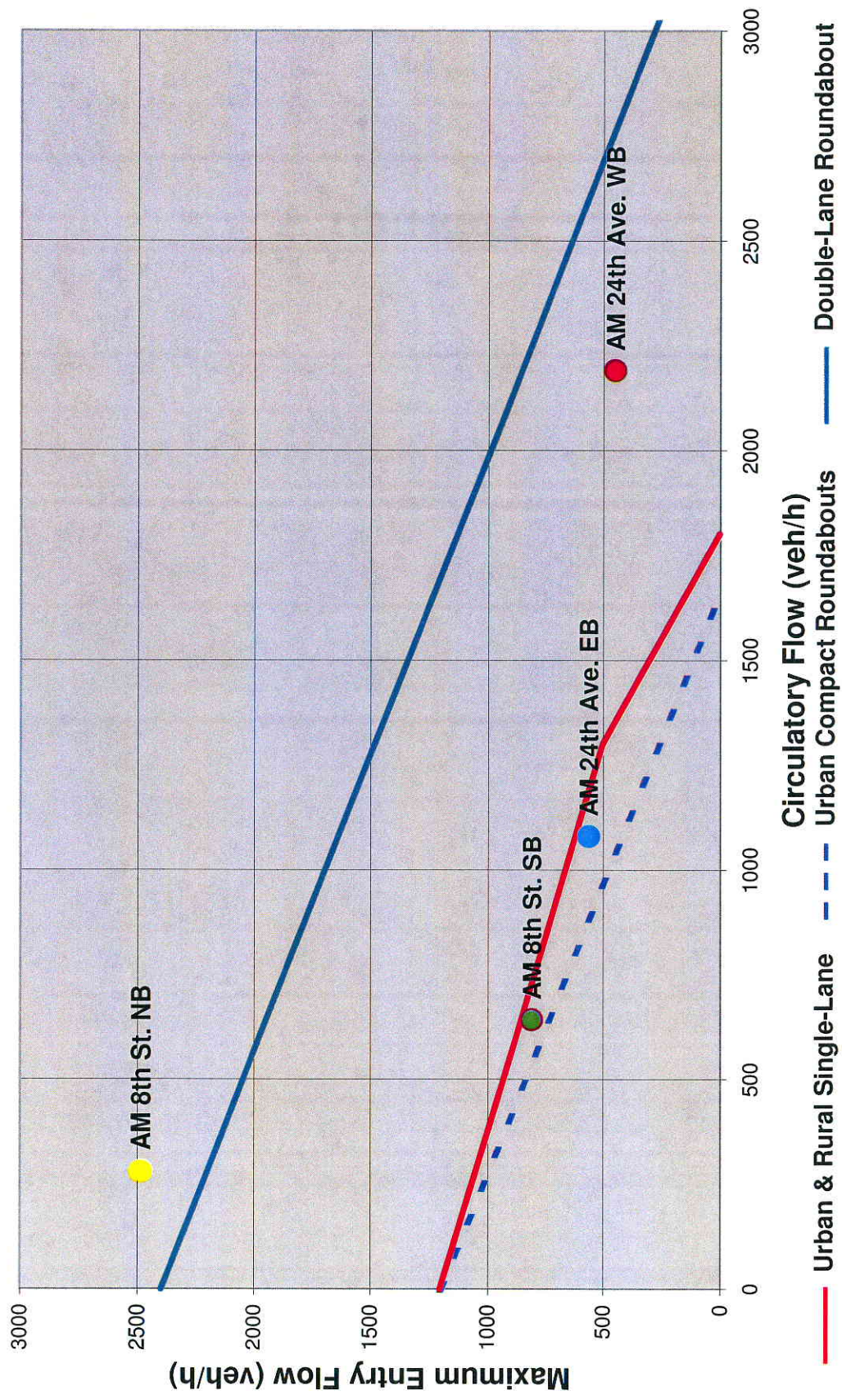
2 = Under Capacity for a Double-Lane Roundabout, Over Capacity for a Single-Lane Roundabout

3 = Over Capacity for a Single-Lane and a Double-Lane Roundabout

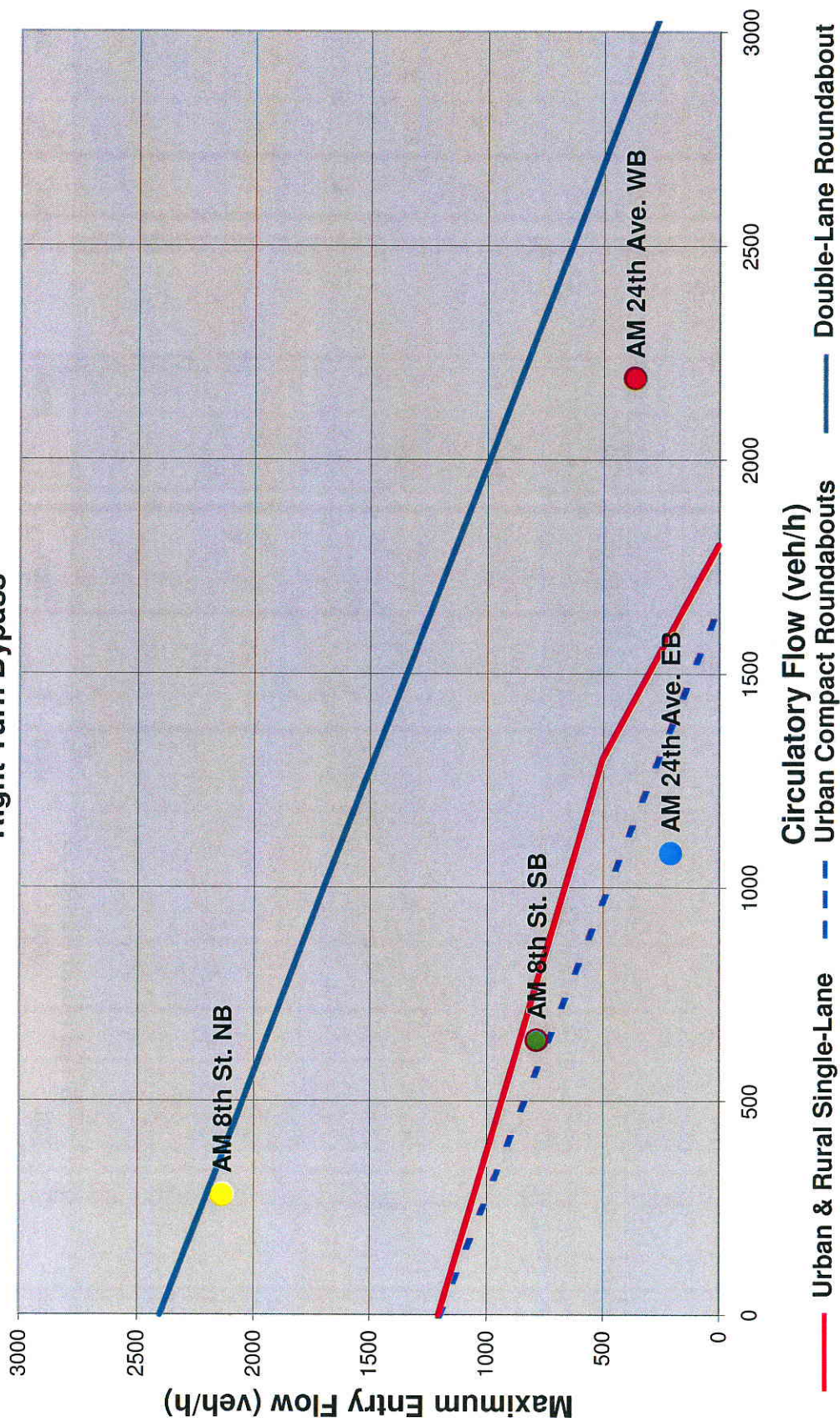
Results of the roundabout analysis at each approach are shown in Table 1. All of the key intersections except for the intersections of 8th Street/50th Avenue and 8th Street/60th Avenue will have at least one approach that will be near or over the capacity for double-lane roundabout (with and without 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

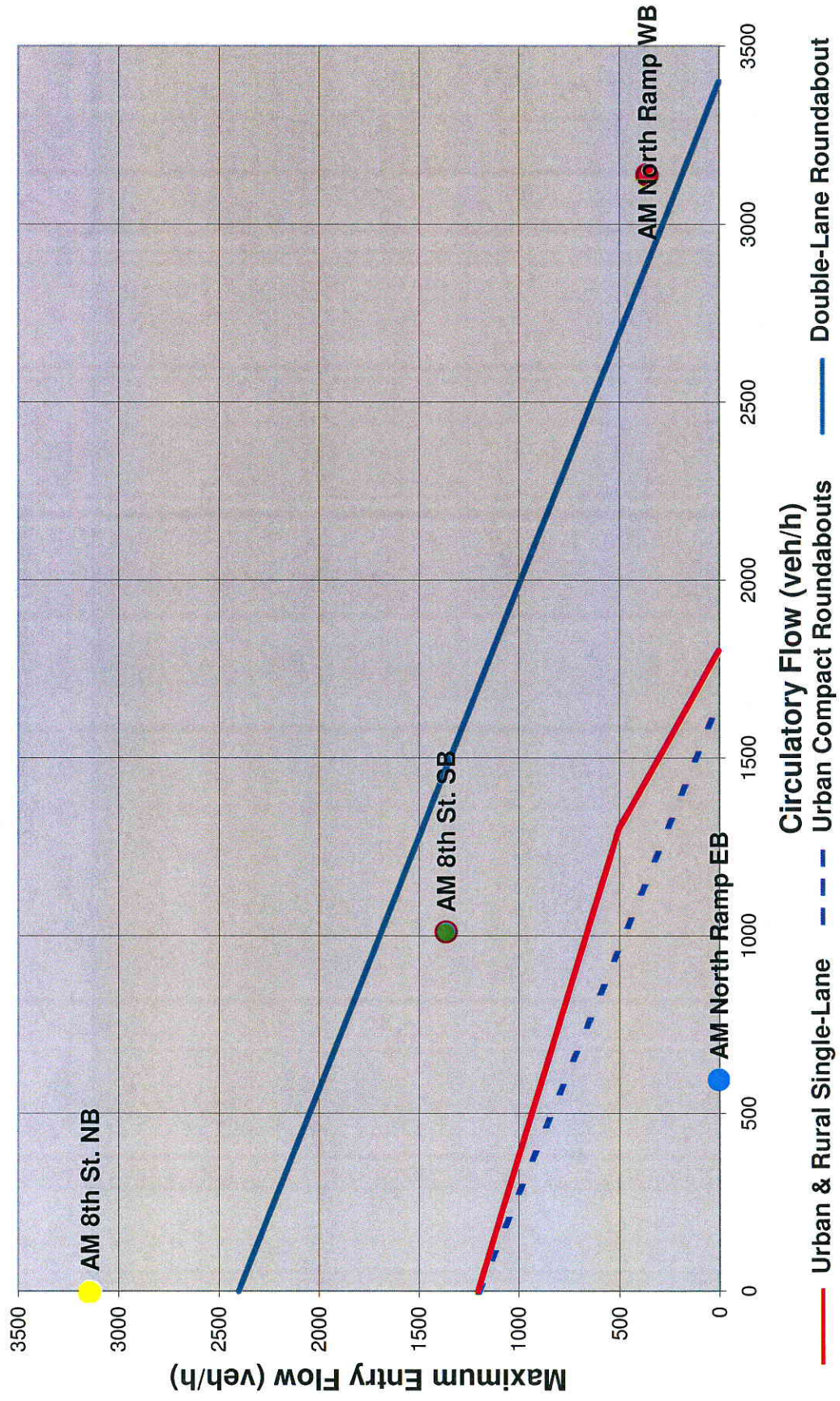
8th Street and 24th Avenue AM



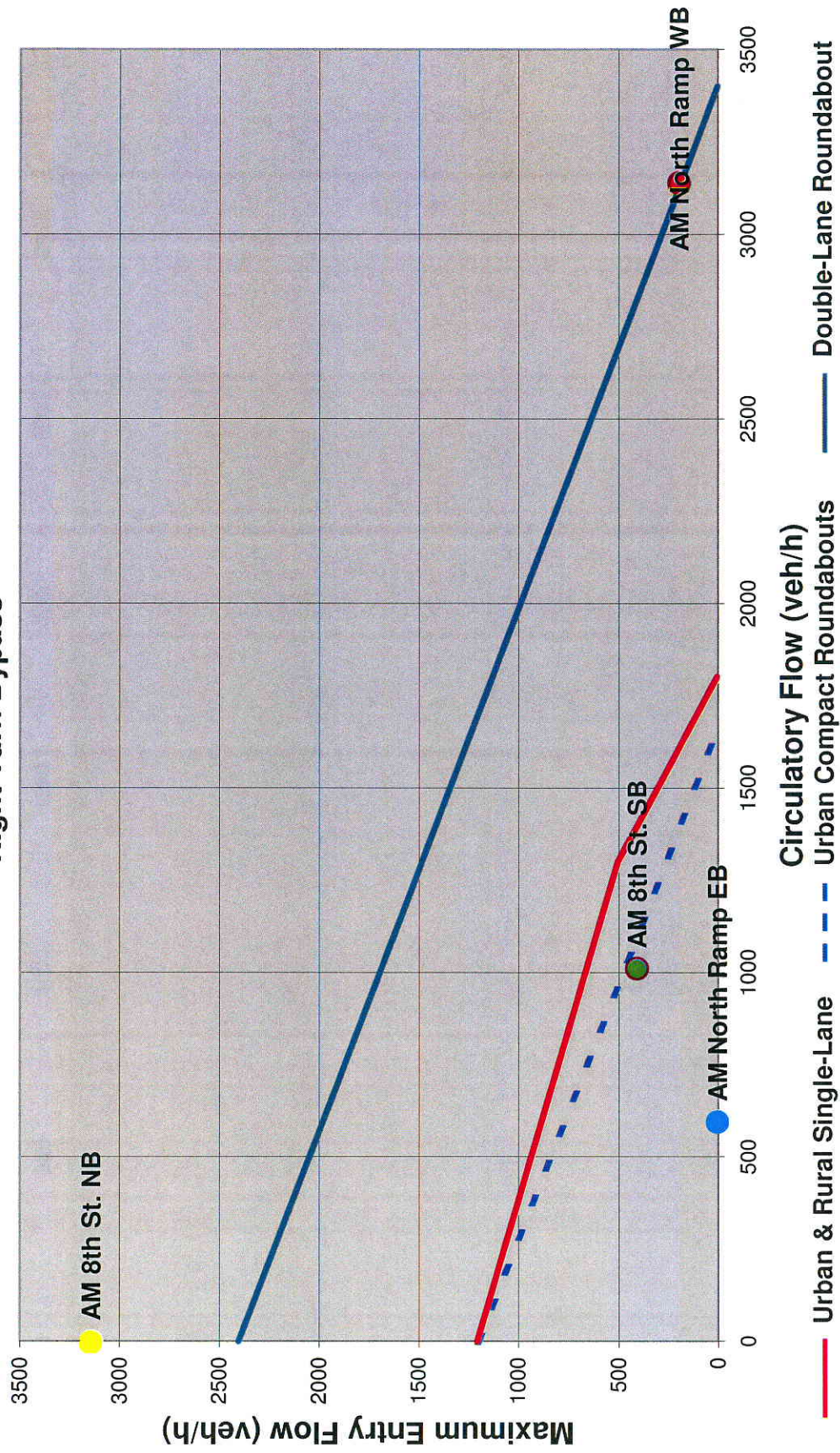
8th Street and 24th Avenue AM Right Turn Bypass



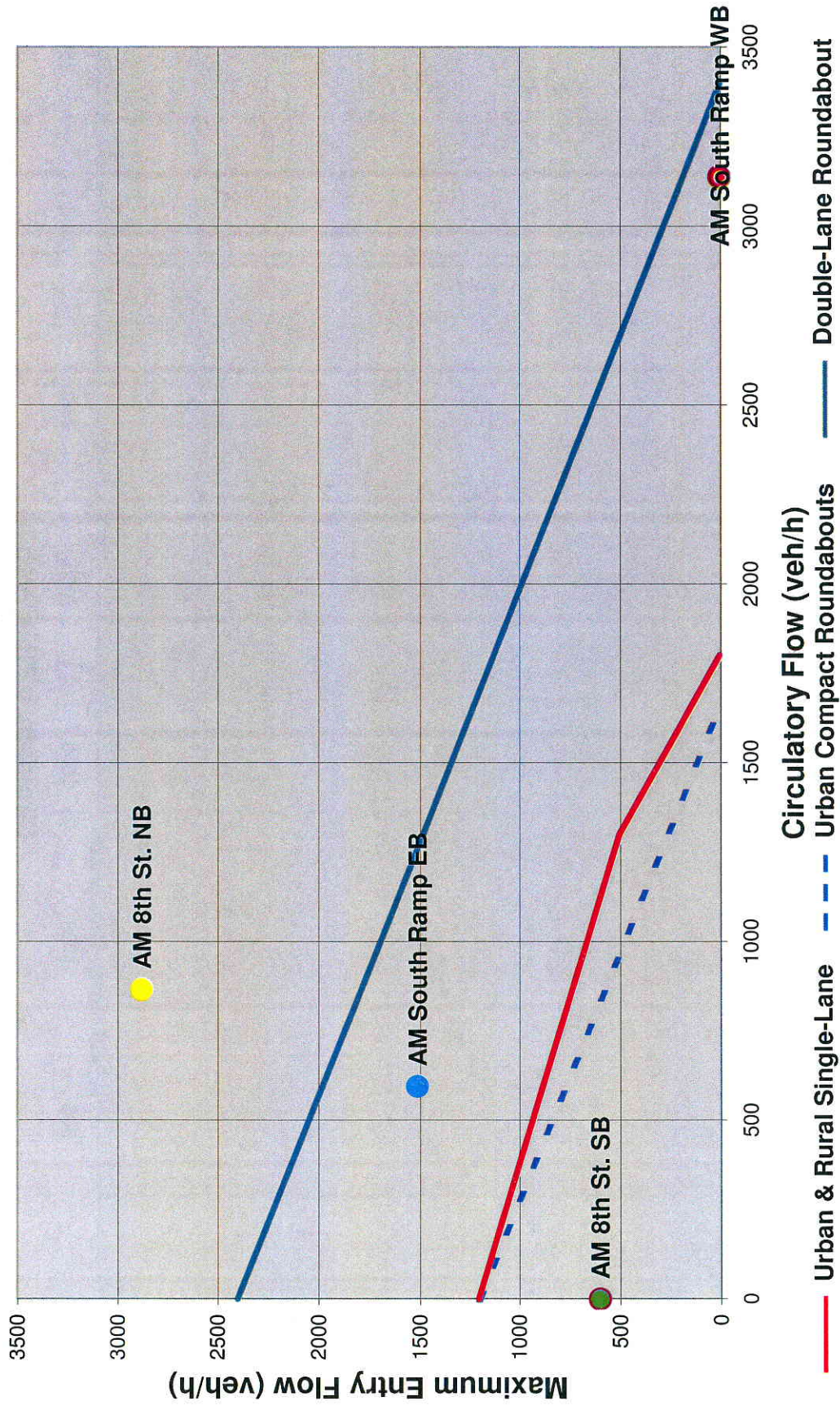
8th Street and I-94 North Ramp AM



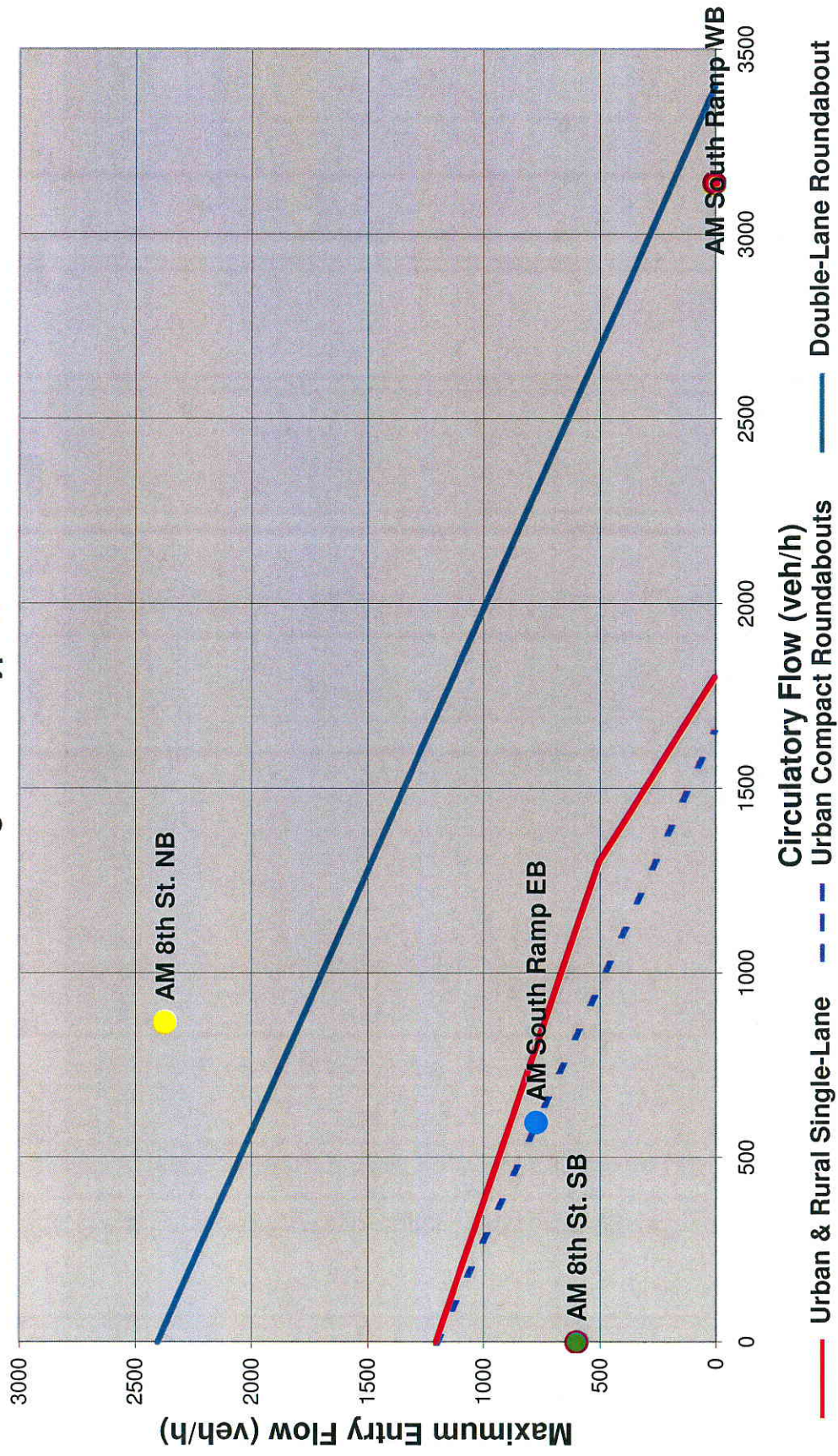
8th Street and I-94 North Ramp AM Right Turn Bypass



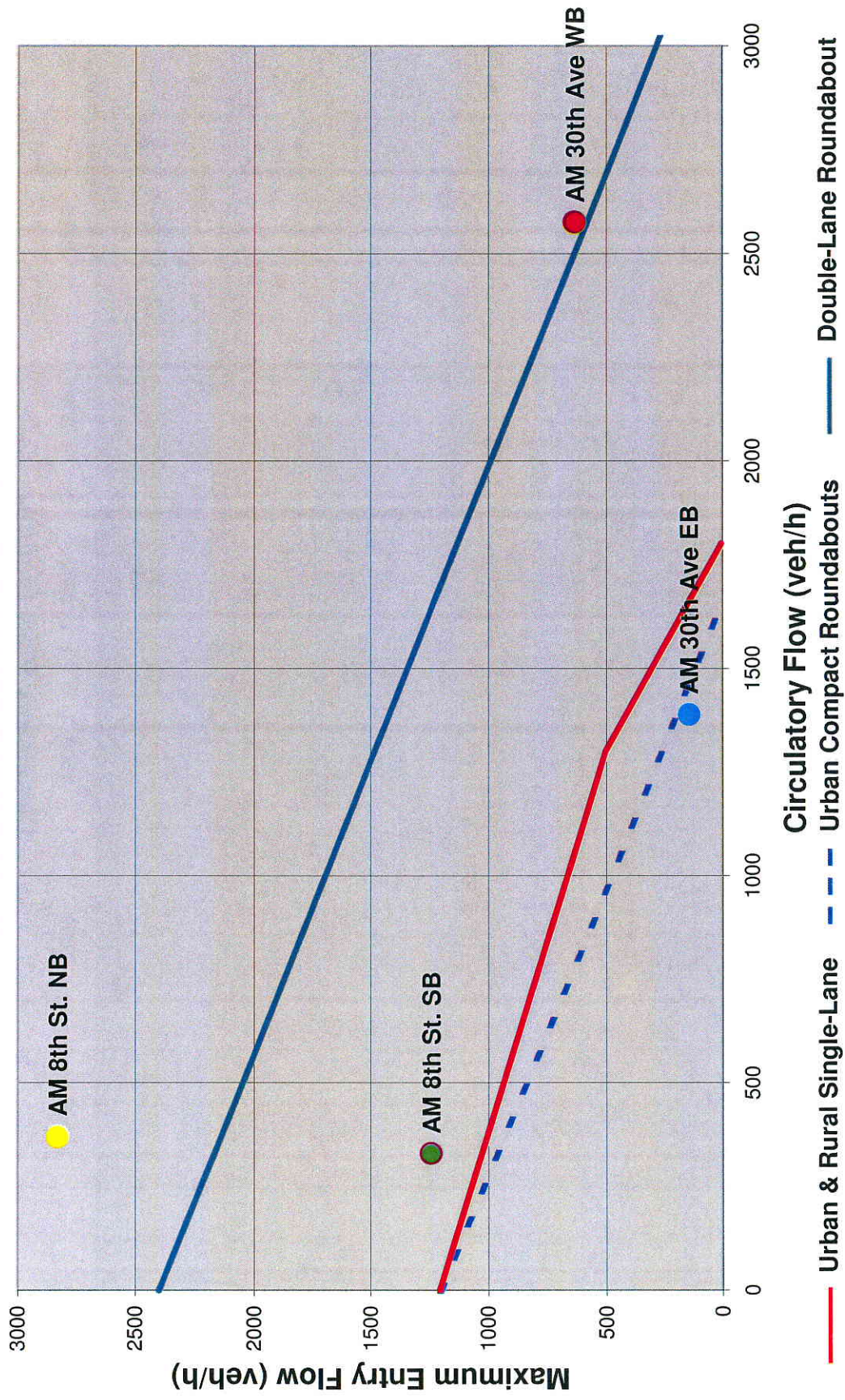
8th Street and I-94 South Ramp AM



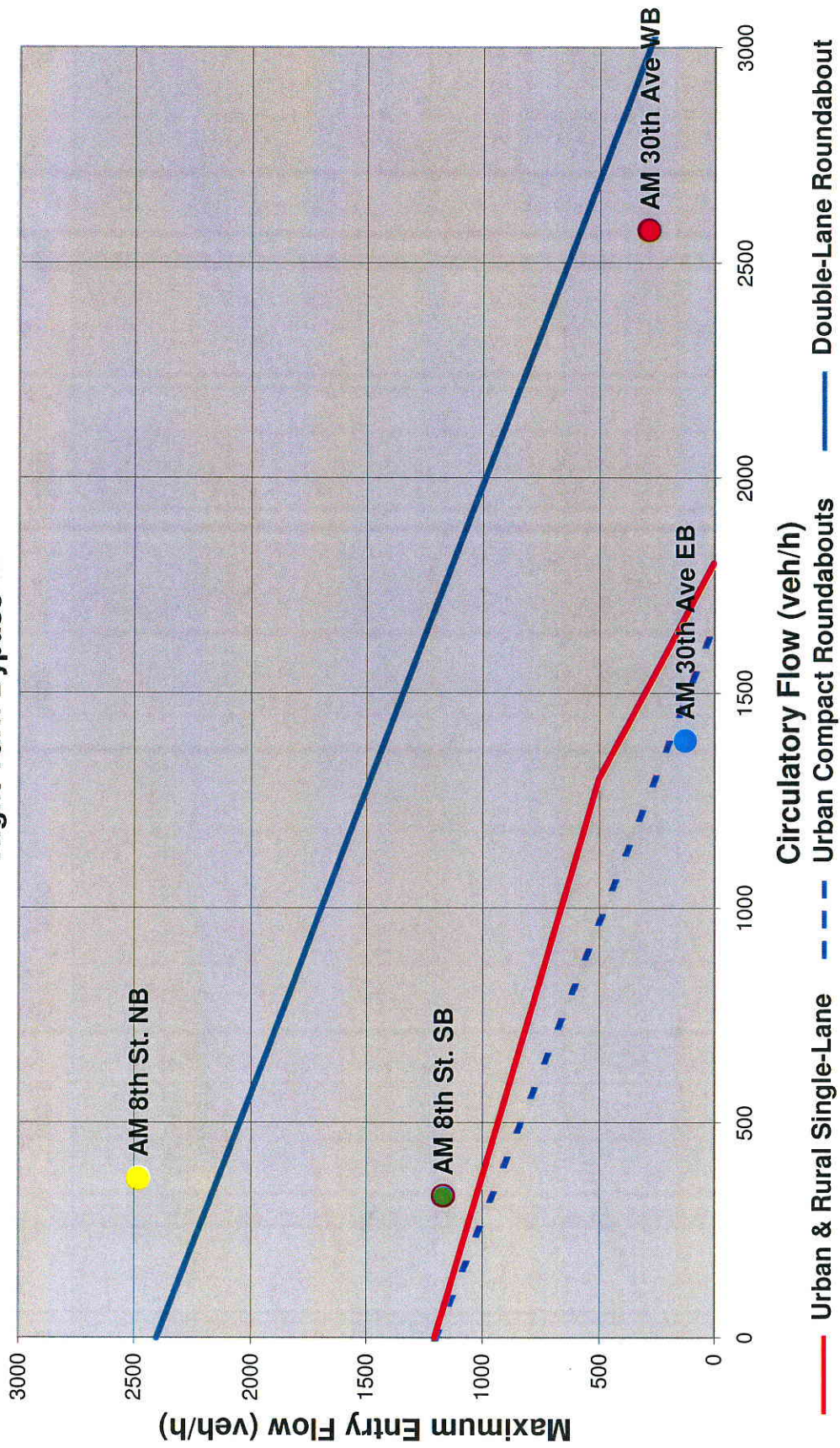
8th Street and I-94 South Ramp AM Right Turn Bypass



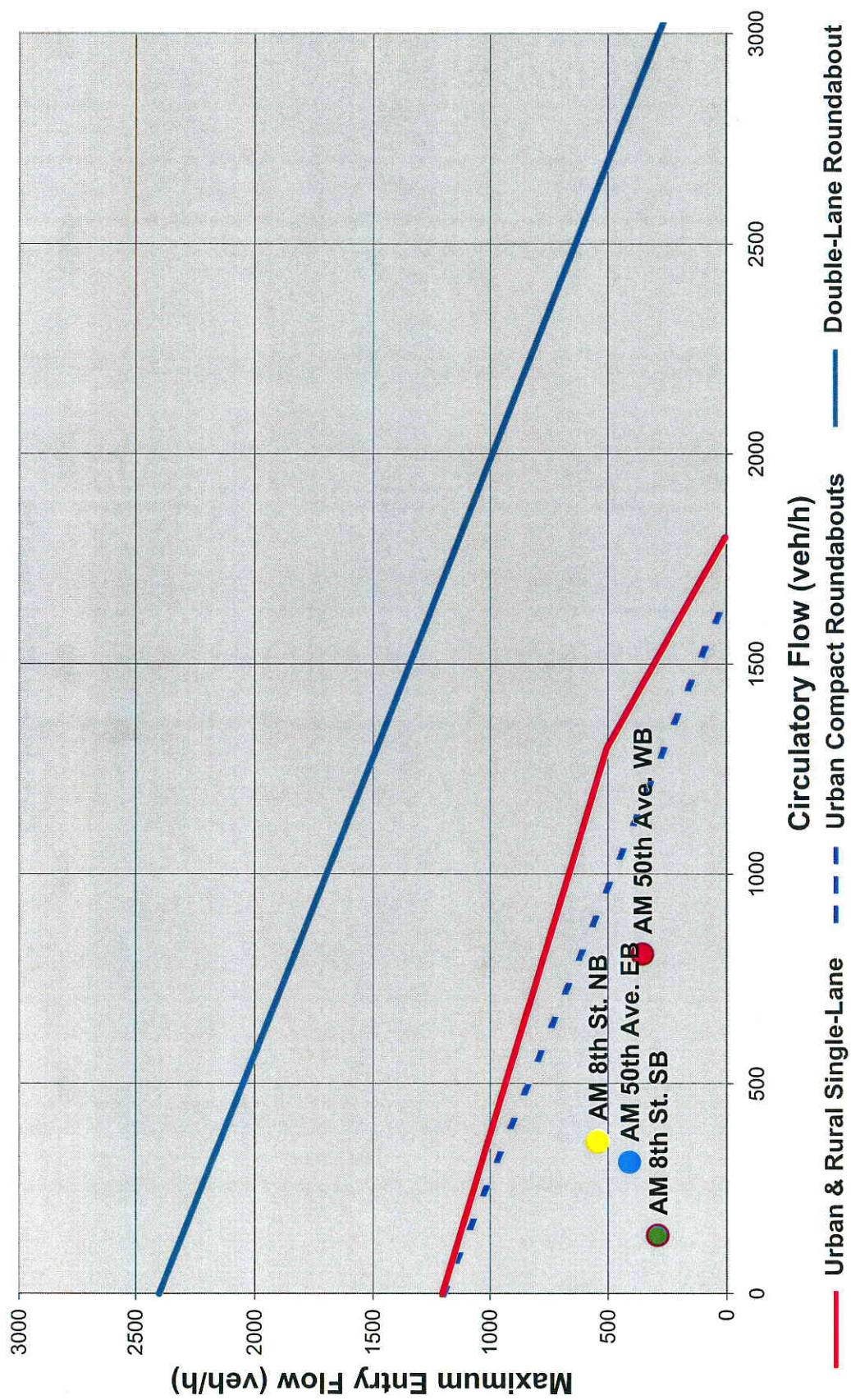
8th Street and 30th Avenue AM



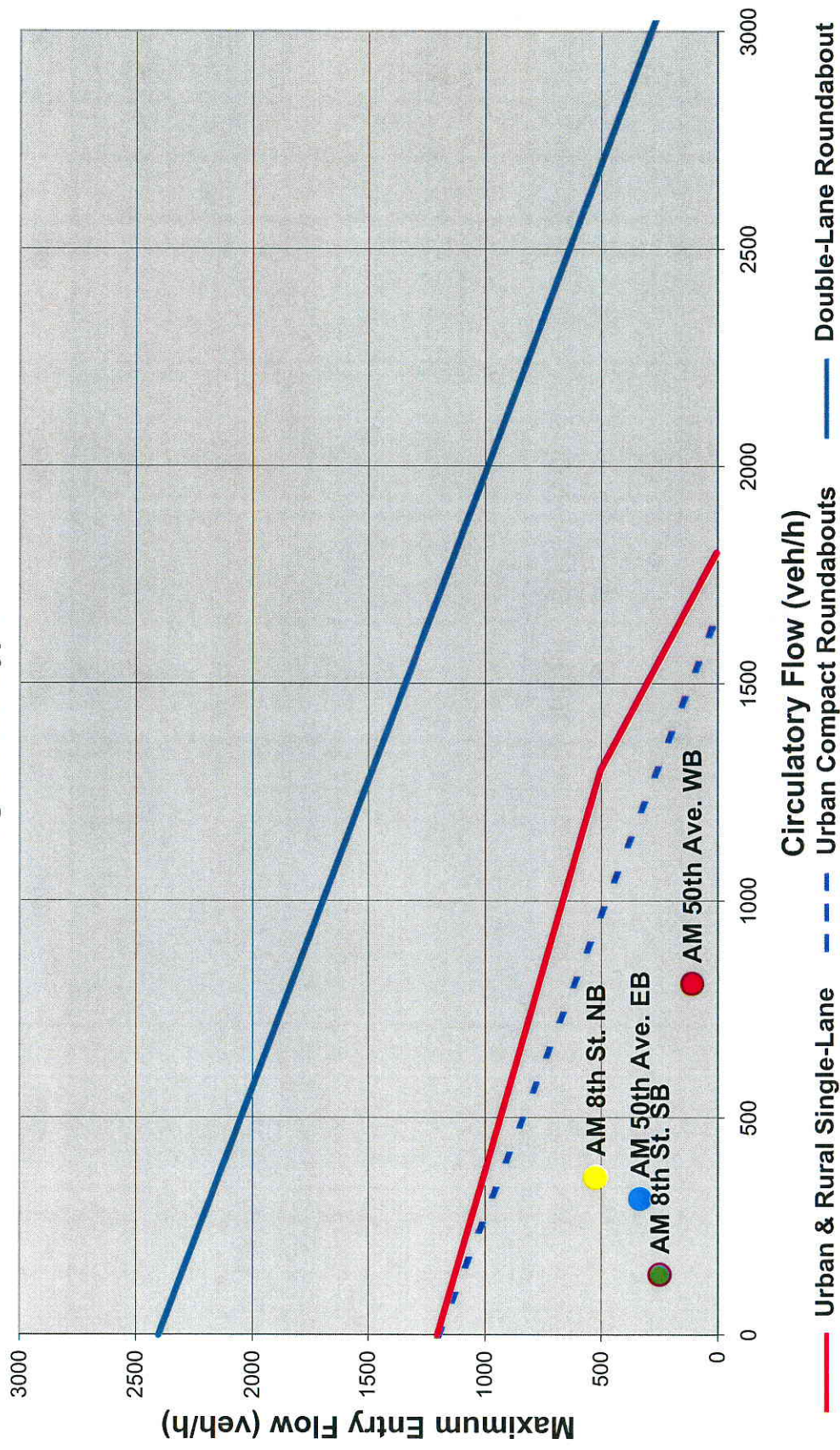
8th Street and 30th Avenue AM Right Turn Bypass



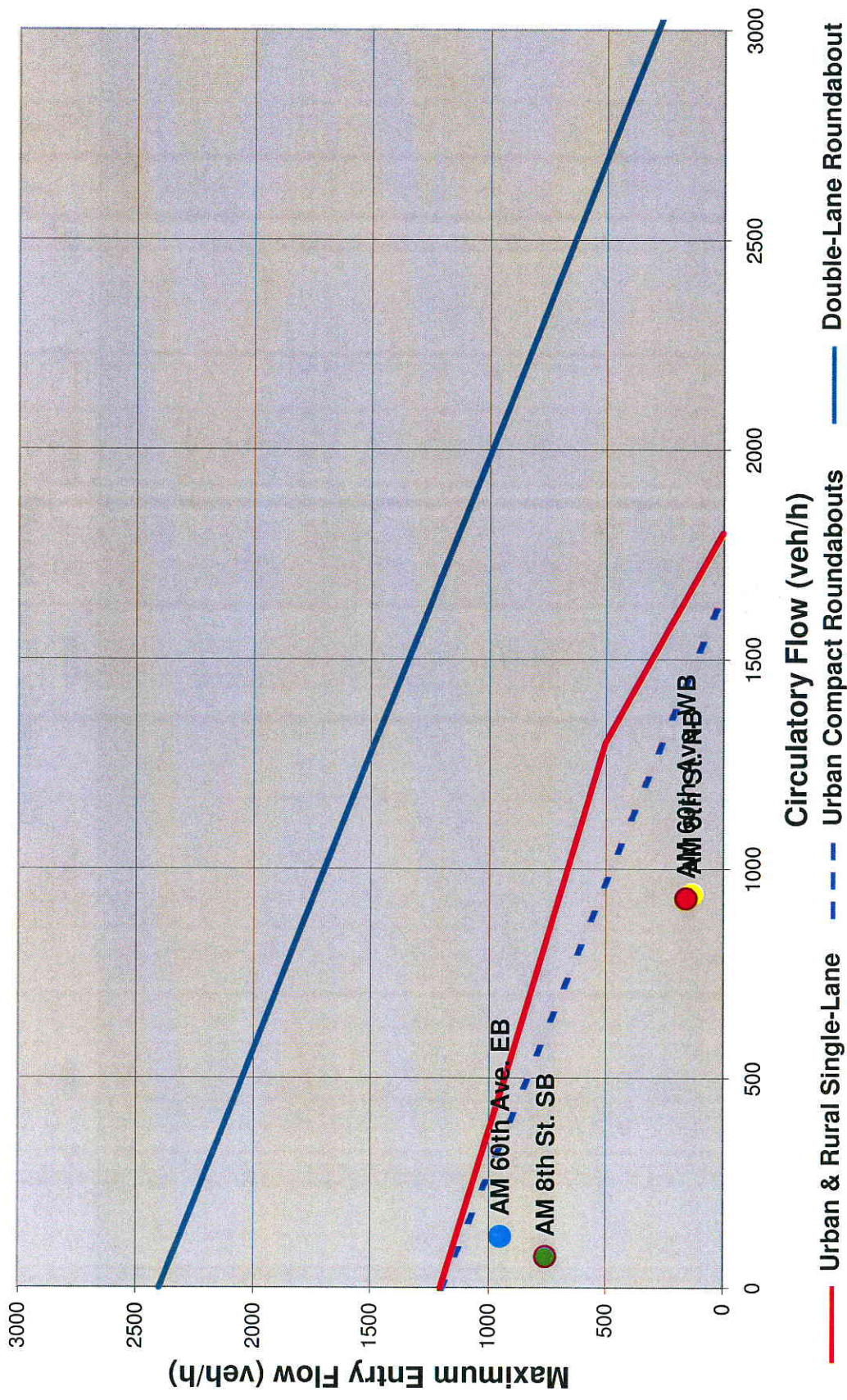
8th Street and 50th Avenue AM



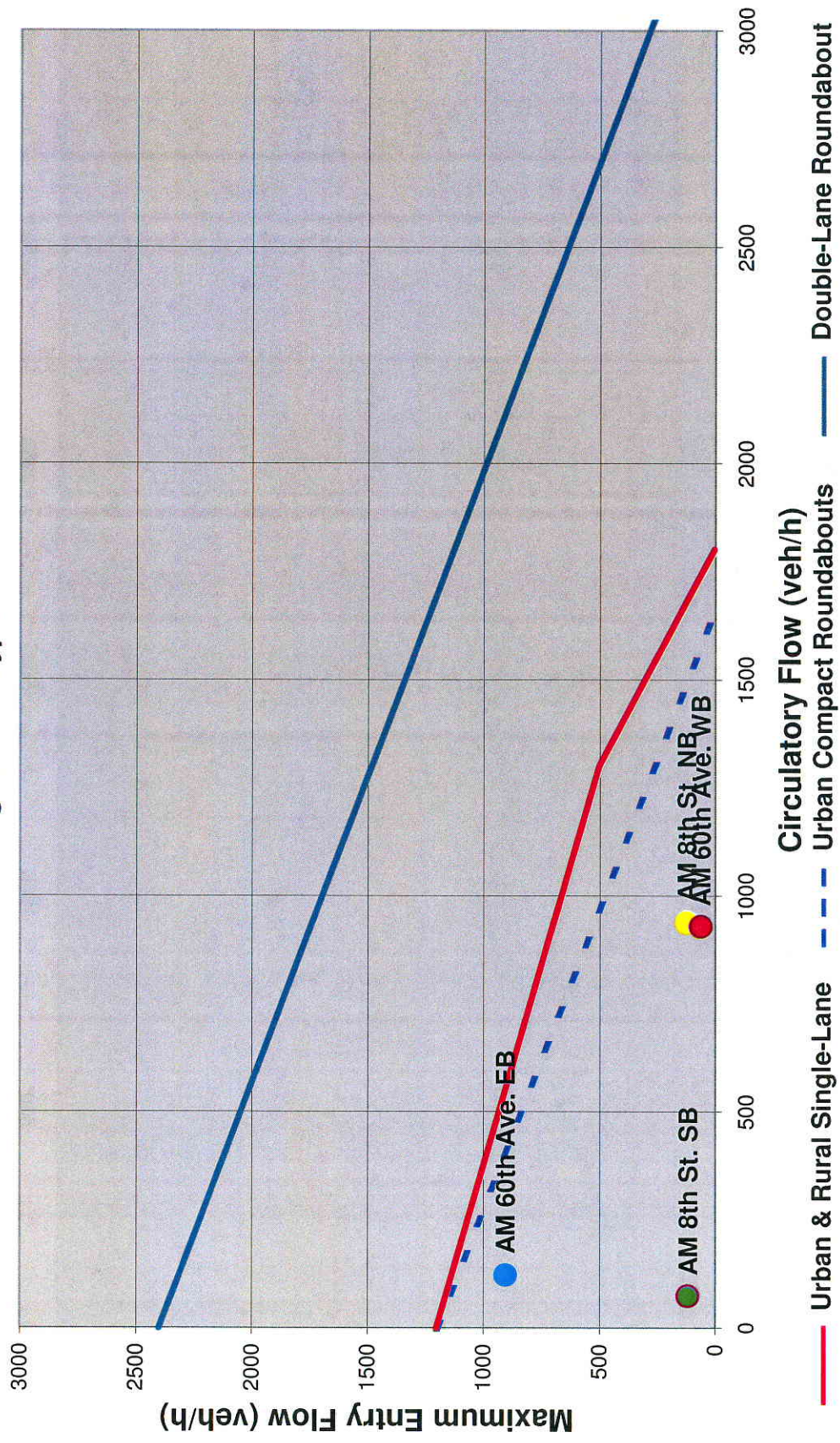
8th Street and 50th Avenue AM Right Turn Bypass



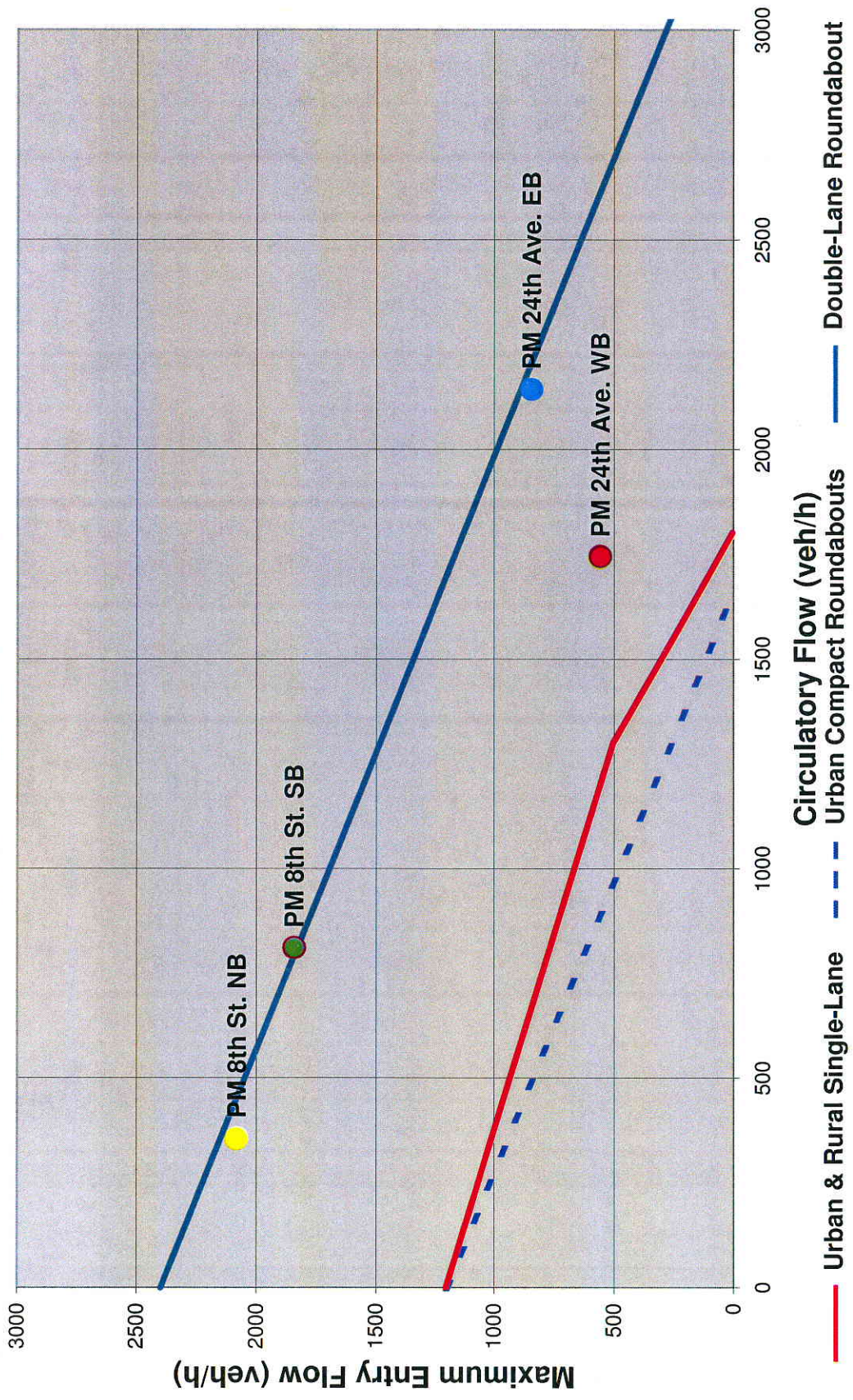
8th Street and 60th Avenue AM



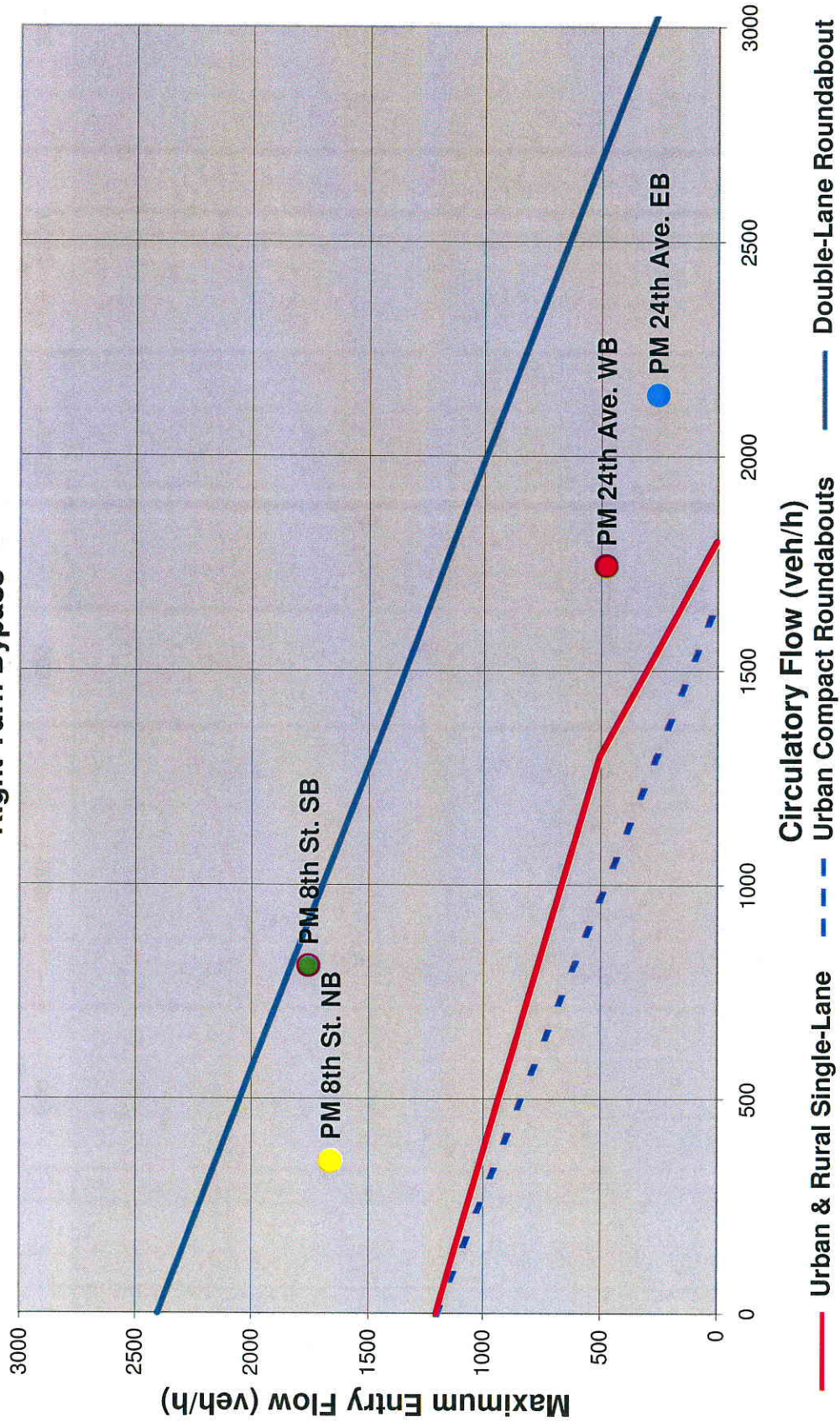
8th Street and 60th Avenue AM Right Turn Bypass



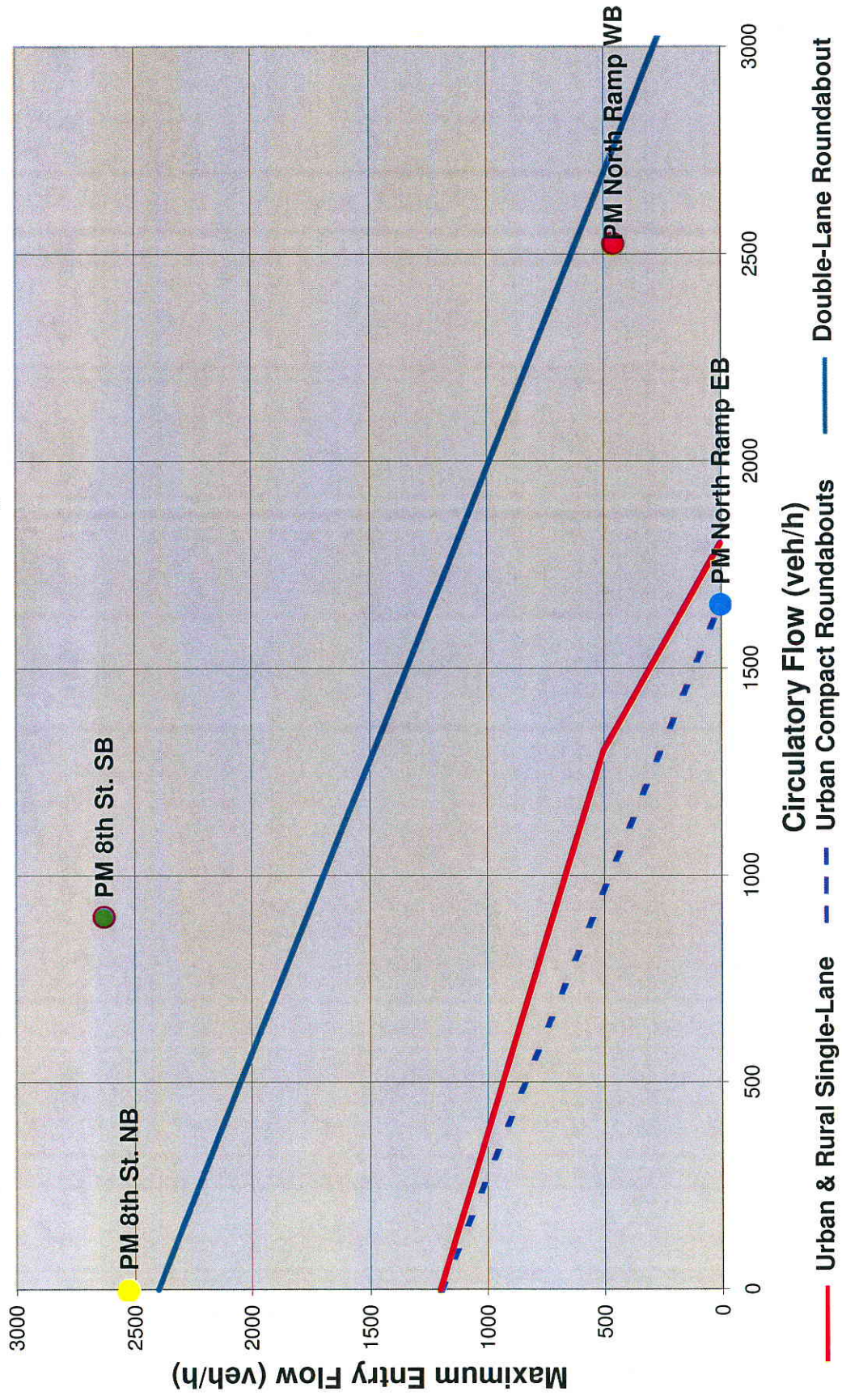
8th Street and 24th Avenue PM



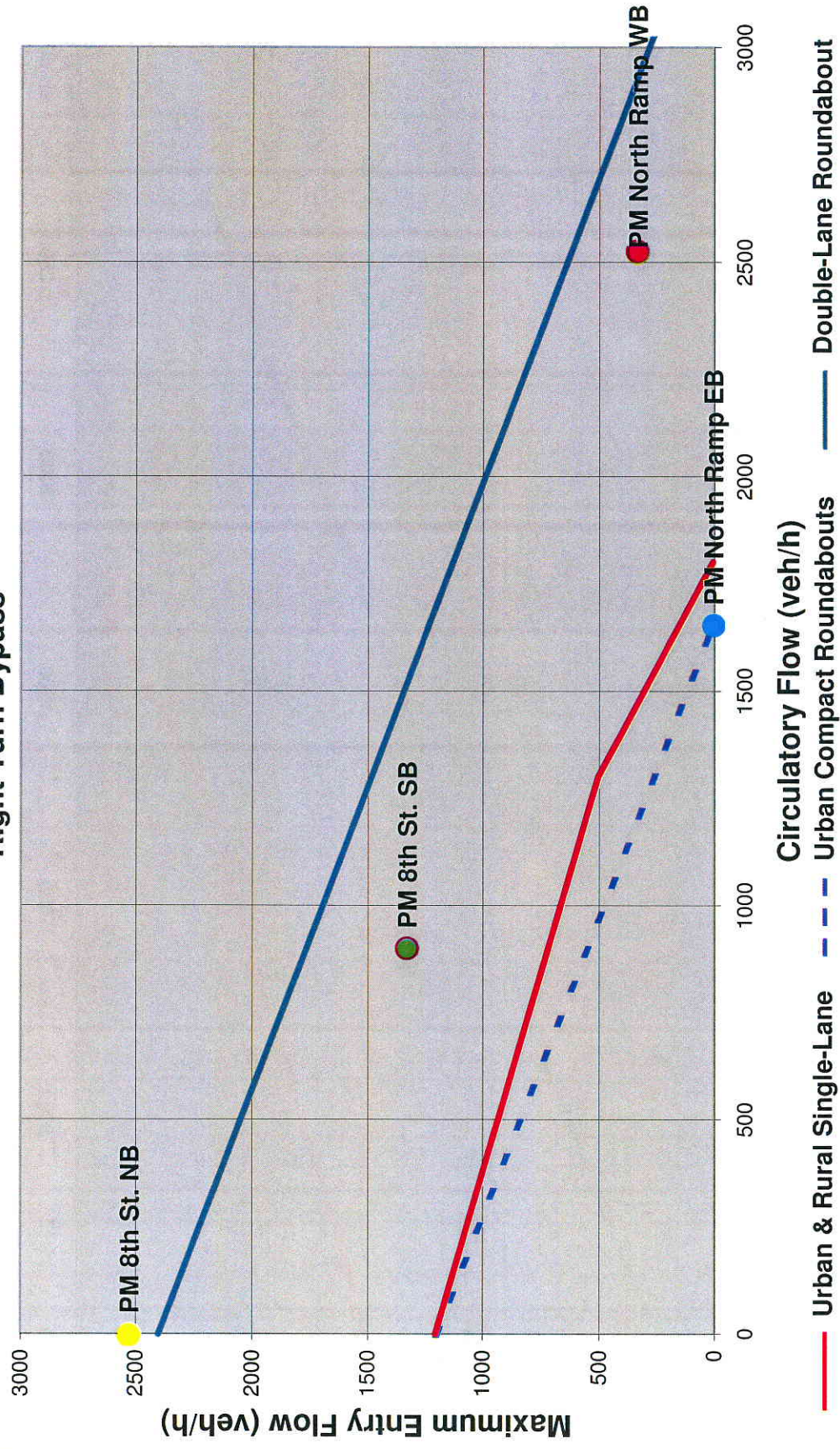
8th Street and 24th Avenue PM Right Turn Bypass



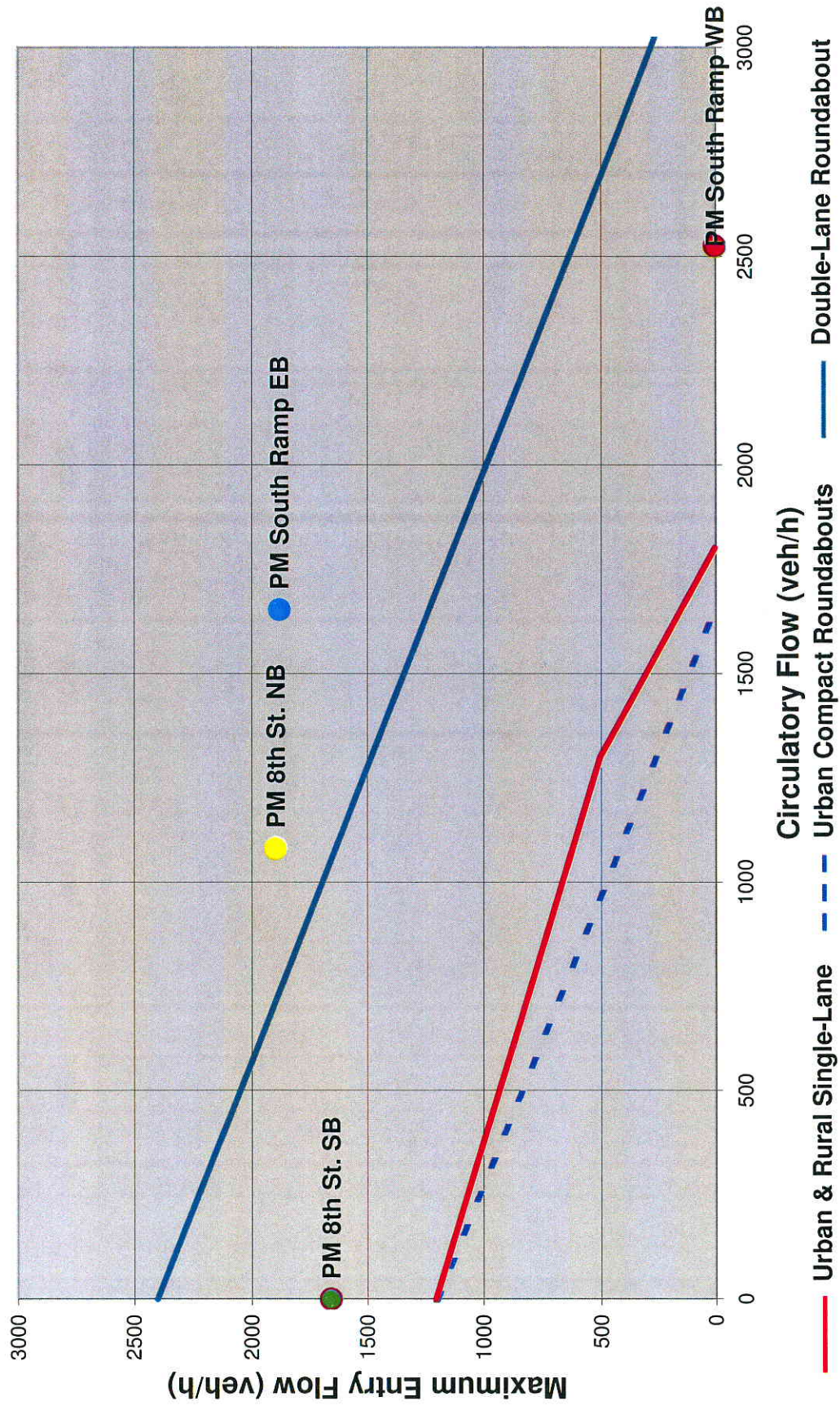
8th Street and I-94 North Ramp PM



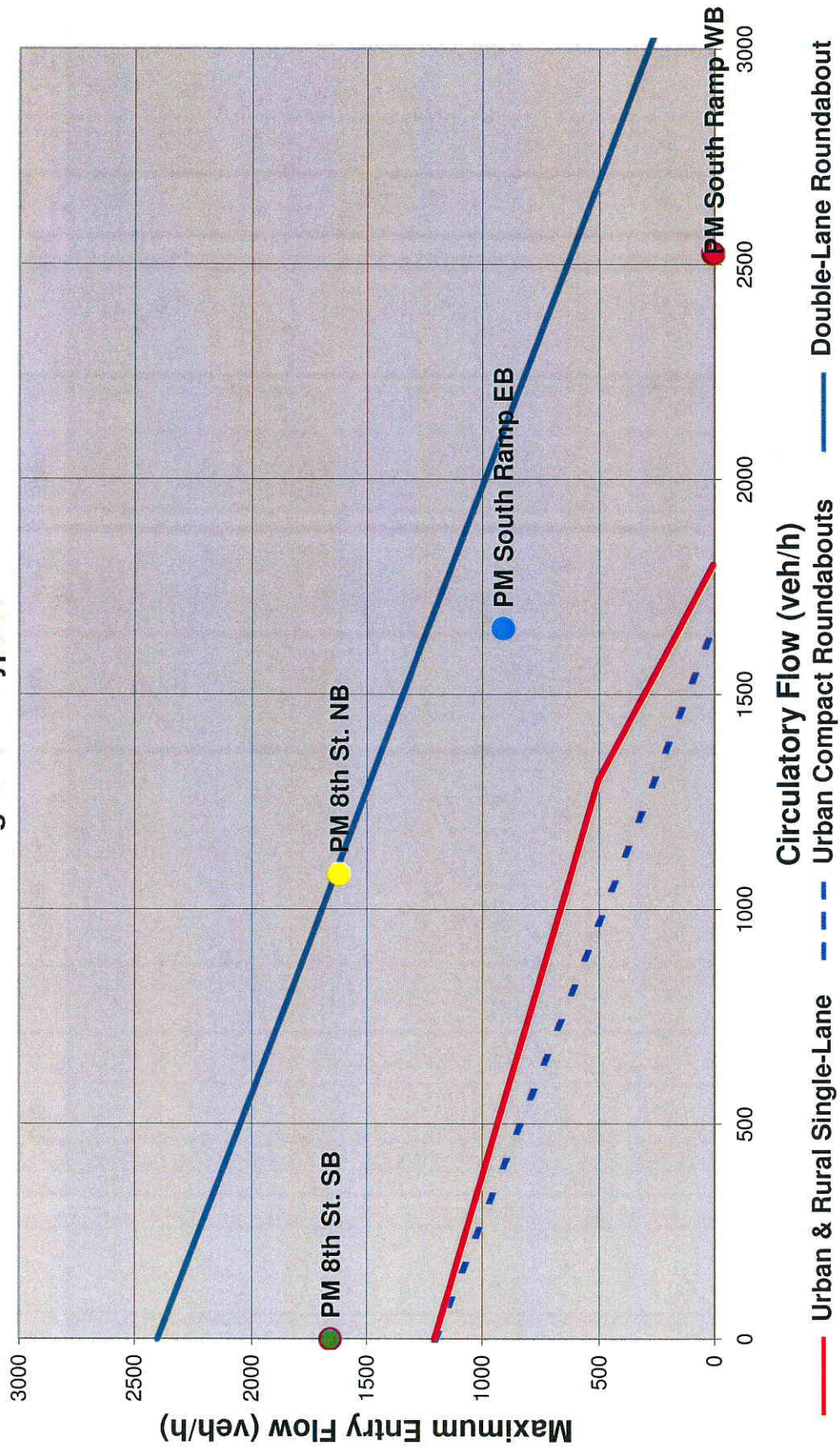
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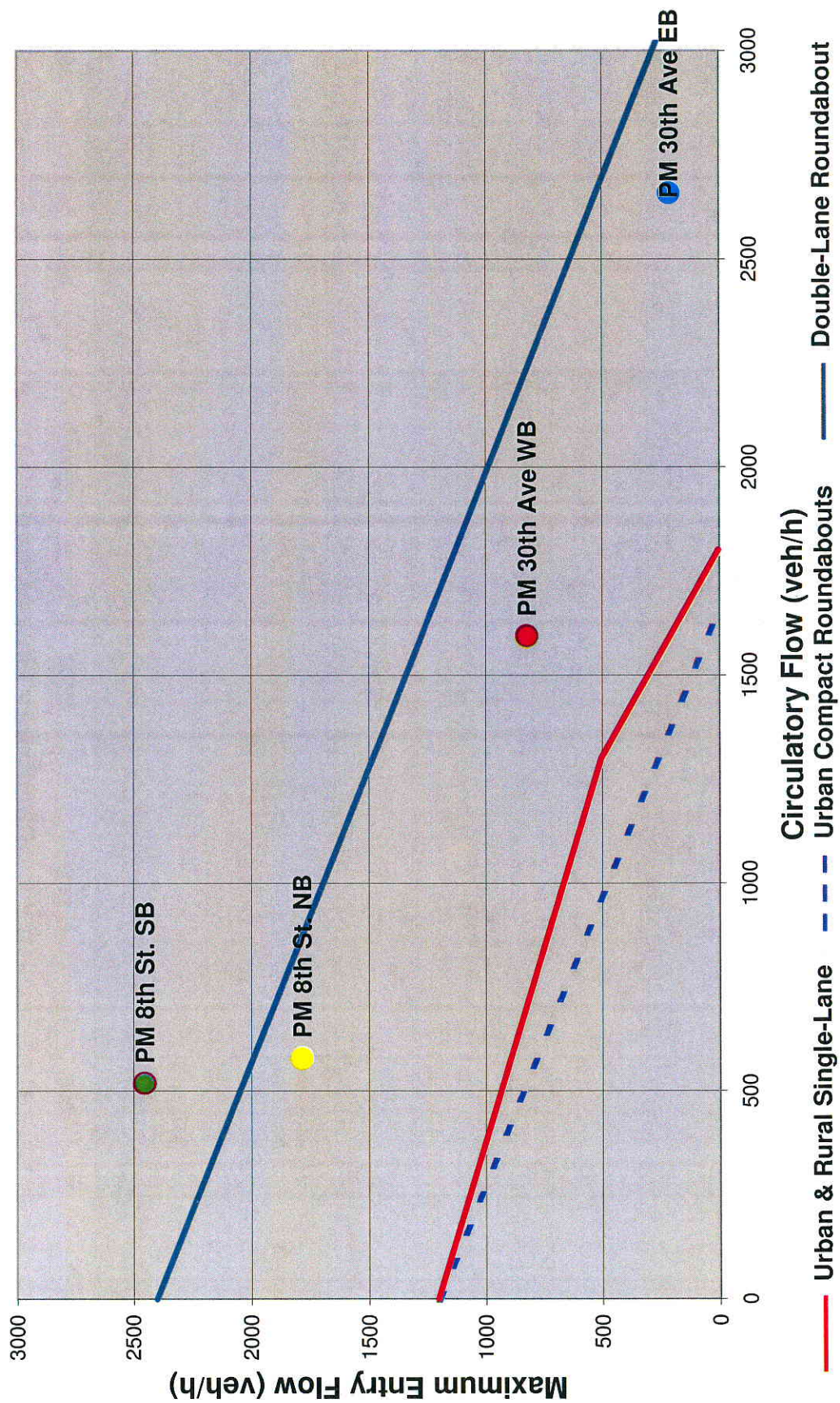
8th Street and I-94 South Ramp PM



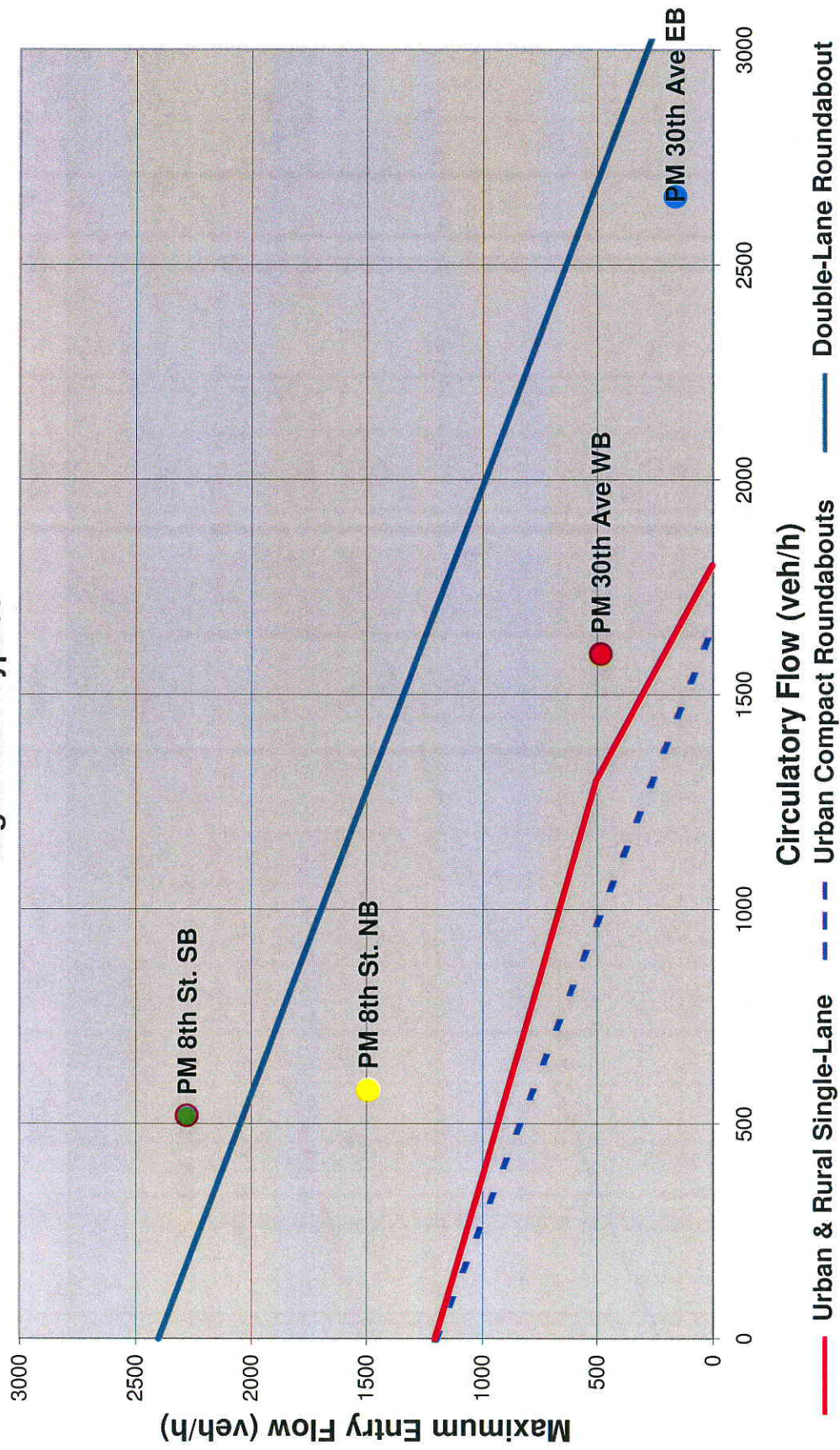
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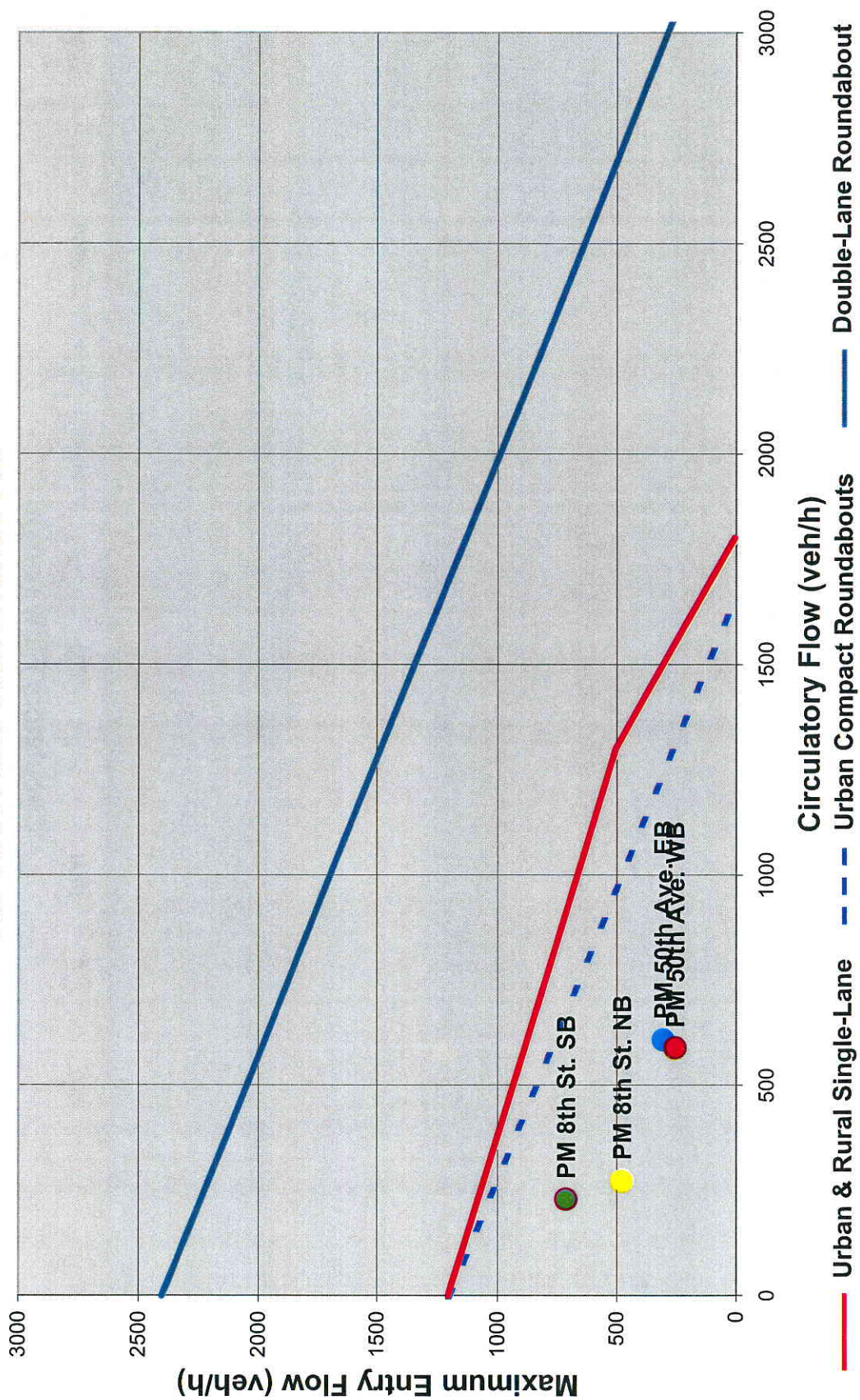
8th Street and 30th Avenue PM



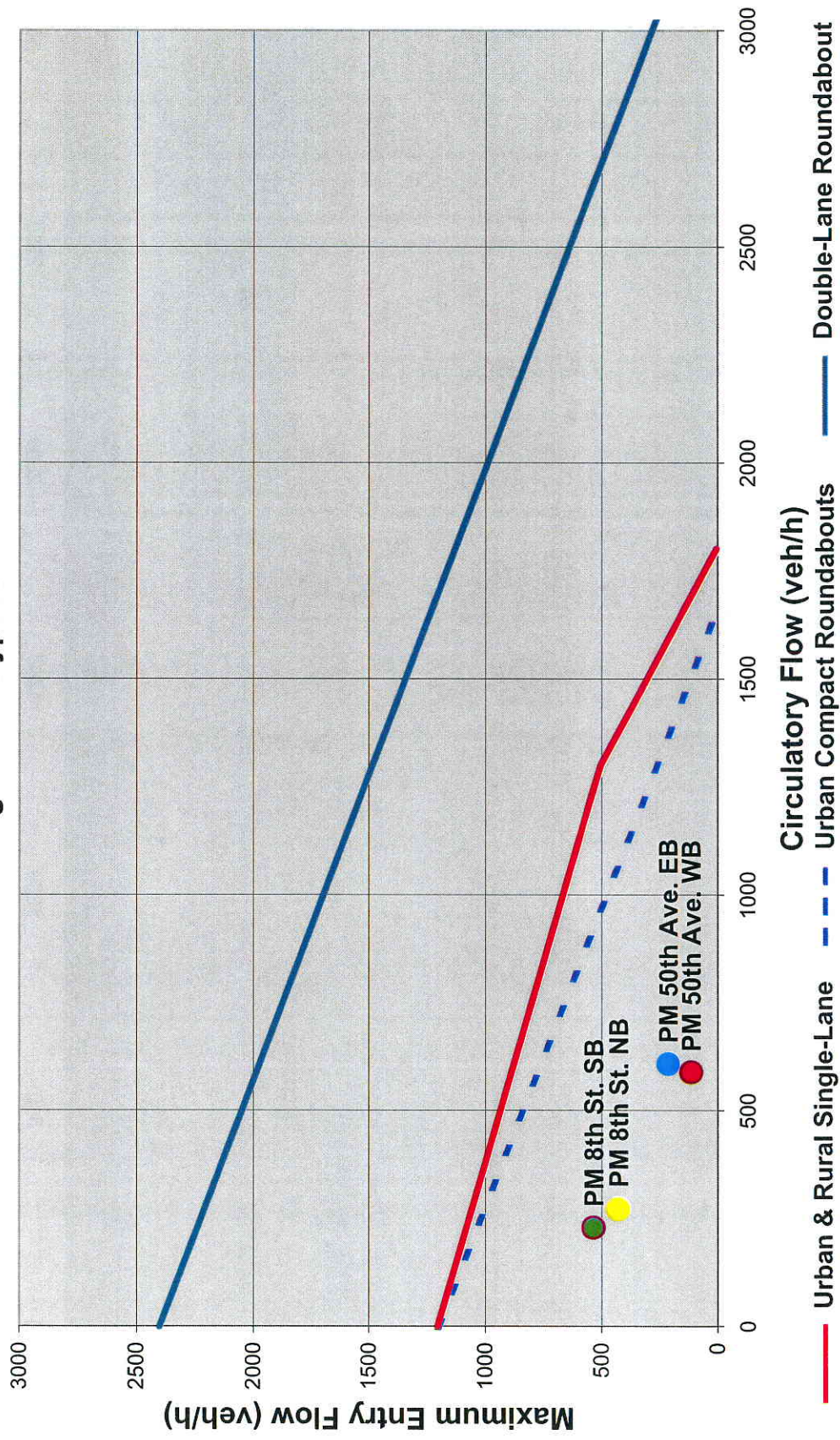
8th Street and 30th Avenue PM Right Turn Bypass



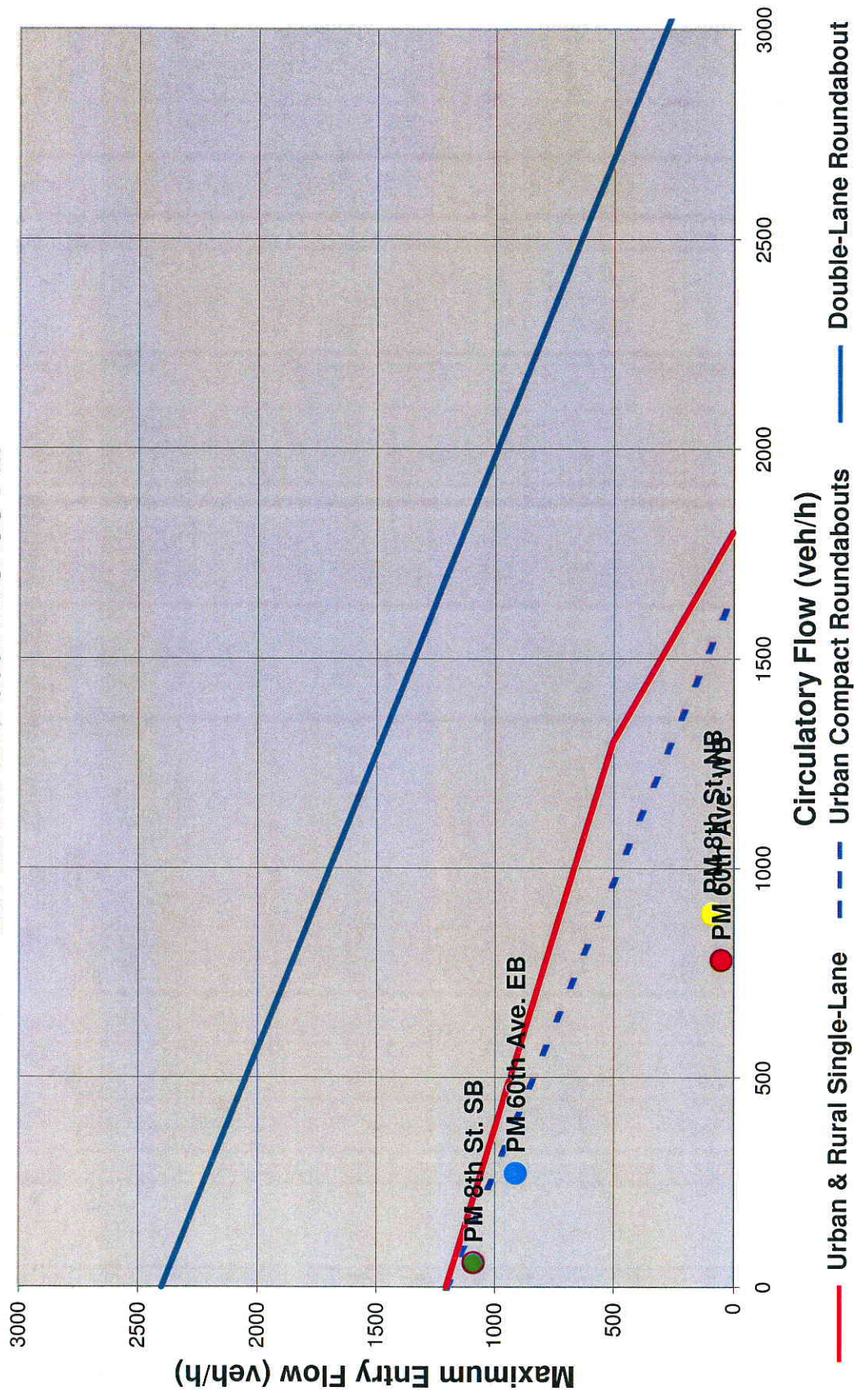
8th Street and 50th Avenue PM



8th Street and 50th Avenue PM Right Turn Bypass



8th Street and 60th Avenue PM



8th Street and 60th Avenue PM Right Turn Bypass

